HOYA CORPORATION OPTICS SECTION

カラーフィルタ ガラス

弊社は、紫外域から赤外域にわたる広範な分光特性をもったカラーフイルタガラスを、最高の製造技術と徹底した品質管理のもとに生産し、販売しております。

これらのカラーフイルタガラスは、カメラ・光学機器、理・化学用、教材用、エレクトロニクス用、オプトエレクトロニクス用、医療用、光学関連産業用、などあらゆるハイテク産業分野に使用され、好評をいただいております。

このカタログは、新しく開発したガラスタイプを含めて、分光特性及びその他の重要な特性を掲載し、実践的な技術情報を提供する目的で編集しました。

一層のご愛顧をお願い申し上げます。

2020年10月

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UVフィルター（UVシリーズ）
青フィルター
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1. カラーフィルタガラスの種類

シャープカットフィルター		透過限界波長	産業用
	L37	370 nm	
	L38	380 nm	
	L39	390 nm	
	L42	420 nm	
	Y44	440 nm	
	Y48	480 nm	
	Y50	500 nm	
	Y52	520 nm	
	O54	540 nm	
	O56	560 nm	
	O58	580 nm	
	R60	600 nm	
	R62	620 nm	
	R64	640 nm	
	R66	660 nm	
赤外透過フィルター	R70	700 nm	監視カメラ、その他
	R72	720 nm	
	IR76N	760 nm	
	IR80N	800 nm	
	IR83N	830 nm	
	IR85N	850 nm	
	RM90	900 nm	
	RM100	1200 nm	
		最高透過率の波長	
	RT830	830 nm	
シャープカットフィルター (W シリーズ)		λτ0.5	産業用
		(τが 0.5 になる波長)	
	W-L420	420 nm	
	W-Y435	435 nm	
	W-Y455	455 nm	
	W-Y475	475 nm	
	W-Y495	495 nm	
	W-Y515	515 nm	
	W-O530	530 nm	
	W-O550	550 nm	
	W-O570	570 nm	
	W-O590	590 nm	
	W-R610	610 nm	
	W-R630	630 nm	
	W-R645	645 nm	
	W-R665	665 nm	
	W-R695	695 nm	
	W-R715	715 nm	
	W-IR760	760 nm	
	W-IR780	780 nm	
	W-IR800	800 nm	
	W-IR830	830 nm	
	W-IR850	850 nm	
UVフィルター	UV28N	280 nm	
	UV30N	300 nm	
	UV32N	320 nm	
	UV34N	340 nm	
	UV36N	360 nm	
青フィルター		最高透過率の波長	
	B370	370 nm	
	E-B390	390 nm	
	B410	410 nm	
	B440	440 nm	
	B460	460 nm	
緑フィルター			
	G530	530 nm	
	G533	533 nm	
	G545	545 nm	
	G550	550 nm	

色温度変換フィルター		色温度変換能力	色温度変換
	LA20	20	
	LA40	40	
	E-LA80	80	
	E-LA100	100	
	E-LA120	120	
	E-LA140	140	
	E-LA200	200	
	LB20	-20	
	LB40	-40	
	LB80	-80	
	LB100	-100	
	LB120	-120	
	LB140	-140	
	LB200	-200	
近赤外吸収フィルター (色補正フィルター)		近赤外吸収フィルター	画像系 / 色補正
	C500S		
	C5000		
	CD700		
	CM700		
ニュートラルデンシティフィルター		減光フイルター	産業用 / 画像系
	ND0		
	ND0.1		
	ND0.3		
	ND1		
	ND3		
	ND5		
	ND10		
	ND13		
	ND15		
	ND20		
	ND25		
	ND30		
	ND40		
	ND50		
	ND60		
	ND70		
	ND80		
ニュートラルデンシティフィルター (W-NDシリーズ)		減光フイルター	産業用 / 画像系
	W-ND9		
	W-ND3		
	W-ND4		
	W-ND5		
	W-ND11		
熱線吸収フィルター		熱線吸収	産業用
	HA5		
	HA15		
	HA30		
	HA50		
紫外透過・可視吸収フィルター		バンドパス	産業用
	U330		
	U340		
	U360		
	UL254S		
	UL365S		
波長校正フィルター			産業用
	V10		
	V11		
	HY1		

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2. カラーフィルタガラスの諸性質

2.1 光学的性質

2.1.1 透過率

このカタログでは、透過率と(T)と、内部透過率(τ)の2種類の透過率を表示しております。
この2種類の透過率の関係は以下のように表すことができます。
透過率(T(λ))=P(λ)τ(λ)

P(λ)：波長(λ)における反射係数

$$P(\lambda)=\frac{2n(\lambda)}{(n(\lambda)^2+1)}$$

n(λ)：波長λにおける屈折率

本カタログでは400nm から1000nm までの範囲で、100nm 間隔の屈折率を記載しており、その間の任意の波長の屈折率は最小自乗法などの方法で容易に計算し求めることができます。
その屈折率から内部透過率を計算しております。

内部透過率は肉厚を変化させたときの透過率を予測するために重要です。異なる肉厚の内部透過率は以下の式から求めることができます。

$$\tau 2(\lambda)=\tau 1(\lambda)^{\frac{t2}{t1}}$$

τ1(λ)：フィルタの肉厚 (τ1) で波長 (λ)における内部透過率
τ2(λ)：フィルタの肉厚 (τ2) で波長 (λ)における内部透過率

内部透過率は簡単に透過率に換算することができますから肉厚が異なる場合の分光透過率特性を簡易的に知ることができます。
・計算によって予測した透過率は様々な要因で誤差を含みます。
肉厚を変化させた場合の正確な透過率を得るには実際に肉厚を変化させて測定することが必要です。

本カタログでは「Catalog Thickness」として標準肉厚を示しておりそのときの透過率特性を表記しております。
肉厚が異なると特性値も変わります。
また、カタログで示しております透過率特性値は製造ロットの代表値であります。
・カタログでは200nmから1200nmまでの透過率と200nmから5000nmまでの透過率カーブを示してあります。
・1300nm以降の値は参考値です。

2.1.2 光学濃度(OD)

カラーフィルタガラスの特性を光学濃度で表すことがあります。光学濃度と透過率との関係は、次式で示されます。

$$D(\lambda)=\log\left(\frac{1}{\tau(\lambda)}\right)$$

2.1.3 色度座標

色度座標はJIS Z8701(1999)及びJIS Z8722(2009)によって求めております。
光源はJIS Z8720(2012)に基づき、A,C,D65の標準の光及び補助標準の光を用いています。
上記規格はISO/CIE10526:1991,ISO/CIE10527:1991及びCIE15:2004,CIE63:1984に準拠しております。
色度図には標準光源A,D65及び補助標準光源Cにおける代表的な硝種について示しております。
・本カタログの色度座標は2度視野のものです。

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2.1.4　屈折率(n)

屈折率は400nmから1000nmまでの屈折率を100nm間隔で小数点以下3桁で示しております。
・本カタログで記載しております屈折率は参考値です。

2.1.5　透過率の温度変化係数(ΔλT)

一般的に温度が上昇すると透過率カーブは長波長側にシフトします。
シャープカットフィルターや赤外透過フィルターについてはシフト量(nm/度)が以下のようになっております。

硝　種	ΔλT
L42/W-L420	0.08
Y44/W-Y435/W-Y455	0.08
Y48/W-Y475/W-Y495	0.10
Y50/W-Y515	0.11
Y52/W-O530	0.13
IR80N/W-IR800	0.20
IR83N/W-IR830	0.22
IR85N/W-IR850	0.23
RM90	0.21
RM100	0.25

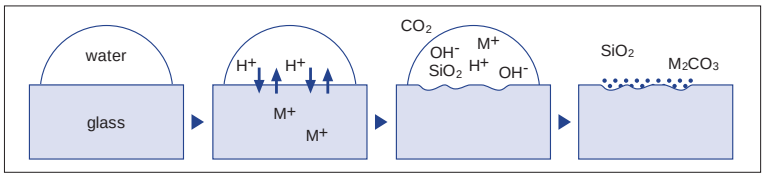
硝　種	ΔλT
O54/W-O550	0.12
O56/W-O570	0.12
O58/W-O590	0.13
R60/W-R610	0.14
R62/W-R630	0.14
R64/W-R645	0.15
R66/W-R665	0.16
R70/W-R715	0.17
R72	0.19
IR76N/W-IR760	0.19

2.2　化学的性質

研磨工程、コーティング工程あるいは保管中にガラス表面に白ヤケや青ヤケが発生することがあります。
これらの現象の傾向を示す尺度として、白ヤケは耐水性、青ヤケは耐酸性によって表示します。

●白ヤケ

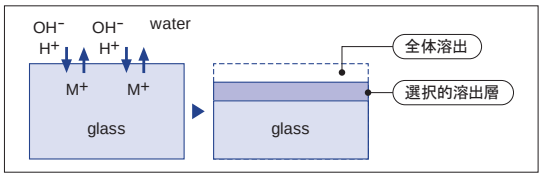
ガラス表面に水滴が付着したり、温度、湿度の急激な変化によって空気中の水分が、ガラス表面に露結した場合に、ガラス中の可溶性成分と水が反応し、ガラス表面が侵食されて荒らされたり、水の蒸発後の溶出成分や溶出成分と空気中のガス(たとえばCO_2)との反応生成物が析出して、表面が白く曇って見えることがあります。この現象が白ヤケです。



白ヤケ発生の難易度は、粉末法耐水性(Dw)により評価できます。

●青ヤケ

研磨された光学ガラスの表面が水分、酸などによって侵されて表面に干渉色の反射光が見えるようになることがあります。この現象が青ヤケです。
ガラスが水や酸と接触すると、化学反応(ガラス中の陽イオンと水中のヒドロニウムイオンとのイオン交換反応)を起こし、表面に母体ガラスよりも屈折率の低い薄層が生じて、干渉色を呈するようになるからです。



青ヤケ発生の難易度は、粉末法耐酸性(DA)や表面法耐青ヤケ値(TBlue)により評価できます。

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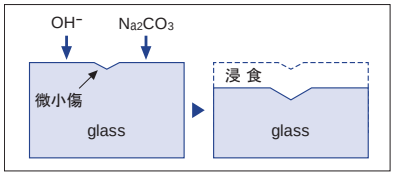
●潜傷

研磨工程でガラス表面に生じた微少傷が、洗浄工程で、特に洗剤溶液中に含まれている無機ビルダーによって表面が侵食を受け、肉眼でも見える程度にまで成長することがあります。この現象が潜傷です。



無機ビルダー溶液中での侵食には、Na_2CO_3などのビルダーが加水分解して水酸イオンを生じ、これがガラスを侵食する場合と、重合リン酸塩ビルダーのように加水分解した重合リン酸イオンがガラスを侵食する場合があります。

2.2.1 耐水性(Dw)

比重に相当する質量の粉末ガラス(粒度425～600μm)を白金かごに入れ、それを純水(pH=6.5～7.5)80mlの入った石英ガラス製丸底フラスコ内に浸漬し、沸騰水浴中で60分間処理し、その減量率(%)によって以下の級に分類してあります。

級	重量減（%）
1	<0.05
2	≧ 0.05 to < 0.10
3	≧ 0.10 to < 0.25
4	≧ 0.25 to < 0.60
5	≧ 0.60 to < 1.10
6	≧ 1.10

2.2.2 耐酸性(DA)

DWの測定方法と同様に、フラスコ内に0.01mol / l 硝酸水溶液を入れて処理し、その減量率(%) によって以下の級に分類してあります。

級	重量減（%）
1	<0.2
2	≧ 0.2 to < 0.35
3	≧ 0.35 to < 0.65
4	≧ 0.65 to < 1.20
5	≧ 1.20 to < 2.20
6	≧ 2.20

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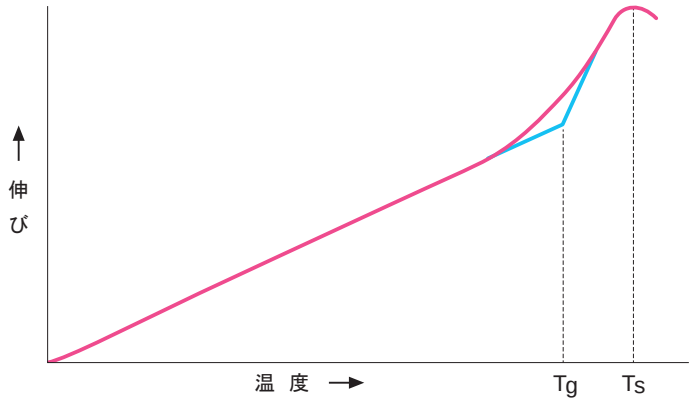
2.3　熱的性質

2.3.1　転移点(Tg)

ガラスが“ガラス状態”(低温側)から“過冷却液体状態”(高温側)に転移する温度を転移点(Tg)といいます。
炉内温度分布が±1°C の示差熱膨張計を用い、十分にアニールされた試料を毎分4°C の一定速度で加熱したときに得られる温度と試料の伸びの関係を示す熱膨張曲線において応する温度を転移点としてあります。
当社では高温側の直線は傾き(微分値)が最大となる温度で、また低温側の直線はTgより100°C 低い温度で求めています。転移点の単位は°C で表示しています。
この温度は、約1013～1014dPa•sの粘度に相当する温度とみなされており、アニールを行う際の保持温度の目安となります。
また、コーティング時の温度管理の指標となります。
注 1dPa•s = 1poise



熱膨張曲線

2.3.2　屈服点(Ts)

熱膨張曲線において、見掛け上、膨張が停止する温度を屈伏点(Ts)として表示してあります。約1010～1011dPa•sの粘度に相当する温度とみなされています。
この現象は、ガラスの本質的な熱膨張特性を示すものではなく、ガラス試料に加わる荷重とガラス試料の自重とによる変形で生じたものです。

2.3.3　平均線膨張係数(α)

常温域(-30°C～70°C)と高温域(100°C～300°C)の平均線膨張係数をそれぞれαn, αhの記号で10^{-7}/ K の単位で表示してあります。
常温域は干渉膨張計を用い、高温域は示差熱膨張計を用いて測定してあります。
平均線膨張係数αn, αhは次式により求めてあります。

$$\alpha_n = \frac{dL_n}{L \times dT_n}$$

ここで、dTn は-30～70°C の温度差(K)、L は試料の初期長さ(mm)、dLn は-30～70°C の温度範囲における試料長さの変化量(mm)です。

$$\alpha_h = \frac{dL_h}{L \times dT_h}$$

ここで、dTh は100～300°C の温度差(K)、L は試料の初期長さ(mm)、dLnは100～300°C の温度範囲における試料長さの変化量(mm)です。

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2.4　機械的性質

2.4.1　ヌープ硬さ(H_K)

平面研磨されたガラス面に、対稜角が172°30' 及び130° の横断面が菱形のダイヤモンド四角錐圧子に0.9807Nの荷重を15秒間かけてくぼみを付け、生じた永久くぼみの長い方の対角線の長さを測定して、次式によりヌープ硬さを求めてあります。

$$H_k = 1.451 \times \frac{F}{l^2}$$

ここで、Fは荷重(N)、lはくぼみの長い方の対角線の長さ(mm)です。
注1) ヌープ硬さの単位は、MPa または N / mm^2 となりますが、慣例にしたがい省いてあります。
注2) SI 単位を用いた上記の計算式により得られるH_K値は、従来のkgf単位を用いた算式により得られるHK値に等しくなっております。
注3) $1N = 1.01972 \times 10^{-1} kgf$
注4) 測定値を下表により分類した級とを表示してあります。

級	ヌープ硬さ
1	<150
2	≧ 150 to < 250
3	≧ 250 to < 350
4	≧ 350 to < 450
5	≧ 450 to < 550
6	≧ 550 to < 650
7	≧ 650

2.4.2　摩耗度(FA)

測定面積が9cm^2の試料を、水平に毎分60回転する鋳鉄製平面皿の中心より80mmの定位置に保持し、平均粒径20μmのアルミナ砥粒10gに水20mlを添加したラップ液を5分間一様に供給し、9.807Nの荷重をかけてラップします。ラップ前後の試料質量を秤量して摩耗質量mを求めます。
同様にして、日本光学硝子工業会で指定された標準試料(BSC7)の摩耗質量moを測定して、次式により摩耗度(FA)を算出してあります。

$$F_A = \frac{m/d}{m_0/d_0} \times 100$$

ここで、dは試料の比重、doは標準試料(BSC7)の比重です。
言い換えると、BSC7を100とした時の砂かけ磨耗の速さの比となります。

2.5　その他の性質

2.5.1　比重(d)

ガラスの比重は4°Cの純水の密度に対する相対値です。

2.5.2　蛍光

カラーフィルタガラスは特に紫外線を照射すると蛍光を発することがあります。
特に可視域のシャープカットフィルターは蛍光を発します。

2.5.3　環境影響物質

カラーフィルタガラスは、一部の種類で、RoHS指令で指定されている有害物質を含有するものがありますが、除外項目リスト(Exemption List AnnexⅢ)により、適用を除外されています。
次項の表に指定有害物質の含有情報を示します。より詳細な情報につきましては担当営業にご確認ください。

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硝種別特定有害物質含有情報

硝　種	As2O3	CdO	PbO	Cr2O3
L37			○	
L38			○	
L39			○	
L42		○		
Y44		○		
Y46		○		
Y48		○		
R64		○		
R66		○		
R68		○		
R70		○		
R72		○		
IR76N		○		
IR80N		○		
IR83N		○		
IR85N		○		
RM90			○	○(*1)
RM100			○	○(*1)
RT830		○		
W-L420		○		
W-Y435		○		
W-Y455		○		
W-Y475		○		
W-Y495		○		
W-Y515		○		
W-O530		○		
W-O550		○		
W-O570		○		
W-O590		○		
W-R610		○		
W-R630		○		
W-R645		○		
W-R665		○		
W-R695		○		
W-R715		○		
W-IR760		○		
W-IR780		○		
W-IR800		○		
W-IR830		○		
W-IR850		○		

硝　種	As2O3	CdO	PbO	Cr2O3
U350	○		○	
U360	○		○	
B370	○		○	
B440			○	
B460	○		○	
G530	○		○	○(*1)
G533	○		○	○(*1)
G545	○		○	○(*1)
G550	○		○	○(*1)
LA20	○		○	
LA40	○		○	
LB20	○		○	
LB40	○		○	
LB60	○		○	
LB80	○		○	
LB100	○		○	
LB120	○			
LB140	○			
LB200	○			
V10	○			

*1 Hexavalent chromium of several ppm - about 100 ppm exists on the manufacture melted at high temperature (analytical value).

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3. カラーフィルタガラスの品質

弊社の製品の最大の特徴は選択透過、選択吸収を実現する方法が蒸着タイプと異なりガラスの「内部吸収」で行っていることです。
蒸着タイプは不要な波長の光を「反射」しますが光学系において、この光が悪影響の原因となる場合があります。
このような場合、弊社の「内部吸収」タイプは高精度な光学系に最適です。また、管理する品質基準は世界標準であります、ISO10110に基づき運用・管理しております。

3.1 分光特性

本カタログの分光透過率は代表値です。
溶解ロットごとの特性は、仕様内で変動しますが、ロット内の変動は極めて小さいです。

3.2 光学定数

本カタログに記載されている吸収係数と屈折率は参考値でありますがコーティング時に必要なデータとして記載しております。

3.3 肉厚

本カタログに示されている肉厚は標準肉厚であります。肉厚をある程度自由に選択することは可能ですが光学特性が変化することを考慮してください。

3.4 外観及び内部品質

カラーフィルタガラスは光学ガラス同様の品質を目標に製造されておりますが溶解方法の違いにより品質基準は異なります。
熔解に際して小さな泡及び細かい脈理の全部を除去することが困難であり、使用上差支えない程度に残存することがあります。

3.4.1 研磨製品

ISO10110-3に基づき、要求品質に応じた製品を提供します。

3.4.2 スライス製品

素材から切り出した半製品です。
素材100ml当たりの、泡・異物断面積の総和により、以下のクラスに分類されます。

Classes of Bubbles and Inclusions	
Bubble class	**Total cross sectional area per 100ml of glass (mm2)**
0	<0.03
1	≧ 0.03 - < 0.10
2	≧ 0.10 - < 0.25
3	≧ 0.25 - < 0.50
4	≧ 0.50

3.5 研磨精度

研磨加工精度はご要望と用途に応じます。

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4.　カラーフィルタガラスの製品仕様

4.1　研磨製品

必要な形状に加工し、研磨した製品です。

4.2　スライス製品

素材から切り出した製品です。

4.3　コーティング製品

弊社ではコーティング製品を取り扱っております。
反射防止膜(コーティング)にはヤケを防止する効果があります。
弊社はお客様のご要求に応じ蒸着タイプのフィルターについても選択可能です。

4.4　強化ガラス製品

強化には化学強化と熱強化があります。
用途及びガラス組成に応じた対応が可能です。
いずれの強化もガラス内に応力が発生し、透過波面に影響が出る場合があります。

4.5　特殊用途製品

その他、カタログに記載されていない製品についても対応可能な場合もございますので担当営業までご連絡ください。

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5.　保存と取り扱い

カラーフィルタガラスは温度や湿度、太陽光の直下などの条件で著しい影響を受けることがあります。特に長期保存の場合は白ヤケや青ヤケ、紫外線によってはソラリゼーションによって透過率の低下が発生することがあります。
数ヶ月に及ぶ保存の場合は使用前に確認されることを推奨します。
保管時の推奨条件は湿度は50%以下、温度は25度±5度以内です。合わせて暗室での保管をお願いします。
また、冬期の室外と室内のような急激な温度差を与えますと表面に結露が発生する場合があります。
光学系に組み込んだ際には特にご注意願います。

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6.　注文及び問い合わせ

ご注文の際は次の項目についてお知らせください。
寸法及び肉厚、公差（可能な限り図面をご提示ください）、数量、納期など
なお掲載されている光学特性、データは改良のため予告無しに変更する場合がありますのでご了承ください。

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Explanation as to Data Tables

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Transmittance (T) or Internal Transmittance(τ)

Thickness	mm

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T or τ																				
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T or τ																				
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T or τ																				
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T or τ																				
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T or τ																				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n							
K							
P							

Classes of Bubbles and Inclusions

Bubble Class

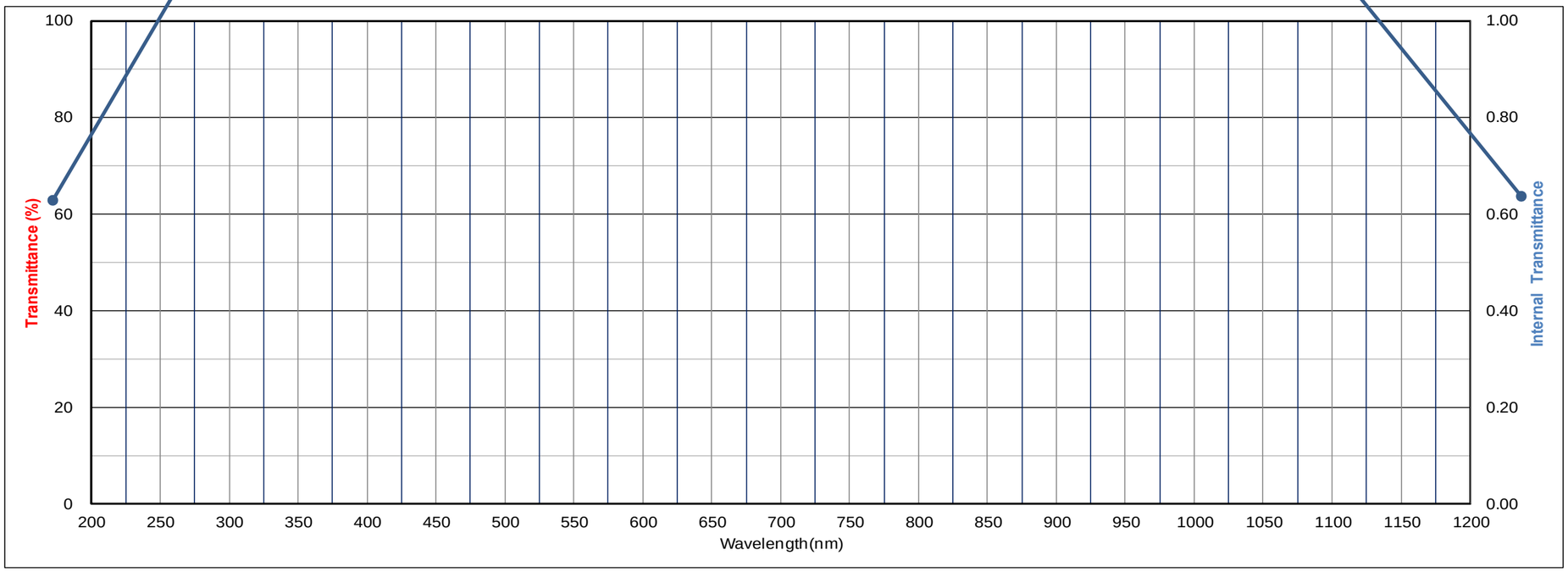
Color Specification

	x	y	Y	λ_d	P_e
A					
C					
D65					

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d

Tolerance of Transmittance (τ)



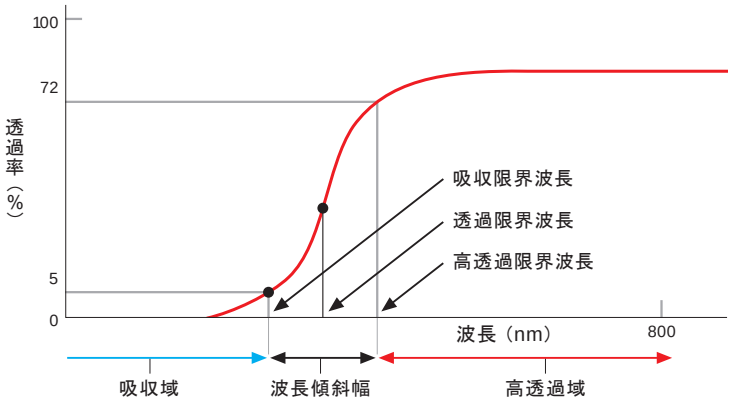
All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

①Glass type
②Thickness stated in this catalog
③Wavelength(nm)
④Transmittance(%) "T"
Transmittance including reflection loss
or
Internal transmittance (-) "τ "
made correction of surface reflection
(for Sharp-cut filter W-series)
⑤Bubble class
⑥Refractive index for each wavelength
⑦Absorption coefficient for each wavelength
⑧Reflection factor for each wavelength
⑨Color specifications based on standard illuminant "A", "C", and "D65"
x,y : Chromaticity coordinates
Y : Tristimulus value
λd: Dominant wavelength
Pe: Excitation purity
⑩Chemical properties
Dw : Water durability
Da : Acid durability
⑪Thermal properties
Tg : Transformation temperature
Ts : Sag temperature
α : Coefficients of liner thermal expansion
⑫Mechanical properties
Hk : Knoop hardness
FA : Abrasion factor
⑬Other properties
d : Specific gravity
⑭Tolerances of transmittance specified for each glass type
⑮Transmittance curve including reflection loss
Red line / Left scale
⑯Internal transmittance curve
Blue line / Right scale

シャープカットフィルター

シャープカットフィルターにはL37からR68まで370nm～680nmの可視域をカバーできる硝種があります。L,Y,O,Rの硝種の頭の記号は透過限界波長の色調を表しています。それぞれColorless,Yellow,Orange,Redとなります。頭文字の二桁の数値がおおよその透過限界波長をしめしています。例えばY48は、透過限界波長が約480nmです。シャープカットフィルターの特徴はカタログに示す透過限界波長以外でも狙って製造することが可能なことです。



波長傾斜幅(Δλ)
透過限界波長(λT)
高透過域の透過率(TH)
吸収域の透過率(TA)

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Thickness 2.50 mm

L37

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	15.8	47.2	68.3	78.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	83.5	85.9	87.0	87.7	88.0	88.2	88.4	88.5	88.5	88.6	88.6	88.7	88.7	88.7	88.8	88.8	88.8	88.9	88.9	88.9
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	88.9	88.9	89.0	88.9	89.0	89.0	89.0	89.1	89.1	89.2	89.1	89.2	89.2	89.2	89.2	89.2	89.2	89.3	89.3	89.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	89.3	89.1	89.2	89.2	89.3	89.3	89.3	89.3	89.4	89.4	89.5	89.6	89.6	89.6	89.7	89.7	89.8	89.8	89.8	89.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	89.8	90.0	90.0	90.0	90.0	90.1	90.0	90.0	90.1	90.0	90.1	90.1	90.2	90.2	90.2	90.2				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.605	1.588	1.580	1.575	1.572	1.570	1.569
P	0.898	0.902	0.904	0.905	0.906	0.906	0.907

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

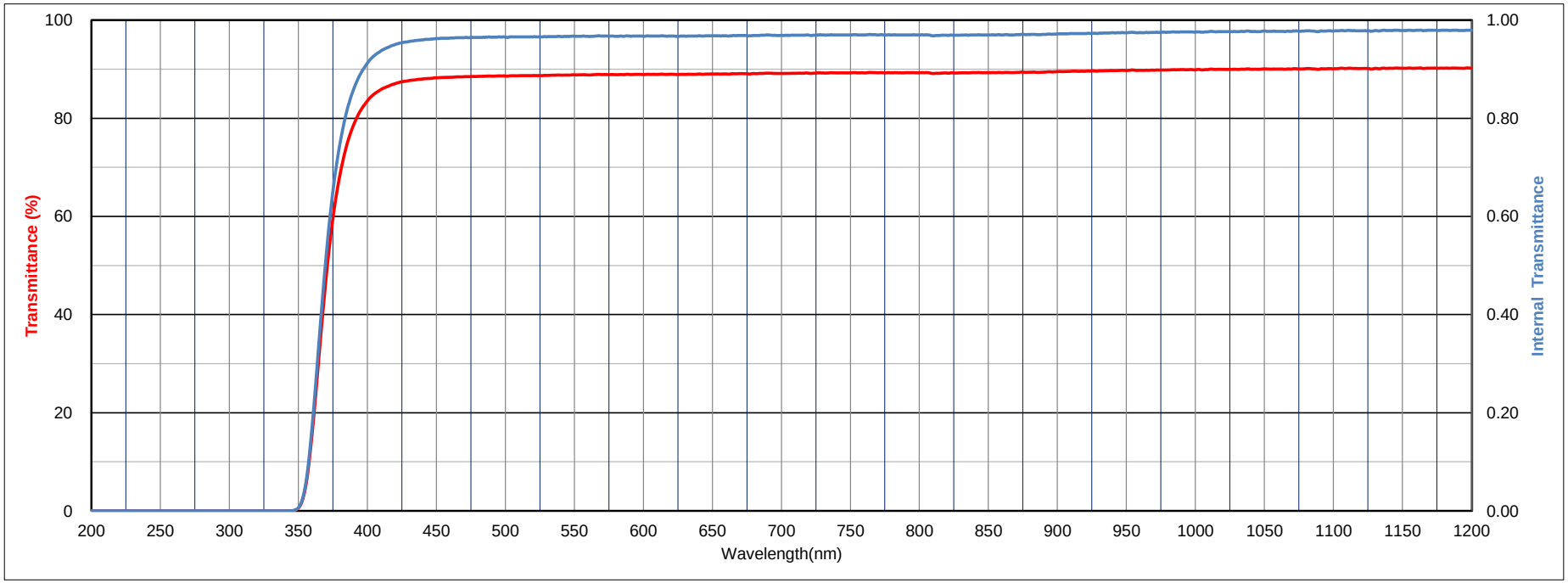
	x	y	Y	λ_d	P_e
A	0.448	0.408	89	583	1
C	0.311	0.317	89	573	0
D65	0.313	0.330	89	572	0

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	440	490	94	103	460	170	3.26

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
370±5	<35	>85



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

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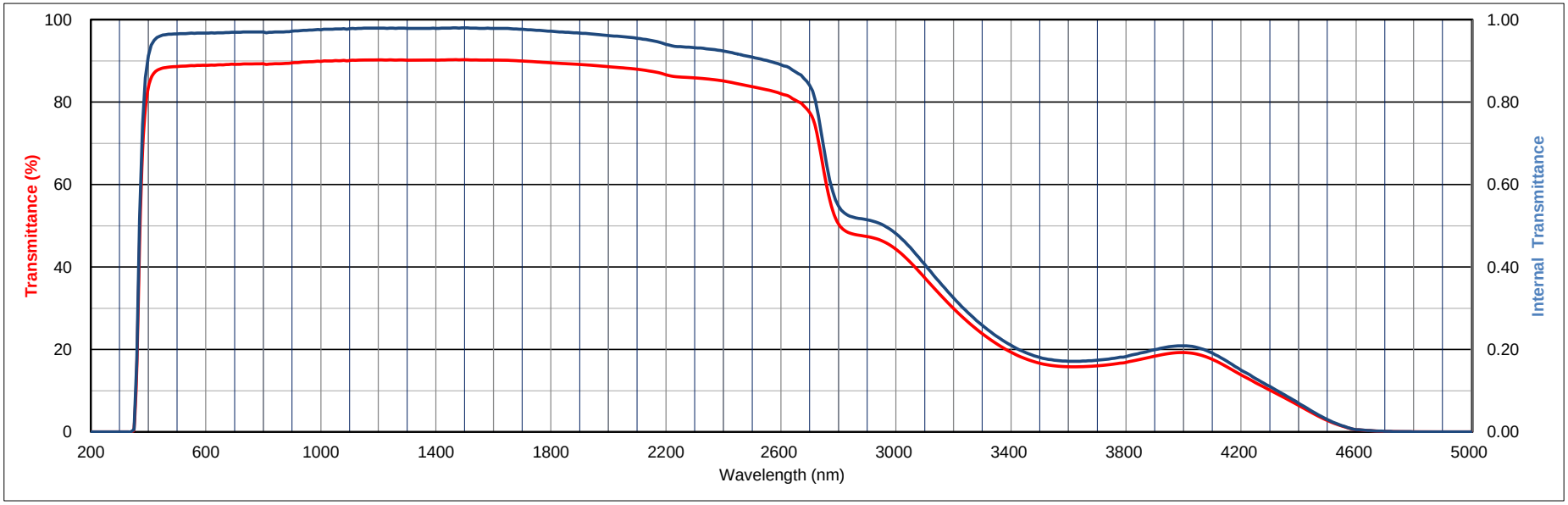
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

L37

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	15.8	47.2	68.3	78.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	83.5	85.9	87.0	87.7	88.0	88.2	88.4	88.5	88.5	88.6	88.6	88.7	88.7	88.7	88.8	88.8	88.8	88.9	88.9	88.9
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	88.9	88.9	89.0	88.9	89.0	89.0	89.0	89.1	89.1	89.2	89.1	89.2	89.2	89.2	89.2	89.2	89.2	89.3	89.3	89.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	89.3	89.1	89.2	89.2	89.3	89.3	89.3	89.3	89.4	89.4	89.5	89.6	89.6	89.6	89.7	89.7	89.8	89.8	89.8	89.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	89.8	90.0	90.0	90.0	90.0	90.1	90.0	90.0	90.1	90.0	90.1	90.2	90.1	90.2	90.2	90.2	90.2	90.2	90.2	90.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.2	90.2	90.2	90.2	90.2	90.3	90.3	90.3	90.2	90.3	90.3	90.3	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	90.2	90.2	90.2	90.2	90.1	90.1	90.1	90.1	90.0	90.0	90.0	89.9	89.9	89.8	89.8	89.7	89.7	89.6	89.6	89.6
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	89.5	89.5	89.4	89.4	89.3	89.3	89.3	89.2	89.2	89.2	89.1	89.1	89.0	89.0	88.9	88.9	88.8	88.8	88.7	88.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	88.6	88.3	88.0	87.4	86.6	86.1	85.9	85.6	85.1	84.4	83.7	83.0	82.0	80.5	77.5	62.9	50.5	48.0	47.4	46.4
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	44.3	41.1	37.4	33.6	29.9	26.7	23.8	21.4	19.3	17.8	16.6	16.0	15.8	15.8	16.0	16.4	16.9	17.6	18.4	19.0
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	19.2	18.8	17.6	15.8	13.8	11.9	10.1	8.3	6.4	4.5	2.8	1.4	0.5	0.3	0.1	0.1	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

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Thickness 2.50 mm

L38

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	20.8	48.7	66.7
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	76.2	81.1	83.7	85.2	86.0	86.6	86.9	87.2	87.4	87.6	87.7	87.8	87.9	88.0	88.1	88.2	88.2	88.3	88.4	88.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	88.4	88.5	88.5	88.5	88.6	88.6	88.6	88.7	88.8	88.8	88.9	88.9	88.9	89.0	89.0	89.0	89.0	89.0	89.0	89.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	89.0	88.9	89.0	89.0	89.0	89.0	89.0	89.1	89.1	89.1	89.3	89.3	89.3	89.3	89.5	89.5	89.5	89.5	89.6	89.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	89.6	89.6	89.6	89.7	89.7	89.7	89.8	89.7	89.7	89.6	89.8	89.8	89.9	89.8	89.9	89.9				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.576	1.565	1.560	1.557	1.555	1.553	1.552
P	0.905	0.907	0.909	0.910	0.910	0.910	0.911

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

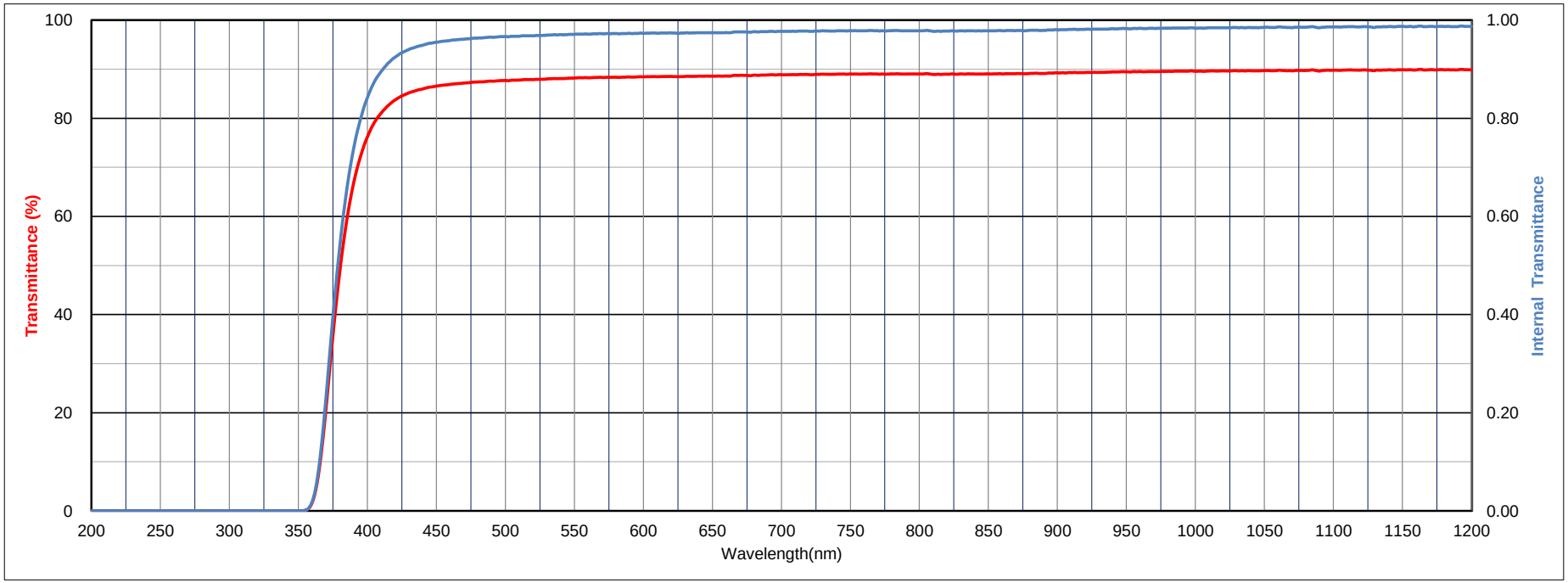
	x	y	Y	λ_d	P_e
A	0.449	0.408	88	583	2
C	0.312	0.319	88	573	1
D65	0.315	0.332	88	572	1

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	480	535	79	86	490	130	2.96

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
380±5	<35	>85



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

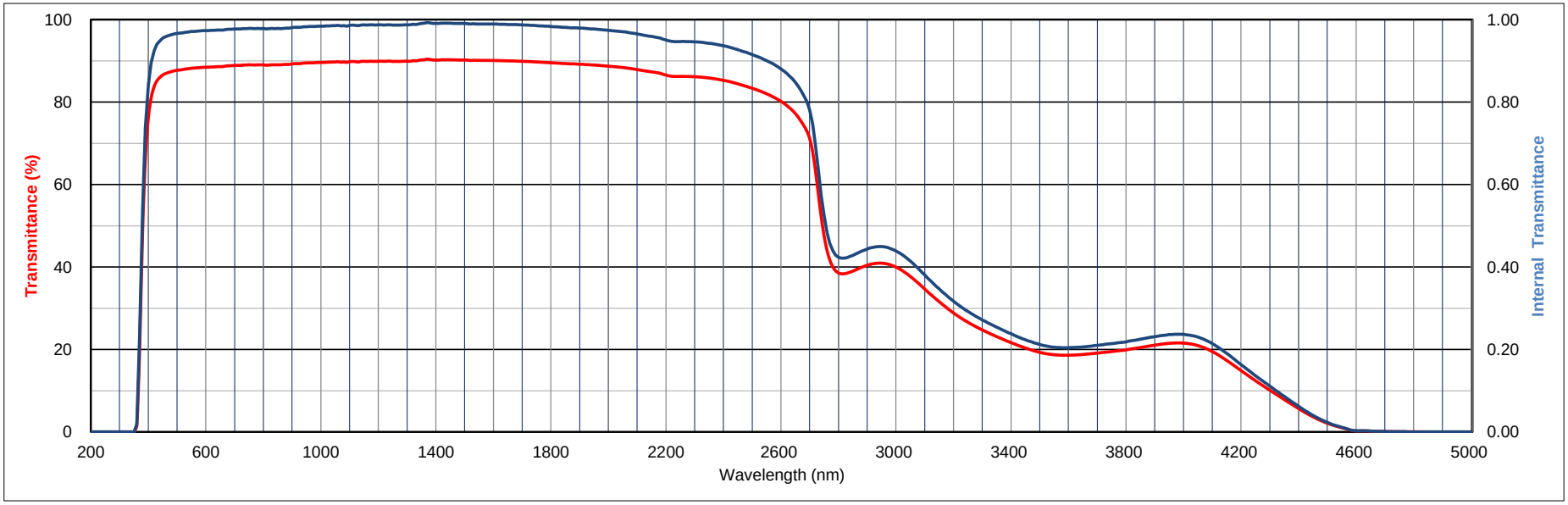
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

L38

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	20.8	48.7	66.7
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	76.2	81.1	83.7	85.2	86.0	86.6	86.9	87.2	87.4	87.6	87.7	87.8	87.9	88.0	88.1	88.2	88.2	88.3	88.4	88.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	88.4	88.5	88.5	88.5	88.6	88.6	88.6	88.7	88.8	88.8	88.9	88.9	88.9	89.0	89.0	89.0	89.0	89.0	89.0	89.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	89.0	88.9	89.0	89.0	89.0	89.0	89.0	89.1	89.1	89.1	89.3	89.3	89.3	89.3	89.5	89.5	89.5	89.5	89.6	89.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	89.6	89.6	89.6	89.7	89.7	89.7	89.8	89.7	89.7	89.6	89.8	89.8	89.8	89.7	89.9	89.9	89.8	89.9	89.9	89.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	89.9	89.9	89.9	89.9	89.9	89.8	89.9	89.8	89.9	89.9	89.9	89.9	90.0	90.0	90.1	90.2	90.2	90.4	90.3	90.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.2	90.2	90.2	90.2	90.3	90.3	90.2	90.2	90.2	90.2	90.2	90.2	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	90.1	90.1	90.0	90.0	90.0	90.0	90.0	90.0	89.9	89.9	89.9	89.8	89.8	89.8	89.8	89.7	89.7	89.6	89.6	89.6
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	89.5	89.5	89.5	89.4	89.4	89.3	89.3	89.3	89.3	89.2	89.2	89.2	89.1	89.1	89.0	89.0	88.9	88.9	88.8	88.8
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	88.7	88.4	87.9	87.3	86.5	86.2	86.1	85.8	85.3	84.4	83.3	82.0	80.2	77.2	71.1	47.6	38.6	39.0	40.4	40.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	40.0	37.7	34.6	31.6	28.9	26.6	24.7	23.1	21.7	20.3	19.3	18.7	18.6	18.8	19.1	19.5	19.9	20.5	21.0	21.5
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	21.5	20.9	19.5	17.3	14.9	12.4	10.1	7.9	5.7	3.7	2.1	1.0	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

L39

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.8	24.6	47.8
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	64.3	74.0	79.5	82.5	84.3	85.3	86.0	86.4	86.7	86.9	87.1	87.3	87.4	87.6	87.7	87.7	87.9	88.0	88.0	88.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	88.1	88.2	88.2	88.2	88.3	88.3	88.3	88.4	88.4	88.4	88.5	88.5	88.5	88.6	88.6	88.6	88.6	88.7	88.7	88.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	88.6	88.6	88.6	88.6	88.6	88.7	88.7	88.7	88.8	88.8	88.8	88.9	89.0	89.0	89.2	89.2	89.1	89.2	89.2	89.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	89.3	89.3	89.4	89.4	89.4	89.4	89.4	89.4	89.4	89.4	89.5	89.5	89.6	89.6	89.6	89.6				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.615	1.597	1.588	1.583	1.580	1.578	1.577
P	0.895	0.900	0.902	0.903	0.904	0.904	0.905

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

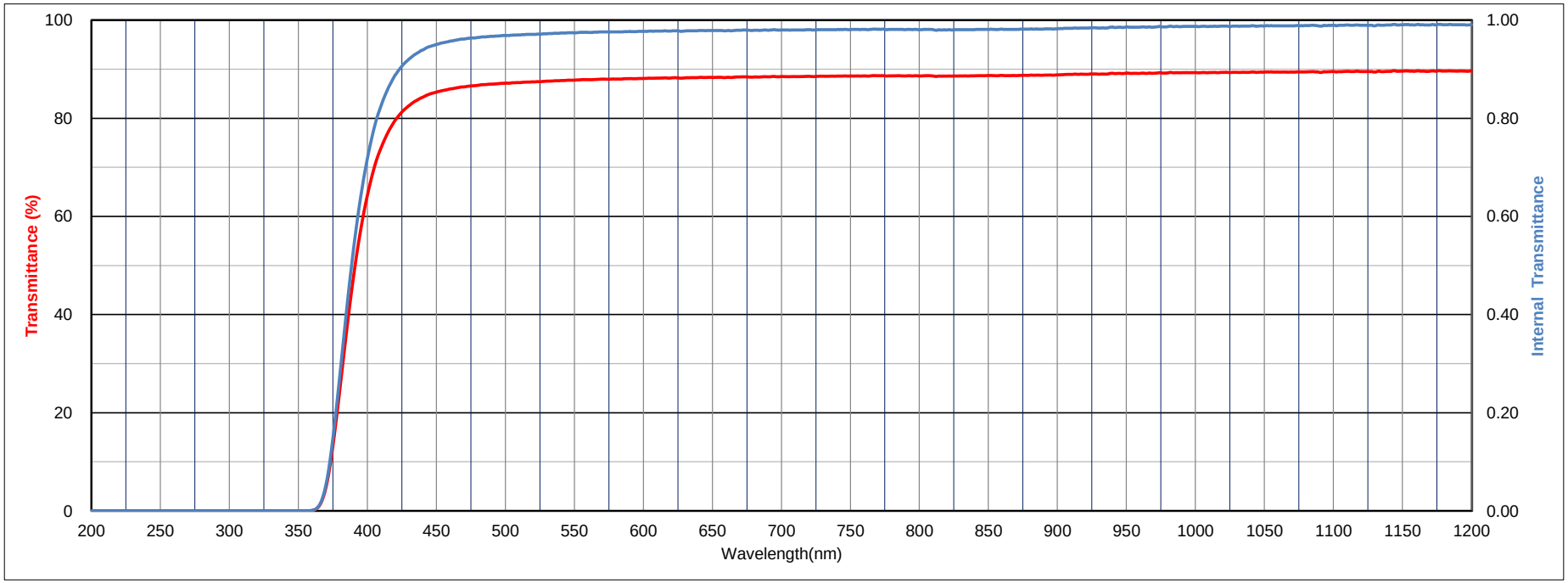
	x	y	Y	λ_d	P_e
A	0.450	0.409	88	582	3
C	0.313	0.321	88	572	2
D65	0.316	0.333	88	571	2

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	440	490	90	100	460	170	3.29

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
390±5	<40	>85



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HOYA

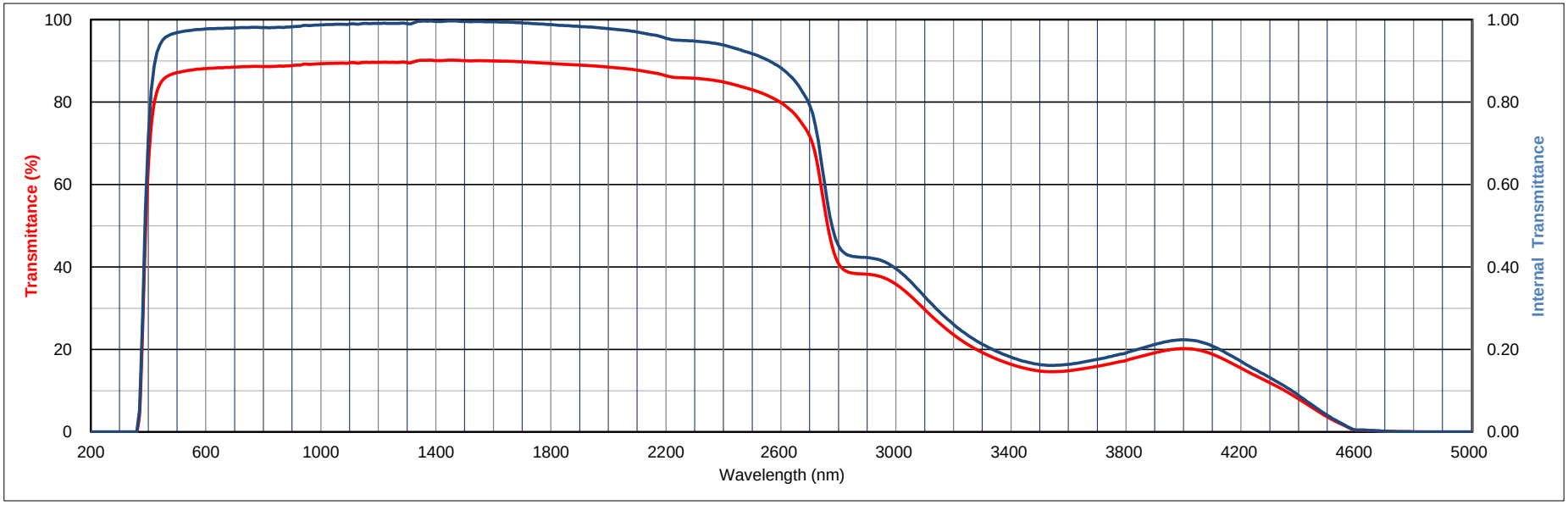
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

L39

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	4.8	24.6	47.8
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	64.3	74.0	79.5	82.5	84.3	85.3	86.0	86.4	86.7	86.9	87.1	87.3	87.4	87.6	87.7	87.7	87.9	88.0	88.0	88.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	88.1	88.2	88.2	88.2	88.3	88.3	88.3	88.4	88.4	88.4	88.5	88.5	88.5	88.6	88.6	88.6	88.6	88.7	88.7	88.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	88.6	88.6	88.6	88.6	88.6	88.7	88.7	88.7	88.8	88.8	88.8	88.9	89.0	89.0	89.2	89.2	89.1	89.2	89.2	89.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	89.3	89.3	89.4	89.4	89.4	89.4	89.4	89.4	89.4	89.4	89.5	89.6	89.5	89.4	89.6	89.6	89.6	89.6	89.6	89.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	89.6	89.6	89.7	89.6	89.6	89.6	89.6	89.6	89.7	89.7	89.5	89.5	89.7	89.9	90.1	90.1	90.1	90.1	90.2	90.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.0	90.0	90.0	90.1	90.1	90.2	90.2	90.1	90.1	90.1	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	90.0	90.0	89.9	89.9	89.9	89.9	89.9	89.9	89.8	89.8	89.8	89.7	89.7	89.6	89.6	89.5	89.5	89.5	89.4	89.4
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	89.4	89.3	89.3	89.2	89.2	89.1	89.1	89.1	89.0	89.0	89.0	88.9	88.9	88.8	88.8	88.8	88.7	88.7	88.6	88.5
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	88.5	88.2	87.7	87.2	86.4	85.9	85.8	85.4	84.9	84.0	83.0	81.7	79.9	76.9	71.7	55.1	40.9	38.5	38.2	37.6
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	35.8	33.0	29.7	26.4	23.6	21.2	19.3	17.7	16.4	15.4	14.8	14.6	14.8	15.3	15.9	16.6	17.3	18.3	19.2	19.9
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	20.2	19.9	18.8	17.3	15.5	13.7	11.9	10.1	8.0	5.8	3.6	1.9	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

L42

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	5.8	49.8	75.3	82.9	85.6	86.9	87.6	88.1	88.5	88.7	89.0	89.1	89.3	89.4	89.5	89.6	89.7	89.7	89.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	89.8	89.8	89.8	89.8	89.8	89.7	89.8	89.9	89.9	90.0	90.0	90.0	90.0	90.1	90.1	90.1	90.1	90.1	90.1	90.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.0	89.9	89.9	89.9	90.0	90.0	90.0	90.0	90.0	90.0	90.1	90.1	90.1	90.2	90.3	90.3	90.3	90.3	90.3	90.4
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.4	90.3	90.4	90.5	90.4	90.4	90.4	90.4	90.4	90.4	90.5	90.5	90.5	90.6	90.6	90.6				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.547	1.537	1.533	1.531	1.529	1.528	1.528
P	0.912	0.914	0.915	0.916	0.916	0.916	0.916

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

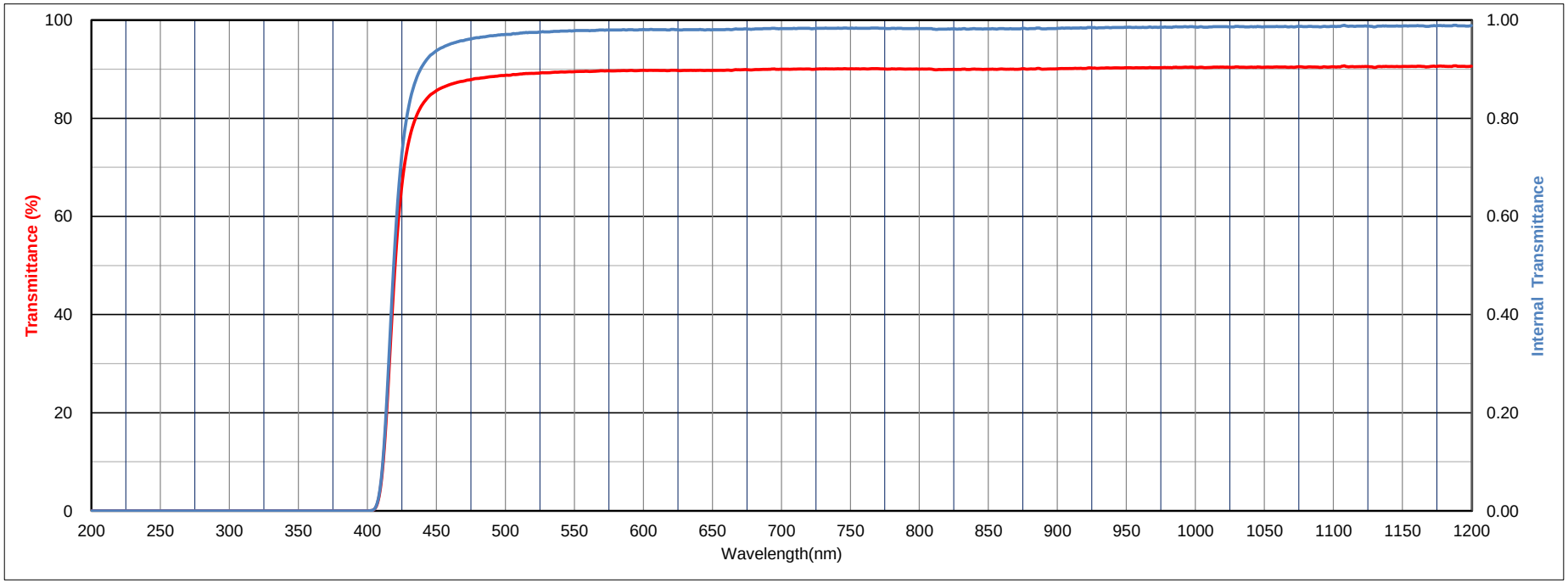
	x	y	Y	λ_d	P_e
A	0.452	0.412	90	580	6
C	0.317	0.329	89	569	5
D65	0.319	0.342	89	569	5

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	550	600	92	105	540	130	2.59

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
420±5	<25	>85



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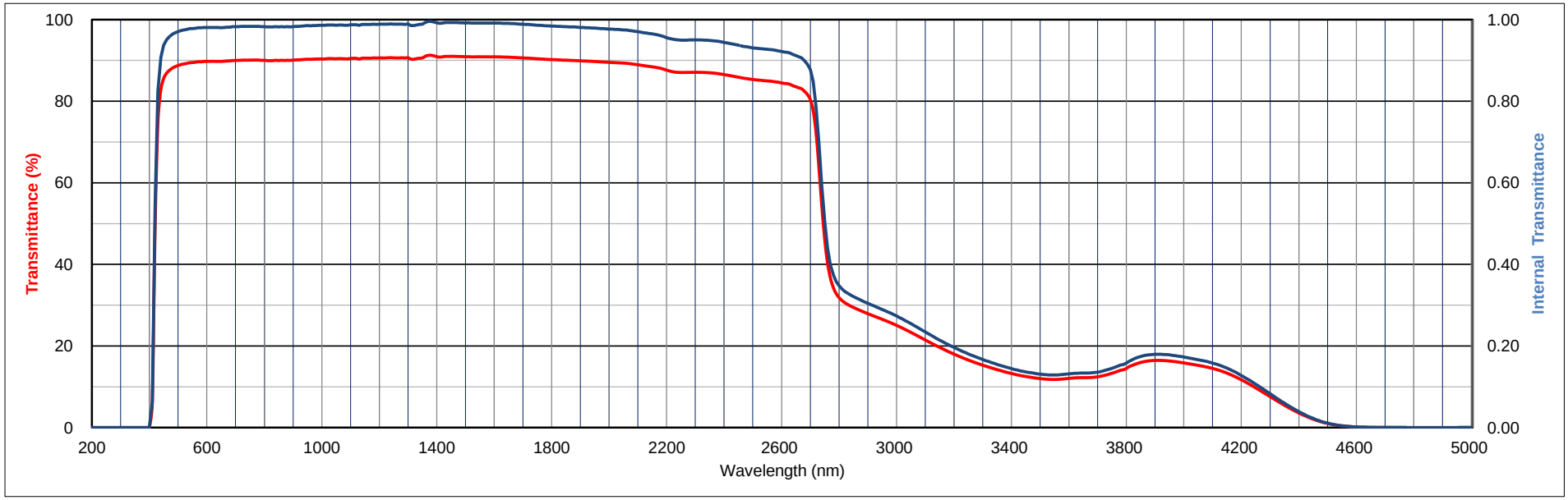
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

L42

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	5.8	49.8	75.3	82.9	85.6	86.9	87.6	88.1	88.5	88.7	89.0	89.1	89.3	89.4	89.5	89.6	89.7	89.7	89.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	89.8	89.8	89.8	89.8	89.8	89.7	89.8	89.9	89.9	90.0	90.0	90.0	90.0	90.1	90.1	90.1	90.1	90.1	90.1	90.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.0	89.9	89.9	89.9	90.0	90.0	90.0	90.0	90.0	90.0	90.1	90.1	90.1	90.2	90.3	90.3	90.3	90.3	90.3	90.4
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.4	90.3	90.4	90.5	90.4	90.4	90.4	90.4	90.4	90.4	90.5	90.5	90.5	90.4	90.5	90.6	90.6	90.5	90.6	90.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	90.6	90.6	90.6	90.6	90.7	90.6	90.6	90.6	90.6	90.6	90.7	90.3	90.3	90.4	90.5	90.6	91.0	91.2	91.2	91.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.9	90.8	90.9	91.0	91.0	91.0	91.0	91.0	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	90.9	90.9	90.9	90.8	90.8	90.8	90.8	90.7	90.7	90.6	90.6	90.6	90.6	90.5	90.5	90.4	90.4	90.3	90.3	90.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.2	90.2	90.1	90.1	90.1	90.1	90.0	90.0	90.0	89.9	89.9	89.9	89.8	89.8	89.8	89.7	89.7	89.6	89.6	89.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	89.5	89.3	88.9	88.4	87.6	87.0	87.1	87.0	86.5	85.9	85.3	85.0	84.5	83.5	80.4	46.2	31.9	29.5	27.9	26.5
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	25.1	23.3	21.5	19.7	18.0	16.5	15.3	14.2	13.3	12.5	12.0	11.8	12.1	12.2	12.4	13.3	14.5	16.0	16.5	16.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	15.8	15.2	14.5	13.3	11.7	9.7	7.6	5.5	3.6	2.1	1.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

Y44

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.2	6.9	49.1	76.0	83.7	86.2	87.5	88.4	89.0	89.5	89.9	90.2	90.5	90.7	90.8	90.9	90.9	91.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	91.0	91.1	91.1	91.1	91.1	91.1	91.1	91.0	91.1	91.0	91.1	91.1	91.0	91.0	91.0	90.9	90.9	90.9	90.8	90.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.7	90.6	90.6	90.6	90.6	90.6	90.6	90.5	90.5	90.6	90.6	90.6	90.6	90.7	90.7	90.7	90.7	90.7	90.7	90.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.8	90.7	90.8	90.7	90.7	90.8	90.7	90.7	90.8	90.9	90.8	90.9	90.8	90.8	90.8	90.9				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.546	1.536	1.531	1.528	1.526	1.525	1.524
P	0.912	0.914	0.916	0.916	0.917	0.917	0.917

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

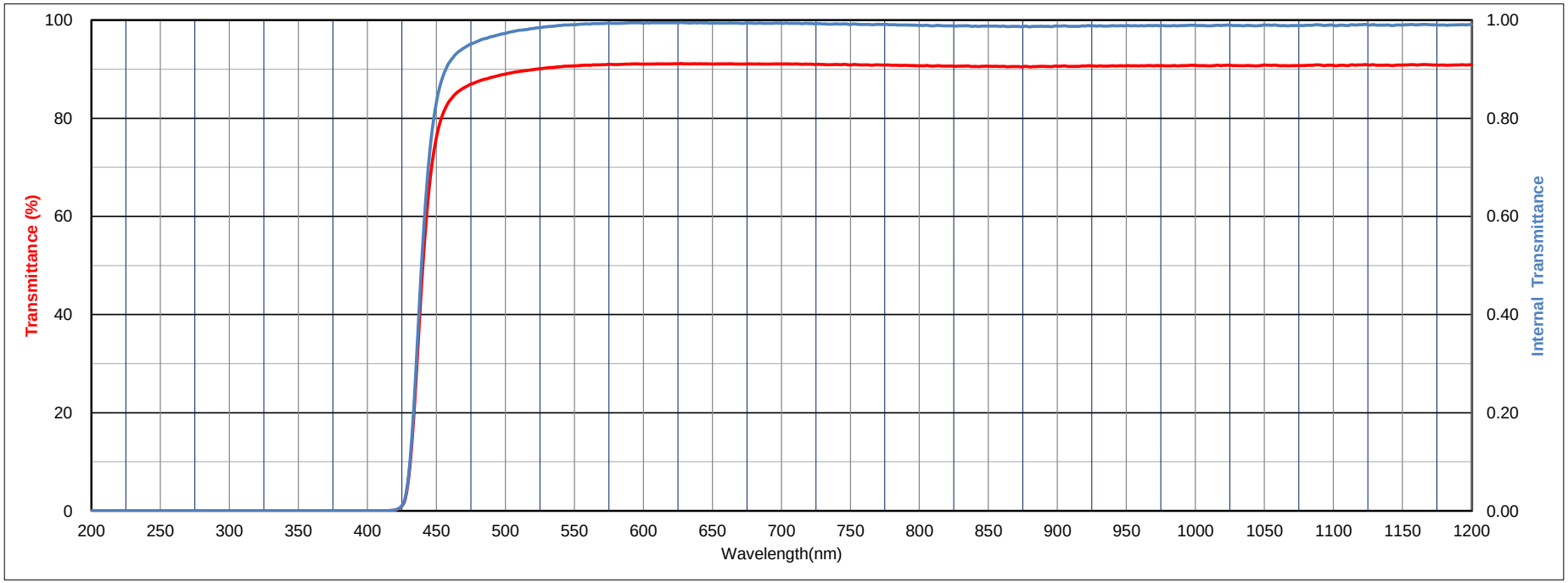
	x	y	Y	λ_d	P_e
A	0.461	0.424	91	580	21
C	0.335	0.366	90	569	20
D65	0.336	0.376	90	568	20

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	2	570	600	99	107	540	130	2.59

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
440±5	<25	>85



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The content of this catalog is accurate as of October ,2020

HOYA

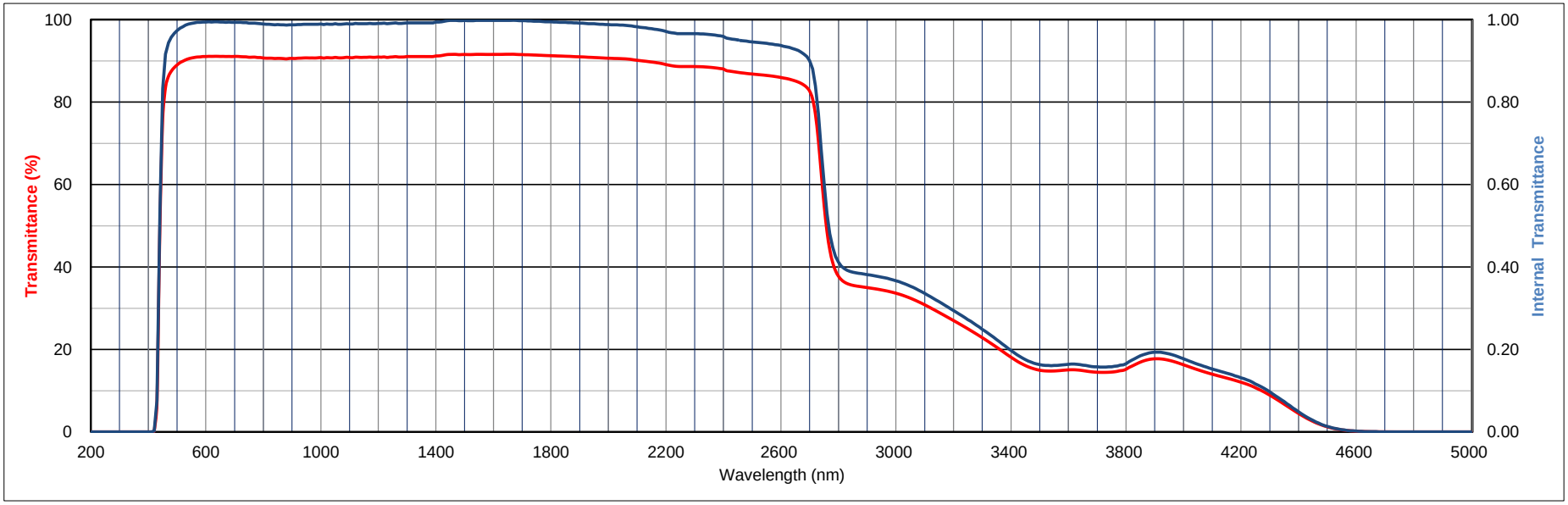
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

Y44

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.2	6.9	49.1	76.0	83.7	86.2	87.5	88.4	89.0	89.5	89.9	90.2	90.5	90.7	90.8	90.9	90.9	91.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	91.0	91.1	91.1	91.1	91.1	91.1	91.1	91.0	91.1	91.0	91.1	91.1	91.0	91.0	91.0	90.9	90.9	90.9	90.8	90.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.7	90.6	90.6	90.6	90.6	90.6	90.6	90.5	90.5	90.6	90.6	90.6	90.6	90.7	90.7	90.7	90.7	90.7	90.7	90.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.8	90.7	90.8	90.7	90.7	90.8	90.7	90.7	90.8	90.9	90.8	90.7	90.9	90.9	90.8	90.8	90.8	90.9	90.8	90.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	90.9	90.9	90.9	90.8	90.9	90.9	91.0	90.9	90.9	90.9	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	91.2	91.2	91.3	91.4	91.5	91.5	91.6	91.6	91.5	91.5	91.5	91.5	91.5	91.5	91.6	91.6	91.6	91.6	91.5	91.5
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.6	91.6	91.6	91.6	91.6	91.6	91.6	91.6	91.6	91.5	91.5	91.5	91.5	91.4	91.4	91.4	91.4	91.3	91.3	91.3
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	91.2	91.2	91.2	91.2	91.1	91.1	91.1	91.1	91.0	91.0	91.0	90.9	90.9	90.9	90.8	90.8	90.8	90.7	90.7	90.7
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.6	90.5	90.1	89.7	89.1	88.6	88.6	88.4	88.0	87.2	86.8	86.5	86.0	85.1	82.6	55.1	37.8	35.5	35.0	34.4
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	33.6	32.4	30.8	29.0	27.0	25.0	22.9	20.5	18.1	16.1	15.0	14.8	15.0	14.9	14.5	14.5	15.2	16.9	17.7	17.4
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	16.3	15.1	14.0	13.1	12.0	10.7	8.9	6.7	4.5	2.6	1.2	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

Y48

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	79.6	87.1	88.9	89.4	89.7	89.8	89.9	90.0	90.0	90.1	90.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.2	90.2	90.3	90.4	90.3	90.3	90.4	90.4	90.4	90.4	90.3	90.4	90.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.3	90.2	90.2	90.2	90.3	90.3	90.3	90.3	90.3	90.4	90.4	90.4	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.7	90.8	90.7	90.7	90.7	90.8	90.8	90.7	90.7	90.8	90.8	90.8	90.9	90.9	90.9	90.9				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.538	1.534	1.532	1.531	1.530	1.529	1.529
P	0.914	0.915	0.915	0.916	0.916	0.916	0.916

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

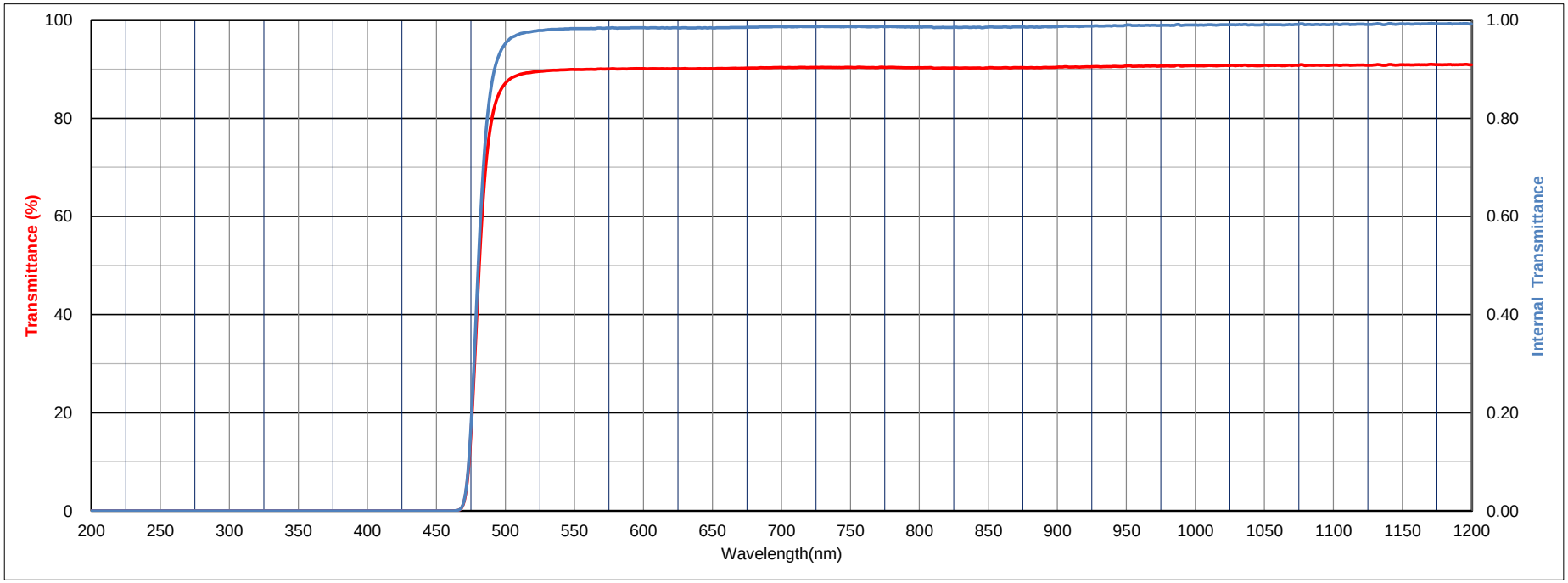
	x	y	Y	λ_d	P_e
A	0.497	0.467	89	580	76
C	0.416	0.504	86	570	79
D65	0.412	0.510	87	569	79

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	560	625	94	105	540	130	2.67

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
480±5	<25	>85



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HOYA

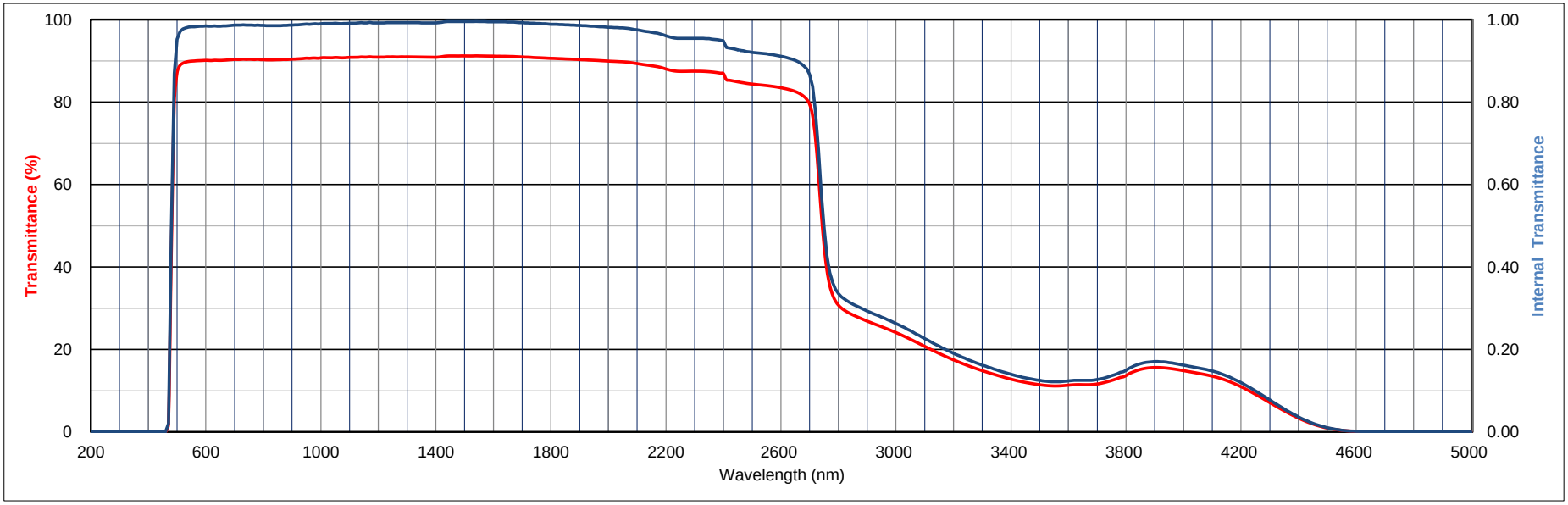
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

Y48

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	79.6	87.1	88.9	89.4	89.7	89.8	89.9	90.0	90.0	90.1	90.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.2	90.2	90.3	90.4	90.3	90.3	90.4	90.4	90.4	90.4	90.3	90.4	90.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.3	90.2	90.2	90.2	90.3	90.3	90.3	90.3	90.3	90.4	90.4	90.4	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.7	90.8	90.7	90.7	90.7	90.8	90.8	90.7	90.7	90.8	90.8	90.8	90.8	90.9	90.9	90.9	90.9	91.0	90.9	90.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	90.9	90.9	90.9	91.0	91.0	91.0	90.9	90.9	91.0	91.0	91.0	91.0	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.9	90.9	91.0	91.1	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.0	91.0	90.9	90.9	90.9	90.9	90.8	90.8	90.7	90.7	90.7	90.6
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.6	90.6	90.6	90.5	90.5	90.5	90.4	90.4	90.4	90.3	90.3	90.3	90.2	90.2	90.2	90.1	90.1	90.1	90.0	90.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	89.9	89.8	89.3	88.8	88.0	87.4	87.5	87.4	86.9	84.9	84.4	84.0	83.5	82.5	79.4	45.1	30.7	28.4	26.9	25.5
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	24.1	22.5	20.7	19.0	17.5	16.1	14.9	13.8	12.8	12.0	11.4	11.1	11.3	11.5	11.6	12.5	13.7	15.2	15.6	15.4
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	14.9	14.2	13.5	12.5	11.0	9.1	7.1	5.1	3.3	1.9	0.9	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

Y50

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.4	42.5	71.2	83.0	87.2	88.9	89.6	89.8	90.0	90.1	90.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	90.1	90.1	90.2	90.2	90.2	90.2	90.2	90.3	90.3	90.3	90.4	90.4	90.4	90.4	90.4	90.5	90.5	90.4	90.5	90.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.4	90.4	90.4	90.3	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.5	90.6	90.6	90.6	90.7	90.7	90.7	90.7	90.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.8	90.8	90.8	90.8	90.9	90.8	90.8	90.8	90.9	90.9	90.9	90.9	91.0	91.0	91.0	91.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.552	1.537	1.530	1.526	1.523	1.522	1.520
P	0.911	0.914	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

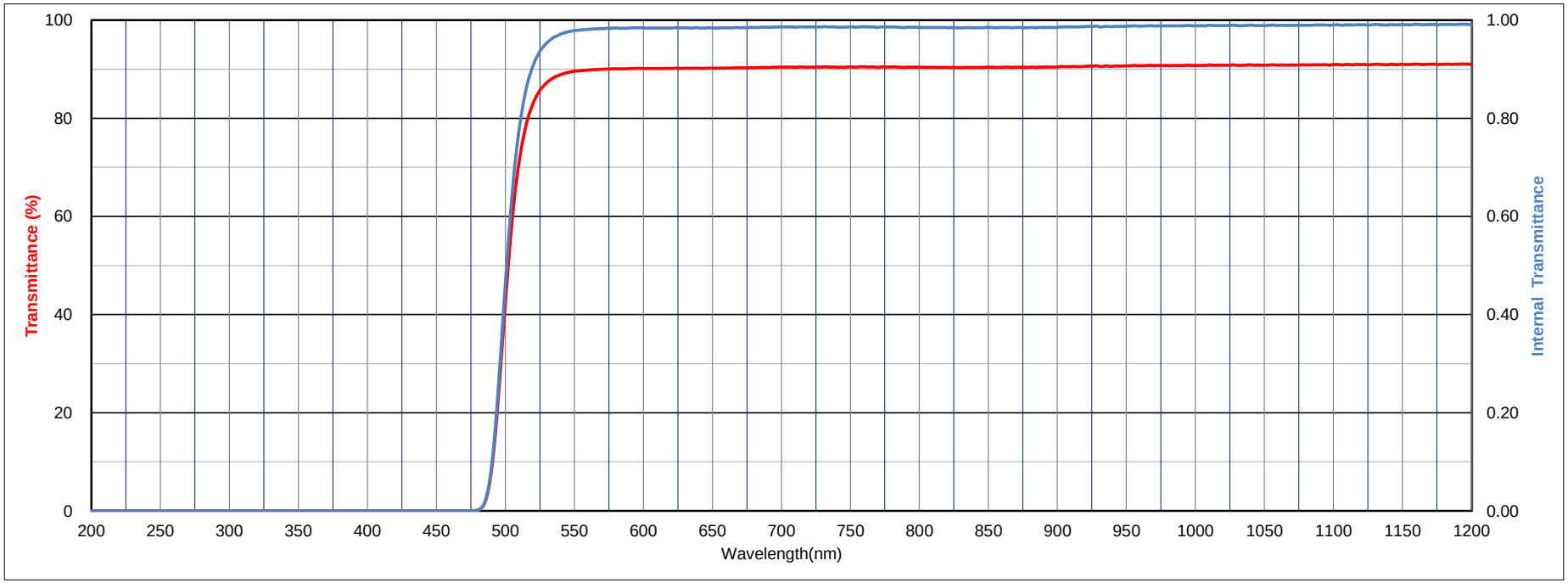
	x	y	Y	λ_d	P_e
A	0.515	0.471	86	582	91
C	0.453	0.521	81	573	93
D65	0.448	0.525	81	572	93

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	560	620	96	108	540	130	2.68

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
500±5	<25	>85



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HOYA

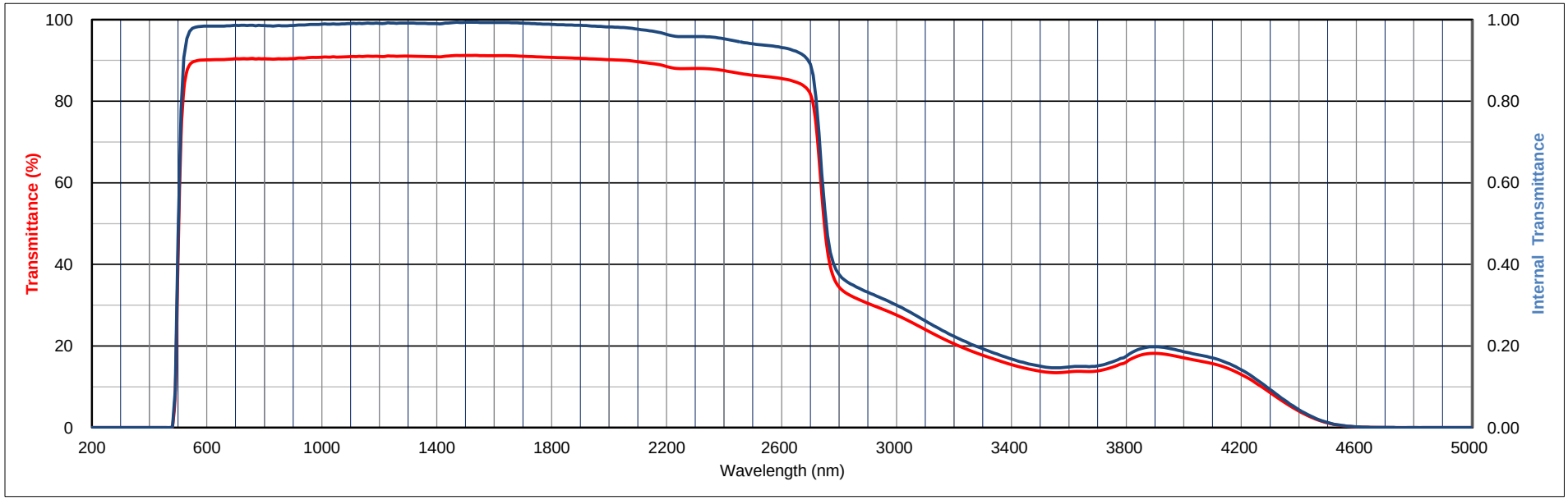
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

Y50

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.4	42.5	71.2	83.0	87.2	88.9	89.6	89.8	90.0	90.1	90.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	90.1	90.1	90.2	90.2	90.2	90.2	90.2	90.3	90.3	90.3	90.4	90.4	90.4	90.4	90.4	90.5	90.5	90.4	90.5	90.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.4	90.4	90.4	90.3	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.5	90.6	90.6	90.6	90.7	90.7	90.7	90.7	90.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.8	90.8	90.8	90.8	90.9	90.8	90.8	90.8	90.9	90.9	90.9	91.0	90.9	91.0	91.0	91.0	91.0	91.0	91.0	91.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	91.0	90.9	91.0	91.1	91.1	91.1	91.0	91.0	91.0	91.1	91.0	91.0	91.0	91.0	91.0	91.0	91.0	90.9	90.9	90.9
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.9	90.9	90.9	91.0	91.1	91.1	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.1	91.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.2	91.2	91.2	91.2	91.2	91.2	91.1	91.1	91.1	91.0	91.0	91.0	91.0	90.9	90.9	90.9	90.9	90.8	90.8	90.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.7	90.7	90.7	90.7	90.7	90.6	90.6	90.6	90.5	90.5	90.5	90.5	90.5	90.4	90.4	90.4	90.3	90.3	90.2	90.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.2	90.0	89.7	89.2	88.5	88.0	88.0	87.9	87.5	86.9	86.4	86.0	85.5	84.7	81.8	49.1	34.5	32.0	30.5	29.1
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	27.6	25.9	24.0	22.2	20.5	19.0	17.7	16.5	15.4	14.5	13.8	13.4	13.7	13.8	13.9	14.8	16.1	17.8	18.2	17.8
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	17.1	16.4	15.7	14.6	13.0	10.9	8.6	6.2	4.0	2.3	1.1	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

Y52

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	47.3	79.0	87.1	89.2	89.8	90.1	90.2	90.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	90.3	90.2	90.3	90.3	90.3	90.3	90.3	90.3	90.4	90.4	90.5	90.5	90.5	90.5	90.5	90.6	90.5	90.5	90.5	90.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.5	90.5	90.4	90.4	90.4	90.5	90.5	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.7	90.8	90.8	90.8	90.9	90.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.9	91.0	90.9	90.9	90.9	91.0	91.0	91.0	90.9	91.0	91.0	91.0	91.0	91.1	91.1	91.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.552	1.539	1.531	1.527	1.524	1.522	1.521
P	0.911	0.914	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

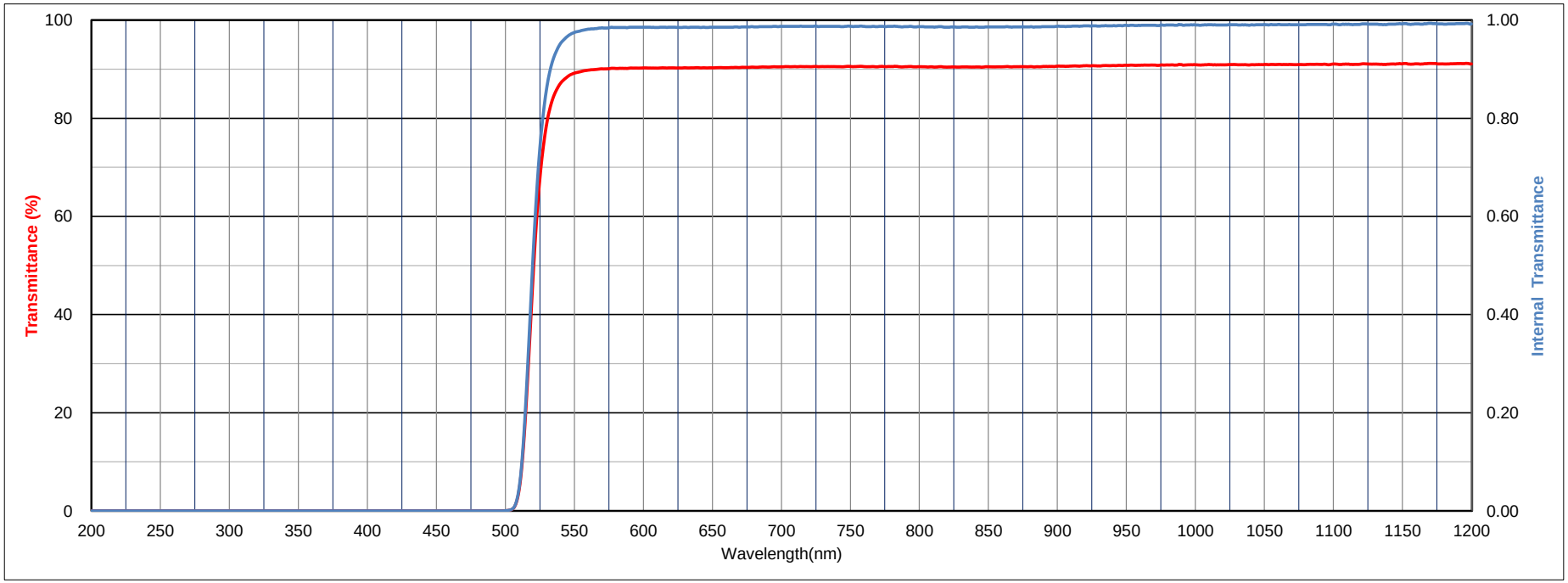
	x	y	Y	λ_d	P_e
A	0.535	0.460	81	584	97
C	0.486	0.507	73	577	98
D65	0.482	0.510	73	576	98

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	560	620	96	108	540	130	2.68

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
520±5	<25	>85



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HOYA

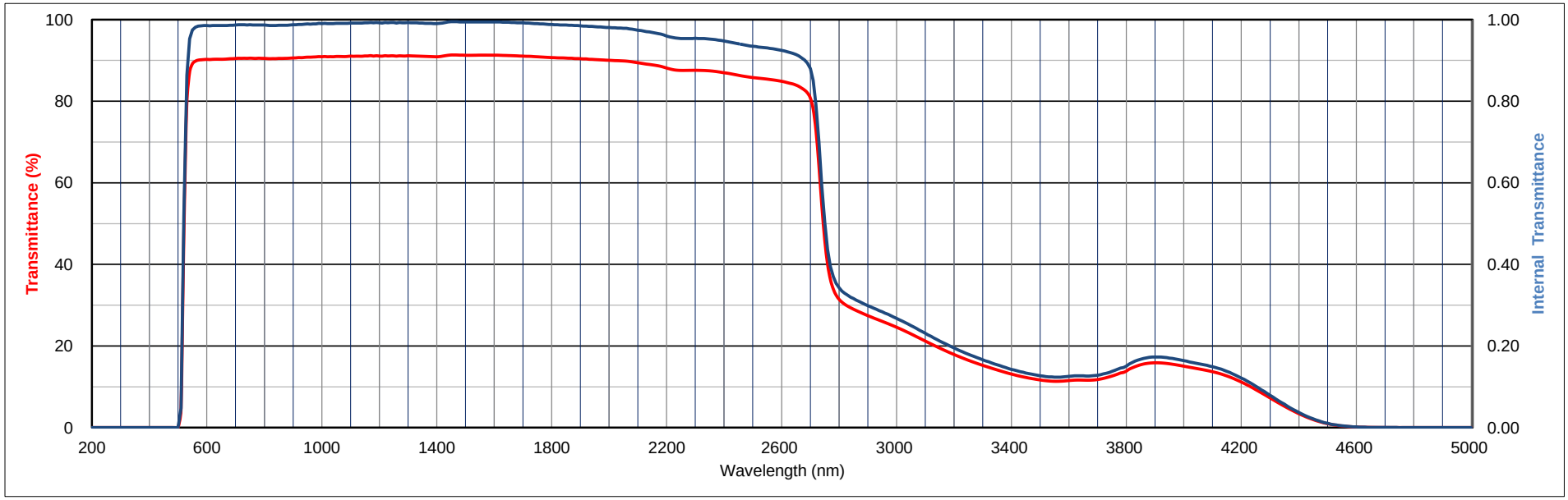
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

Y52

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	47.3	79.0	87.1	89.2	89.8	90.1	90.2	90.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	90.3	90.2	90.3	90.3	90.3	90.3	90.3	90.3	90.4	90.4	90.5	90.5	90.5	90.5	90.5	90.6	90.5	90.5	90.5	90.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.5	90.5	90.4	90.4	90.4	90.5	90.5	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.7	90.8	90.8	90.8	90.9	90.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.9	91.0	90.9	90.9	90.9	91.0	91.0	91.0	90.9	91.0	91.0	91.0	91.0	91.0	91.0	91.1	91.1	91.2	91.1	91.1
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	91.1	91.0	91.2	91.1	91.1	91.1	91.0	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.0	91.0	91.0	91.0	90.9	90.9
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.9	90.9	91.0	91.2	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.2	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.3	91.3	91.3	91.2	91.2	91.2	91.2	91.1	91.1	91.1	91.1	91.0	91.0	91.0	90.9	90.9	90.8	90.8	90.8	90.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.7	90.7	90.6	90.6	90.6	90.6	90.5	90.5	90.5	90.5	90.4	90.4	90.4	90.3	90.3	90.2	90.2	90.1	90.1	90.1
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.0	89.9	89.4	88.9	88.1	87.6	87.6	87.4	87.0	86.4	85.8	85.4	84.9	84.0	80.8	46.2	31.5	29.0	27.4	26.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	24.6	23.0	21.2	19.5	17.9	16.5	15.3	14.1	13.1	12.3	11.7	11.3	11.5	11.6	11.8	12.6	13.9	15.4	15.9	15.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	15.0	14.4	13.7	12.6	11.2	9.3	7.3	5.2	3.4	2.0	1.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

O54

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	8.3	42.1	71.4	83.6	87.8	89.3	90.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	90.2	90.3	90.4	90.4	90.4	90.4	90.4	90.5	90.5	90.5	90.6	90.5	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.6	90.5	90.5	90.5	90.5	90.5	90.5	90.5	90.5	90.5	90.6	90.7	90.6	90.7	90.8	90.8	90.8	90.8	90.9	90.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.9	90.9	90.9	90.9	91.0	90.9	91.0	90.9	91.0	90.9	91.0	91.0	91.1	91.1	91.1	91.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.552	1.541	1.532	1.528	1.525	1.524	1.522
P	0.911	0.913	0.915	0.916	0.917	0.917	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

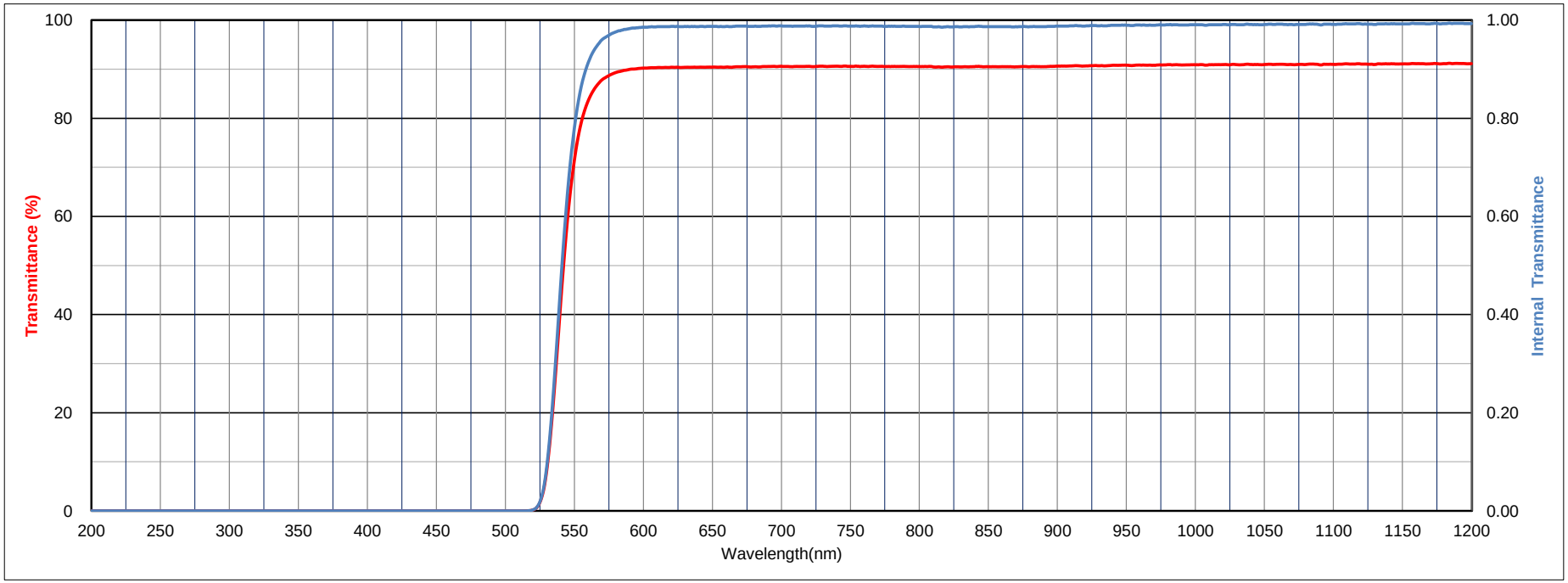
	x	y	Y	λ_d	P_e
A	0.570	0.428	68	589	99
C	0.534	0.464	57	584	100
D65	0.534	0.464	56	583	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	625	99	107	520	140	2.68

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
540±5	<25	>85



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HOYA

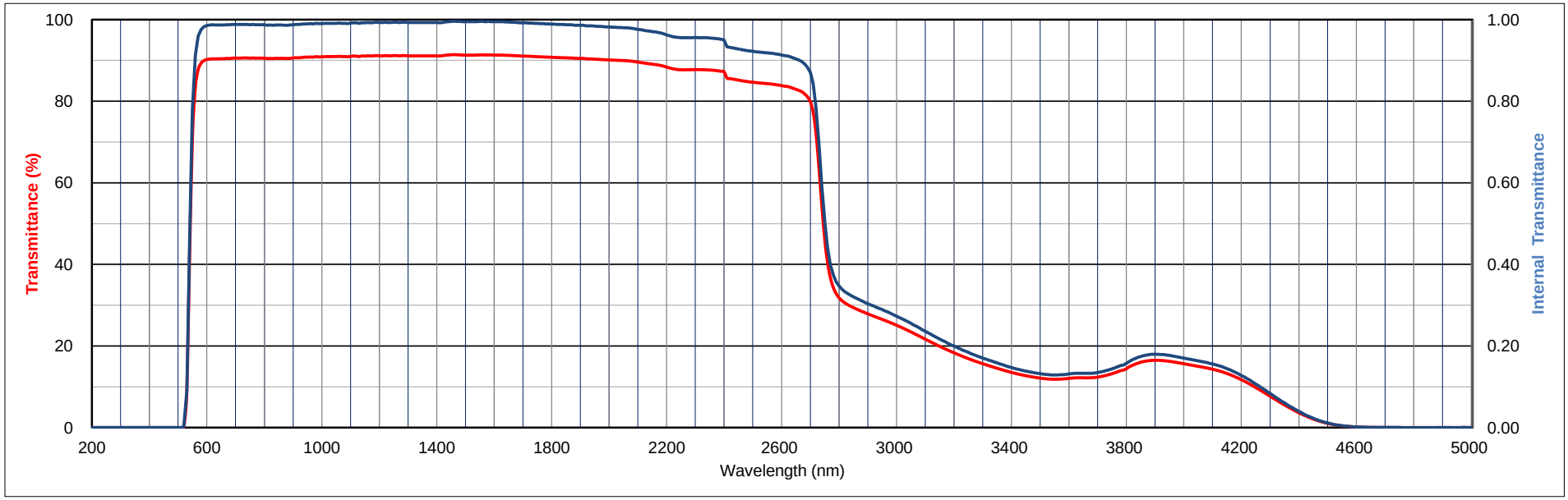
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

O54

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	8.3	42.1	71.4	83.6	87.8	89.3	90.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	90.2	90.3	90.4	90.4	90.4	90.4	90.4	90.5	90.5	90.5	90.6	90.5	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.6	90.5	90.5	90.5	90.5	90.5	90.5	90.5	90.5	90.5	90.6	90.7	90.6	90.7	90.8	90.8	90.8	90.8	90.9	90.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.9	90.9	90.9	90.9	91.0	90.9	91.0	90.9	91.0	90.9	91.0	91.1	91.0	91.0	91.1	91.1	91.1	91.1	91.1	91.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	91.1	91.1	91.2	91.1	91.1	91.2	91.2	91.1	91.2	91.2	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	91.1	91.1	91.2	91.3	91.3	91.4	91.4	91.4	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.4	91.3	91.3	91.3
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.3	91.3	91.3	91.3	91.3	91.2	91.2	91.2	91.1	91.1	91.1	91.0	91.0	91.0	91.0	90.9	90.9	90.9	90.8	90.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.8	90.7	90.7	90.7	90.7	90.6	90.6	90.6	90.5	90.5	90.5	90.5	90.4	90.4	90.4	90.3	90.3	90.2	90.2	90.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.1	90.0	89.6	89.1	88.4	87.7	87.7	87.6	87.2	85.2	84.6	84.3	83.8	82.9	79.9	46.4	31.8	29.4	27.9	26.5
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	25.1	23.4	21.7	19.9	18.3	16.9	15.6	14.5	13.5	12.7	12.1	11.8	12.1	12.2	12.4	13.2	14.4	16.0	16.5	16.2
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	15.6	15.0	14.3	13.3	11.7	9.8	7.7	5.6	3.6	2.1	1.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

O56

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	9.6	41.3	69.9	82.8	87.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	89.2	89.9	90.2	90.3	90.4	90.5	90.4	90.5	90.4	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.5	90.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.5	90.5	90.4	90.4	90.4	90.5	90.4	90.4	90.4	90.4	90.5	90.6	90.6	90.6	90.7	90.8	90.8	90.7	90.7	90.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.8	90.8	90.8	90.8	90.9	90.9	90.9	90.9	90.9	90.9	90.9	91.0	91.0	91.1	91.0	91.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.549	1.538	1.530	1.525	1.523	1.521	1.520
P	0.911	0.914	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

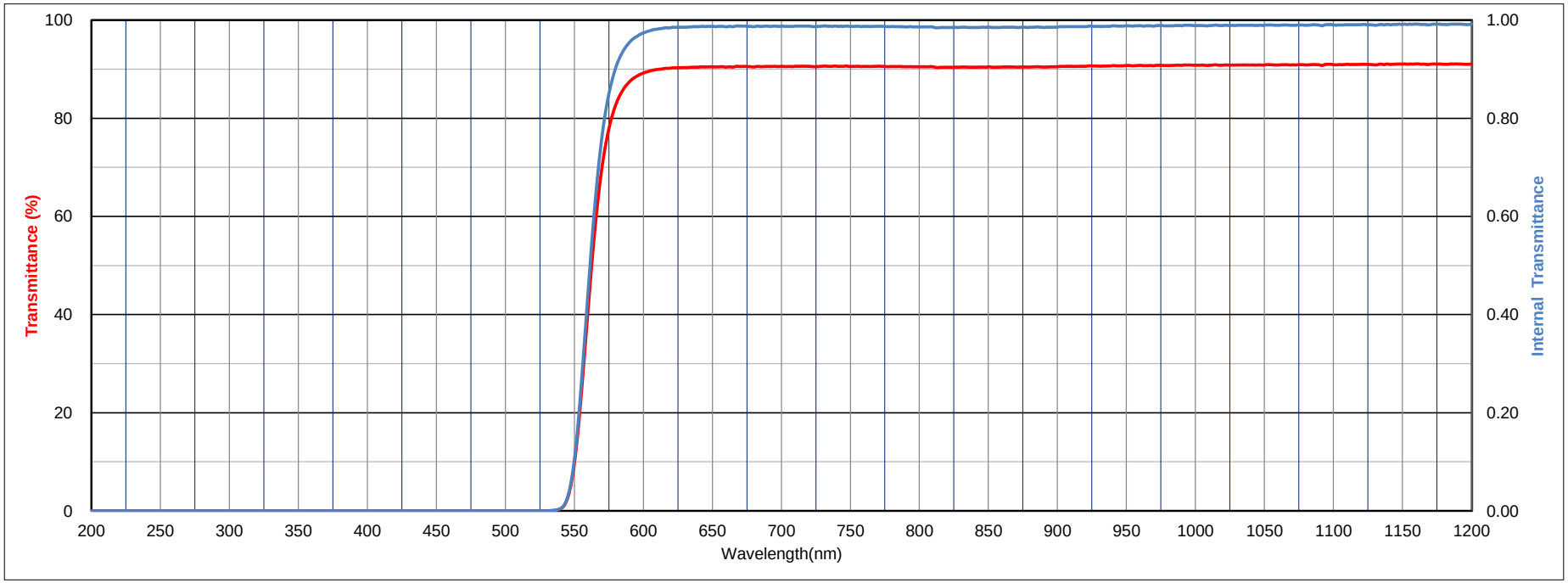
	x	y	Y	λ_d	P_e
A	0.610	0.389	52	597	100
C	0.588	0.412	40	592	100
D65	0.588	0.411	39	592	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	625	93	104	520	140	2.68

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
560±5	<25	>85



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HOYA

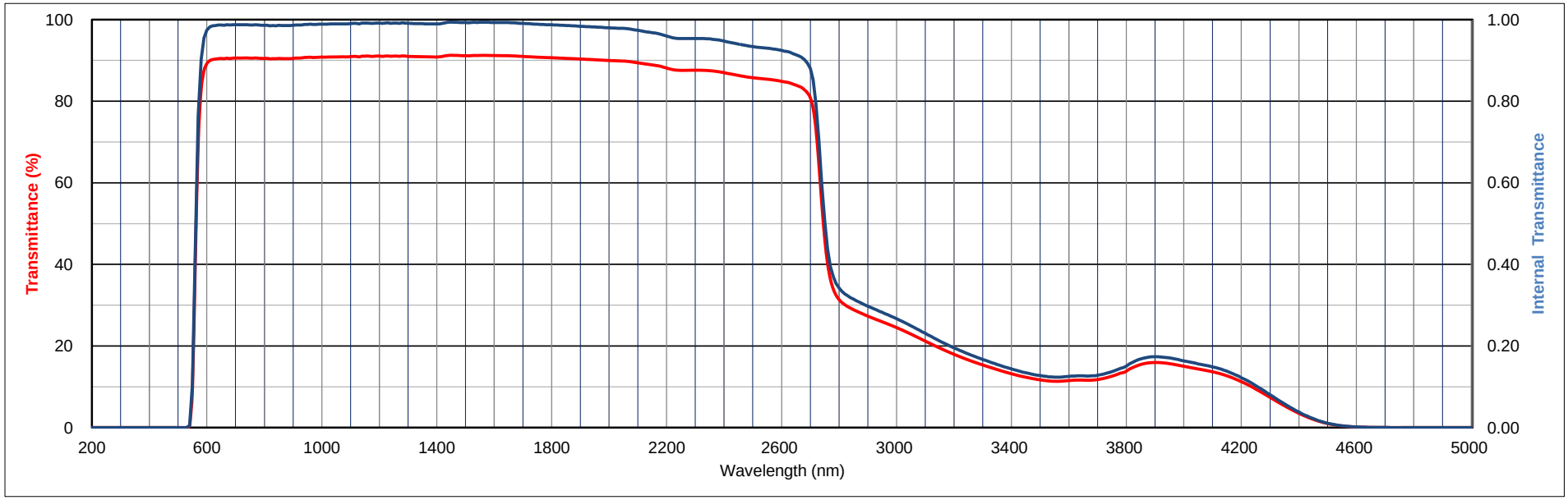
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

O56

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	9.6	41.3	69.9	82.8	87.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	89.2	89.9	90.2	90.3	90.4	90.5	90.4	90.5	90.4	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.5	90.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.5	90.5	90.4	90.4	90.4	90.5	90.4	90.4	90.4	90.4	90.5	90.6	90.6	90.6	90.7	90.8	90.8	90.7	90.7	90.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.8	90.8	90.8	90.8	90.9	90.9	90.9	90.9	90.9	90.9	90.9	91.0	91.0	90.9	91.0	91.0	91.1	91.0	91.0	91.1
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	91.1	91.0	91.1	91.1	91.0	91.1	91.1	91.0	91.1	91.1	91.0	91.0	91.0	90.9	90.9	90.9	90.9	90.9	90.9	90.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.8	90.9	91.0	91.1	91.2	91.3	91.2	91.2	91.2	91.1	91.2	91.1	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.2	91.2	91.2	91.2	91.2	91.1	91.1	91.1	91.0	91.0	91.0	90.9	90.9	90.9	90.8	90.8	90.8	90.7	90.7	90.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.7	90.6	90.6	90.6	90.5	90.5	90.5	90.4	90.4	90.4	90.3	90.3	90.3	90.2	90.2	90.2	90.1	90.1	90.0	90.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.0	89.8	89.4	88.9	88.1	87.6	87.6	87.5	87.0	86.3	85.8	85.4	84.9	83.9	80.8	46.4	31.4	28.9	27.3	25.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	24.5	22.9	21.2	19.5	18.0	16.6	15.3	14.2	13.2	12.3	11.7	11.3	11.5	11.6	11.8	12.6	13.8	15.5	16.0	15.7
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	15.0	14.4	13.7	12.7	11.2	9.4	7.4	5.3	3.5	2.0	1.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

O58

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	7.4	38.9	69.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	83.0	87.7	89.4	90.0	90.3	90.4	90.4	90.5	90.5	90.6	90.6	90.6	90.6	90.6	90.5	90.6	90.5	90.6	90.5	90.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.4	90.5	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.5	90.6	90.5	90.6	90.7	90.8	90.6	90.7	90.8	90.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.7	90.7	90.8	90.8	90.8	90.8	90.8	90.9	90.8	90.8	90.9	90.9	90.9	90.9	90.9	91.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.550	1.540	1.531	1.526	1.524	1.522	1.520
P	0.911	0.913	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

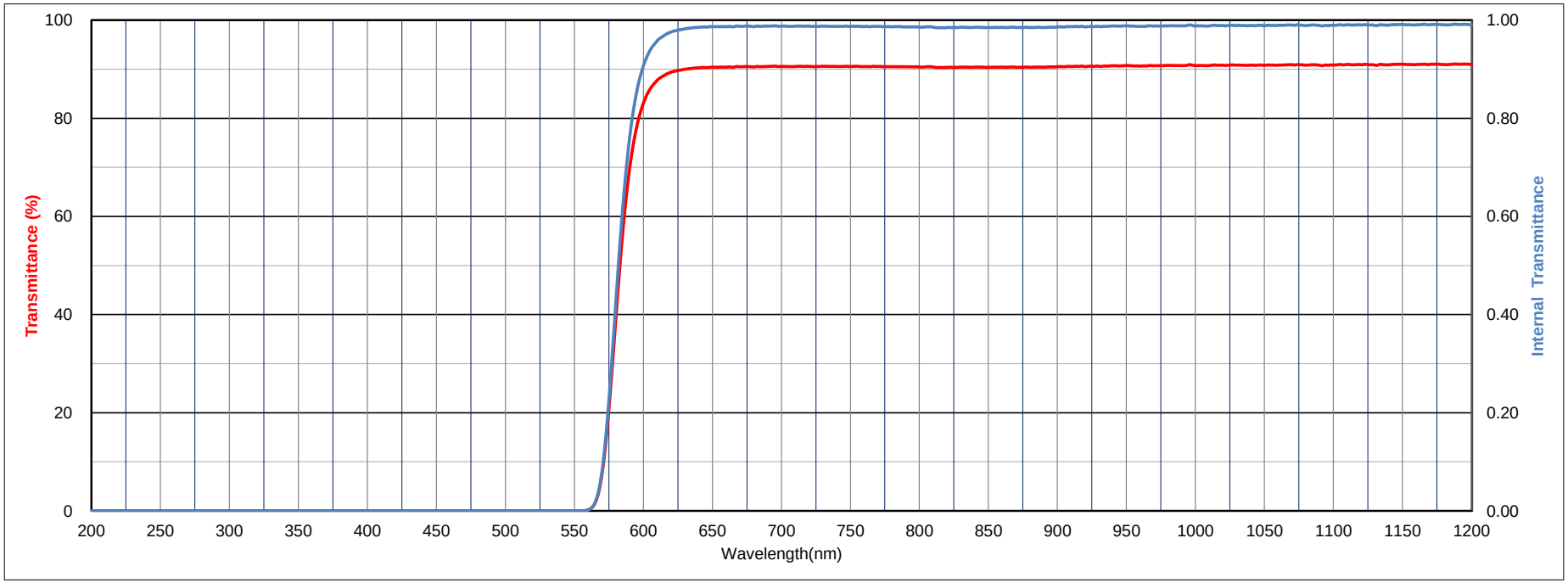
	x	y	Y	λ_d	P_e
A	0.654	0.346	36	606	100
C	0.643	0.356	24	604	100
D65	0.643	0.357	24	604	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	625	93	104	520	140	2.68

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
580±5	<25	>85



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HOYA

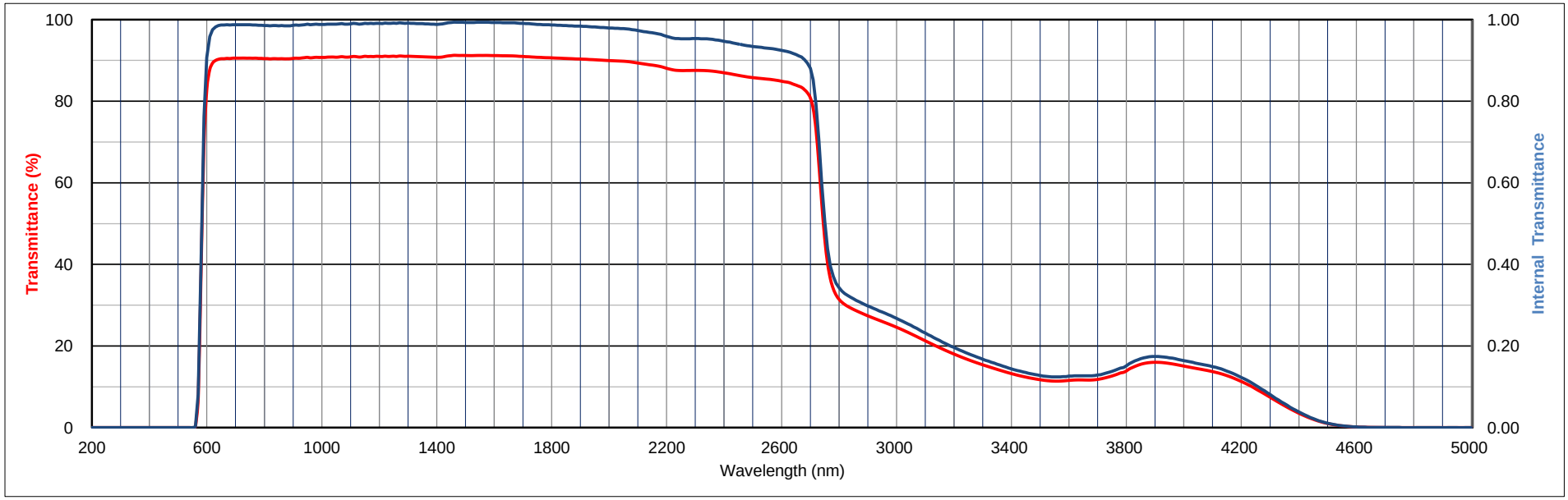
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

O58

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	7.4	38.9	69.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	83.0	87.7	89.4	90.0	90.3	90.4	90.4	90.5	90.5	90.6	90.6	90.6	90.6	90.6	90.5	90.6	90.5	90.6	90.5	90.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.4	90.5	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.5	90.6	90.5	90.6	90.7	90.8	90.6	90.7	90.8	90.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.7	90.7	90.8	90.8	90.8	90.8	90.8	90.9	90.8	90.8	90.9	91.0	90.9	90.8	90.9	91.0	90.9	91.0	90.9	91.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.1	91.0	91.0	91.0	91.0	91.0	90.9	90.9	90.9	90.9	90.8	90.8	90.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.8	90.8	90.8	91.0	91.1	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2	91.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.2	91.2	91.2	91.1	91.1	91.1	91.1	91.1	91.0	91.0	91.0	90.9	90.9	90.8	90.8	90.8	90.7	90.7	90.7	90.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.6	90.6	90.6	90.5	90.5	90.5	90.4	90.4	90.4	90.4	90.3	90.3	90.3	90.2	90.2	90.2	90.1	90.1	90.0	90.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.0	89.8	89.4	88.8	88.1	87.5	87.6	87.4	87.0	86.3	85.8	85.4	84.9	84.0	80.8	46.4	31.4	29.0	27.4	26.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	24.6	23.0	21.3	19.6	18.0	16.6	15.4	14.3	13.2	12.4	11.7	11.4	11.6	11.7	11.8	12.6	13.9	15.5	16.0	15.7
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	15.1	14.4	13.7	12.7	11.3	9.5	7.4	5.4	3.5	2.0	1.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R60

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	9.6
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	43.5	72.3	84.0	87.9	89.2	89.7	90.0	90.0	90.2	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.2	90.2	90.3	90.3	90.3	90.4	90.3	90.3	90.4	90.4	90.4	90.5	90.5	90.5	90.5	90.6	90.6	90.6	90.6	90.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.7	90.8	90.8	90.7	90.7	90.8	90.8	90.7	90.8	90.8	90.8	90.8	90.8	90.9	90.9	91.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.550	1.538	1.530	1.526	1.523	1.522	1.520
P	0.911	0.914	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

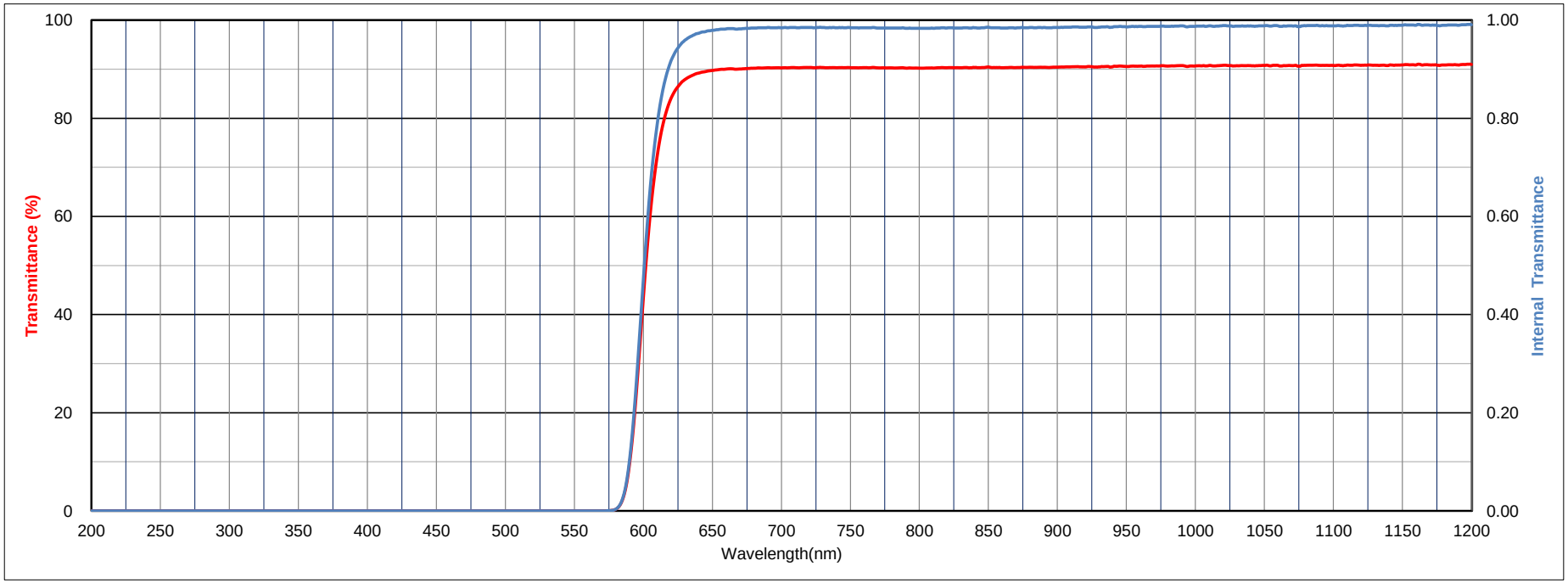
	x	y	Y	λ_d	P_e
A	0.687	0.312	22	618	100
C	0.683	0.316	14	616	100
D65	0.683	0.317	13	616	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	2	560	620	93	103	520	140	2.69

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
600±5	<25	>85



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HOYA

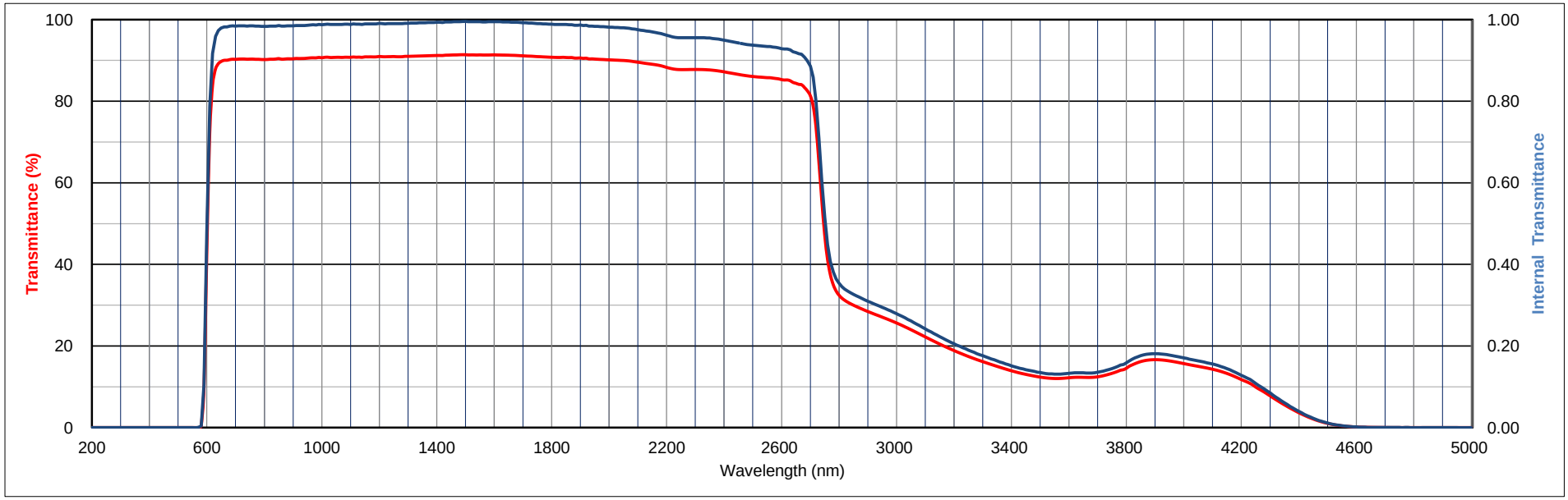
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R60

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	9.6
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	43.5	72.3	84.0	87.9	89.2	89.7	90.0	90.0	90.2	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.2	90.2	90.3	90.3	90.3	90.4	90.3	90.3	90.4	90.4	90.4	90.5	90.5	90.5	90.5	90.6	90.6	90.6	90.6	90.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.7	90.8	90.8	90.7	90.7	90.8	90.8	90.7	90.8	90.8	90.8	90.8	90.8	90.8	90.8	90.9	90.9	90.9	90.9	90.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	91.0	90.9	90.9	90.9	90.9	91.0	90.9	90.9	90.9	91.0	91.0	91.0	91.0	91.1	91.1	91.1	91.1	91.1	91.2	91.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	91.2	91.2	91.2	91.3	91.3	91.3	91.3	91.4	91.4	91.4	91.4	91.3	91.4	91.3	91.3	91.4	91.3	91.3	91.3	91.3
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.4	91.3	91.3	91.3	91.3	91.3	91.3	91.2	91.2	91.2	91.1	91.1	91.1	91.0	91.0	90.9	90.9	90.9	90.8	90.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.8	90.7	90.7	90.7	90.8	90.7	90.7	90.7	90.6	90.6	90.6	90.5	90.5	90.4	90.4	90.3	90.3	90.2	90.2	90.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.1	90.0	89.6	89.1	88.3	87.7	87.8	87.7	87.2	86.6	86.1	85.8	85.3	84.4	81.4	47.3	32.4	30.0	28.5	27.1
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	25.6	24.0	22.2	20.5	18.9	17.4	16.2	15.0	13.9	13.0	12.4	12.0	12.2	12.3	12.4	13.3	14.5	16.2	16.6	16.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	15.7	15.0	14.3	13.3	11.8	9.9	7.8	5.6	3.6	2.1	1.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R62

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.2	8.7	44.9	74.1	85.0	88.4	89.5	89.9	90.1	90.2	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.2	90.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.2	90.3	90.3	90.4	90.3	90.3	90.3	90.4	90.4	90.4	90.5	90.5	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.6	90.7	90.7	90.7	90.7	90.7	90.8	90.8	90.8	90.8	90.9	90.8	90.8	90.9	90.9	90.9				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.552	1.542	1.533	1.528	1.525	1.523	1.521
P	0.911	0.913	0.915	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

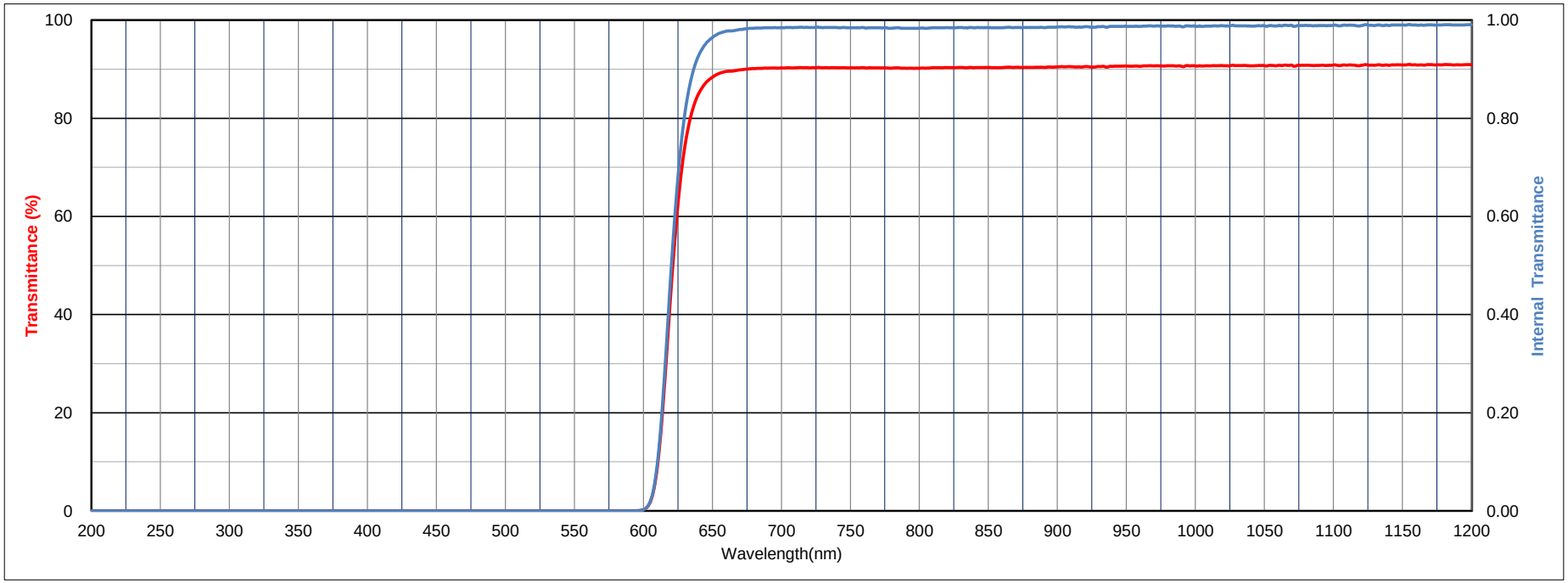
	x	y	Y	λ_d	P_e
A	0.712	0.288	11	633	100
C	0.711	0.289	6	632	100
D65	0.710	0.290	6	632	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	620	95	107	520	140	2.68

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
620±5	<25	>85



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

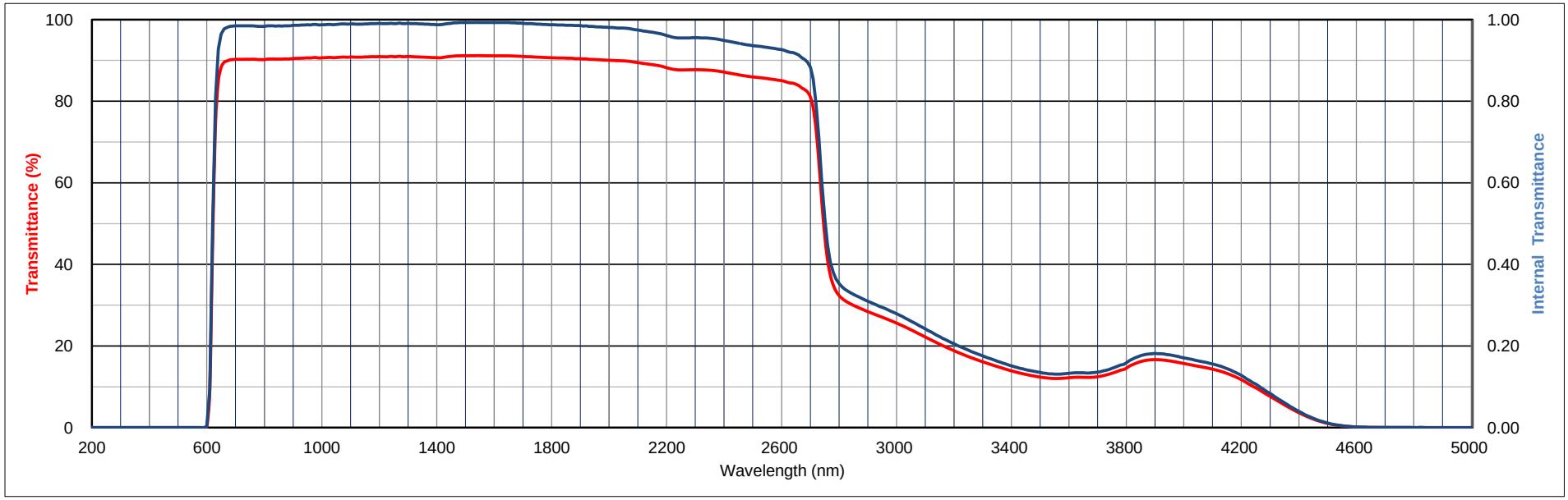
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R62

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.2	8.7	44.9	74.1	85.0	88.4	89.5	89.9	90.1	90.2	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.3	90.2	90.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.2	90.3	90.3	90.4	90.3	90.3	90.3	90.4	90.4	90.4	90.5	90.5	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.6	90.7	90.7	90.7	90.7	90.7	90.8	90.8	90.8	90.8	90.9	90.8	90.8	90.8	90.8	90.9	90.9	90.9	90.9	90.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	90.9	90.9	90.9	90.9	91.0	90.9	90.9	91.0	90.9	90.9	91.0	90.9	90.9	90.9	90.8	90.8	90.8	90.8	90.7	90.7
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.7	90.6	90.7	90.8	90.9	91.0	91.1	91.1	91.1	91.1	91.1	91.1	91.2	91.1	91.2	91.2	91.1	91.1	91.1	91.1
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.0	91.0	91.0	90.9	90.9	90.9	90.8	90.8	90.8	90.7	90.7	90.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.7	90.6	90.6	90.6	90.6	90.6	90.5	90.5	90.5	90.4	90.4	90.4	90.4	90.3	90.3	90.2	90.2	90.1	90.1	90.1
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.0	89.9	89.5	89.0	88.2	87.7	87.7	87.6	87.1	86.5	85.9	85.6	85.0	84.1	81.1	47.2	32.4	30.0	28.4	27.1
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	25.6	24.0	22.2	20.5	18.8	17.4	16.1	15.0	13.9	13.0	12.4	12.0	12.2	12.3	12.5	13.3	14.6	16.2	16.7	16.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	15.7	15.0	14.3	13.3	11.8	9.8	7.6	5.6	3.6	2.1	1.0	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R64

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.0	0.1	0.9	10.0	39.7	70.3	84.2	88.2	89.7	90.1	90.3	90.3	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.4	90.4	90.5	90.5	90.5	90.6	90.5	90.6	90.6	90.5	90.6	90.7	90.8	90.8	90.8	90.8	90.8	90.9	90.9	90.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	91.0	90.9	91.0	91.0	90.9	91.0	90.9	91.0	91.0	91.0	91.0	90.9	91.0	91.1	91.1	91.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.551	1.540	1.532	1.527	1.524	1.522	1.521
P	0.911	0.914	0.915	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

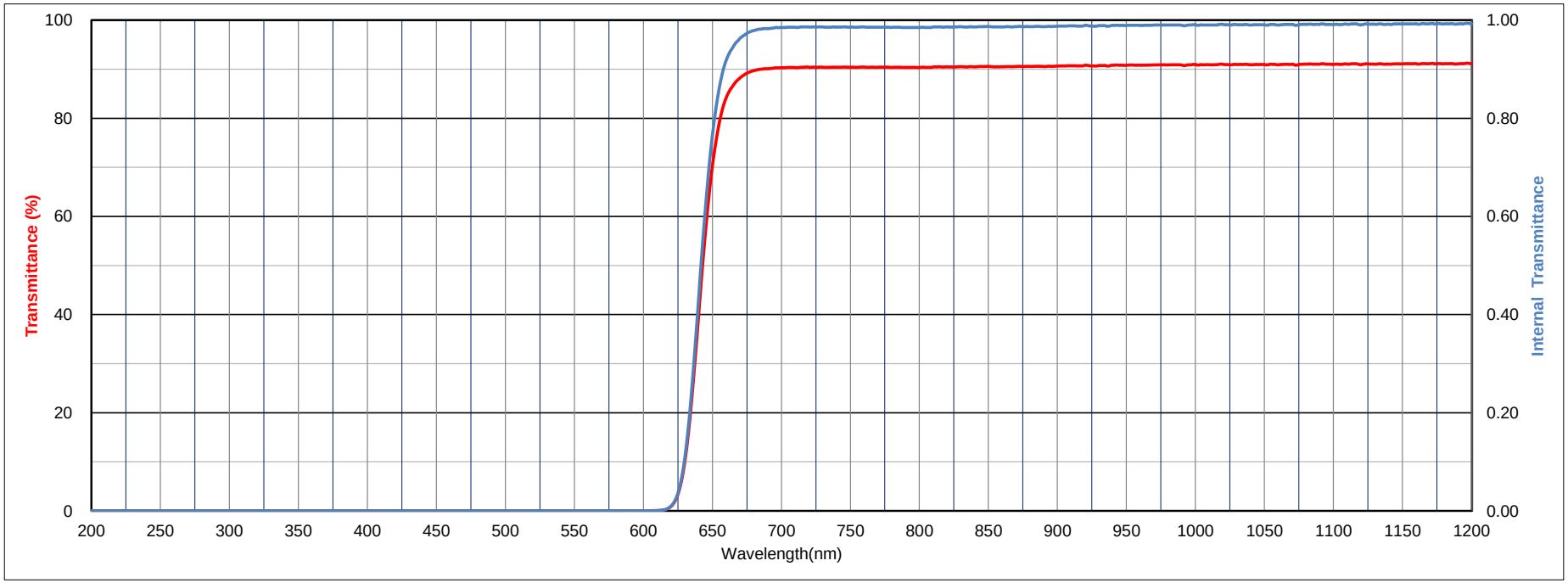
	x	y	Y	λ_d	P_e
A	0.725	0.275	4	648	100
C	0.724	0.276	2	647	100
D65	0.724	0.276	2	647	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	555	620	94	106	520	140	2.68

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
640±5	<35	>85



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HOYA

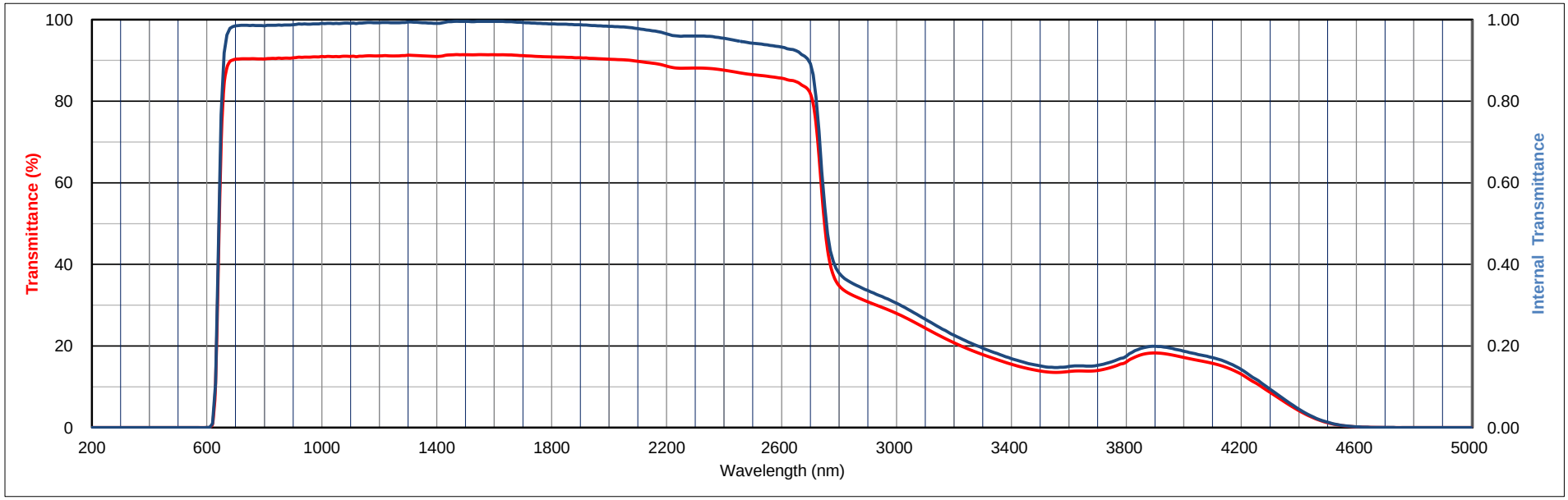
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R64

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.0	0.1	0.9	10.0	39.7	70.3	84.2	88.2	89.7	90.1	90.3	90.3	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.4	90.4	90.5	90.5	90.5	90.6	90.5	90.6	90.6	90.5	90.6	90.7	90.8	90.8	90.8	90.8	90.8	90.9	90.9	90.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	91.0	90.9	91.0	91.0	90.9	91.0	90.9	91.0	91.0	91.0	91.0	91.0	90.9	91.0	91.0	91.1	91.1	91.1	91.1	91.1
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	91.1	91.1	91.2	91.1	91.1	91.1	91.1	91.1	91.2	91.2	91.3	91.3	91.2	91.2	91.2	91.1	91.1	91.1	91.0	91.0
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	91.0	91.0	91.1	91.2	91.3	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4	91.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.4	91.4	91.4	91.4	91.4	91.3	91.3	91.3	91.3	91.2	91.2	91.1	91.1	91.1	91.0	91.0	90.9	90.9	90.9	90.9
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.9	90.8	90.8	90.8	90.8	90.8	90.7	90.7	90.7	90.7	90.7	90.6	90.6	90.5	90.5	90.5	90.4	90.4	90.4	90.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.3	90.2	89.8	89.3	88.6	88.1	88.1	88.0	87.6	87.0	86.5	86.1	85.6	84.8	81.9	49.7	34.8	32.3	30.8	29.5
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	28.0	26.3	24.4	22.5	20.8	19.2	17.9	16.7	15.5	14.6	13.9	13.5	13.7	13.9	14.0	14.8	16.1	17.8	18.3	17.9
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	17.2	16.5	15.7	14.7	13.1	10.9	8.6	6.3	4.2	2.4	1.2	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R66

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.0	0.0	0.0	0.0	0.6	9.9	42.3	70.9	84.3	88.5	89.8	90.1	90.3	90.3	90.4	90.4	90.4	90.4	90.4	90.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.4	90.5	90.5	90.5	90.5	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.7	90.8	90.8	90.8	90.9	90.9	91.0	90.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.9	90.9	91.0	91.0	90.9	90.9	91.0	91.1	91.0	91.1	91.1	91.0	91.1	91.1	91.2	91.2				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.551	1.542	1.535	1.529	1.526	1.524	1.523
P	0.911	0.913	0.915	0.916	0.917	0.917	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

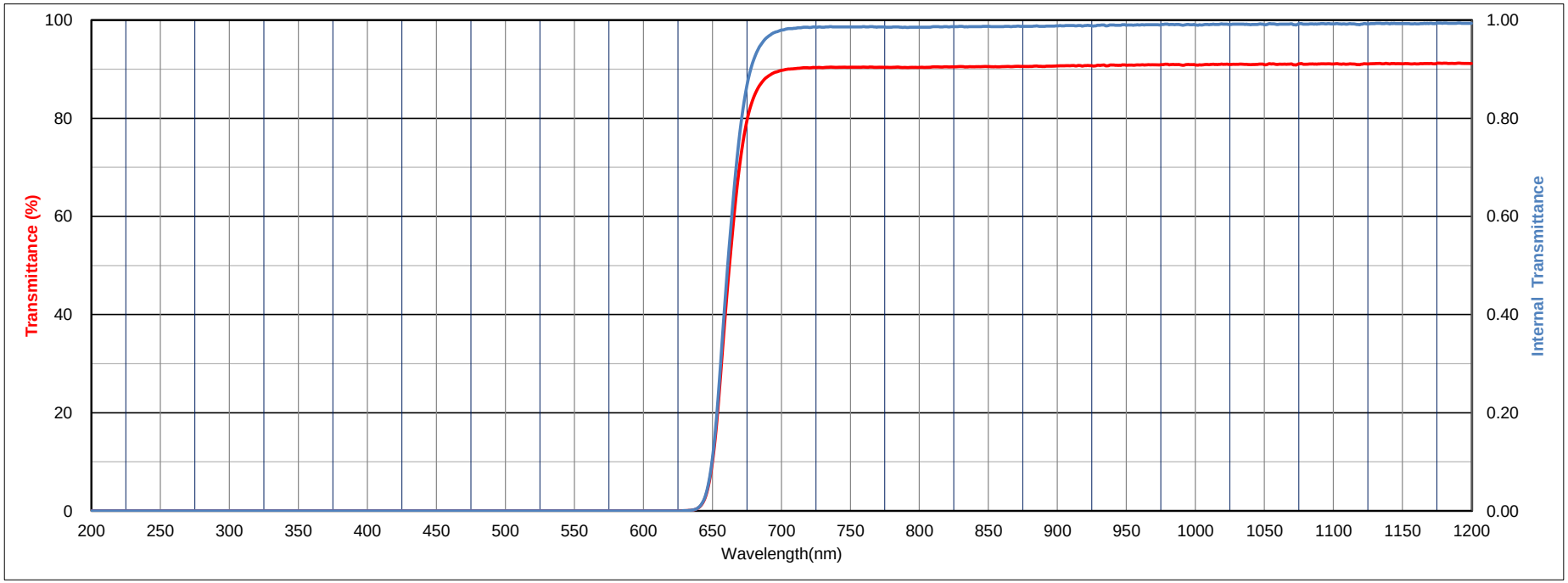
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	530	565	98	117	470	160	2.85

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
660±5	<35	>85



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HOYA

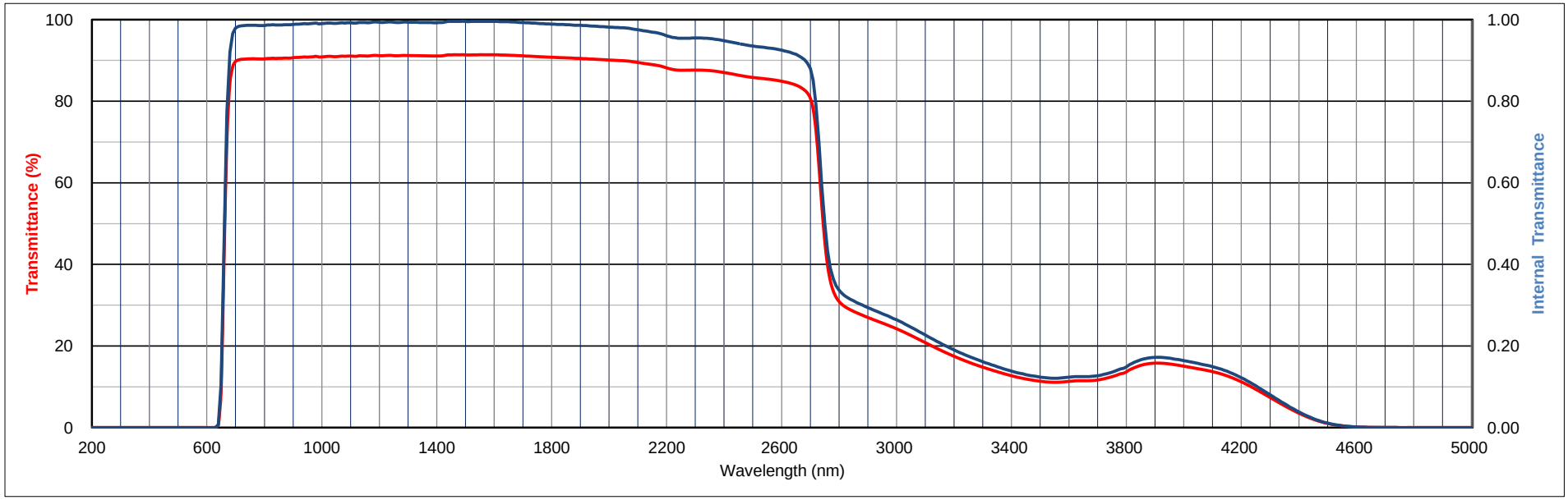
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R66

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.0	0.0	0.0	0.0	0.6	9.9	42.3	70.9	84.3	88.5	89.8	90.1	90.3	90.3	90.4	90.4	90.4	90.4	90.4	90.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	90.4	90.5	90.5	90.5	90.5	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.7	90.8	90.8	90.8	90.9	90.9	91.0	90.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.9	90.9	91.0	91.0	90.9	90.9	91.0	91.1	91.0	91.1	91.1	91.0	91.0	91.1	91.1	91.1	91.1	91.1	91.2	91.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	91.2	91.1	91.2	91.2	91.2	91.2	91.1	91.1	91.2	91.2	91.2	91.2	91.2	91.2	91.1	91.1	91.1	91.1	91.1	91.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	91.1	91.1	91.1	91.3	91.4	91.3	91.4	91.4	91.4	91.4	91.4	91.3	91.3	91.4	91.4	91.4	91.4	91.4	91.4	91.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.4	91.4	91.3	91.3	91.3	91.3	91.2	91.2	91.2	91.1	91.1	91.1	91.1	91.0	91.0	90.9	90.9	90.9	90.8	90.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.8	90.7	90.7	90.7	90.7	90.6	90.6	90.6	90.5	90.5	90.5	90.4	90.4	90.3	90.3	90.3	90.3	90.2	90.2	90.1
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	90.1	89.9	89.5	89.0	88.2	87.6	87.6	87.5	87.0	86.4	85.8	85.4	84.9	84.0	80.8	45.9	30.9	28.5	27.0	25.6
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	24.2	22.6	20.8	19.1	17.5	16.0	14.8	13.7	12.7	11.9	11.4	11.1	11.3	11.5	11.7	12.5	13.7	15.3	15.8	15.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	15.0	14.4	13.7	12.7	11.2	9.4	7.4	5.4	3.5	2.1	1.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

赤外透過フィルター

可視域をほとんど吸収し、赤外域を透過する特性を有するフィルターです。
可視域を比較的シャープにカットするRとIRシリーズ、緩やかにカットするRMシリーズ、赤外域にバンドパスを有するRTシリーズがあります。
赤外線を利用するセキュリテイシステムや暗視装置などに利用されています。

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R70

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	14.2	44.0	68.9	81.1	86.2	88.2	89.1	89.5	89.7	89.8	89.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	89.9	90.0	90.0	90.0	90.0	90.1	90.2	90.1	90.1	90.2	90.2	90.3	90.4	90.4	90.5	90.4	90.4	90.5	90.5	90.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	90.6	90.6	90.7	90.6	90.6	90.6	90.6	90.7	90.7	90.7	90.7	90.7	90.8	90.8	90.8	90.8				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.562	1.552	1.546	1.543	1.541	1.540	1.539
P	0.908	0.911	0.912	0.913	0.913	0.914	0.914

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

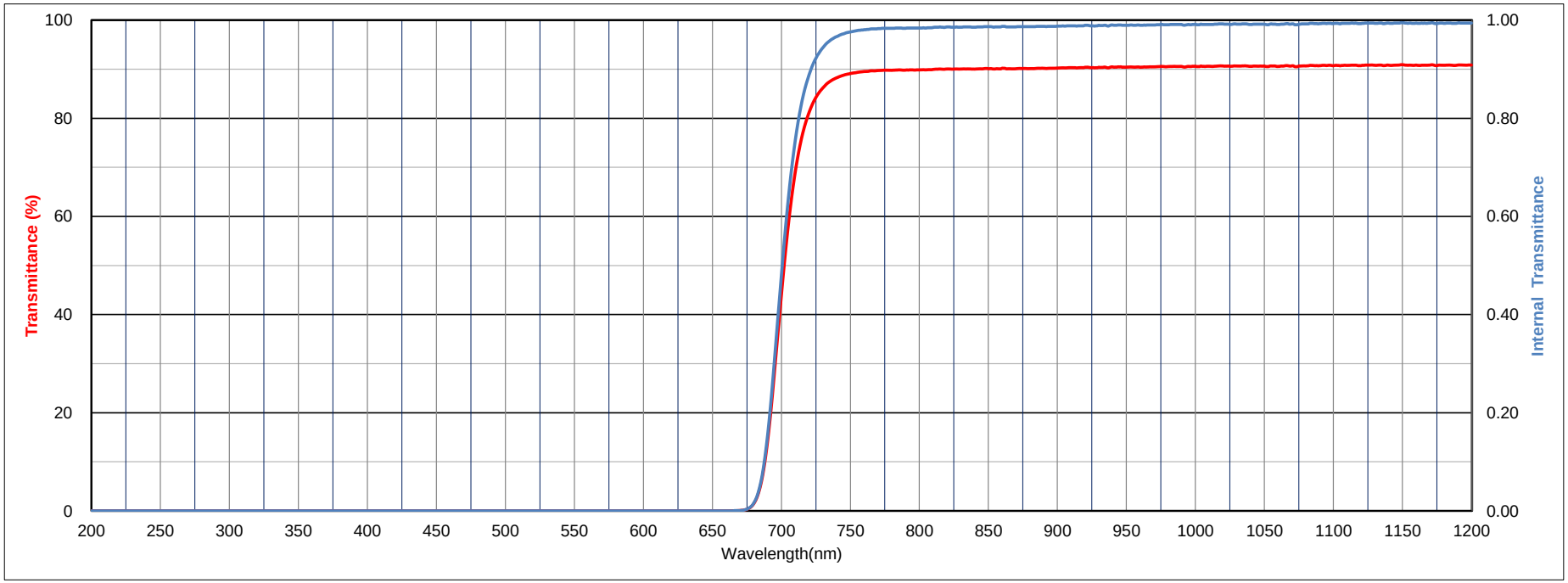
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	525	575	98	115	470	160	2.86

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
700±10	<45	>85



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HOYA

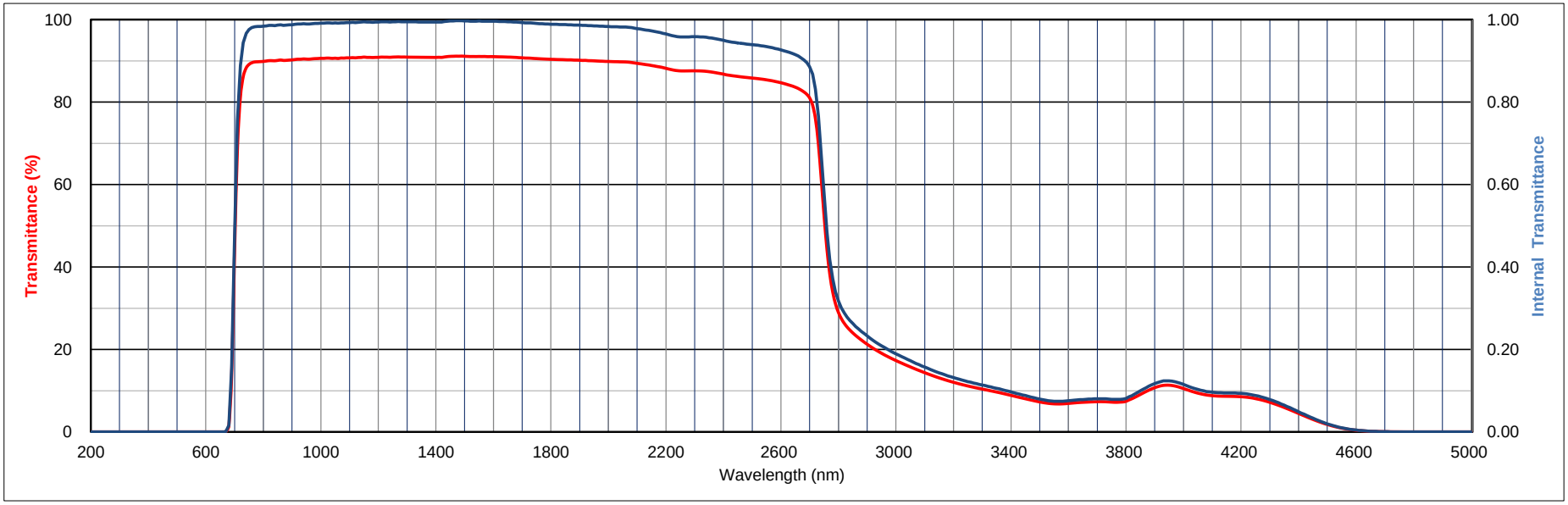
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R70

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	14.2	44.0	68.9	81.1	86.2	88.2	89.1	89.5	89.7	89.8	89.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	89.9	90.0	90.0	90.0	90.0	90.1	90.2	90.1	90.1	90.2	90.2	90.3	90.4	90.4	90.5	90.4	90.4	90.5	90.5	90.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	90.6	90.6	90.7	90.6	90.6	90.6	90.6	90.7	90.7	90.7	90.7	90.8	90.7	90.8	90.8	90.9	90.8	90.8	90.8	90.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	90.8	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.9	90.8	90.8	90.8	90.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	90.8	90.9	90.8	90.9	91.0	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	91.0	91.0	91.0	91.0	90.9	90.9	90.9	90.9	90.8	90.8	90.7	90.7	90.7	90.6	90.6	90.5	90.5	90.5	90.4	90.4
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	90.4	90.3	90.3	90.3	90.3	90.3	90.2	90.2	90.2	90.2	90.1	90.1	90.1	90.0	90.0	90.0	90.0	89.9	89.9	89.9
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	89.8	89.7	89.4	88.9	88.2	87.6	87.6	87.4	86.8	86.2	85.8	85.4	84.7	83.6	81.0	52.4	29.0	24.0	21.2	19.1
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	17.3	15.8	14.4	13.1	12.0	11.1	10.4	9.7	8.9	8.0	7.3	6.8	6.9	7.2	7.3	7.2	7.4	9.1	10.7	11.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	10.5	9.4	8.8	8.6	8.5	8.1	7.2	5.9	4.5	3.0	1.8	0.9	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
τ	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R72

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	10.5	45.0	71.2	81.4	84.9	86.1	86.7	87.1	87.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	87.4	87.6	87.8	87.9	88.0	88.2	88.2	88.4	88.5	88.6	88.7	88.8	88.9	88.9	89.1	89.1	89.2	89.3	89.3	89.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	89.4	89.5	89.5	89.6	89.6	89.6	89.7	89.7	89.8	89.8	89.8	89.8	89.9	90.0	89.9	90.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.565	1.554	1.547	1.543	1.540	1.538	1.537
P	0.907	0.910	0.912	0.913	0.914	0.914	0.914

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

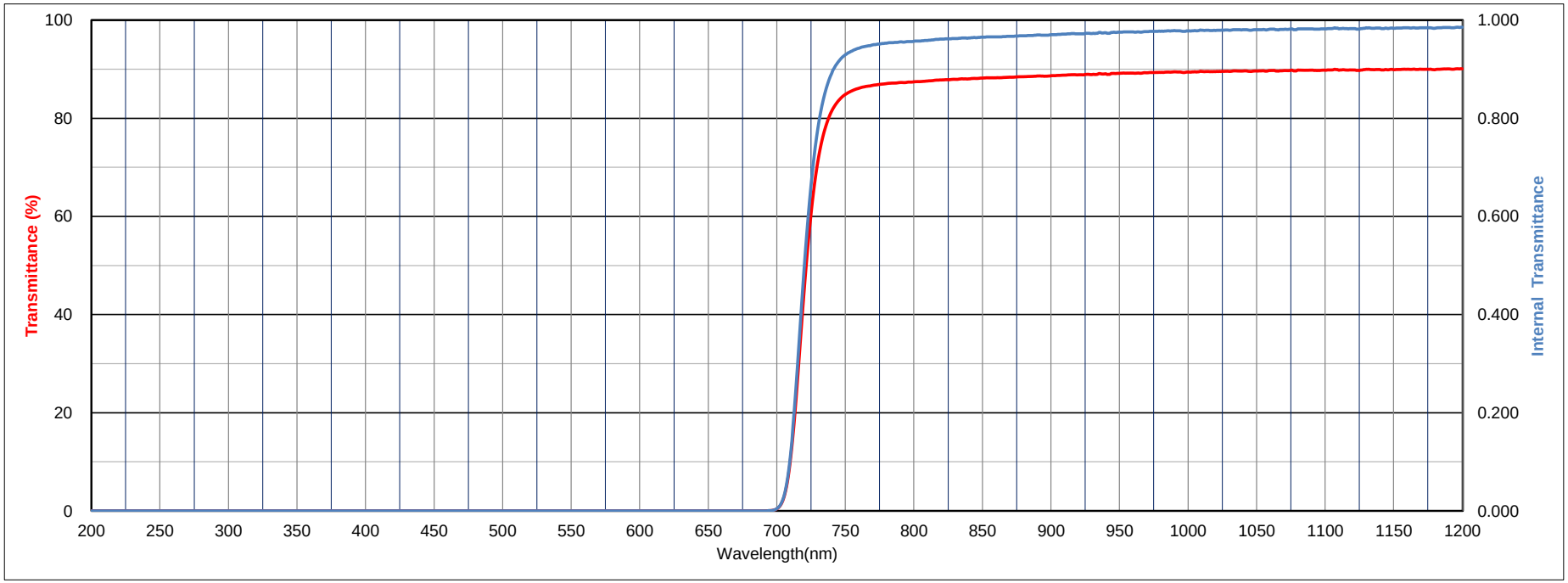
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	525	575	100	116	470	160	2.86

Tolerance of Transmittance (τ)

λτ (nm)	⊿λ (nm)	TH (%)
720±10	<45	>85



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HOYA

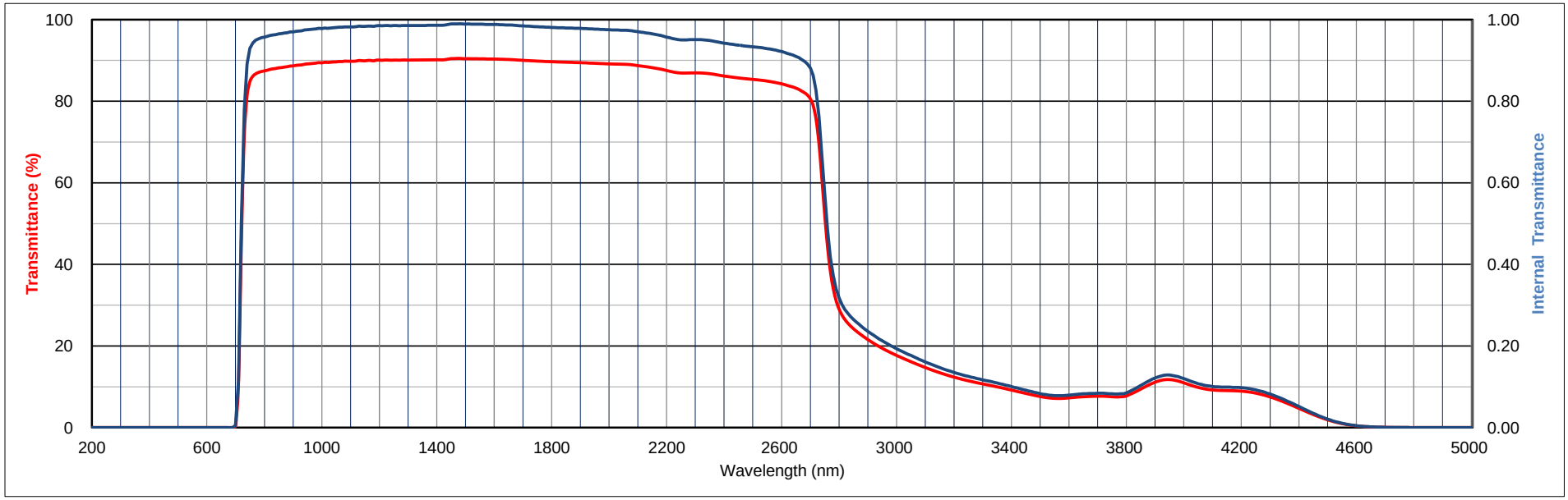
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

R72

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	10.5	45.0	71.2	81.4	84.9	86.1	86.7	87.1	87.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	87.4	87.6	87.8	87.9	88.0	88.2	88.2	88.4	88.5	88.6	88.7	88.8	88.9	88.9	89.1	89.1	89.2	89.3	89.3	89.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.4	89.5	89.5	89.6	89.6	89.6	89.7	89.7	89.8	89.8	89.8	89.8	89.8	90.0	89.9	89.9	90.0	90.0	89.9	90.1
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	90.1	90.0	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1	90.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.1	90.1	90.1	90.2	90.3	90.4	90.4	90.5	90.5	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.4	90.3	90.3
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	90.3	90.3	90.3	90.3	90.2	90.2	90.2	90.2	90.1	90.1	90.0	90.0	89.9	89.9	89.9	89.8	89.8	89.8	89.7	89.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	89.7	89.7	89.6	89.6	89.6	89.6	89.5	89.5	89.5	89.5	89.5	89.4	89.4	89.3	89.3	89.3	89.3	89.2	89.2	89.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	89.1	89.1	88.7	88.2	87.5	86.9	86.9	86.7	86.2	85.7	85.3	84.9	84.3	83.2	80.6	52.3	29.1	24.2	21.6	19.4
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	17.7	16.1	14.7	13.4	12.4	11.5	10.7	10.0	9.2	8.4	7.6	7.2	7.3	7.6	7.7	7.6	7.7	9.4	11.1	11.8
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	11.0	9.8	9.2	9.1	8.9	8.4	7.5	6.2	4.7	3.2	1.9	1.0	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

IR76N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	12.8	38.5	63.7	77.5	83.7
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	86.3	87.3	87.9	88.2	88.3	88.5	88.6	88.7	88.8	88.9	89.0	89.0	89.1	89.2	89.3	89.4	89.3	89.4	89.4	89.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.5	89.6	89.6	89.6	89.6	89.7	89.7	89.8	89.8	89.8	89.8	89.8	89.9	89.9	89.9	89.9				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.576	1.567	1.561	1.556	1.553	1.551	1.550
P	0.905	0.907	0.908	0.910	0.910	0.911	0.911

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

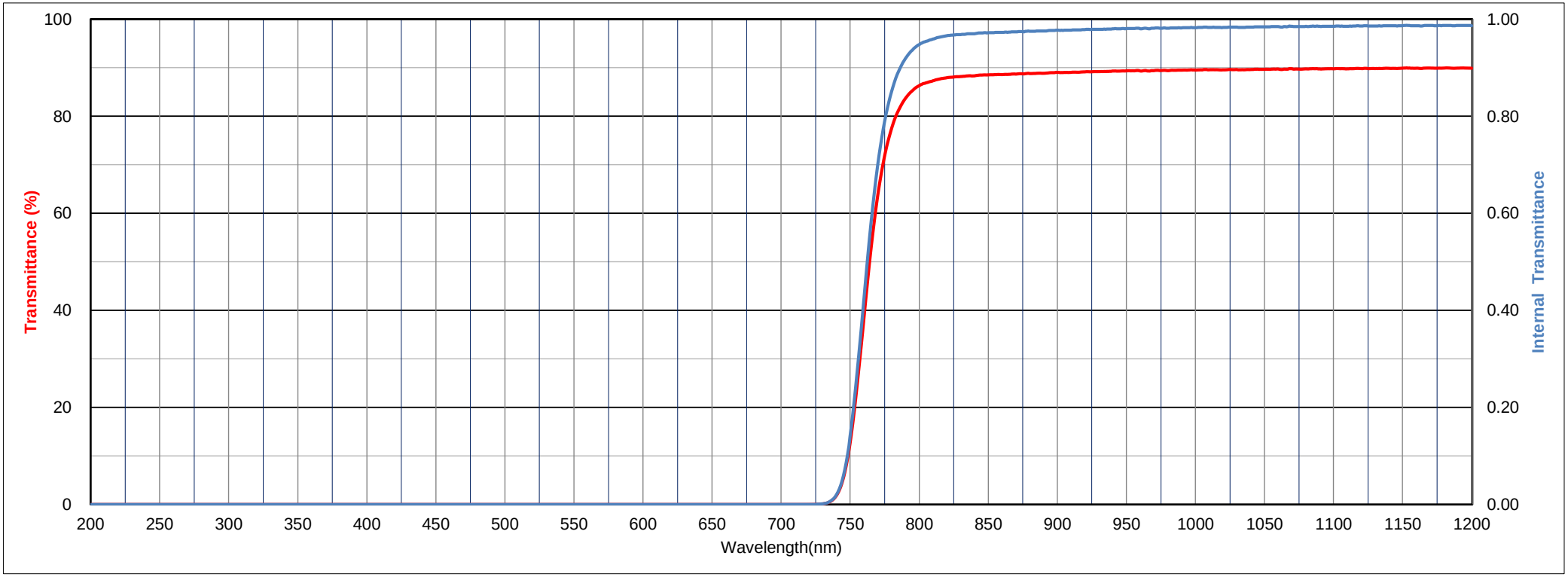
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	2	495	545	89	99	500	160	2.84

Tolerance of Transmittance (T)

λT (nm)	⊿λ (nm)
760±10	<60



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HOYA

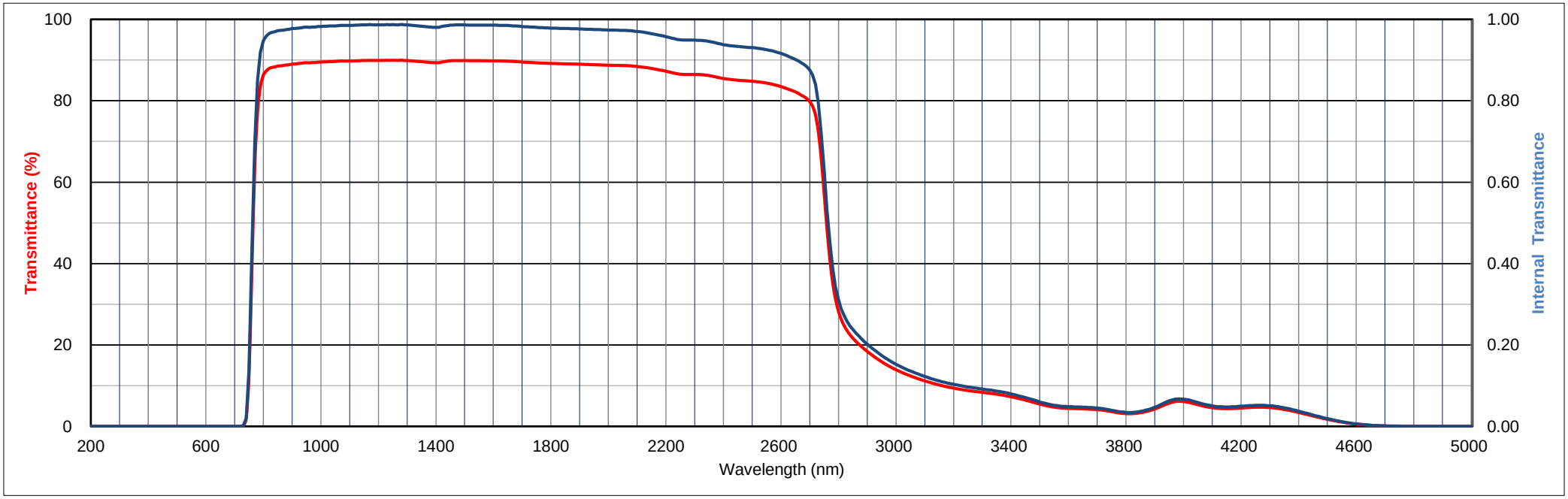
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

IR76N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.8	12.8	38.5	63.7	77.5	83.7
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	86.3	87.3	87.9	88.2	88.3	88.5	88.6	88.7	88.8	88.9	89.0	89.0	89.1	89.2	89.3	89.4	89.3	89.4	89.4	89.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.5	89.6	89.6	89.6	89.6	89.7	89.7	89.8	89.8	89.8	89.8	89.8	89.8	89.8	89.9	89.9	89.9	89.9	89.9	89.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	89.9	89.9	89.9	89.9	89.9	90.0	89.9	89.9	90.0	89.9	89.9	89.8	89.8	89.7	89.7	89.6	89.5	89.5	89.4	89.4
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	89.4	89.4	89.5	89.6	89.7	89.8	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.8	89.8	89.8	89.8
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.8	89.8	89.8	89.8	89.8	89.7	89.7	89.7	89.6	89.6	89.5	89.5	89.5	89.4	89.4	89.3	89.3	89.3	89.2	89.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	89.2	89.2	89.1	89.1	89.1	89.1	89.1	89.0	89.0	89.0	89.0	89.0	88.9	88.9	88.9	88.9	88.8	88.8	88.8	88.8
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	88.7	88.7	88.4	87.9	87.3	86.5	86.5	86.2	85.5	85.0	84.8	84.3	83.5	82.2	79.8	57.4	28.3	21.7	18.4	15.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	13.9	12.4	11.2	10.2	9.4	8.8	8.4	7.9	7.3	6.4	5.5	4.7	4.4	4.3	4.1	3.6	3.1	3.4	4.3	5.7
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	6.1	5.3	4.6	4.3	4.5	4.7	4.6	4.2	3.4	2.5	1.7	1.1	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

IR80N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	3.9	14.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	36.9	59.4	74.8	82.3	85.7	87.2	87.8	88.2	88.4	88.6	88.8	88.9	89.0	89.1	89.2	89.2	89.3	89.2	89.4	89.4
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.4	89.5	89.5	89.5	89.5	89.6	89.6	89.6	89.7	89.7	89.8	89.8	89.8	89.8	89.9	89.8				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.582	1.570	1.563	1.557	1.554	1.551	1.550
P	0.903	0.906	0.908	0.909	0.910	0.911	0.911

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

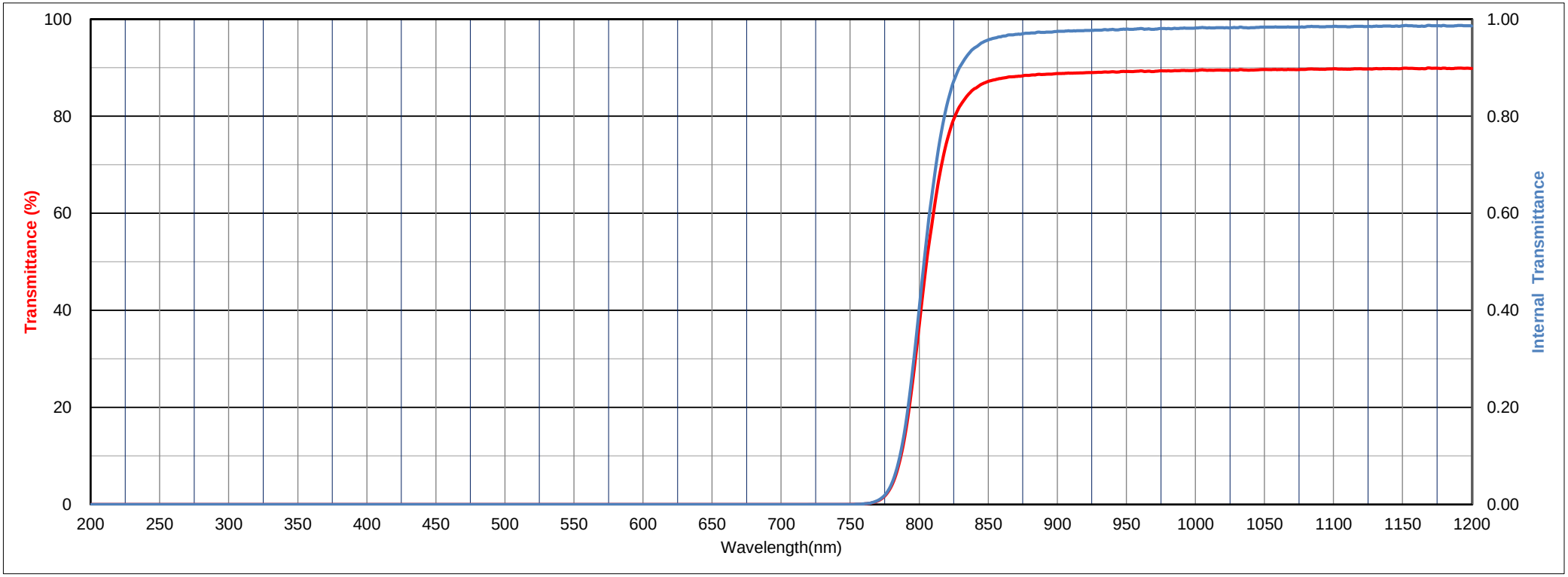
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	495	550	87	100	500	160	2.85

Tolerance of Transmittance (T)

λT (nm)	⊿λ (nm)
800±10	<60



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

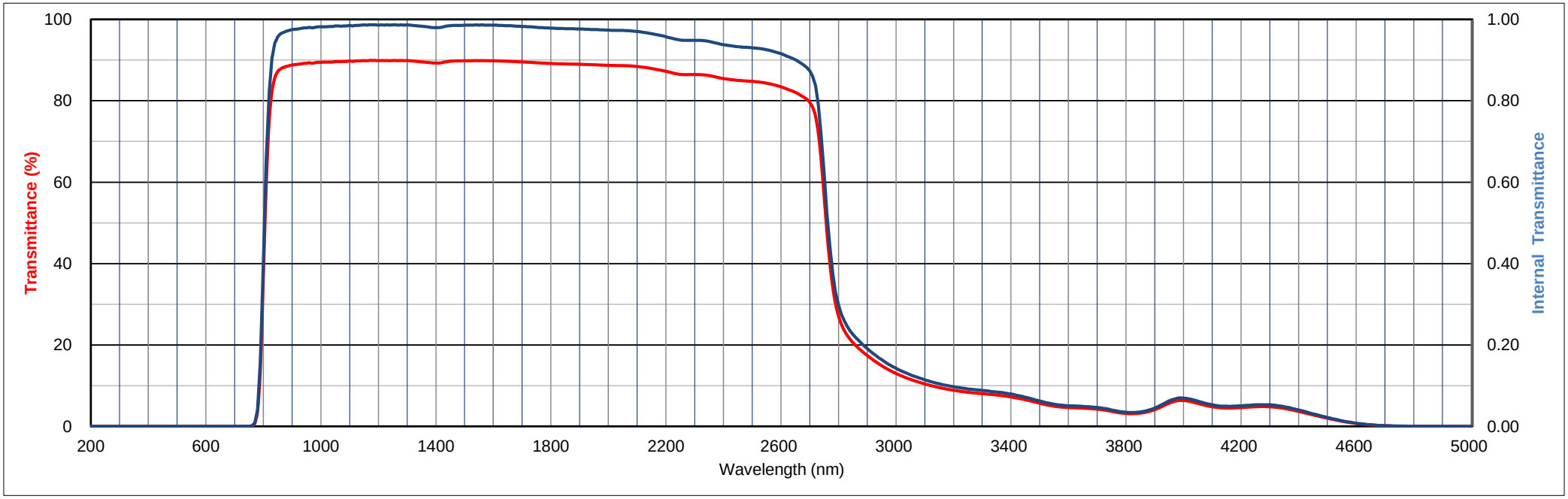
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

IR80N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.7	3.9	14.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	36.9	59.4	74.8	82.3	85.7	87.2	87.8	88.2	88.4	88.6	88.8	88.9	89.0	89.1	89.2	89.2	89.3	89.2	89.4	89.4
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.4	89.5	89.5	89.5	89.5	89.6	89.6	89.6	89.7	89.7	89.8	89.7	89.8	89.8	89.8	89.9	89.8	89.9	89.9	89.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	89.8	89.9	89.9	89.9	89.8	89.9	89.9	89.9	89.9	89.8	89.9	89.8	89.8	89.7	89.6	89.6	89.5	89.4	89.4	89.3
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	89.3	89.3	89.3	89.5	89.6	89.7	89.8	89.8	89.8	89.8	89.8	89.8	89.8	89.9	89.9	89.8	89.9	89.8	89.9	89.8
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.8	89.8	89.8	89.7	89.7	89.7	89.7	89.6	89.6	89.6	89.5	89.5	89.5	89.4	89.4	89.3	89.3	89.3	89.2	89.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	89.2	89.1	89.1	89.1	89.1	89.0	89.0	89.0	89.0	89.0	89.0	88.9	88.9	88.9	88.9	88.8	88.8	88.8	88.8	88.7
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	88.7	88.6	88.4	87.9	87.2	86.5	86.5	86.2	85.4	85.0	84.8	84.3	83.4	82.1	79.6	56.6	27.2	20.6	17.4	14.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	13.0	11.6	10.4	9.5	8.9	8.4	8.0	7.7	7.2	6.5	5.7	5.0	4.6	4.5	4.2	3.7	3.2	3.2	4.1	5.7
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	6.3	5.6	4.8	4.5	4.6	4.8	4.8	4.4	3.7	2.8	2.0	1.3	0.7	0.3	0.2	0.1	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

IR83N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.0	4.3	14.7	36.5	59.3	74.9	82.5	85.7	87.0	87.8	88.1	88.4	88.6	88.7	88.8	88.9	89.0	89.0	89.1	89.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.2	89.3	89.3	89.3	89.3	89.4	89.4	89.4	89.5	89.6	89.6	89.6	89.6	89.7	89.7	89.7				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.588	1.576	1.569	1.563	1.560	1.558	1.556
P	0.902	0.905	0.906	0.908	0.909	0.909	0.910

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

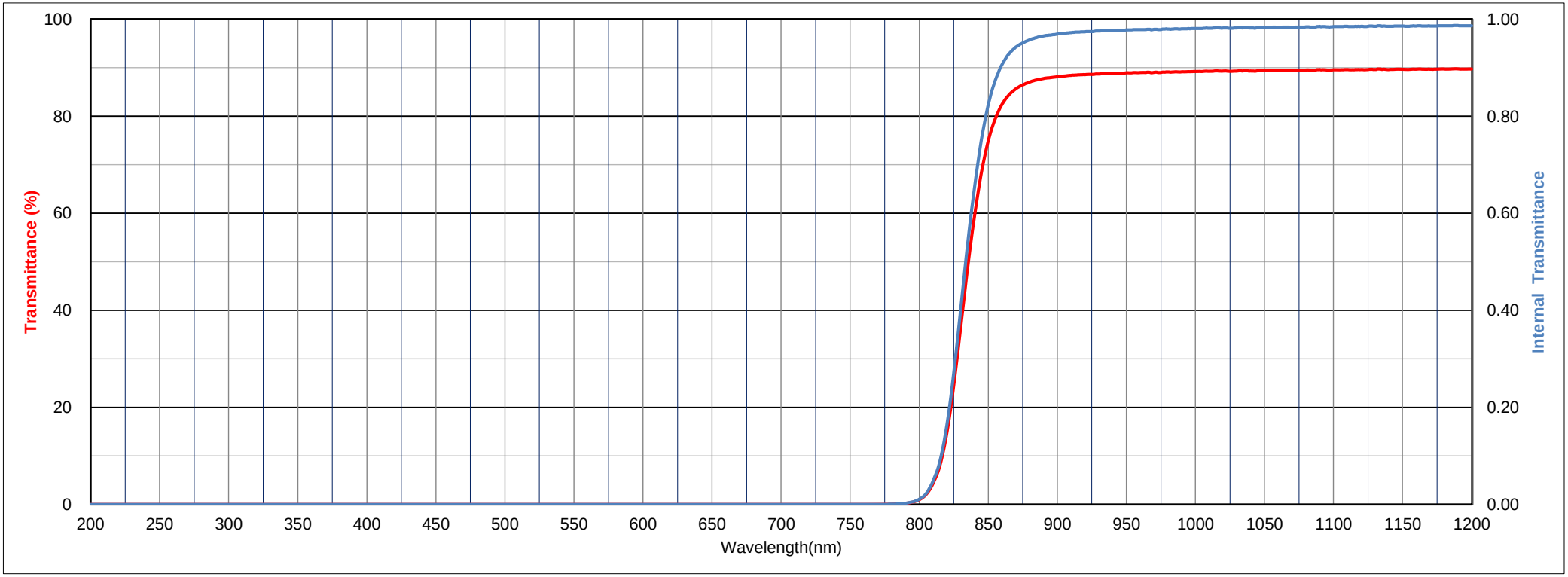
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	4	500	555	99	109	500	160	2.99

Tolerance of Transmittance (T)

λT (nm)	⊿λ (nm)
830±10	<60



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

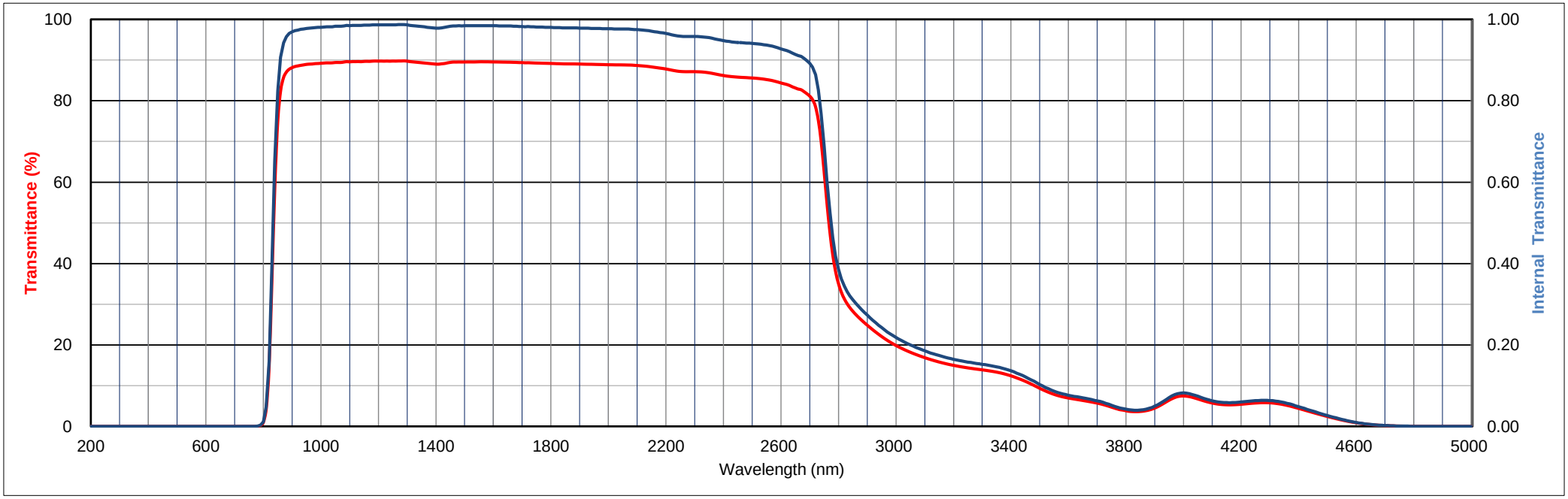
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

IR83N

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.0	4.3	14.7	36.5	59.3	74.9	82.5	85.7	87.0	87.8	88.1	88.4	88.6	88.7	88.8	88.9	89.0	89.0	89.1	89.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.2	89.3	89.3	89.3	89.3	89.4	89.4	89.4	89.5	89.6	89.6	89.6	89.6	89.6	89.6	89.7	89.7	89.7	89.7	89.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	89.7	89.8	89.7	89.8	89.7	89.8	89.7	89.8	89.8	89.8	89.7	89.6	89.6	89.5	89.4	89.4	89.3	89.2	89.1	89.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	89.0	89.0	89.1	89.2	89.3	89.4	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.6	89.6	89.6	89.6	89.6	89.6
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.4	89.4	89.4	89.4	89.3	89.3	89.3	89.3	89.3	89.3	89.2	89.2	89.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	89.2	89.2	89.1	89.1	89.1	89.1	89.1	89.1	89.1	89.0	89.0	89.0	89.0	89.0	89.0	88.9	88.9	88.9	88.9	88.9
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	88.9	88.8	88.7	88.3	87.8	87.2	87.1	86.9	86.2	85.8	85.6	85.2	84.4	83.2	81.1	62.7	35.1	28.3	24.9	22.1
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	19.9	18.2	16.9	15.8	15.0	14.4	13.9	13.3	12.4	11.1	9.4	7.9	7.0	6.4	5.7	4.7	3.8	3.7	4.5	6.4
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	7.5	6.7	5.7	5.3	5.4	5.7	5.8	5.3	4.4	3.4	2.4	1.6	0.9	0.4	0.2	0.1	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

IR85N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.0	0.1	0.6	3.8	15.9	39.1	60.8	73.7	80.2	83.7	85.5	86.5	87.2	87.6	87.9	88.1	88.4	88.5	88.7	88.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.0	89.1	89.2	89.3	89.4	89.5	89.6	89.7	89.7	89.8	89.8	90.0	90.1	90.2	90.3	90.3				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.589	1.578	1.572	1.566	1.563	1.560	1.559
P	0.902	0.904	0.906	0.907	0.908	0.909	0.909

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

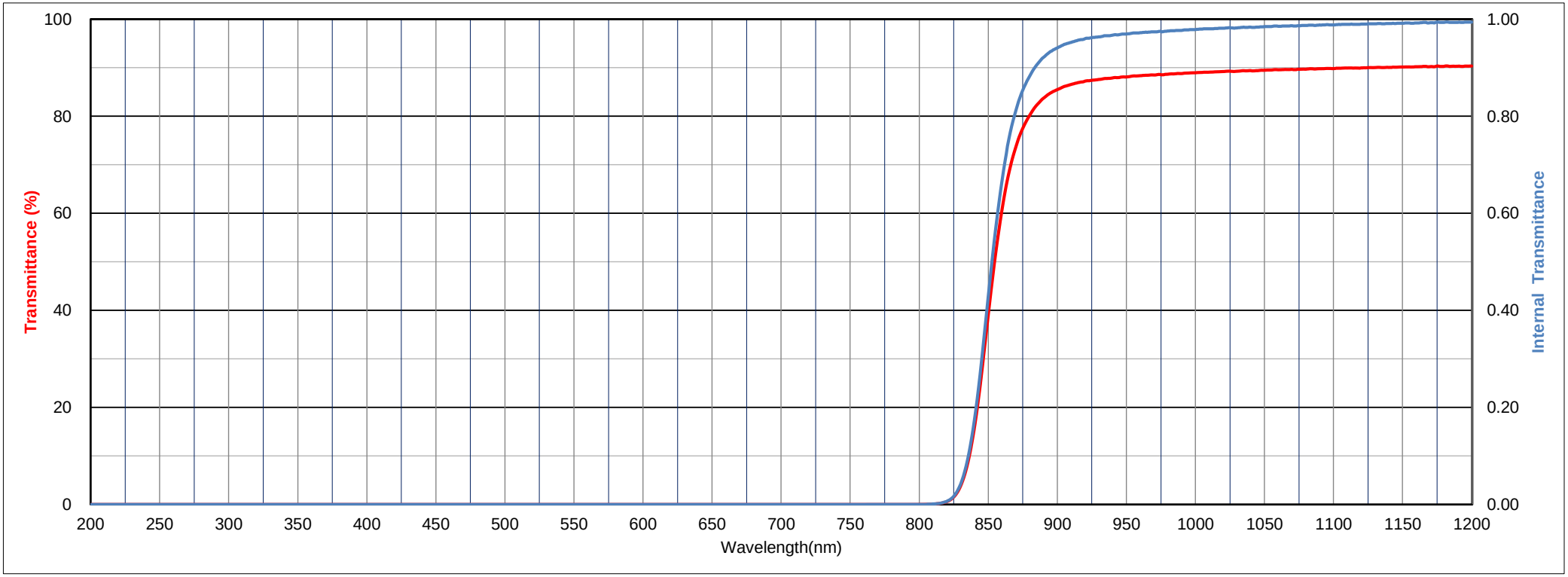
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	4	490	535	92	102	500	150	3.02

Tolerance of Transmittance (T)

λT (nm)	⊿λ (nm)
850±10	<60



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

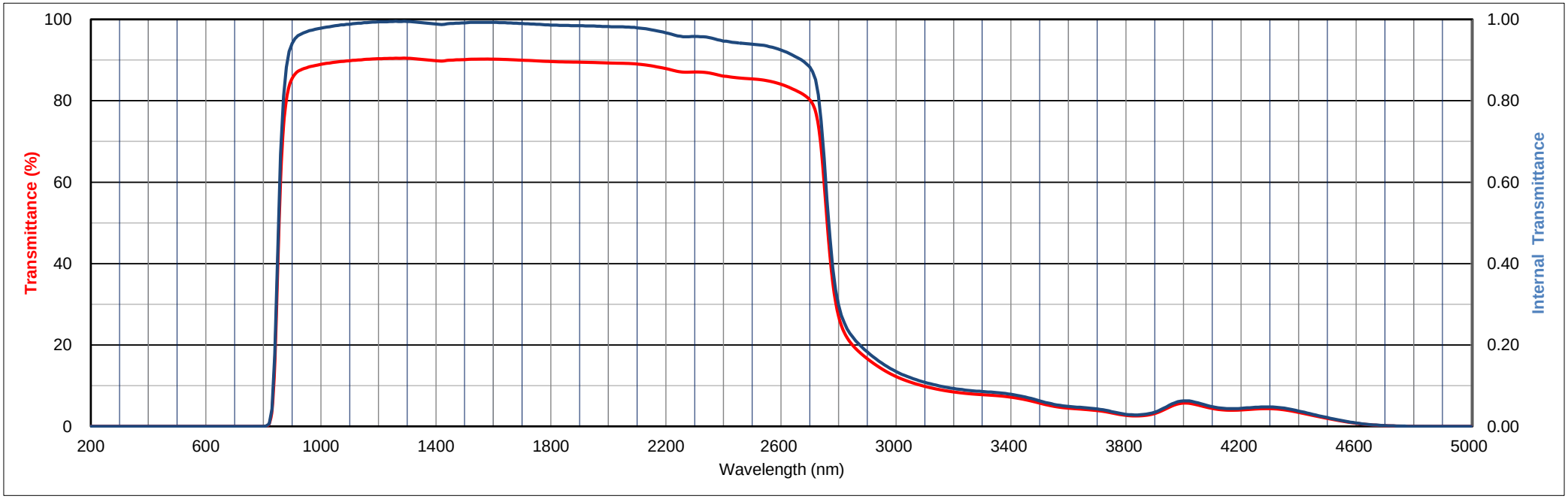
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

IR85N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.0	0.1	0.6	3.8	15.9	39.1	60.8	73.7	80.2	83.7	85.5	86.5	87.2	87.6	87.9	88.1	88.4	88.5	88.7	88.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.0	89.1	89.2	89.3	89.4	89.5	89.6	89.7	89.7	89.8	89.8	89.9	90.0	90.0	90.1	90.2	90.2	90.2	90.3	90.3
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	90.3	90.3	90.4	90.4	90.4	90.4	90.5	90.4	90.4	90.5	90.4	90.4	90.4	90.3	90.2	90.2	90.1	90.0	90.0	89.9
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	89.8	89.8	89.8	89.8	89.9	90.0	90.0	90.1	90.1	90.1	90.1	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.3	90.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	90.2	90.2	90.2	90.2	90.2	90.1	90.1	90.1	90.0	90.0	90.0	89.9	89.9	89.9	89.8	89.8	89.8	89.7	89.7	89.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	89.6	89.6	89.6	89.6	89.6	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.5	89.4	89.4	89.4	89.4	89.4	89.3	89.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	89.3	89.2	89.0	88.6	87.9	87.1	87.1	86.8	86.1	85.6	85.4	85.0	84.1	82.6	80.3	59.9	27.2	19.9	16.6	14.2
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	12.3	10.9	9.8	9.0	8.5	8.1	7.8	7.6	7.2	6.6	5.7	4.9	4.5	4.2	3.9	3.3	2.7	2.6	3.2	4.7
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	5.7	5.2	4.4	4.0	4.0	4.3	4.3	4.1	3.4	2.7	2.0	1.3	0.8	0.4	0.2	0.1	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

RM90

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.7	1.2	1.8	2.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	4.1	5.8	8.0	10.7	13.9	17.8	21.9	26.3	30.8	35.6	40.3	45.0	49.5	53.7	57.6	61.1	64.3	67.3	69.9	72.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	74.3	76.2	77.8	79.2	80.4	81.5	82.5	83.3	84.0	84.6	85.3	86.1	86.9	87.4	87.8	88.2				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.573	1.556	1.549	1.544	1.541	1.539	1.537
P	0.905	0.910	0.911	0.913	0.913	0.914	0.914

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

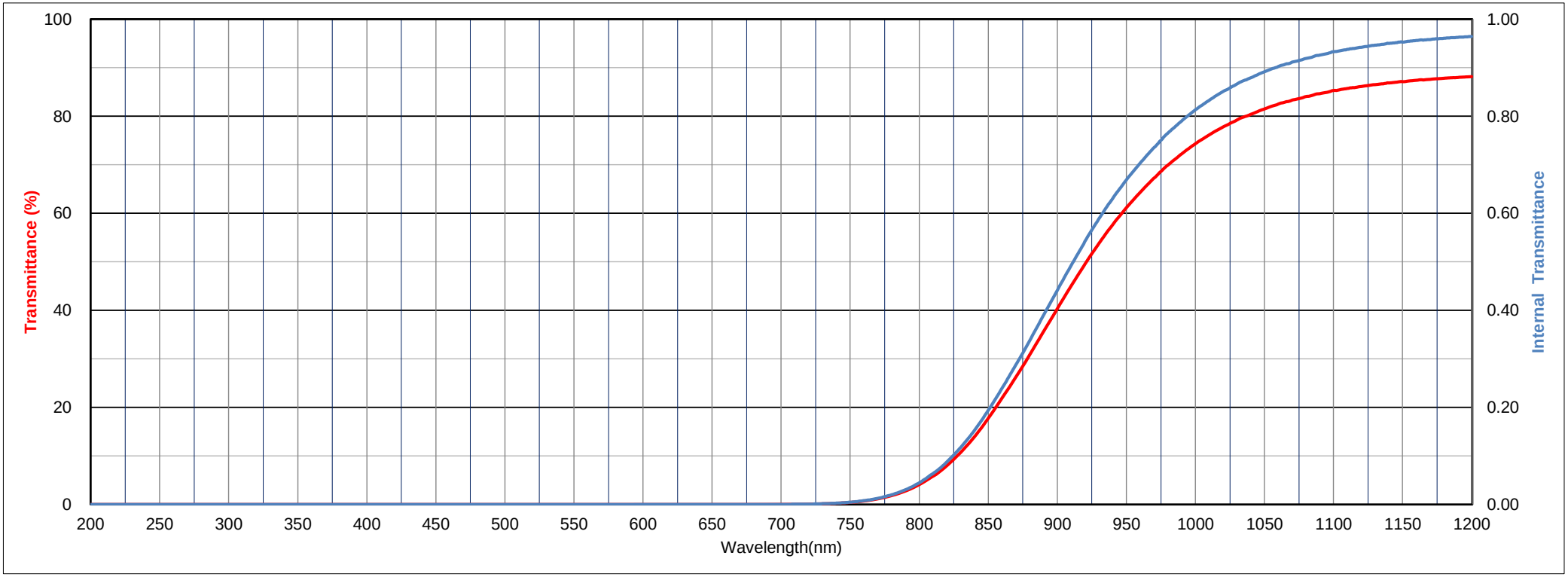
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	3	400	490	107	125	450	170	3.15

Tolerance of Transmittance (T)

Wavelength for less than 5% Transmittance	Transmittance at 1200nm
λ5(nm)	λ80(nm)
>770	<1050



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The content of this catalog is accurate as of October ,2020

HOYA

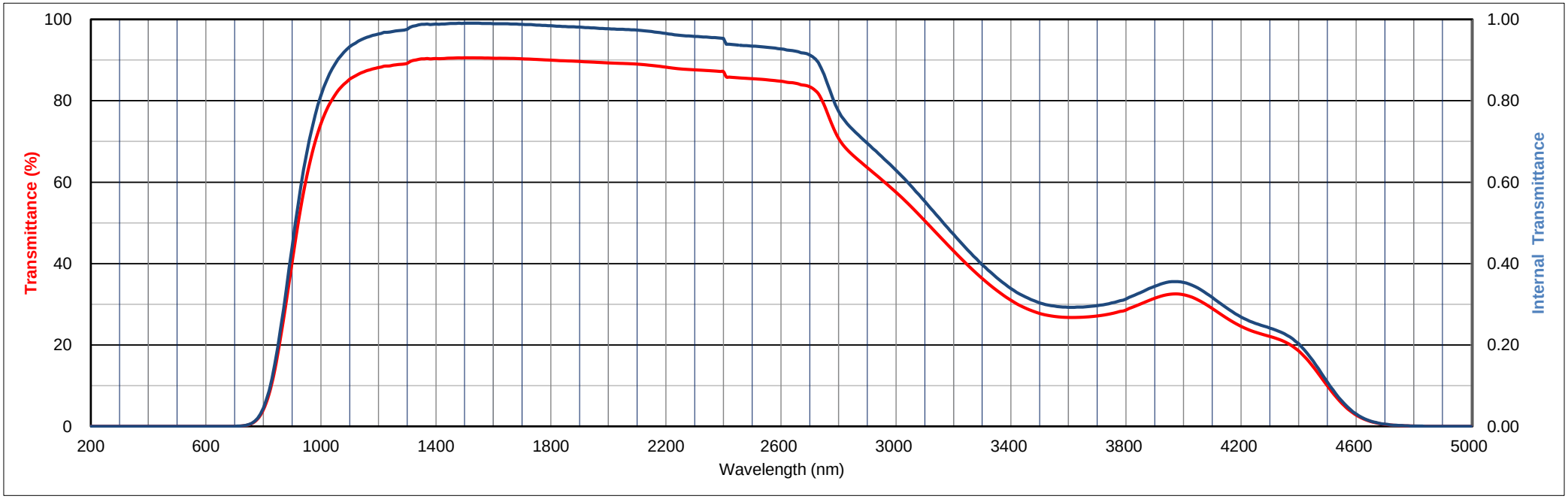
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

RM90

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.7	1.2	1.8	2.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	4.1	5.8	8.0	10.7	13.9	17.8	21.9	26.3	30.8	35.6	40.3	45.0	49.5	53.7	57.6	61.1	64.3	67.3	69.9	72.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	74.3	76.2	77.8	79.2	80.4	81.5	82.5	83.3	84.0	84.6	85.3	85.7	86.1	86.5	86.9	87.1	87.4	87.6	87.8	88.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	88.2	88.3	88.5	88.5	88.6	88.7	88.8	88.9	89.0	89.0	89.2	89.6	89.9	90.0	90.2	90.3	90.3	90.4	90.3	90.3
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.4	90.3	90.4	90.4	90.5	90.5	90.5	90.5	90.6	90.5	90.6	90.6	90.6	90.6	90.5	90.5	90.5	90.5	90.5	90.5
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	90.5	90.4	90.5	90.4	90.4	90.4	90.4	90.4	90.4	90.3	90.3	90.3	90.3	90.2	90.2	90.2	90.1	90.1	90.0	90.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	90.0	89.9	89.9	89.9	89.8	89.8	89.8	89.8	89.7	89.7	89.7	89.6	89.6	89.6	89.5	89.5	89.5	89.4	89.4	89.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	89.3	89.2	89.0	88.7	88.3	87.8	87.6	87.4	87.2	85.6	85.4	85.2	84.8	84.3	83.4	79.0	70.8	66.6	63.6	60.6
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	57.5	54.2	50.5	46.8	43.1	39.6	36.3	33.4	31.0	29.1	27.7	27.0	26.8	26.8	27.1	27.7	28.6	30.1	31.5	32.4
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	32.3	31.1	29.0	26.6	24.6	23.1	22.1	20.8	18.6	14.7	10.0	5.7	2.8	1.2	0.5	0.2	0.1	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

RM100

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.2	0.4	0.8	1.3	2.1	3.3	4.9	6.9	9.2	12.1	15.4	19.0	22.9	26.9	31.0	35.0	38.8	42.7	46.4	49.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	53.1	56.2	59.0	61.6	63.8	66.0	68.0	69.7	71.2	72.6	73.8	75.9	77.4	78.6	79.4	80.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.650	1.630	1.620	1.614	1.610	1.607	1.605
P	0.887	0.892	0.894	0.895	0.896	0.897	0.898

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

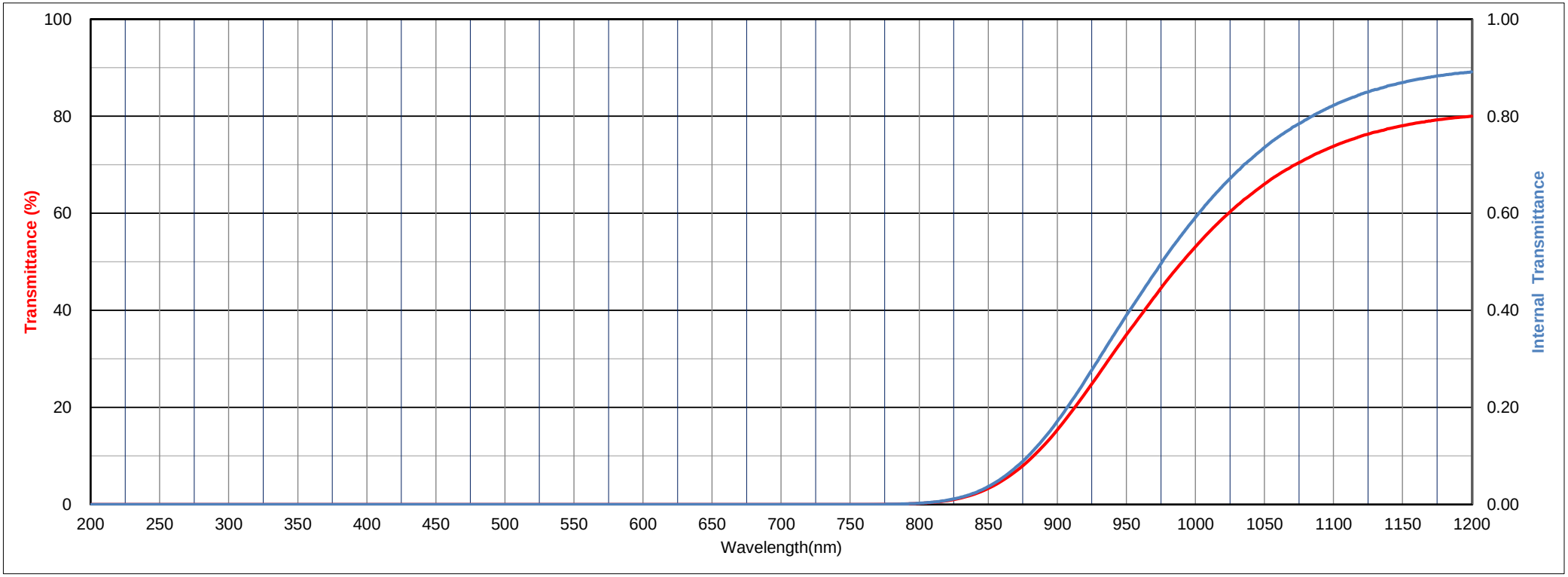
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	4	450	490	98	115	460	180	3.23

Tolerance of Transmittance (T)

Wavelength for less than 5% Transmittance	Transmittance at 1200nm
λ5(nm)	T1200(%)
>850	80±5



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HOYA

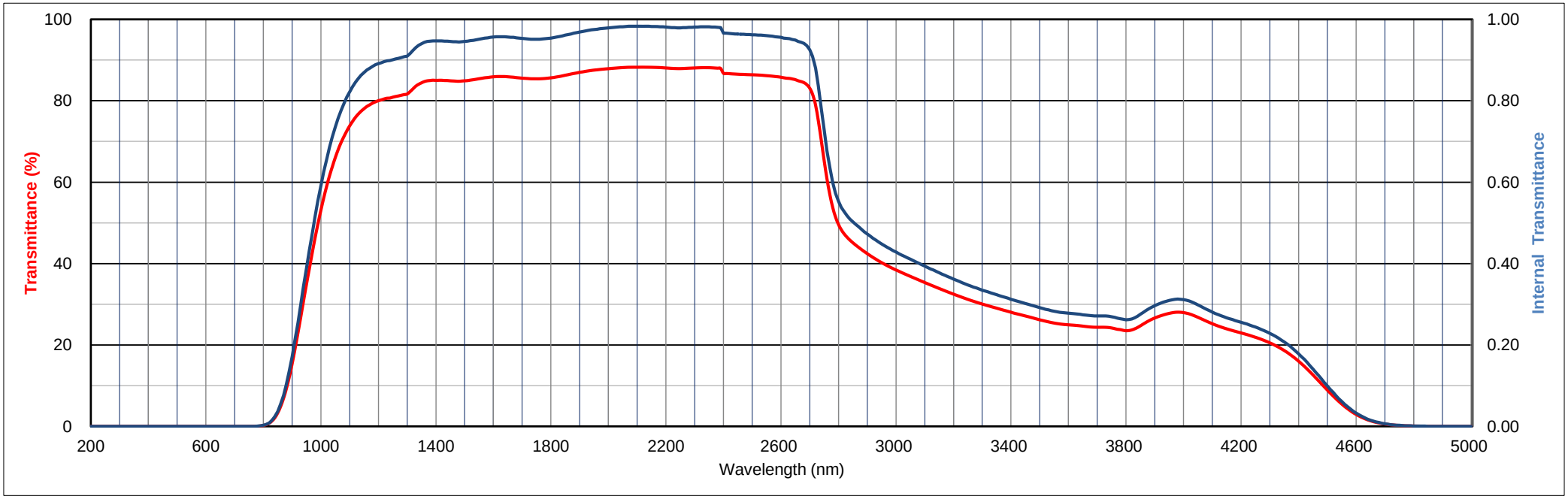
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

RM100

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.2	0.4	0.8	1.3	2.1	3.3	4.9	6.9	9.2	12.1	15.4	19.0	22.9	26.9	31.0	35.0	38.8	42.7	46.4	49.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	53.1	56.2	59.0	61.6	63.8	66.0	68.0	69.7	71.2	72.6	73.8	74.9	75.9	76.7	77.4	78.0	78.6	79.0	79.4	79.7
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	80.0	80.2	80.4	80.6	80.7	80.9	81.1	81.2	81.4	81.5	81.6	82.2	82.9	83.6	84.1	84.4	84.7	84.9	85.0	85.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	85.0	85.0	85.0	85.0	85.0	84.9	84.9	84.8	84.8	84.9	84.9	85.0	85.1	85.2	85.3	85.4	85.5	85.7	85.7	85.8
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	85.9	85.9	86.0	86.0	86.0	85.9	85.8	85.8	85.7	85.6	85.6	85.5	85.5	85.4	85.4	85.4	85.4	85.4	85.5	85.6
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	85.6	85.7	85.9	86.0	86.1	86.3	86.4	86.6	86.7	86.8	87.0	87.1	87.2	87.3	87.4	87.5	87.6	87.7	87.8	87.8
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	87.9	88.2	88.2	88.2	88.1	87.9	88.1	88.1	86.8	86.5	86.4	86.2	85.8	85.2	83.1	65.4	49.6	45.1	42.4	40.2
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	38.4	36.9	35.3	33.9	32.5	31.2	30.1	29.0	28.0	27.1	26.2	25.4	25.0	24.6	24.3	24.2	23.5	24.7	26.6	27.8
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	28.0	26.8	25.2	24.0	23.0	21.9	20.5	18.6	16.0	12.7	8.9	5.5	2.9	1.4	0.6	0.2	0.1	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

RT830

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	5.0	21.1	43.8	61.4	70.6	75.1	77.0	77.0	77.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	79.2	81.5	83.0	83.5	83.4	82.8	82.0	81.0	80.0	78.8	77.6	76.1	74.6	72.8	70.8	68.8	66.5	63.9	60.9	57.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	54.3	50.4	46.3	42.0	37.5	32.9	28.3	24.0	20.0	16.3	12.9	7.6	4.1	2.1	1.0	0.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.553	1.542	1.536	1.532	1.530	1.529	1.527
P	0.910	0.913	0.915	0.915	0.916	0.916	0.917

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

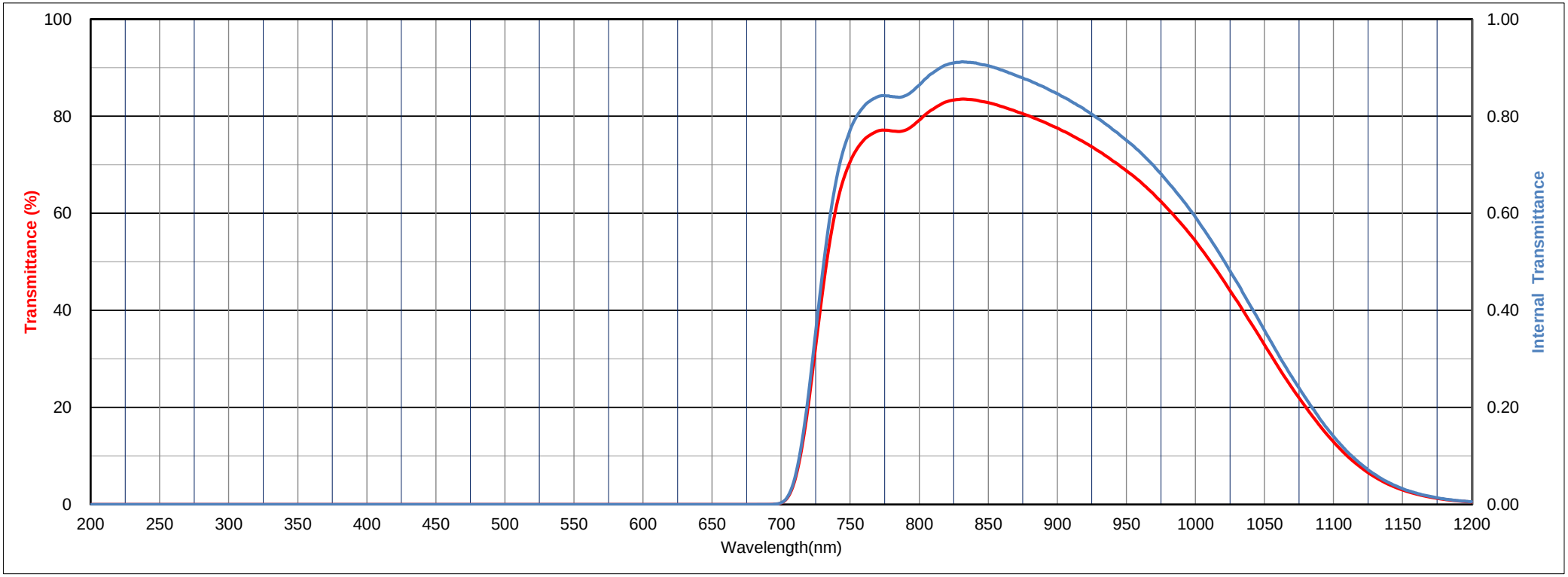
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	545	605	-	101	510	140	2.75

Tolerance of Transmittance (T)

Transmittance at 830nm	Transmittance at 700nm	Transmittance at 1200nm
T830(%)	T700(%)	T1200(%)
82±5	<5	<1



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HOYA

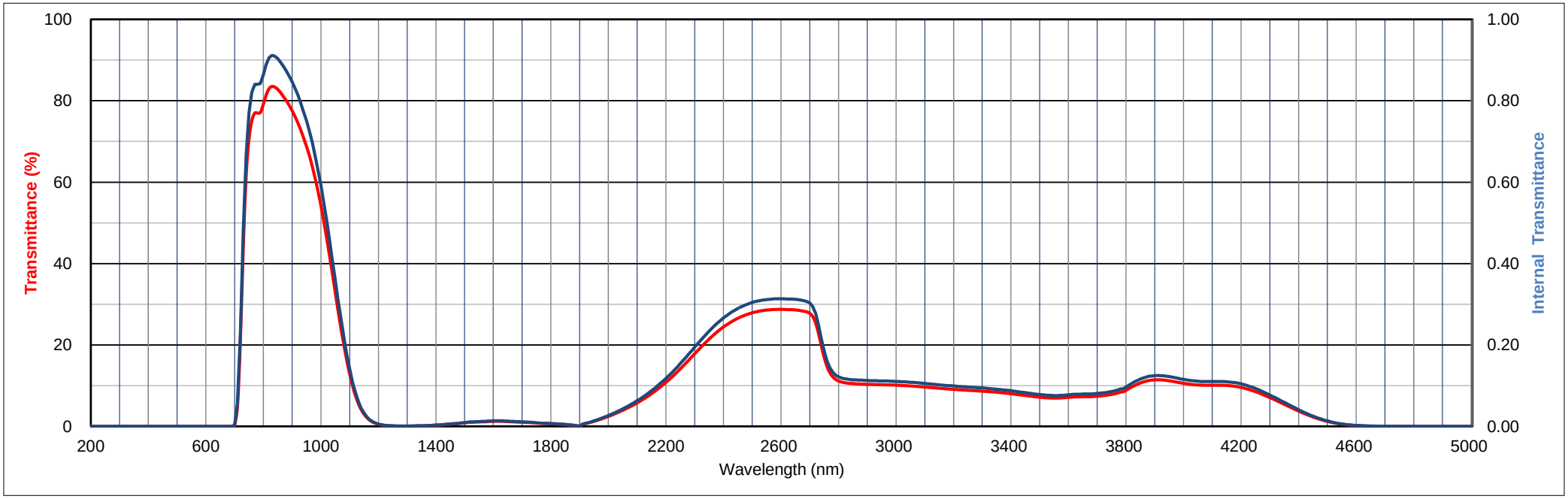
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

RT830

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	5.0	21.1	43.8	61.4	70.6	75.1	77.0	77.0	77.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	79.2	81.5	83.0	83.5	83.4	82.8	82.0	81.0	80.0	78.8	77.6	76.1	74.6	72.8	70.8	68.8	66.5	63.9	60.9	57.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	54.3	50.4	46.3	42.0	37.5	32.9	28.3	24.0	20.0	16.3	12.9	10.0	7.6	5.7	4.1	3.0	2.1	1.5	1.0	0.7
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	0.5	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	1.2	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.3	0.2	0.1	0.1	0.5	0.7	0.8	1.0	1.2	1.5	1.7	1.9	2.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	2.5	3.9	5.8	8.0	10.8	14.1	17.8	21.4	24.4	26.5	27.9	28.6	28.8	28.6	27.8	17.0	11.2	10.5	10.3	10.2
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	10.1	9.9	9.7	9.4	9.1	8.9	8.6	8.4	8.0	7.6	7.2	6.9	7.1	7.3	7.4	7.8	8.8	10.7	11.4	11.2
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	10.6	10.2	10.1	10.1	9.6	8.5	7.1	5.4	3.8	2.3	1.2	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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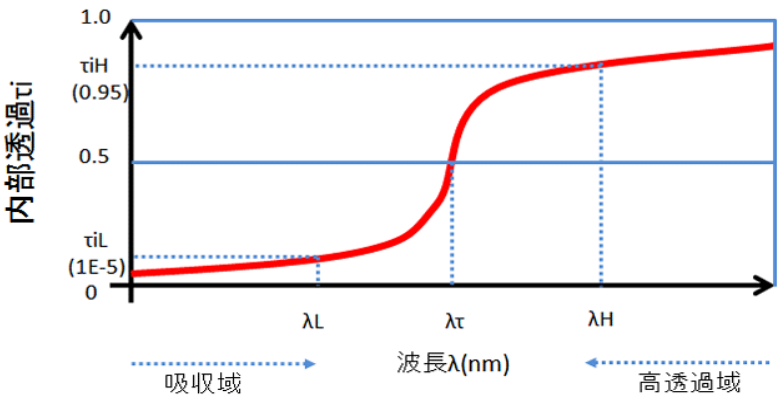
シャープカットフィルター（W シリーズ）

シャープカットフィルター（W シリーズ）は透過限界波長をλτ0.5に置き換えかつ内部透過率を前提とした新しいシリーズです。
従来のシャープカットフィルターは国内規格に対応した製品でしたがW シリーズは世界（World）市場のニーズに対応させた製品です。

新しく設定した規格値

硝　種	カタログ規格（肉厚3mm）		
	限界波長	吸収域	高透過域
	λτ0.5	**$\tau<1\times10^{-5}$**	硝種に依存
W-L420	420±5 nm	>360 nm	>0.93 >530 nm
W-Y435	435±5 nm	>370 nm	>0.92 >520 nm
W-Y455	455±5 nm	>390 nm	>0.92 >530 nm
W-Y475	475±5 nm	>410 nm	>0.92 >550 nm
W-Y495	495±5 nm	>430 nm	>0.92 >560 nm
W-Y515	515±5 nm	>440 nm	>0.93 >580 nm
W-O530	530±5 nm	>460 nm	>0.93 >600 nm
W-O550	550±5 nm	>480 nm	>0.93 >620 nm
W-O570	570±5 nm	>500 nm	>0.93 >640 nm
W-O590	590±5 nm	>520 nm	>0.93 >660 nm
W-R610	610±5 nm	>540 nm	>0.94 >690 nm
W-R630	630±5 nm	>550 nm	>0.94 >710 nm
W-R645	645±5 nm	>560 nm	>0.94 >720 nm
W-R665	665±5 nm	>580 nm	>0.96 >750 nm
W-R695	695±5 nm	>610 nm	>0.96 >780 nm
W-R715	715±8 nm	>630 nm	>0.96 >810 nm
W-IR760	760±8 nm	>680 nm	>0.97 >880 nm
W-IR780	780±8 nm	>690 nm	>0.97 >900 nm
W-IR800	800±8 nm	>710 nm	>0.97 >920 nm
W-IR830	830±8 nm	>730 nm	>0.97 >950 nm
W-IR850	850±8 nm	>740 nm	>0.90 >950 nm



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-L420

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	0.036	0.489	0.799	0.895	0.929	0.945	0.953	0.959	0.964	0.967	0.970	0.971	0.973	0.975	0.977	0.977	0.977	0.978	0.978
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.979	0.979	0.979	0.978	0.979	0.979	0.979	0.980	0.981	0.982	0.982	0.982	0.983	0.983	0.983	0.984	0.983	0.983	0.983	0.983
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.983	0.982	0.981	0.981	0.981	0.982	0.982	0.982	0.982	0.983	0.984	0.984	0.985	0.986	0.986	0.987	0.987	0.987	0.988	0.988
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.988	0.989	0.989	0.989	0.989	0.989	0.990	0.989	0.990	0.990	0.990	0.990	0.991	0.992	0.992	0.993				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.549	1.536	1.530	1.526	1.524	1.523	1.521
P	0.911	0.914	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

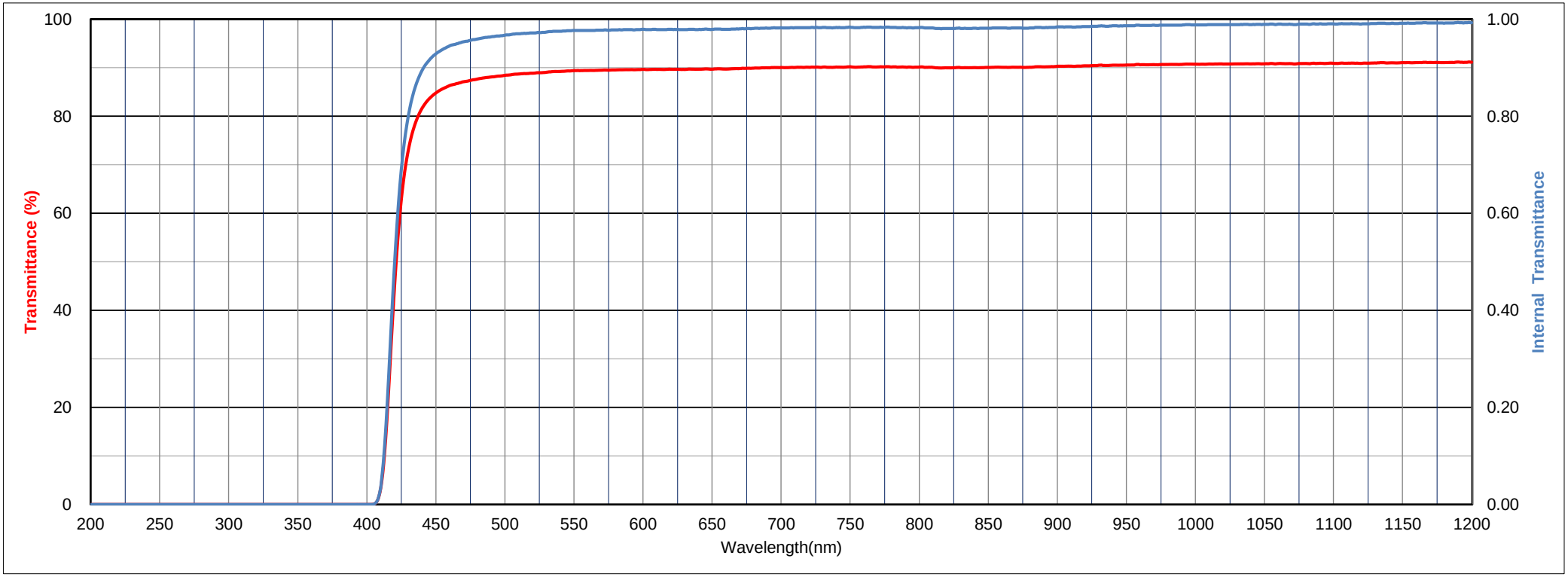
	x	y	Y	λ_d	P_e
A	0.452	0.413	89	580	7
C	0.317	0.330	89	569	6
D65	0.320	0.343	89	569	6

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	550	600	92	105	540	130	2.59

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
420±5	>360	>530



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HOYA

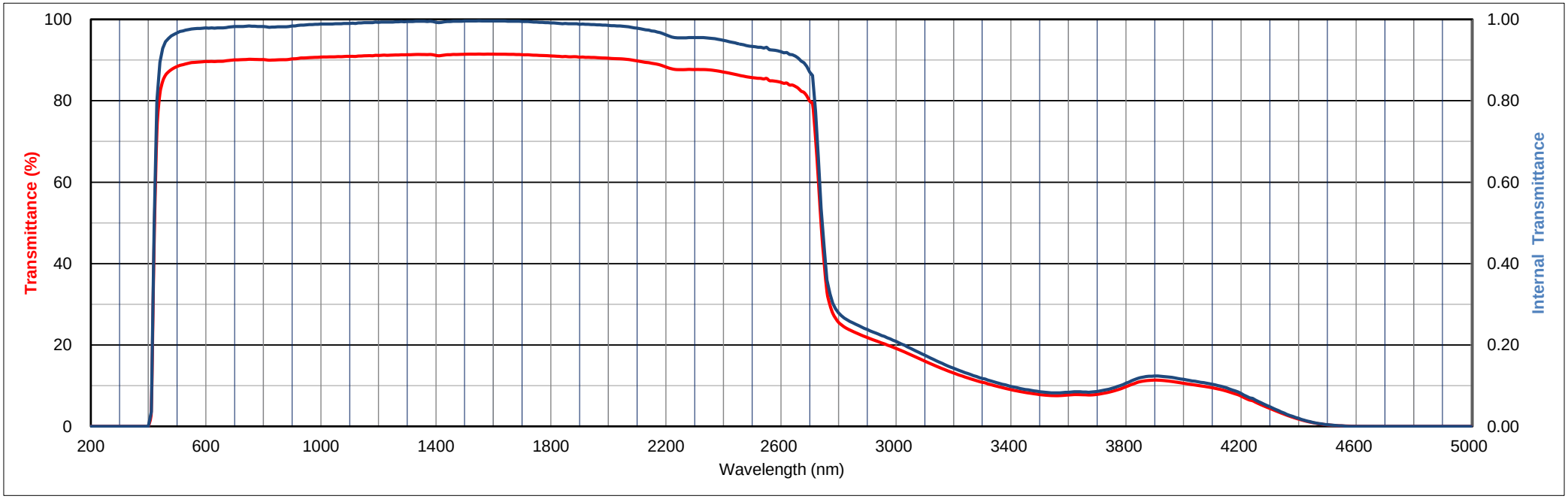
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-L420

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	0.036	0.489	0.799	0.895	0.929	0.945	0.953	0.959	0.964	0.967	0.970	0.971	0.973	0.975	0.977	0.977	0.977	0.978	0.978
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.979	0.979	0.979	0.978	0.979	0.979	0.979	0.980	0.981	0.982	0.982	0.982	0.983	0.983	0.983	0.984	0.983	0.983	0.983	0.983
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.983	0.982	0.981	0.981	0.981	0.982	0.982	0.982	0.982	0.983	0.984	0.984	0.985	0.986	0.986	0.987	0.987	0.987	0.988	0.988
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.988	0.989	0.989	0.989	0.989	0.989	0.990	0.989	0.990	0.990	0.990	0.990	0.990	0.991	0.991	0.992	0.992	0.992	0.992	0.993
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.993	0.993	0.994	0.993	0.993	0.994	0.994	0.994	0.995	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.994
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.993	0.992	0.993	0.994	0.995	0.995	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.994	0.995	0.994	0.993	0.993	0.993	0.993	0.992	0.992
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.991	0.991	0.991	0.990	0.989	0.990	0.989	0.989	0.989	0.989	0.988	0.988	0.988	0.988	0.987	0.987	0.987	0.986	0.986	0.986
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.985	0.983	0.978	0.972	0.962	0.955	0.955	0.954	0.948	0.940	0.933	0.931	0.921	0.910	0.870	0.440	0.279	0.254	0.238	0.223
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.209	0.192	0.175	0.158	0.143	0.130	0.118	0.108	0.098	0.091	0.085	0.082	0.084	0.085	0.086	0.093	0.106	0.120	0.124	0.121
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.115	0.109	0.103	0.094	0.081	0.065	0.048	0.033	0.019	0.010	0.004	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y435

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	0.005	0.231	0.678	0.854	0.905	0.925	0.938	0.949	0.957	0.964	0.970	0.974	0.979	0.982	0.984	0.985	0.986	0.987
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.988	0.988	0.988	0.988	0.989	0.988	0.988	0.988	0.988	0.989	0.988	0.988	0.987	0.988	0.987	0.986	0.986	0.986	0.985	0.984
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.984	0.983	0.981	0.981	0.981	0.981	0.982	0.980	0.980	0.981	0.981	0.982	0.982	0.983	0.984	0.984	0.984	0.984	0.984	0.984
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.984	0.985	0.985	0.985	0.985	0.985	0.986	0.985	0.985	0.986	0.986	0.986	0.986	0.987	0.987	0.988				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.541	1.534	1.531	1.529	1.527	1.526	1.526
P	0.913	0.915	0.916	0.916	0.917	0.917	0.917

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

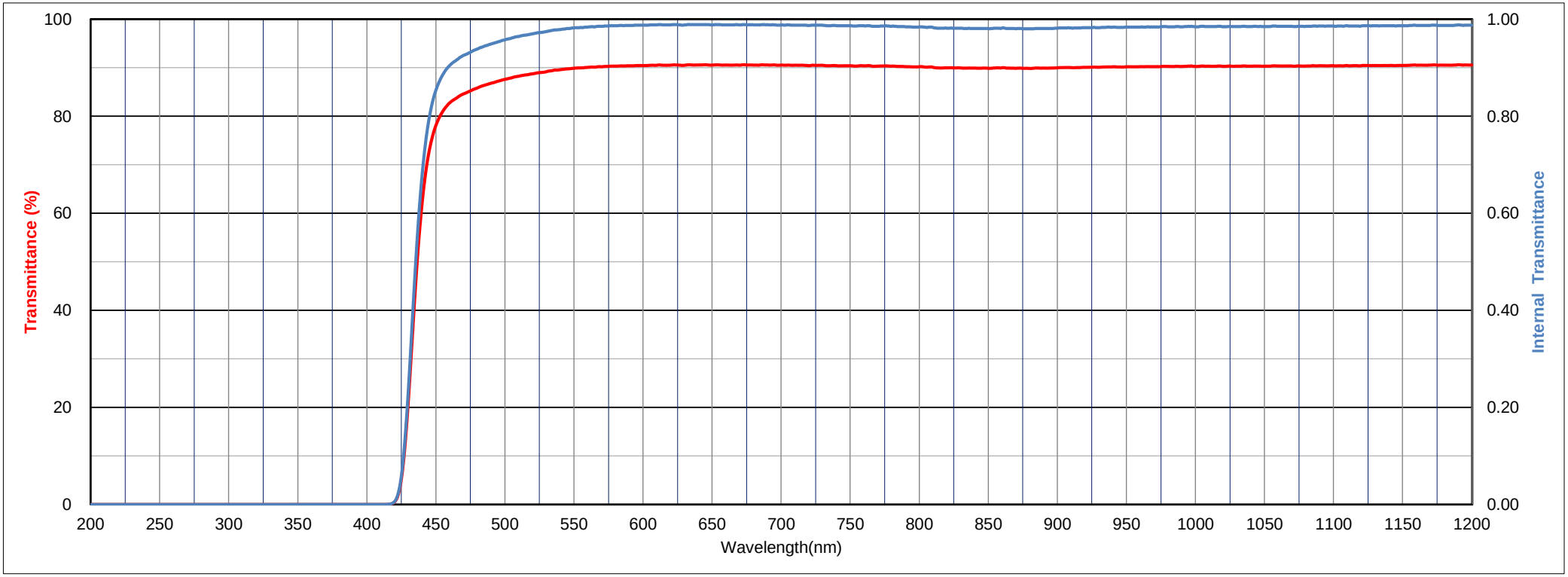
	x	y	Y	λ_d	P_e
A	0.460	0.421	90	580	18
C	0.331	0.357	89	569	17
D65	0.333	0.368	89	569	16

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	2	570	600	99	107	540	130	2.59

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
435±5	>370	>520



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

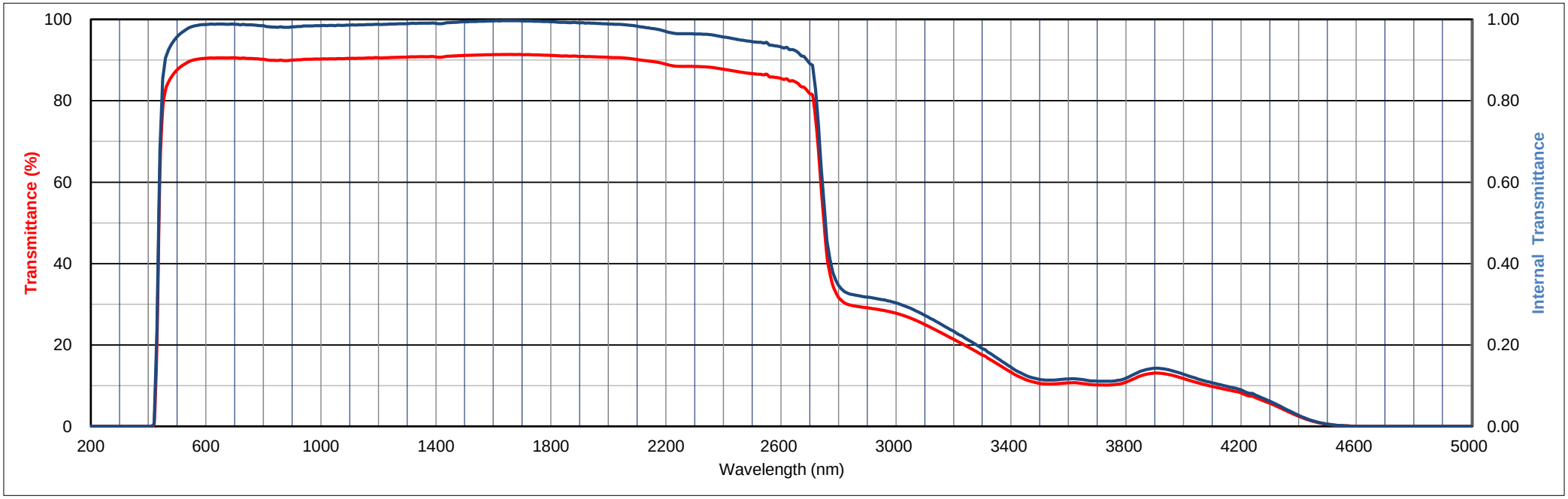
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y435

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	0.005	0.231	0.678	0.854	0.905	0.925	0.938	0.949	0.957	0.964	0.970	0.974	0.979	0.982	0.984	0.985	0.986	0.987
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.988	0.988	0.988	0.988	0.989	0.988	0.988	0.988	0.988	0.989	0.988	0.988	0.987	0.988	0.987	0.986	0.986	0.986	0.985	0.984
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.984	0.983	0.981	0.981	0.981	0.981	0.982	0.980	0.980	0.981	0.981	0.982	0.982	0.983	0.984	0.984	0.984	0.984	0.984	0.984
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.984	0.985	0.985	0.985	0.985	0.985	0.986	0.985	0.985	0.986	0.986	0.986	0.986	0.987	0.986	0.987	0.987	0.987	0.987	0.988
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.988	0.987	0.988	0.988	0.988	0.989	0.989	0.989	0.989	0.989	0.989	0.990	0.990	0.990	0.991	0.991	0.991	0.991	0.991	0.991
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.990	0.989	0.989	0.991	0.992	0.992	0.993	0.993	0.993	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.995	0.996	0.996	0.996
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.996	0.996	0.996	0.997	0.996	0.997	0.997	0.996	0.996	0.997	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.995	0.995	0.995
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.994	0.994	0.993	0.993	0.992	0.993	0.992	0.992	0.993	0.992	0.991	0.992	0.991	0.991	0.991	0.990	0.990	0.990	0.990	0.989
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.989	0.987	0.983	0.978	0.970	0.965	0.964	0.963	0.957	0.951	0.945	0.944	0.932	0.923	0.892	0.544	0.346	0.323	0.318	0.312
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.303	0.290	0.273	0.254	0.234	0.213	0.191	0.169	0.145	0.126	0.115	0.114	0.117	0.115	0.111	0.111	0.119	0.135	0.143	0.139
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.128	0.117	0.107	0.099	0.089	0.077	0.062	0.044	0.027	0.014	0.006	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y455

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	0.006	0.261	0.708	0.888	0.942	0.960	0.967	0.971	0.974	0.975	0.977	0.978	0.978	0.980	0.981	0.981
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.982	0.982	0.983	0.983	0.983	0.984	0.985	0.985	0.986	0.984	0.985	0.986	0.986	0.988	0.988	0.987	0.988	0.988	0.989	0.989
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.988	0.988	0.989	0.989	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.989	0.988	0.989
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.989	0.990	0.990	0.989	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.991	0.991	0.991	0.991	0.993				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.543	1.533	1.528	1.525	1.523	1.522	1.521
P	0.913	0.915	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

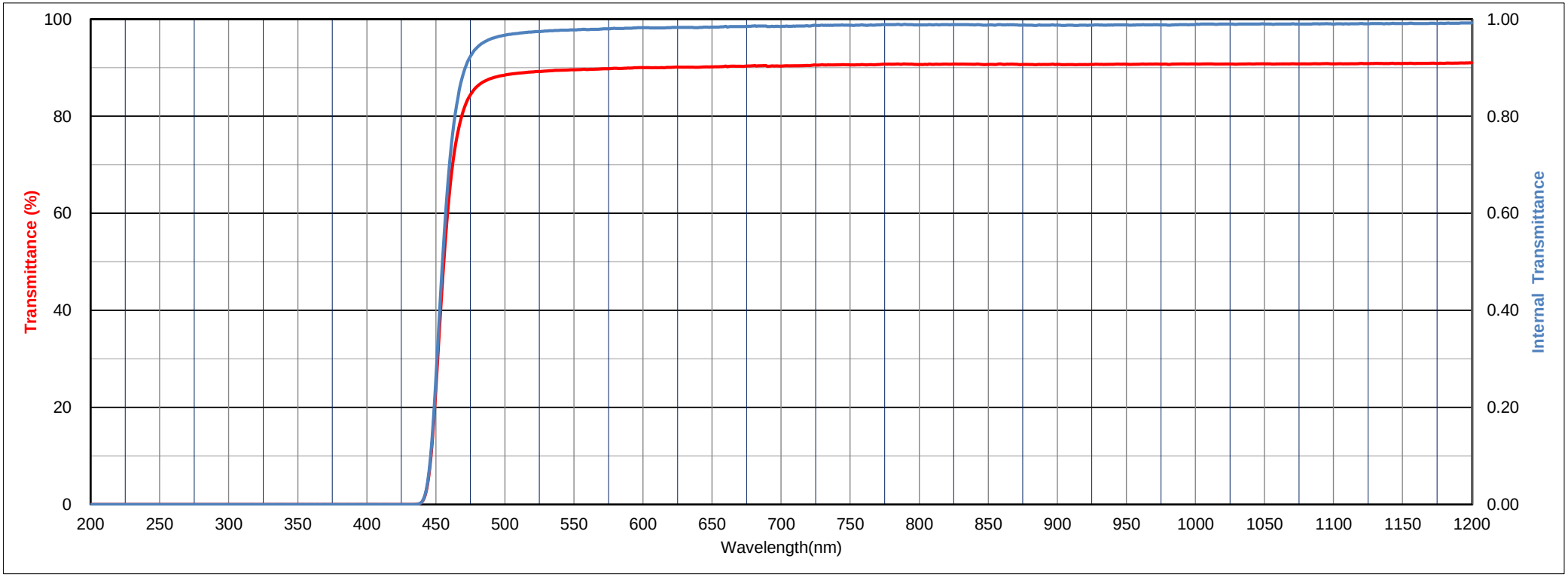
	x	y	Y	λ_d	P_e
A	0.473	0.440	89	580	40
C	0.360	0.416	89	569	40
D65	0.359	0.424	89	568	40

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	560	625	94	105	540	130	2.67

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
455±5	>390	>530



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HOYA

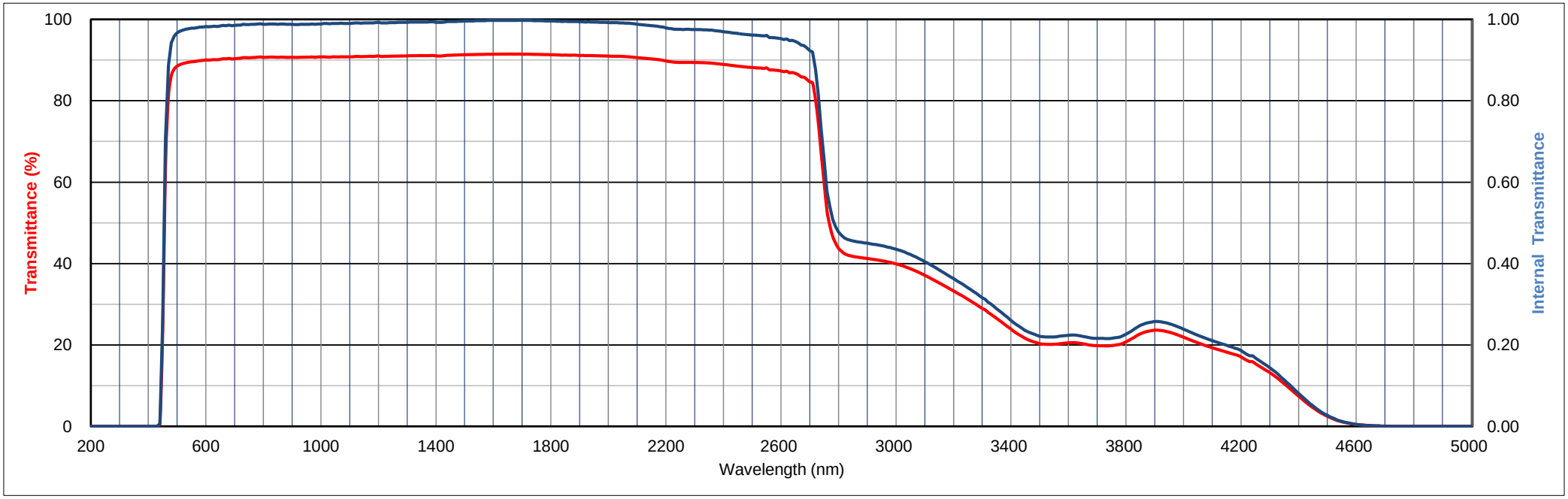
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y455

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	0.006	0.261	0.708	0.888	0.942	0.960	0.967	0.971	0.974	0.975	0.977	0.978	0.978	0.980	0.981	0.981
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.982	0.982	0.983	0.983	0.983	0.984	0.985	0.985	0.986	0.984	0.985	0.986	0.986	0.988	0.988	0.987	0.988	0.988	0.989	0.989
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.988	0.988	0.989	0.989	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.988	0.989	0.988	0.989
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.989	0.990	0.990	0.989	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.991	0.991	0.991	0.991	0.991	0.992	0.991	0.992
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.993	0.991	0.992	0.992	0.992	0.992	0.992	0.992	0.993	0.993	0.993	0.993	0.993	0.993	0.994	0.994	0.994	0.993	0.994	0.994
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.993	0.992	0.993	0.993	0.994	0.994	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.997	0.997	0.997	0.997	0.997	0.997
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.997	0.998	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.996	0.996	0.996
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.996	0.996	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.994	0.994	0.994	0.994	0.994	0.993	0.993	0.993	0.993	0.993
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.992	0.991	0.988	0.985	0.979	0.975	0.975	0.974	0.970	0.965	0.962	0.961	0.952	0.946	0.923	0.655	0.477	0.456	0.450	0.444
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.435	0.422	0.405	0.384	0.363	0.341	0.316	0.289	0.261	0.236	0.221	0.220	0.224	0.221	0.216	0.216	0.226	0.248	0.258	0.252
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.239	0.224	0.211	0.199	0.186	0.168	0.144	0.114	0.081	0.050	0.027	0.012	0.005	0.002	0.001	0.001	0.001	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y475

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.018	0.281	0.672	0.865	0.934	0.960	0.970	0.975	0.978	0.980	0.980	0.981	0.982	0.982
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.982	0.982	0.983	0.982	0.982	0.983	0.983	0.984	0.985	0.985	0.986	0.986	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.986
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.987	0.985	0.985	0.985	0.985	0.985	0.986	0.985	0.986	0.986	0.988	0.988	0.989	0.990	0.990	0.991	0.991	0.991	0.992	0.993
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.992	0.993	0.993	0.993	0.993	0.993	0.994	0.994	0.994	0.995	0.995	0.995	0.996	0.996	0.996	0.996				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.548	1.536	1.530	1.527	1.525	1.523	1.522
P	0.912	0.915	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

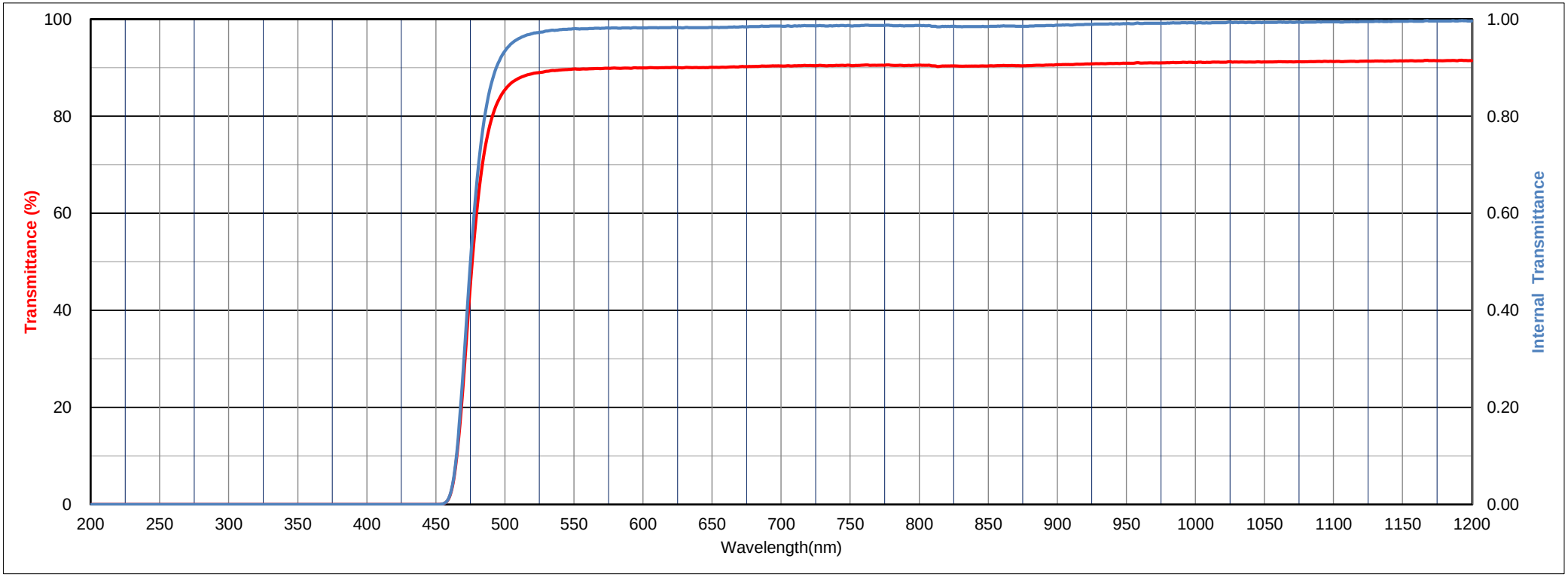
	x	y	Y	λ_d	P_e
A	0.493	0.462	89	580	69
C	0.405	0.487	87	570	71
D65	0.402	0.493	87	569	71

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	560	625	94	105	540	130	2.67

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
475±5	>410	>550



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HOYA

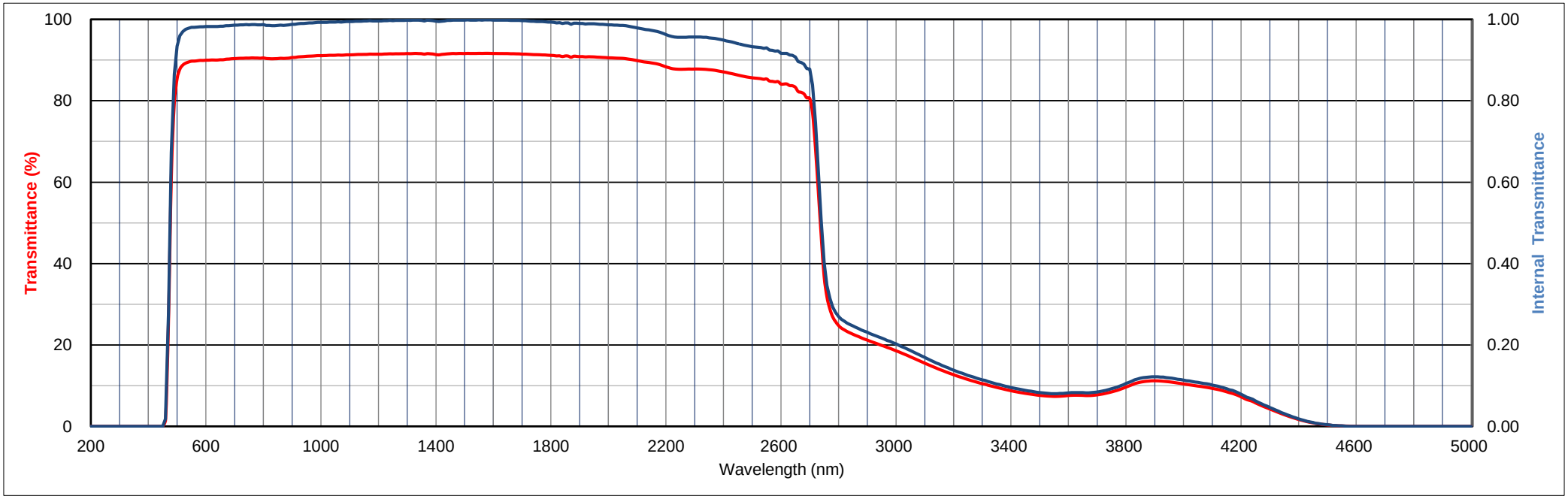
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y475

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.018	0.281	0.672	0.865	0.934	0.960	0.970	0.975	0.978	0.980	0.980	0.981	0.982	0.982
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.982	0.982	0.983	0.982	0.982	0.983	0.983	0.984	0.985	0.985	0.986	0.986	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.986
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.987	0.985	0.985	0.985	0.985	0.985	0.986	0.985	0.986	0.986	0.988	0.988	0.989	0.990	0.990	0.991	0.991	0.991	0.992	0.993
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.992	0.993	0.993	0.993	0.993	0.993	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.996	0.996	0.997	0.997	0.997	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.996	0.998	0.997	0.997
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.995	0.994	0.996	0.996	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.998	0.998	0.998	0.999	0.998	0.999	0.999	0.999
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.997	0.997	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.994	0.994	0.994
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.993	0.993	0.992	0.992	0.990	0.992	0.991	0.988	0.991	0.990	0.990	0.990	0.989	0.989	0.989	0.989	0.988	0.988	0.988	0.987
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.987	0.985	0.979	0.973	0.962	0.956	0.957	0.955	0.949	0.940	0.933	0.930	0.916	0.908	0.878	0.402	0.270	0.247	0.231	0.217
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.202	0.186	0.169	0.153	0.138	0.125	0.114	0.104	0.095	0.088	0.083	0.080	0.083	0.083	0.084	0.092	0.105	0.118	0.122	0.119
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.114	0.108	0.102	0.092	0.079	0.063	0.046	0.031	0.018	0.009	0.004	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y495

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.004	0.251	0.720	0.900	0.951	0.968	0.975	0.978	0.980	0.980	0.981	0.981
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.982	0.981	0.982	0.982	0.982	0.982	0.982	0.983	0.983	0.984	0.985	0.985	0.985	0.986	0.985	0.986	0.985	0.985	0.985	0.985
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.985	0.984	0.983	0.983	0.983	0.984	0.984	0.984	0.984	0.985	0.986	0.987	0.987	0.988	0.988	0.989	0.990	0.990	0.990	0.991
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.991	0.992	0.991	0.992	0.992	0.992	0.993	0.992	0.992	0.993	0.993	0.993	0.994	0.994	0.994	0.995				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.548	1.537	1.530	1.527	1.525	1.523	1.522
P	0.912	0.914	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

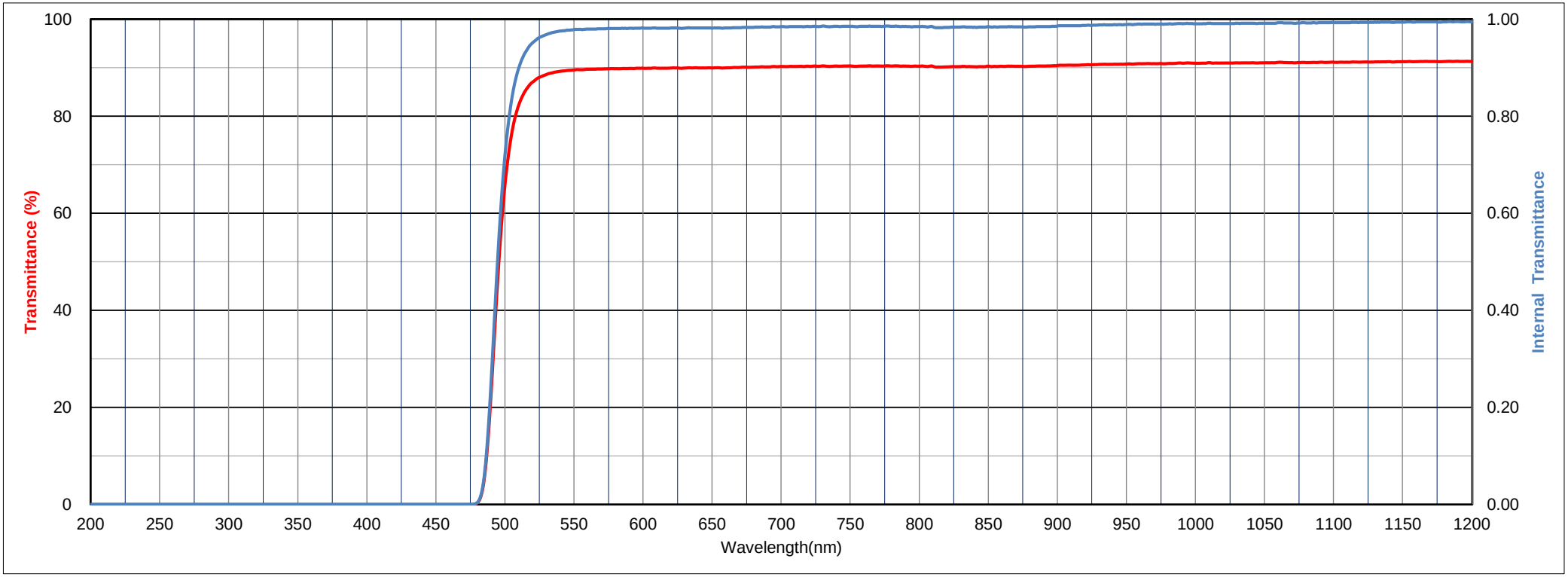
	x	y	Y	λ_d	P_e
A	0.510	0.472	87	581	88
C	0.443	0.521	83	572	91
D65	0.438	0.526	83	571	90

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	560	625	94	105	540	130	2.67

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
495±5	>430	>560



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HOYA

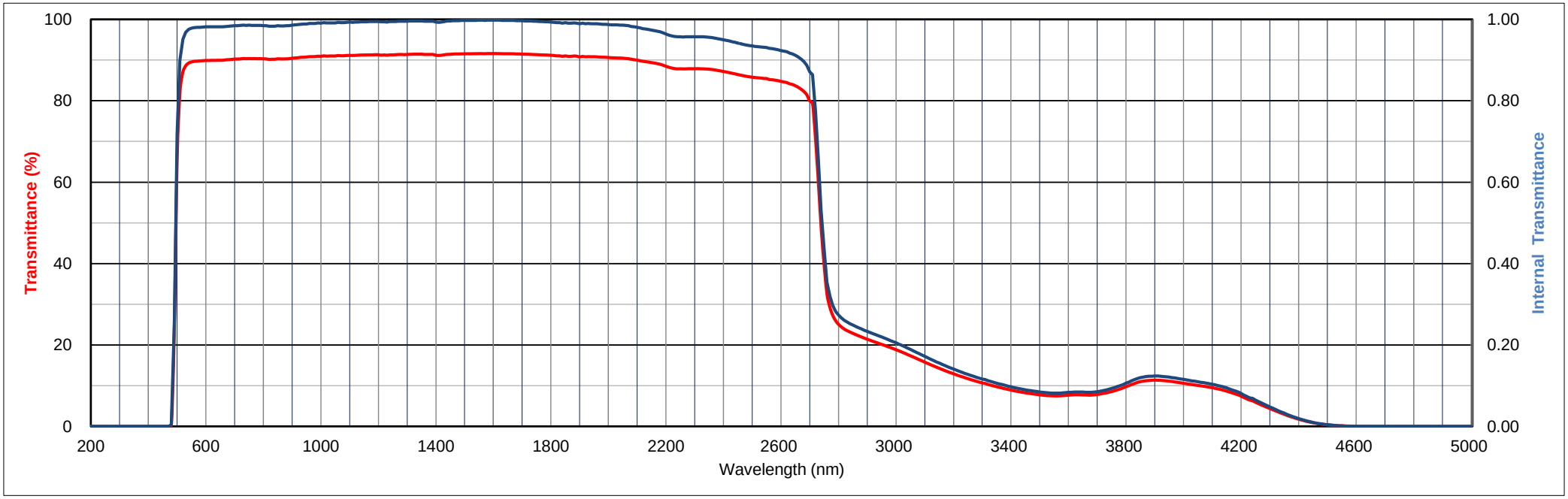
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y495

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.004	0.251	0.720	0.900	0.951	0.968	0.975	0.978	0.980	0.980	0.981	0.981
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.982	0.981	0.982	0.982	0.982	0.982	0.982	0.983	0.983	0.984	0.985	0.985	0.985	0.986	0.985	0.986	0.985	0.985	0.985	0.985
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.985	0.984	0.983	0.983	0.983	0.984	0.984	0.984	0.984	0.985	0.986	0.987	0.987	0.988	0.988	0.989	0.990	0.990	0.990	0.991
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.991	0.992	0.991	0.992	0.992	0.992	0.993	0.992	0.992	0.993	0.993	0.993	0.993	0.994	0.994	0.994	0.994	0.995	0.994	0.995
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.995	0.994	0.994	0.994	0.994	0.994	0.995	0.995	0.996	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.993	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.997	0.997	0.998	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.998	0.998	0.998	0.998	0.997	0.998	0.997	0.997	0.997	0.997	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.994	0.994	0.994
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.993	0.993	0.992	0.992	0.991	0.992	0.991	0.991	0.991	0.991	0.989	0.990	0.989	0.990	0.989	0.989	0.989	0.988	0.988	0.988
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.987	0.986	0.980	0.974	0.964	0.957	0.957	0.956	0.950	0.942	0.935	0.931	0.924	0.912	0.871	0.434	0.273	0.249	0.233	0.219
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.205	0.189	0.172	0.156	0.141	0.128	0.116	0.106	0.097	0.090	0.084	0.082	0.083	0.084	0.085	0.093	0.106	0.120	0.124	0.121
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.115	0.110	0.103	0.094	0.081	0.065	0.048	0.032	0.019	0.010	0.004	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y515

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.004	0.234	0.704	0.894	0.949	0.967	0.973	0.976	0.977	0.978
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.978	0.978	0.979	0.978	0.979	0.979	0.979	0.980	0.980	0.981	0.981	0.981	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.982	0.981	0.979	0.980	0.980	0.980	0.980	0.981	0.981	0.981	0.982	0.983	0.984	0.985	0.985	0.986	0.987	0.987	0.987	0.988
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.988	0.988	0.988	0.989	0.989	0.989	0.990	0.990	0.990	0.990	0.990	0.991	0.992	0.992	0.992	0.993				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.543	1.534	1.529	1.526	1.524	1.523	1.522
P	0.913	0.915	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

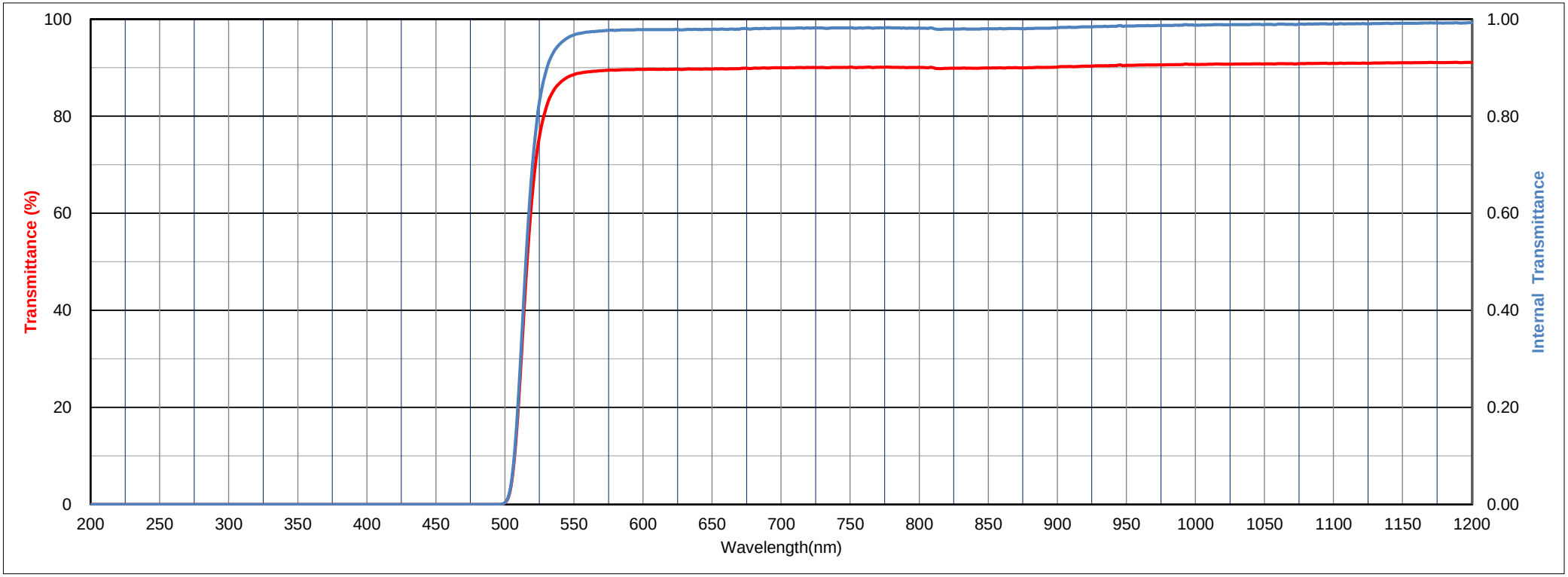
	x	y	Y	λ_d	P_e
A	0.530	0.464	82	583	96
C	0.478	0.512	75	576	98
D65	0.473	0.516	75	575	97

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	560	620	96	108	540	130	2.68

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
515±5	>440	>580



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HOYA

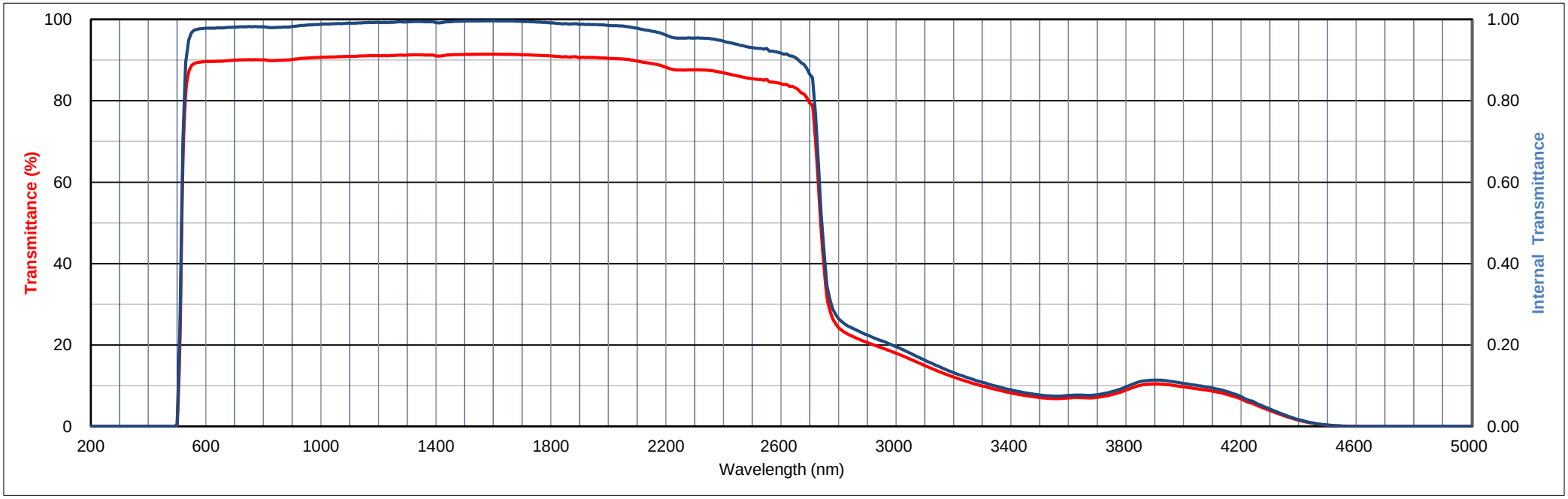
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-Y515

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.004	0.234	0.704	0.894	0.949	0.967	0.973	0.976	0.977	0.978
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.978	0.978	0.979	0.978	0.979	0.979	0.979	0.980	0.980	0.981	0.981	0.981	0.982	0.982	0.982	0.982	0.982	0.982	0.982	0.982
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.982	0.981	0.979	0.980	0.980	0.980	0.980	0.981	0.981	0.981	0.982	0.983	0.984	0.985	0.985	0.986	0.987	0.987	0.987	0.988
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.988	0.988	0.988	0.989	0.989	0.989	0.990	0.990	0.990	0.990	0.990	0.991	0.991	0.991	0.992	0.992	0.992	0.993	0.992	0.992
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.993	0.992	0.993	0.992	0.993	0.993	0.993	0.994	0.994	0.993	0.994	0.994	0.995	0.995	0.995	0.995	0.994	0.994	0.994	0.994
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.992	0.991	0.992	0.993	0.994	0.994	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.997	0.996
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.995	0.995	0.994	0.994	0.993	0.993	0.993	0.992	0.992
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.992	0.991	0.990	0.990	0.989	0.990	0.989	0.989	0.990	0.989	0.987	0.988	0.987	0.988	0.987	0.988	0.987	0.987	0.986	0.986
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.985	0.984	0.978	0.971	0.961	0.954	0.954	0.953	0.947	0.938	0.931	0.928	0.918	0.906	0.865	0.426	0.265	0.240	0.225	0.210
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.196	0.180	0.163	0.147	0.132	0.119	0.108	0.098	0.090	0.082	0.077	0.074	0.076	0.077	0.078	0.085	0.097	0.110	0.114	0.111
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.106	0.100	0.094	0.086	0.073	0.058	0.043	0.028	0.017	0.008	0.003	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-O530

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.007	0.134	0.484	0.772	0.901	0.950	0.968	0.976	0.980
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.981	0.982	0.983	0.983	0.983	0.983	0.984	0.984	0.985	0.985	0.986	0.986	0.986	0.987	0.986	0.986	0.986	0.986	0.986	0.985
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.986	0.986	0.984	0.984	0.984	0.985	0.985	0.985	0.985	0.986	0.987	0.987	0.988	0.989	0.989	0.990	0.990	0.991	0.991	0.992
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.992	0.993	0.992	0.993	0.993	0.993	0.993	0.994	0.994	0.995	0.994	0.995	0.995	0.996	0.996	0.996				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.545	1.535	1.529	1.525	1.523	1.522	1.521
P	0.912	0.915	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

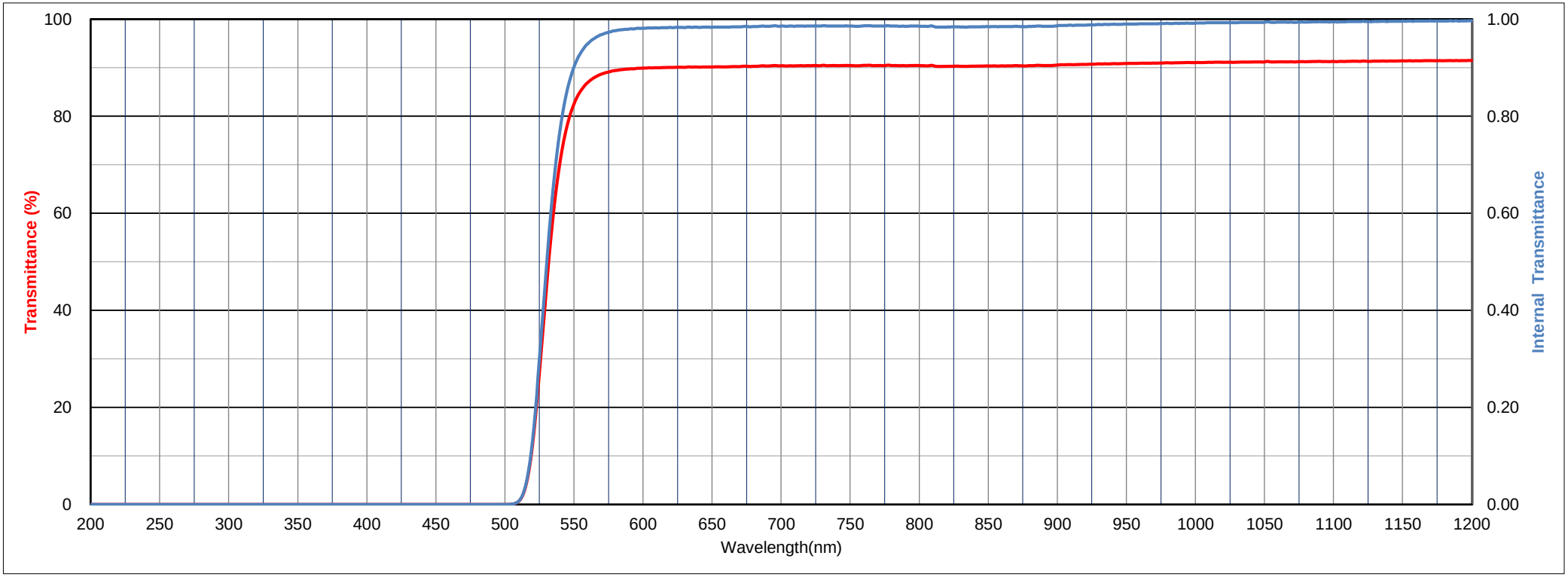
	x	y	Y	λ_d	P_e
A	0.552	0.445	74	586	99
C	0.509	0.487	65	580	99
D65	0.507	0.489	64	579	99

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	625	99	107	520	140	2.68

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
530±5	>460	>600



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

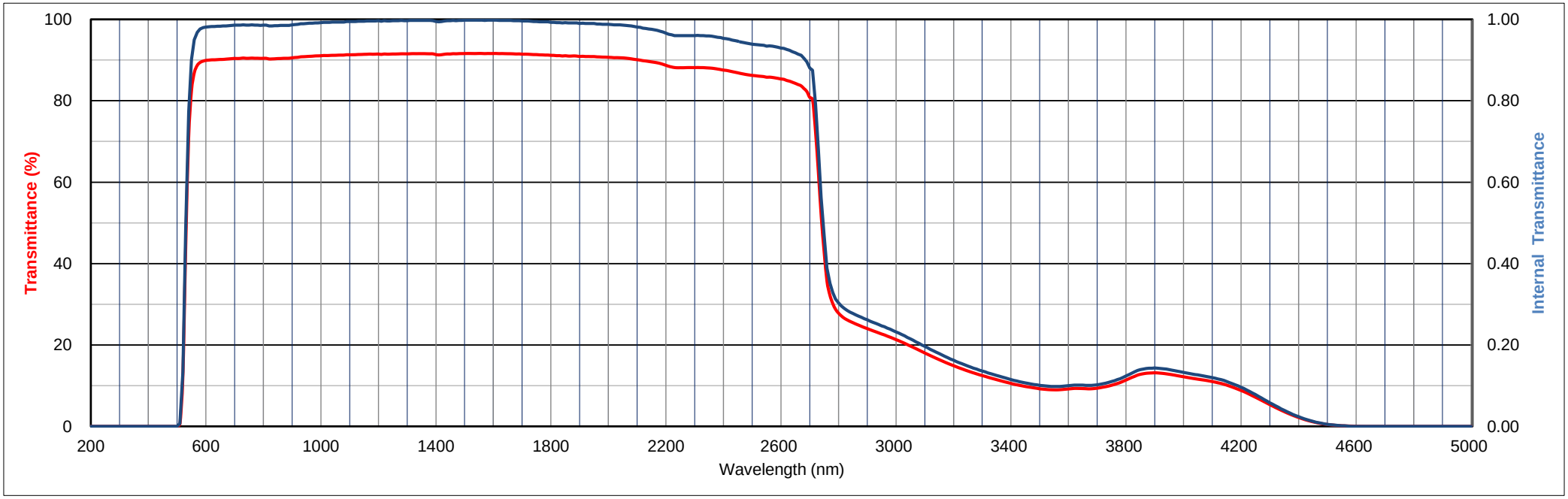
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-O530

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.007	0.134	0.484	0.772	0.901	0.950	0.968	0.976	0.980
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.981	0.982	0.983	0.983	0.983	0.983	0.984	0.984	0.985	0.985	0.986	0.986	0.986	0.987	0.986	0.986	0.986	0.986	0.986	0.985
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.986	0.986	0.984	0.984	0.984	0.985	0.985	0.985	0.985	0.986	0.987	0.987	0.988	0.989	0.989	0.990	0.990	0.991	0.991	0.992
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.992	0.993	0.992	0.993	0.993	0.993	0.993	0.994	0.994	0.995	0.994	0.995	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.996	0.995	0.997	0.996	0.996	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.998	0.997	0.998	0.997	0.997	0.997	0.997	0.997
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.995	0.994	0.995	0.996	0.997	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.998	0.998	0.998	0.998	0.997	0.997	0.997	0.997	0.997	0.997	0.996	0.996	0.996	0.995	0.995	0.995	0.994	0.994	0.994	0.994
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.993	0.993	0.992	0.992	0.991	0.992	0.991	0.991	0.991	0.991	0.990	0.990	0.990	0.990	0.990	0.990	0.989	0.989	0.988	0.988
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.988	0.986	0.981	0.975	0.966	0.960	0.960	0.959	0.954	0.946	0.939	0.934	0.930	0.918	0.880	0.469	0.303	0.278	0.262	0.247
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.232	0.215	0.197	0.179	0.163	0.148	0.136	0.125	0.115	0.107	0.100	0.098	0.100	0.101	0.102	0.110	0.124	0.139	0.143	0.139
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.133	0.126	0.120	0.110	0.096	0.078	0.058	0.039	0.024	0.012	0.005	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-O550

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.003	0.111	0.477	0.775	0.903	0.951	0.970
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.977	0.981	0.982	0.983	0.983	0.984	0.983	0.984	0.985	0.985	0.985	0.986	0.986	0.986	0.986	0.987	0.986	0.986	0.986	0.986
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.986	0.985	0.984	0.984	0.984	0.984	0.985	0.984	0.984	0.985	0.986	0.987	0.988	0.989	0.989	0.989	0.990	0.990	0.991	0.991
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.992	0.992	0.992	0.993	0.992	0.993	0.993	0.994	0.993	0.994	0.994	0.994	0.995	0.996	0.996	0.996				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.546	1.535	1.528	1.525	1.522	1.521	1.519
P	0.912	0.915	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

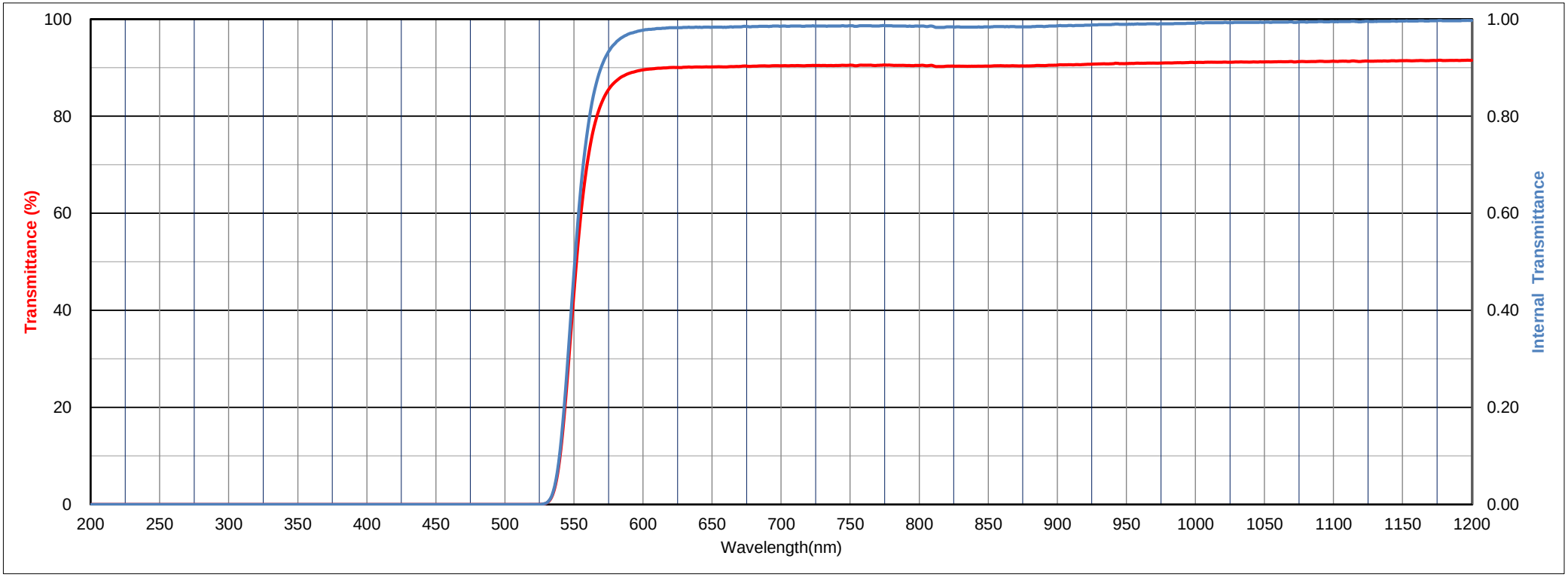
	x	y	Y	λ_d	P_e
A	0.589	0.410	61	592	100
C	0.559	0.440	49	587	100
D65	0.559	0.439	48	587	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	625	93	104	520	140	2.68

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
550±5	>480	>620



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HOYA

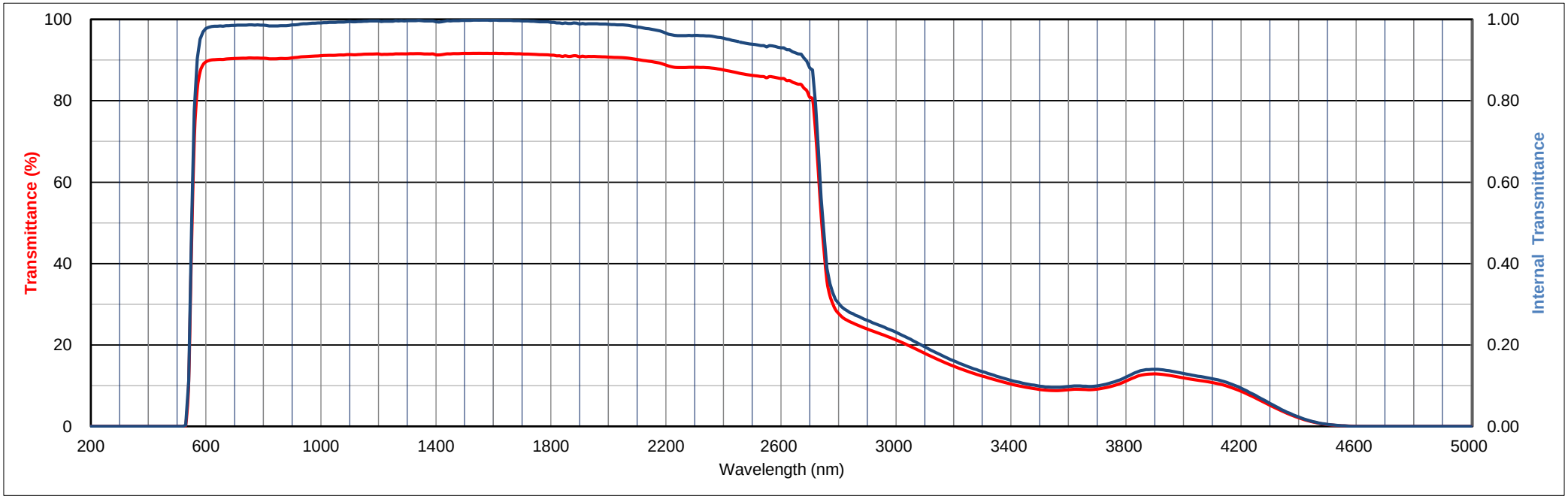
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-O550

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.003	0.111	0.477	0.775	0.903	0.951	0.970
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.977	0.981	0.982	0.983	0.983	0.984	0.983	0.984	0.985	0.985	0.985	0.986	0.986	0.986	0.986	0.987	0.986	0.986	0.986	0.986
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.986	0.985	0.984	0.984	0.984	0.984	0.985	0.984	0.984	0.985	0.986	0.987	0.988	0.989	0.989	0.989	0.990	0.990	0.991	0.991
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.992	0.992	0.992	0.993	0.992	0.993	0.993	0.994	0.993	0.994	0.994	0.994	0.994	0.995	0.995	0.996	0.996	0.996	0.996	0.996
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.996	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.997	0.996	0.996	0.997	0.997	0.997	0.997	0.997	0.996	0.996	0.996	0.996
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.994	0.994	0.994	0.995	0.997	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.998	0.998	0.998	0.998	0.997	0.997	0.997	0.997	0.997	0.997	0.996	0.996	0.996	0.996	0.995	0.995	0.994	0.994	0.994	0.994
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.993	0.993	0.991	0.991	0.990	0.991	0.990	0.990	0.992	0.991	0.988	0.990	0.989	0.990	0.989	0.990	0.989	0.989	0.988	0.988
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.988	0.986	0.981	0.976	0.966	0.960	0.960	0.959	0.954	0.946	0.939	0.932	0.930	0.918	0.880	0.468	0.302	0.276	0.261	0.246
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.231	0.214	0.195	0.177	0.161	0.147	0.134	0.123	0.113	0.105	0.098	0.096	0.098	0.099	0.100	0.107	0.121	0.136	0.140	0.137
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.130	0.123	0.117	0.108	0.094	0.076	0.057	0.038	0.023	0.012	0.005	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-O570

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.003	0.104	0.485	0.794	0.917
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.958	0.973	0.979	0.981	0.983	0.983	0.983	0.984	0.985	0.985	0.985	0.986	0.985	0.986	0.986	0.986	0.986	0.986	0.986	0.985
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.985	0.984	0.983	0.983	0.984	0.984	0.985	0.984	0.984	0.985	0.985	0.986	0.987	0.988	0.989	0.989	0.989	0.990	0.990	0.990
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.991	0.991	0.991	0.992	0.992	0.992	0.992	0.992	0.993	0.993	0.993	0.993	0.994	0.994	0.995	0.995				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.545	1.535	1.529	1.525	1.523	1.522	1.521
P	0.912	0.915	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

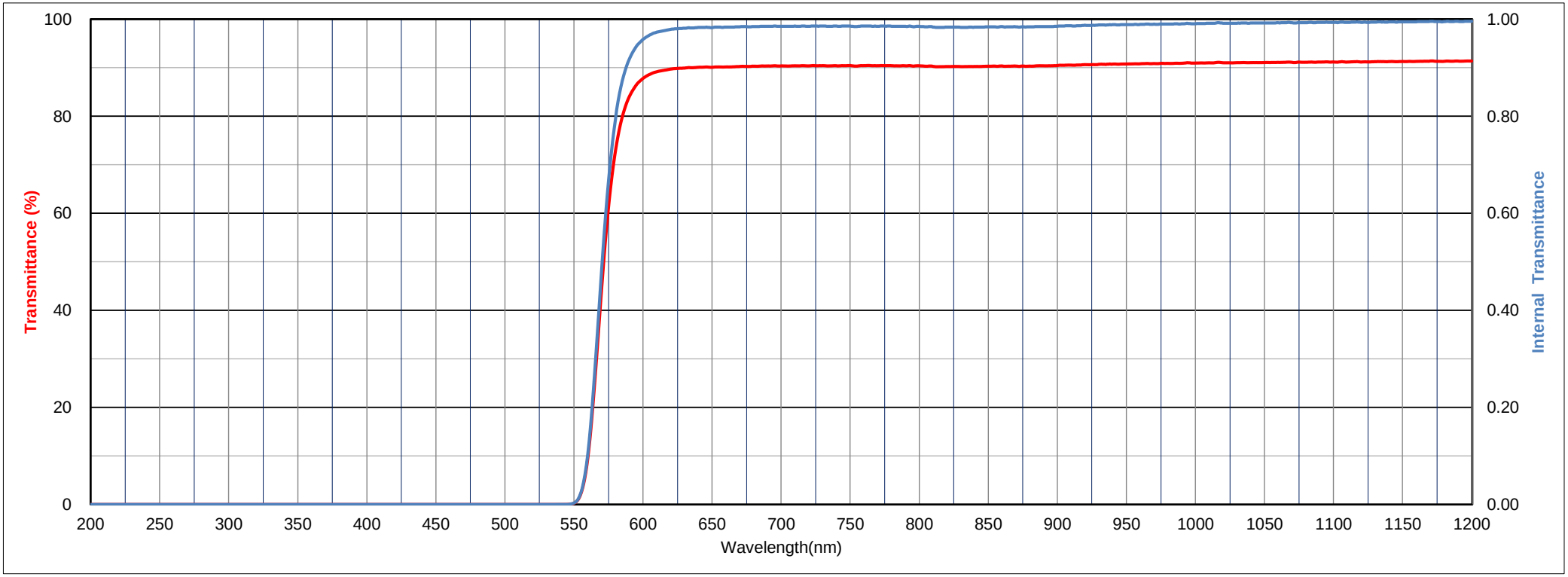
	x	y	Y	λ_d	P_e
A	0.630	0.370	45	601	100
C	0.614	0.386	33	597	100
D65	0.614	0.386	32	597	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	625	93	104	520	140	2.68

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
570±5	>500	>640



All data is mean values of various melts.

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HOYA

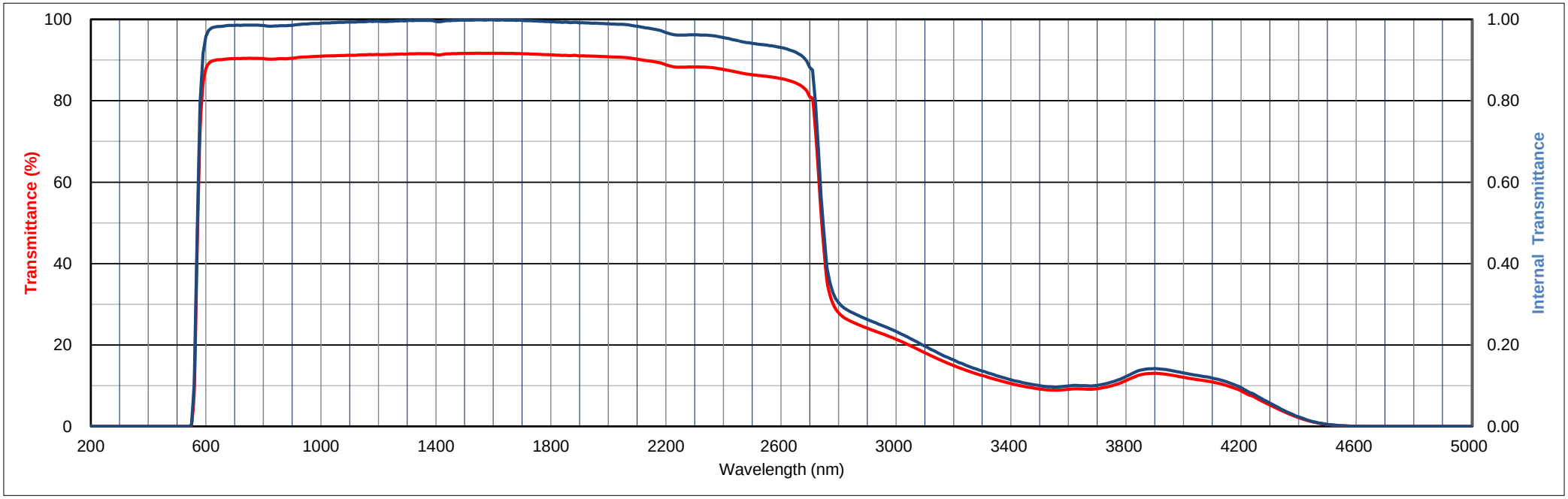
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-O570

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.003	0.104	0.485	0.794	0.917
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.958	0.973	0.979	0.981	0.983	0.983	0.983	0.984	0.985	0.985	0.985	0.986	0.985	0.986	0.986	0.986	0.986	0.986	0.986	0.985
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.985	0.984	0.983	0.983	0.984	0.984	0.985	0.984	0.984	0.985	0.985	0.986	0.987	0.988	0.989	0.989	0.989	0.990	0.990	0.990
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.991	0.991	0.991	0.992	0.992	0.992	0.992	0.992	0.993	0.993	0.993	0.993	0.993	0.994	0.994	0.994	0.994	0.995	0.995	0.995
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.995	0.995	0.995	0.995	0.996	0.995	0.996	0.996	0.997	0.996	0.997	0.997	0.997	0.997	0.998	0.997	0.997	0.997	0.997	0.997
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.995	0.994	0.995	0.996	0.997	0.997	0.998	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.999	0.998	0.998	0.999	0.999
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.999	0.998	0.998	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.997	0.997	0.997	0.996	0.996	0.996	0.996	0.995	0.995	0.995
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.994	0.994	0.993	0.993	0.993	0.993	0.992	0.992	0.993	0.992	0.991	0.992	0.991	0.991	0.991	0.991	0.991	0.990	0.990	0.990
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.989	0.988	0.983	0.977	0.968	0.961	0.962	0.961	0.955	0.948	0.941	0.937	0.931	0.920	0.882	0.469	0.304	0.279	0.263	0.248
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.233	0.216	0.197	0.179	0.163	0.148	0.136	0.125	0.115	0.106	0.100	0.097	0.099	0.100	0.101	0.109	0.123	0.138	0.142	0.138
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.131	0.125	0.119	0.109	0.095	0.077	0.057	0.039	0.023	0.012	0.005	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-O590

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.002	0.100	0.512
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.822	0.931	0.964	0.975	0.980	0.982	0.983	0.984	0.984	0.985	0.985	0.985	0.986	0.986	0.985	0.985	0.985	0.985	0.984	0.985
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.984	0.984	0.983	0.983	0.983	0.983	0.984	0.983	0.983	0.984	0.985	0.986	0.986	0.987	0.987	0.988	0.989	0.989	0.989	0.990
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.990	0.991	0.990	0.991	0.991	0.991	0.991	0.992	0.992	0.992	0.993	0.992	0.994	0.994	0.994	0.994				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.546	1.536	1.530	1.526	1.524	1.523	1.521
P	0.912	0.915	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

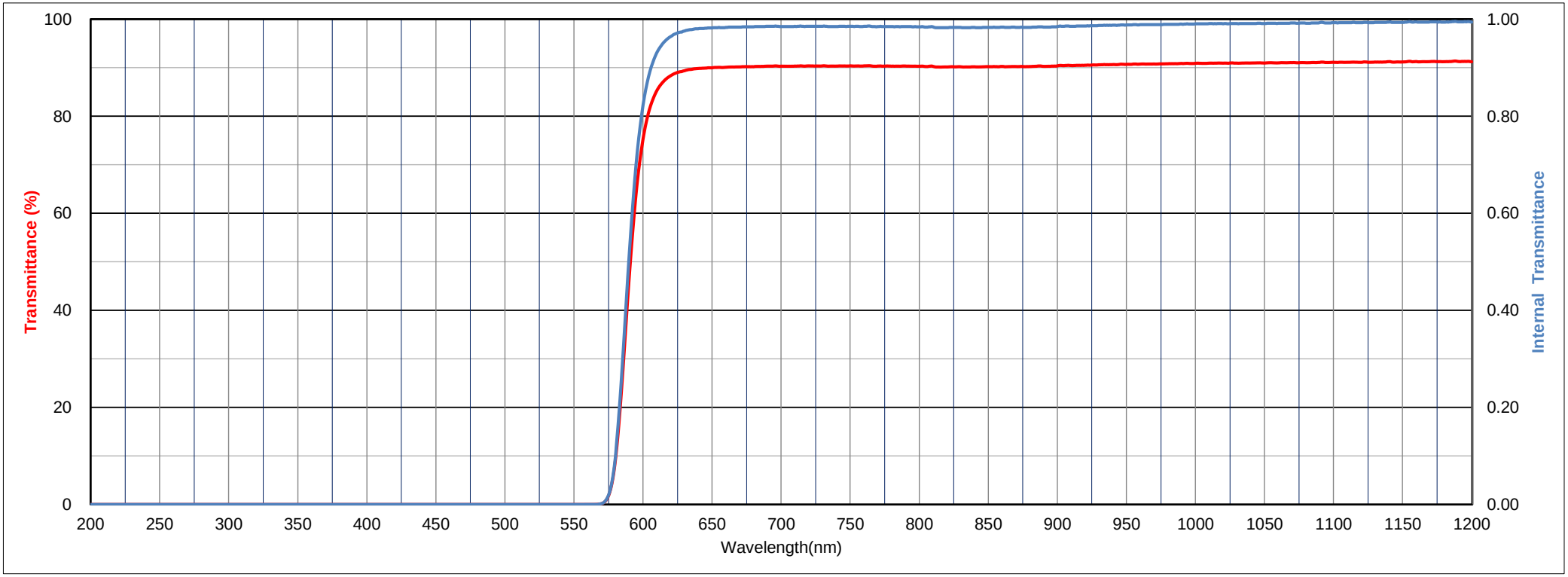
	x	y	Y	λ_d	P_e
A	0.670	0.330	29	611	100
C	0.663	0.337	19	609	100
D65	0.663	0.337	19	609	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	625	93	104	520	140	2.68

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
590±5	>520	>660



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HOYA

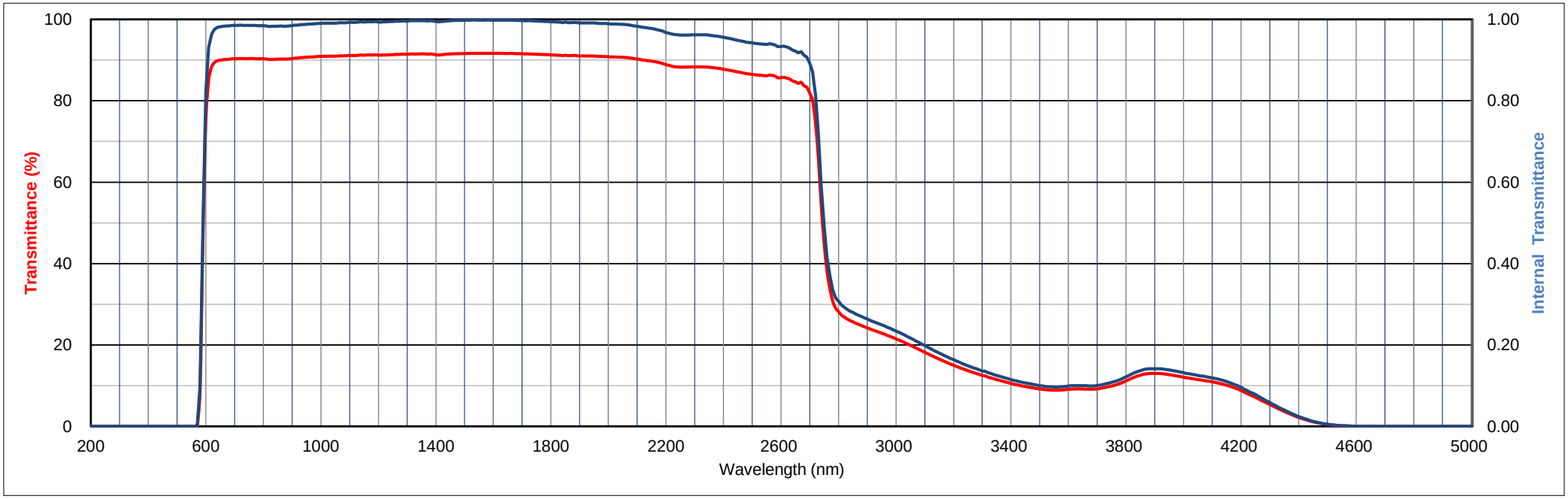
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-O590

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.002	0.100	0.512
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.822	0.931	0.964	0.975	0.980	0.982	0.983	0.984	0.984	0.985	0.985	0.985	0.986	0.986	0.985	0.985	0.985	0.985	0.984	0.985
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.984	0.984	0.983	0.983	0.983	0.983	0.984	0.983	0.983	0.984	0.985	0.986	0.986	0.987	0.987	0.988	0.989	0.989	0.989	0.990
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.990	0.991	0.990	0.991	0.991	0.991	0.991	0.992	0.992	0.992	0.993	0.992	0.992	0.993	0.994	0.993	0.994	0.994	0.994	0.994
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.994	0.993	0.994	0.994	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.997	0.997	0.996	0.997	0.997	0.997	0.996	0.997	0.996
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.994	0.994	0.995	0.996	0.996	0.997	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.998
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.997	0.998	0.997	0.997	0.997	0.996	0.996	0.996	0.995	0.995	0.995	0.995
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.994	0.994	0.993	0.993	0.992	0.993	0.992	0.992	0.993	0.992	0.991	0.992	0.991	0.991	0.991	0.991	0.991	0.990	0.990	0.990
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.989	0.988	0.983	0.977	0.968	0.961	0.962	0.961	0.956	0.949	0.942	0.938	0.933	0.922	0.892	0.492	0.307	0.280	0.264	0.249
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.234	0.217	0.198	0.180	0.164	0.149	0.136	0.125	0.115	0.107	0.100	0.097	0.099	0.100	0.100	0.108	0.122	0.137	0.142	0.138
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.132	0.125	0.119	0.110	0.096	0.078	0.058	0.040	0.024	0.012	0.005	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R610

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.017
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.169	0.522	0.806	0.921	0.959	0.971	0.976	0.978	0.979	0.980	0.980	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.981	0.981	0.980	0.980	0.981	0.981	0.980	0.981	0.981	0.982	0.983	0.983	0.984	0.984	0.985	0.986	0.986	0.987	0.987	0.988
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.988	0.989	0.986	0.989	0.988	0.989	0.989	0.990	0.990	0.990	0.990	0.991	0.991	0.992	0.992	0.992				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.547	1.536	1.531	1.527	1.525	1.524	1.523
P	0.912	0.914	0.916	0.917	0.917	0.917	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

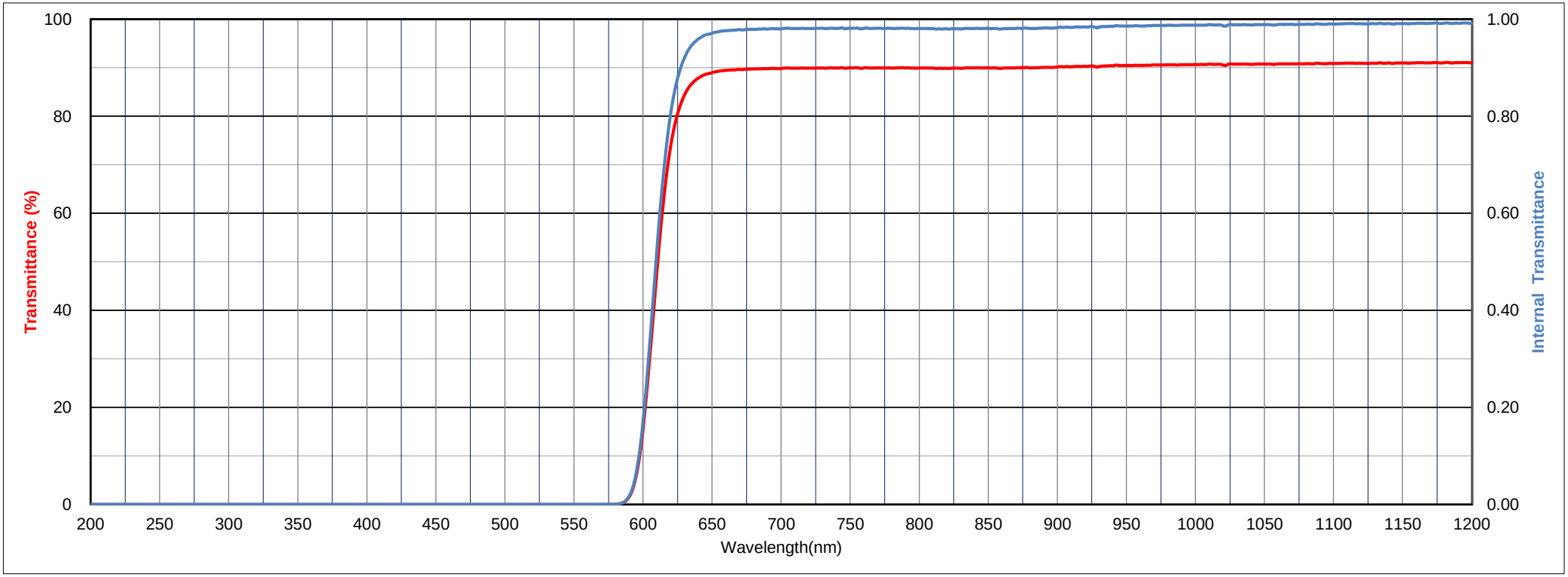
	x	y	Y	λ_d	P_e
A	0.698	0.301	17	624	100
C	0.696	0.304	10	622	100
D65	0.695	0.305	10	622	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	2	560	620	93	103	520	140	2.69

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
610±5	>540	>690



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HOYA

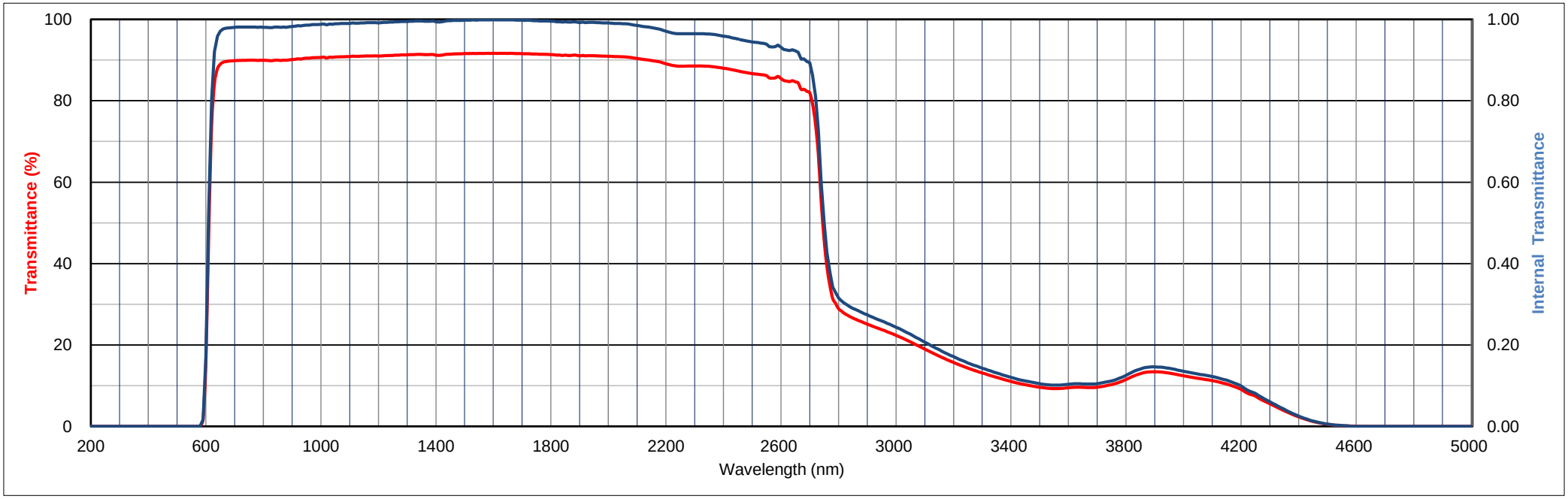
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R610

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.017
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.169	0.522	0.806	0.921	0.959	0.971	0.976	0.978	0.979	0.980	0.980	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981	0.981
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.981	0.981	0.980	0.980	0.981	0.981	0.980	0.981	0.981	0.982	0.983	0.983	0.984	0.984	0.985	0.986	0.986	0.987	0.987	0.988
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.988	0.989	0.986	0.989	0.988	0.989	0.989	0.990	0.990	0.990	0.990	0.991	0.991	0.991	0.991	0.991	0.992	0.992	0.992	0.992
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.992	0.992	0.993	0.993	0.993	0.993	0.994	0.994	0.995	0.995	0.995	0.995	0.995	0.996	0.996	0.996	0.995	0.995	0.996	0.996
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.994	0.993	0.994	0.995	0.996	0.996	0.997	0.997	0.998	0.998	0.998	0.998	0.998	0.999	0.998	0.999	0.999	0.999	0.999	0.999
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.998	0.998	0.998	0.998	0.998	0.997	0.997	0.997	0.996	0.996	0.996	0.996
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.995	0.995	0.994	0.994	0.993	0.994	0.993	0.993	0.994	0.994	0.992	0.993	0.992	0.993	0.992	0.992	0.992	0.992	0.991	0.991
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.991	0.990	0.985	0.980	0.971	0.965	0.965	0.964	0.959	0.952	0.945	0.939	0.931	0.922	0.893	0.500	0.315	0.290	0.274	0.259
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.244	0.226	0.207	0.188	0.171	0.156	0.143	0.131	0.120	0.112	0.105	0.101	0.103	0.104	0.105	0.112	0.125	0.141	0.146	0.143
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.135	0.129	0.122	0.113	0.099	0.081	0.061	0.042	0.025	0.013	0.006	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R630

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.001	0.013	0.148	0.503	0.802	0.925	0.963	0.974	0.978	0.980	0.981	0.982	0.982	0.981	0.982	0.982	0.982	0.982	0.981	0.982
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.981	0.980	0.980	0.980	0.981	0.981	0.981	0.982	0.981	0.982	0.983	0.984	0.984	0.984	0.986	0.986	0.986	0.987	0.987	0.988
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.988	0.989	0.986	0.989	0.988	0.989	0.989	0.989	0.990	0.990	0.991	0.990	0.991	0.992	0.992	0.992				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.547	1.536	1.530	1.526	1.524	1.522	1.521
P	0.912	0.914	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

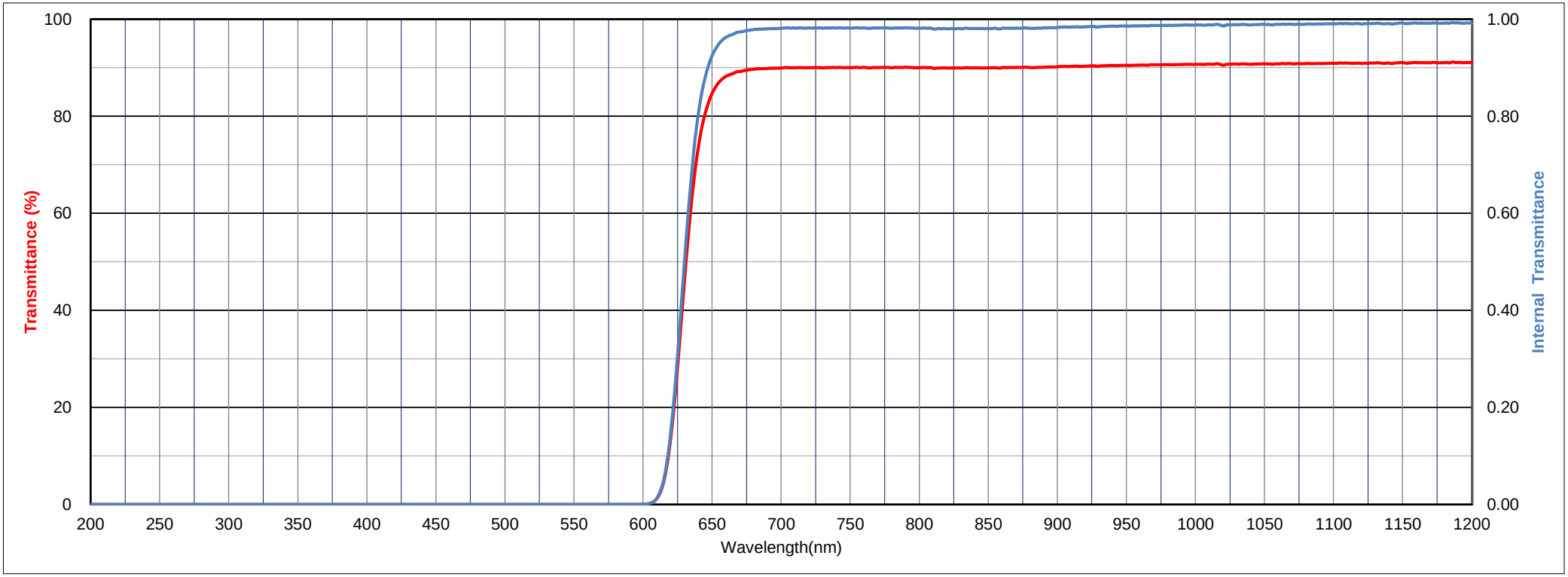
	x	y	Y	λ_d	P_e
A	0.718	0.281	8	639	100
C	0.717	0.283	4	638	100
D65	0.717	0.283	4	638	100

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	560	620	95	107	520	140	2.68

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
630±5	>550	>710



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

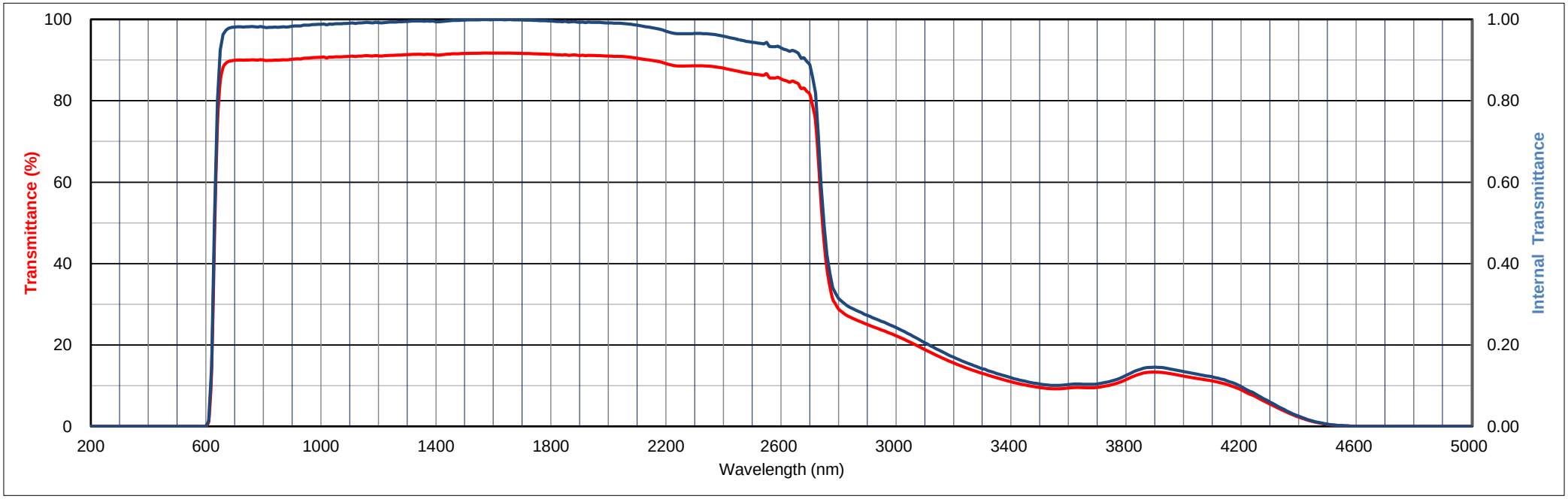
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R630

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.001	0.013	0.148	0.503	0.802	0.925	0.963	0.974	0.978	0.980	0.981	0.982	0.982	0.981	0.982	0.982	0.982	0.982	0.981	0.982
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.981	0.980	0.980	0.980	0.981	0.981	0.981	0.982	0.981	0.982	0.983	0.984	0.984	0.984	0.986	0.986	0.986	0.987	0.987	0.988
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.988	0.989	0.986	0.989	0.988	0.989	0.989	0.989	0.990	0.990	0.991	0.991	0.990	0.991	0.991	0.992	0.992	0.992	0.992	0.992
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.992	0.991	0.992	0.993	0.993	0.993	0.994	0.994	0.994	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.995	0.996	0.996	0.996
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.994	0.994	0.995	0.995	0.996	0.997	0.998	0.997	0.997	0.998	0.998	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.998	0.998	0.998	0.997	0.997	0.997	0.997	0.997	0.996
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.996	0.995	0.995	0.995	0.994	0.995	0.993	0.994	0.995	0.994	0.993	0.994	0.992	0.993	0.993	0.993	0.992	0.992	0.992	0.991
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.991	0.990	0.986	0.980	0.971	0.965	0.965	0.964	0.959	0.951	0.944	0.944	0.930	0.921	0.889	0.493	0.314	0.289	0.273	0.258
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.243	0.225	0.206	0.187	0.170	0.155	0.142	0.130	0.119	0.111	0.104	0.101	0.103	0.104	0.104	0.111	0.125	0.140	0.145	0.142
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.135	0.128	0.122	0.112	0.098	0.080	0.060	0.041	0.025	0.013	0.005	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R645

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	0.002	0.047	0.319	0.696	0.890	0.951	0.971	0.978	0.981	0.982	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.983	0.983	0.982	0.982	0.982	0.982	0.983	0.983	0.983	0.983	0.984	0.986	0.986	0.986	0.987	0.988	0.988	0.989	0.989	0.989
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.990	0.990	0.989	0.990	0.990	0.991	0.991	0.992	0.992	0.992	0.993	0.992	0.994	0.994	0.994	0.994				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.547	1.536	1.531	1.527	1.525	1.523	1.522
P	0.912	0.914	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

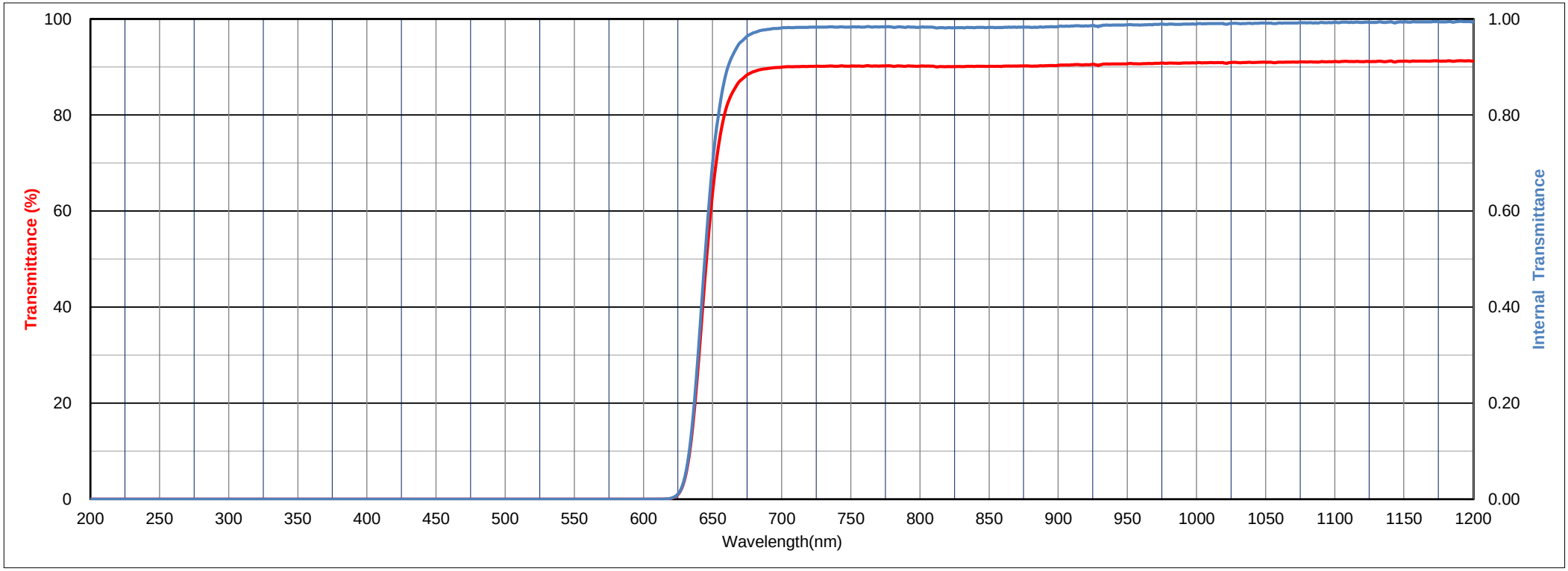
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	555	620	94	106	520	140	2.68

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
645±5	>560	>720



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HOYA

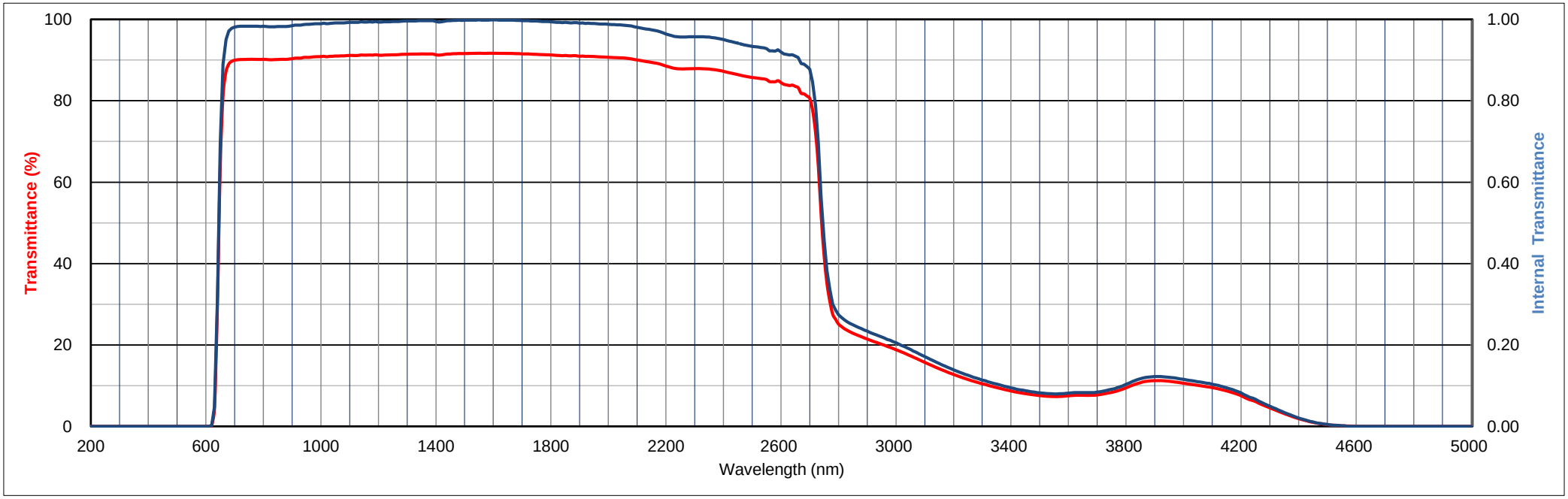
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R645

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	0.002	0.047	0.319	0.696	0.890	0.951	0.971	0.978	0.981	0.982	0.983	0.983	0.983	0.983	0.983	0.983	0.983	0.983
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.983	0.983	0.982	0.982	0.982	0.982	0.983	0.983	0.983	0.983	0.984	0.986	0.986	0.986	0.987	0.988	0.988	0.989	0.989	0.989
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.990	0.990	0.989	0.990	0.990	0.991	0.991	0.992	0.992	0.992	0.993	0.993	0.992	0.993	0.994	0.994	0.994	0.994	0.994	0.995
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.994	0.993	0.994	0.994	0.994	0.994	0.994	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.997	0.997	0.997	0.996	0.997	0.996
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.994	0.994	0.994	0.995	0.996	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.998	0.998	0.998	0.999
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.999	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.997	0.998	0.997	0.997	0.997	0.996	0.996	0.996	0.995	0.995	0.995	0.994
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.994	0.994	0.993	0.993	0.992	0.993	0.992	0.992	0.992	0.992	0.990	0.991	0.990	0.990	0.990	0.990	0.989	0.989	0.989	0.988
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.988	0.986	0.981	0.974	0.964	0.957	0.957	0.956	0.950	0.941	0.934	0.928	0.920	0.910	0.878	0.457	0.274	0.249	0.234	0.220
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.205	0.189	0.171	0.154	0.139	0.126	0.114	0.104	0.095	0.088	0.082	0.080	0.082	0.083	0.084	0.091	0.103	0.117	0.122	0.121
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.115	0.110	0.104	0.095	0.082	0.066	0.050	0.034	0.021	0.011	0.005	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R665

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.013	0.263	0.663	0.863	0.931	0.955	0.964	0.968	0.970	0.971	0.972	0.973
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.974	0.973	0.973	0.974	0.974	0.975	0.975	0.976	0.976	0.977	0.978	0.979	0.980	0.980	0.983	0.983	0.983	0.985	0.985	0.986
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.986	0.986	0.985	0.986	0.987	0.987	0.987	0.988	0.988	0.989	0.989	0.990	0.991	0.991	0.991	0.991				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.546	1.535	1.530	1.526	1.523	1.522	1.521
P	0.912	0.915	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

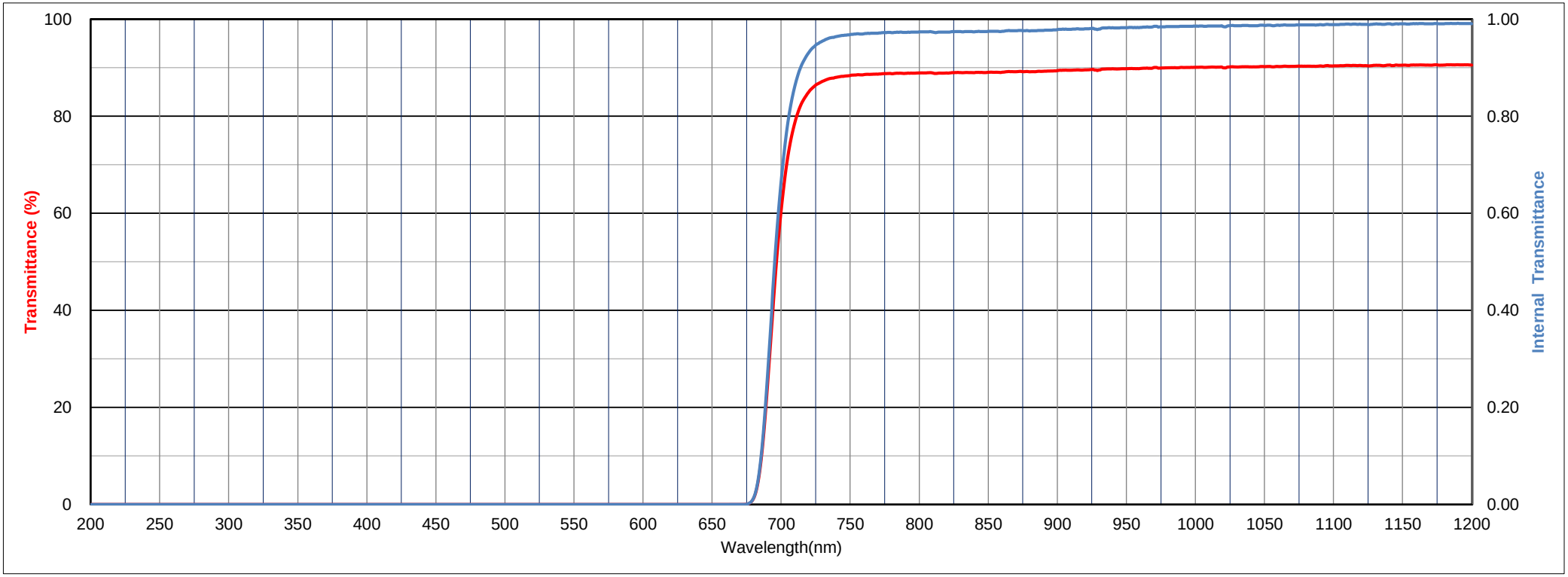
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	555	620	94	106	520	140	2.68

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
665±5	>580	>750



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HOYA

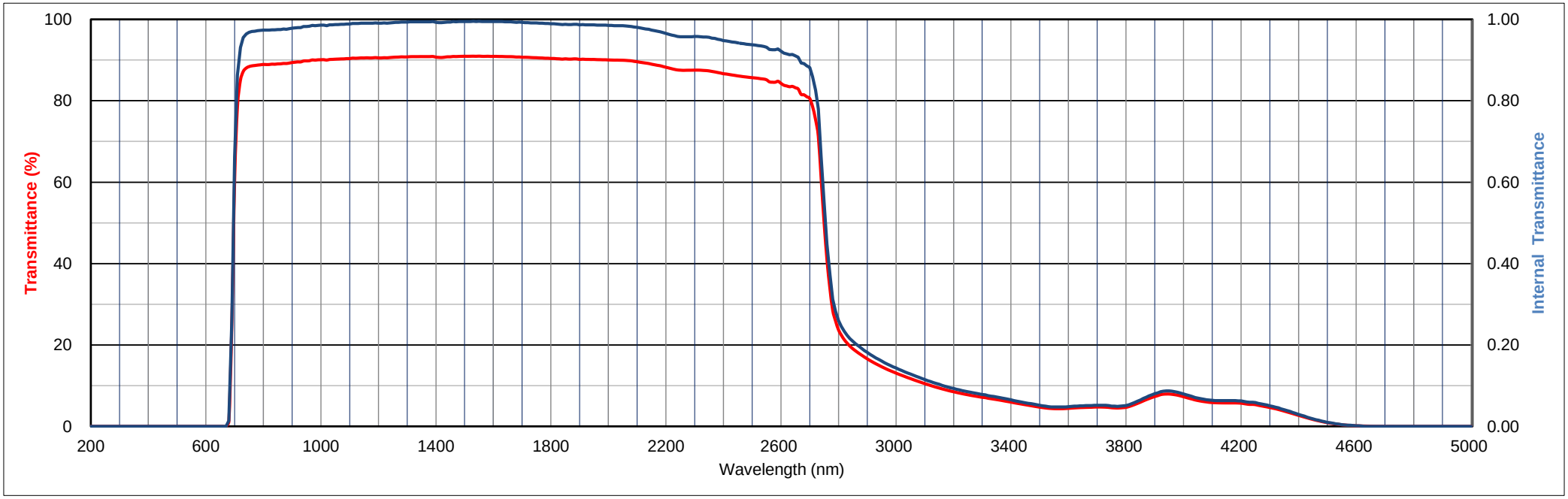
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R665

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.013	0.263	0.663	0.863	0.931	0.955	0.964	0.968	0.970	0.971	0.972	0.973
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.974	0.973	0.973	0.974	0.974	0.975	0.975	0.976	0.976	0.977	0.978	0.979	0.980	0.980	0.983	0.983	0.983	0.985	0.985	0.986
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.986	0.986	0.985	0.986	0.987	0.987	0.987	0.988	0.988	0.989	0.989	0.990	0.990	0.990	0.991	0.990	0.991	0.991	0.991	0.991
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.991	0.991	0.991	0.991	0.992	0.992	0.993	0.993	0.993	0.993	0.993	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.993	0.992	0.992	0.993	0.993	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.995	0.995	0.994	0.994	0.994	0.994	0.994	0.994	0.993	0.993	0.992	0.992	0.992	0.992	0.991	0.991	0.991	0.990	0.990	0.990
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.989	0.989	0.988	0.988	0.987	0.988	0.987	0.987	0.988	0.988	0.987	0.987	0.987	0.987	0.986	0.986	0.986	0.986	0.986	0.986
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.985	0.984	0.980	0.974	0.965	0.958	0.958	0.956	0.948	0.942	0.937	0.932	0.922	0.910	0.882	0.548	0.260	0.209	0.182	0.160
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.143	0.129	0.115	0.103	0.093	0.085	0.078	0.072	0.065	0.058	0.052	0.048	0.048	0.051	0.052	0.050	0.051	0.065	0.080	0.087
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.080	0.069	0.064	0.063	0.062	0.058	0.051	0.041	0.030	0.019	0.010	0.004	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R695

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.013	0.263	0.663	0.863	0.931	0.955	0.964	0.968	0.970	0.971	0.972	0.973
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.974	0.973	0.973	0.974	0.974	0.975	0.975	0.976	0.976	0.977	0.978	0.979	0.980	0.980	0.983	0.983	0.983	0.985	0.985	0.986
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.986	0.986	0.985	0.986	0.987	0.987	0.987	0.988	0.988	0.989	0.989	0.990	0.991	0.991	0.991	0.991				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.562	1.552	1.547	1.543	1.541	1.539	1.538
P	0.908	0.911	0.912	0.913	0.913	0.914	0.914

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

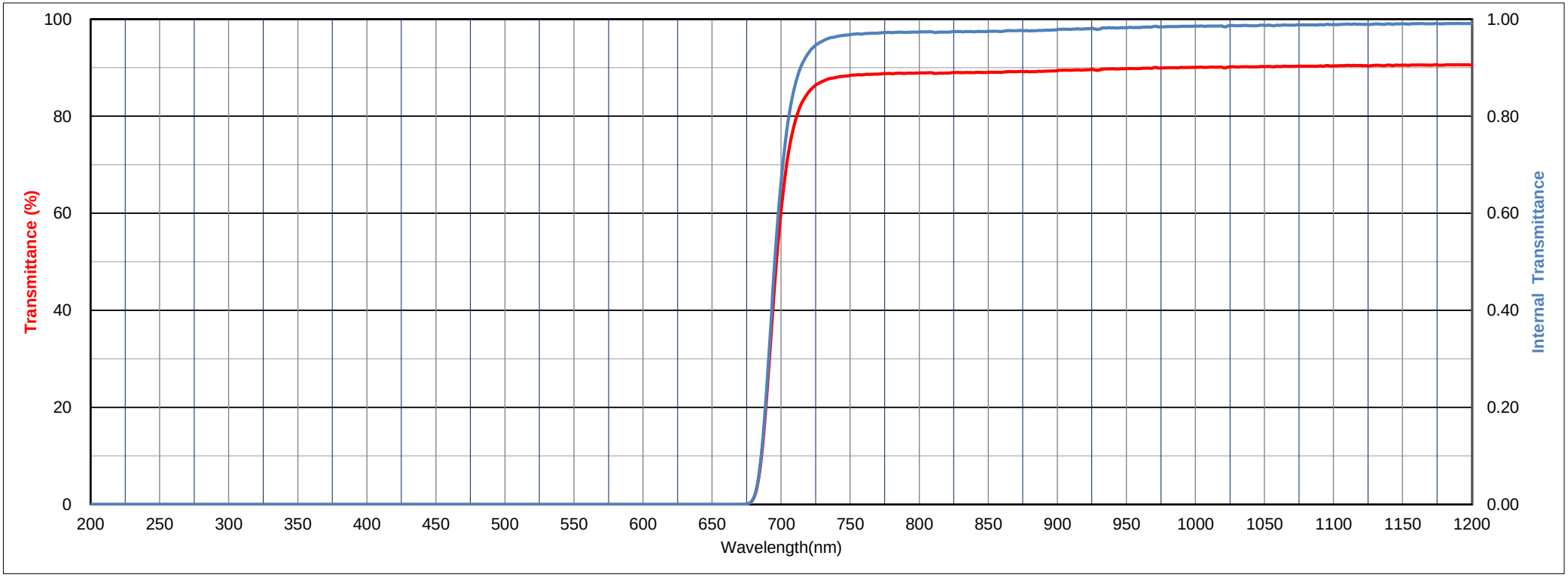
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	525	575	98	115	470	160	2.86

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
695±5	>610	>780



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HOYA

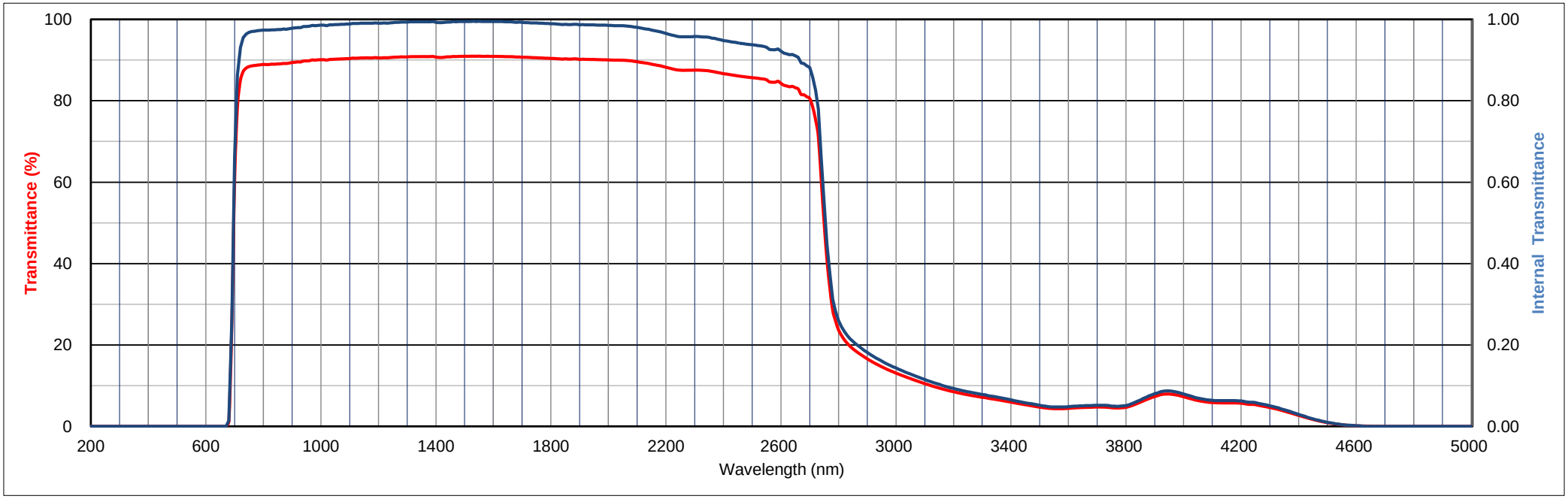
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R695

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.013	0.263	0.663	0.863	0.931	0.955	0.964	0.968	0.970	0.971	0.972	0.973
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.974	0.973	0.973	0.974	0.974	0.975	0.975	0.976	0.976	0.977	0.978	0.979	0.980	0.980	0.983	0.983	0.983	0.985	0.985	0.986
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.986	0.986	0.985	0.986	0.987	0.987	0.987	0.988	0.988	0.989	0.989	0.990	0.990	0.990	0.991	0.990	0.991	0.991	0.991	0.991
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.991	0.991	0.991	0.991	0.992	0.992	0.993	0.993	0.993	0.993	0.993	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994	0.994
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.993	0.992	0.992	0.993	0.993	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.995	0.995	0.994	0.994	0.994	0.994	0.994	0.994	0.993	0.993	0.992	0.992	0.992	0.992	0.991	0.991	0.991	0.990	0.990	0.990
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.989	0.989	0.988	0.988	0.987	0.988	0.987	0.987	0.988	0.988	0.987	0.987	0.987	0.987	0.986	0.986	0.986	0.986	0.986	0.986
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.985	0.984	0.980	0.974	0.965	0.958	0.958	0.956	0.948	0.942	0.937	0.932	0.922	0.910	0.882	0.548	0.260	0.209	0.182	0.160
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.143	0.129	0.115	0.103	0.093	0.085	0.078	0.072	0.065	0.058	0.052	0.048	0.048	0.051	0.052	0.050	0.051	0.065	0.080	0.087
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.080	0.069	0.064	0.063	0.062	0.058	0.051	0.041	0.030	0.019	0.010	0.004	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R715

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.023	0.301	0.681	0.856	0.914	0.933	0.943	0.946	0.949	0.953
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.954	0.954	0.957	0.958	0.960	0.962	0.963	0.964	0.965	0.967	0.969	0.970	0.971	0.974	0.974	0.975	0.976	0.978	0.979	0.979
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.980	0.981	0.979	0.982	0.982	0.983	0.983	0.984	0.985	0.985	0.986	0.986	0.987	0.989	0.989	0.988				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.567	1.555	1.549	1.545	1.542	1.541	1.540
P	0.907	0.910	0.911	0.912	0.913	0.913	0.914

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

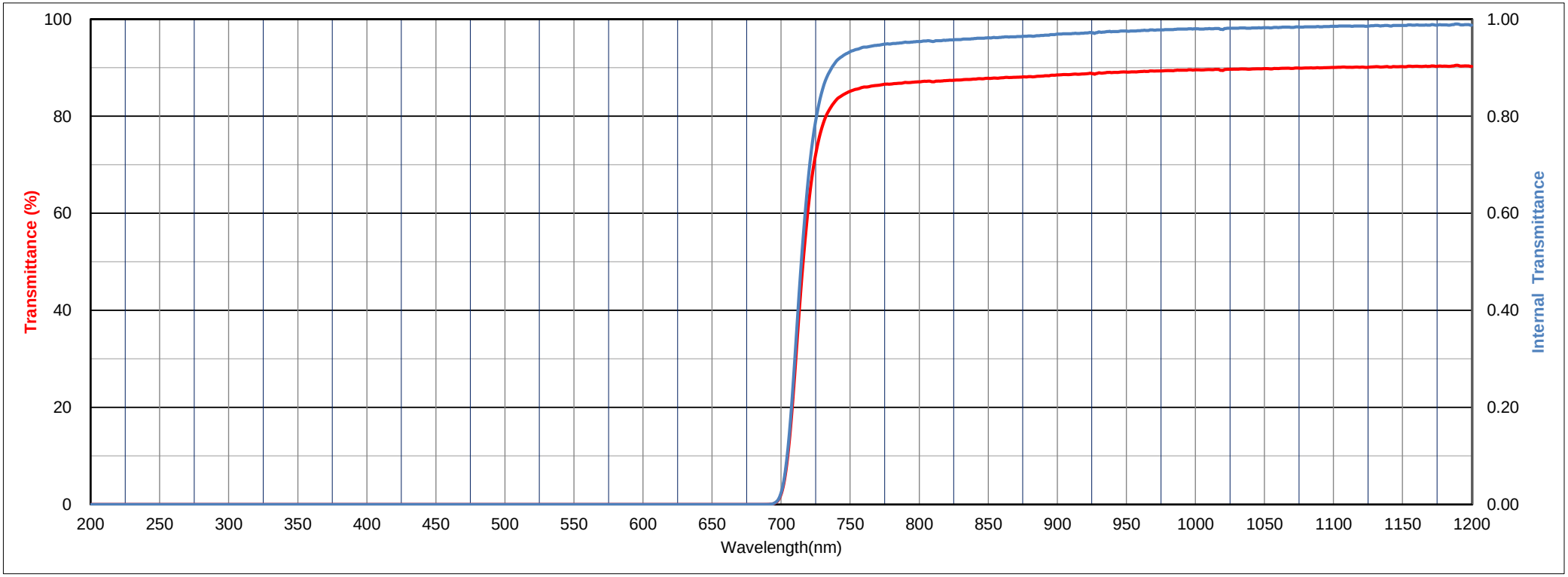
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	525	575	100	116	470	160	2.86

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
715±8	>630	>810



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HOYA

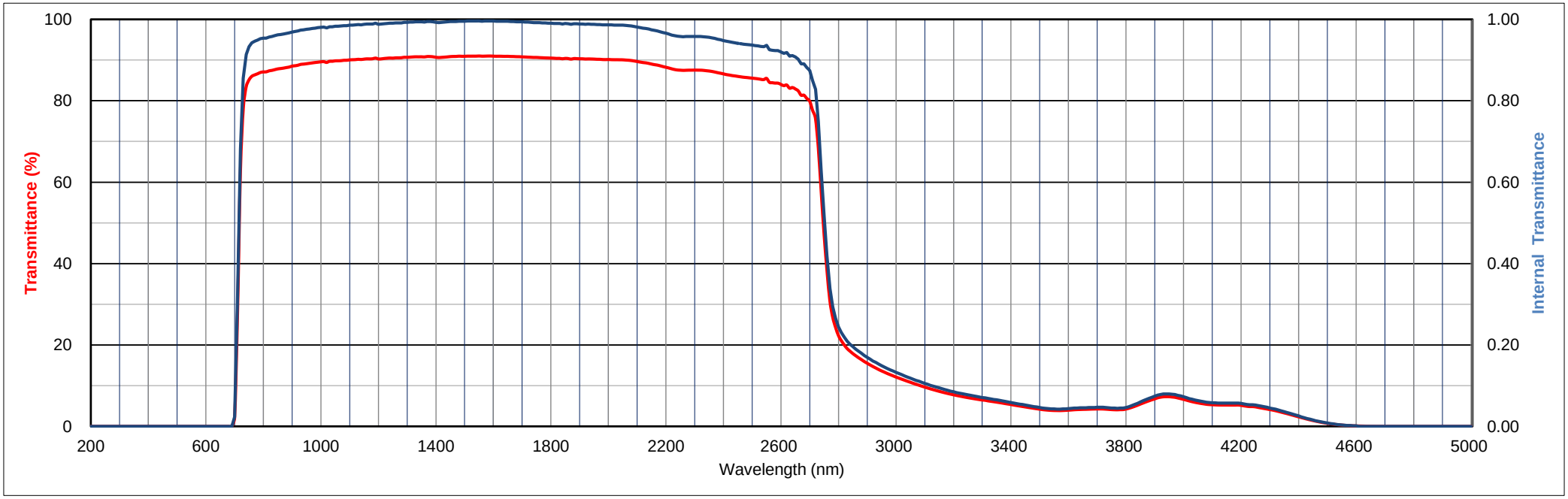
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-R715

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.023	0.301	0.681	0.856	0.914	0.933	0.943	0.946	0.949	0.953
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.954	0.954	0.957	0.958	0.960	0.962	0.963	0.964	0.965	0.967	0.969	0.970	0.971	0.974	0.974	0.975	0.976	0.978	0.979	0.979
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.980	0.981	0.979	0.982	0.982	0.983	0.983	0.984	0.985	0.985	0.986	0.986	0.986	0.987	0.987	0.988	0.989	0.988	0.989	0.991
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.988	0.988	0.989	0.990	0.991	0.990	0.991	0.991	0.992	0.993	0.993	0.993	0.994	0.994	0.994	0.994	0.994	0.995	0.995	0.994
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.993	0.992	0.993	0.993	0.994	0.995	0.995	0.995	0.996	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.996	0.995	0.996	0.995	0.995	0.995	0.995	0.995	0.994	0.994	0.994	0.993	0.993	0.993	0.992	0.992	0.992	0.991	0.991	0.991
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.991	0.990	0.990	0.990	0.989	0.990	0.989	0.988	0.989	0.989	0.989	0.989	0.988	0.988	0.988	0.988	0.987	0.987	0.987	0.987
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.987	0.986	0.981	0.974	0.966	0.958	0.958	0.956	0.948	0.941	0.937	0.936	0.920	0.908	0.875	0.516	0.244	0.196	0.170	0.149
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.133	0.119	0.106	0.094	0.085	0.077	0.071	0.065	0.059	0.052	0.046	0.043	0.044	0.046	0.047	0.045	0.047	0.060	0.074	0.080
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.073	0.063	0.058	0.057	0.057	0.052	0.045	0.036	0.026	0.016	0.008	0.003	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR760

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.004	0.046	0.229	0.532	0.765	0.884	0.934
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.956	0.965	0.969	0.971	0.973	0.974	0.975	0.976	0.976	0.977	0.978	0.980	0.980	0.980	0.983	0.983	0.983	0.984	0.985	0.986
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.985	0.986	0.984	0.987	0.986	0.987	0.988	0.988	0.988	0.988	0.988	0.989	0.991	0.990	0.991	0.990				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.584	1.572	1.566	1.561	1.559	1.557	1.555
P	0.903	0.906	0.907	0.908	0.909	0.909	0.910

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

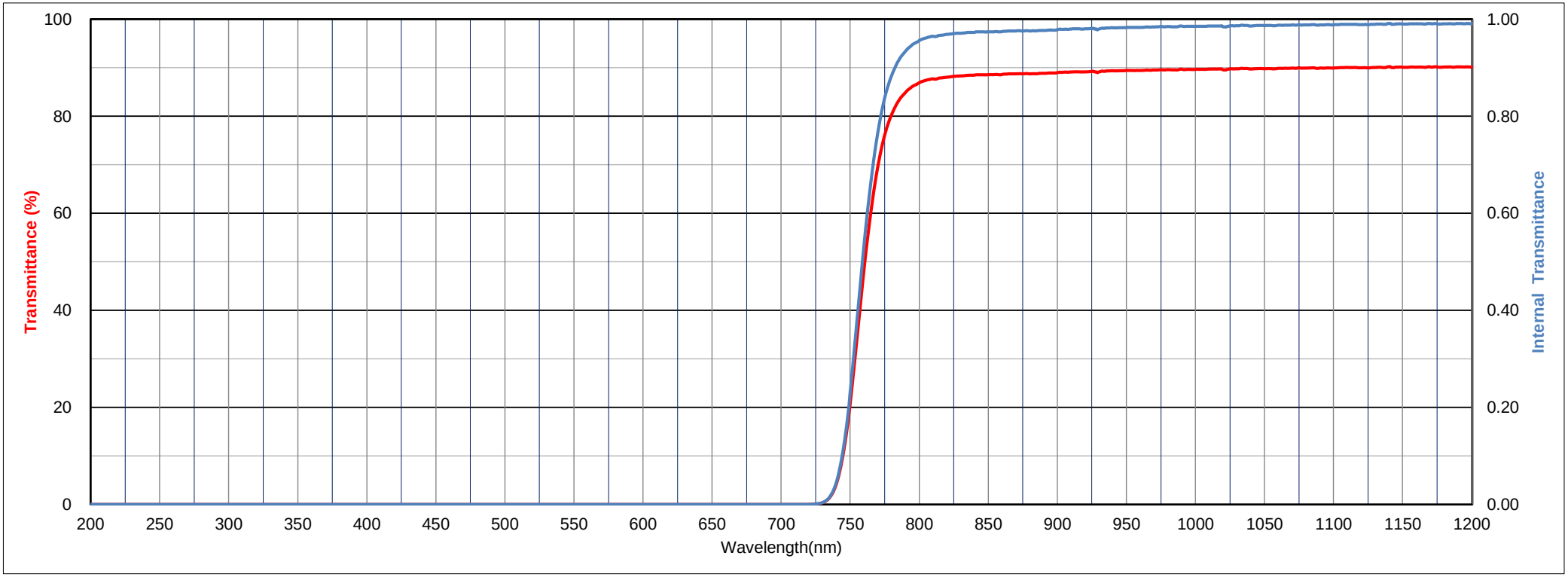
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	5	550	605	-	108	415	200	2.97

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
760±8	>680	>880



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

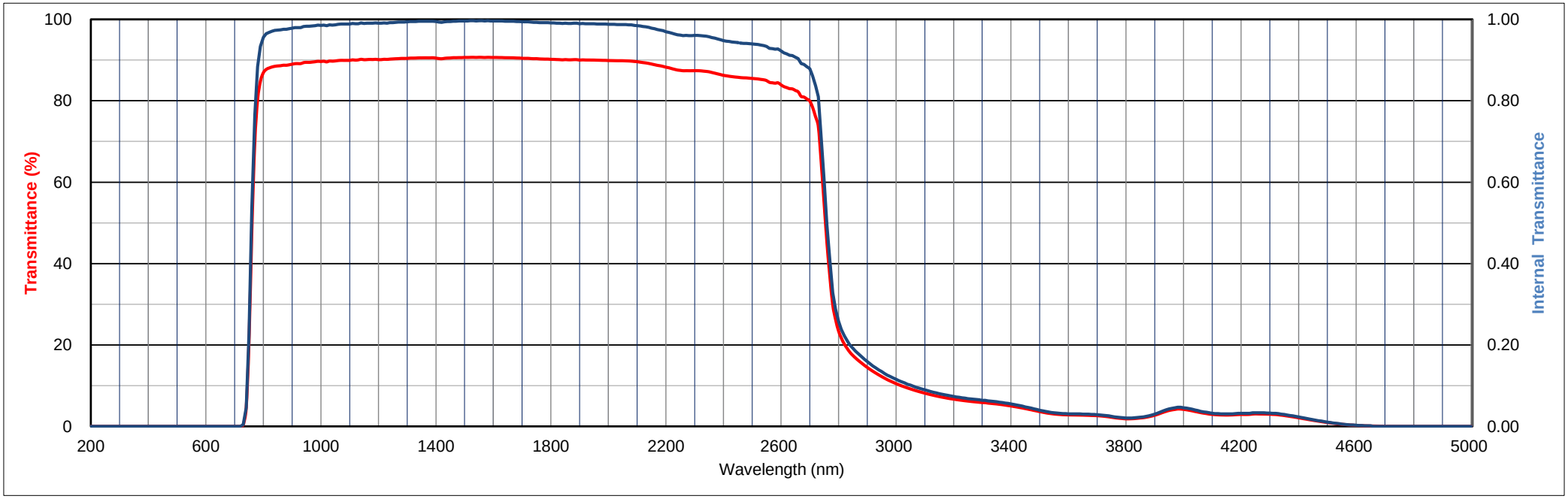
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR760

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.004	0.046	0.229	0.532	0.765	0.884	0.934
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.956	0.965	0.969	0.971	0.973	0.974	0.975	0.976	0.976	0.977	0.978	0.980	0.980	0.980	0.983	0.983	0.983	0.984	0.985	0.986
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.985	0.986	0.984	0.987	0.986	0.987	0.988	0.988	0.988	0.988	0.988	0.990	0.989	0.990	0.991	0.990	0.990	0.991	0.991	0.991
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.990	0.990	0.991	0.991	0.992	0.992	0.993	0.993	0.994	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.995	0.995
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.994	0.993	0.993	0.994	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.997	0.996	0.997	0.996	0.996	0.997	0.996
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.996	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.995	0.995	0.994	0.994	0.994	0.993	0.993	0.993	0.992	0.992	0.992	0.992
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.991	0.991	0.991	0.990	0.990	0.990	0.990	0.990	0.990	0.990	0.989	0.990	0.989	0.989	0.989	0.989	0.989	0.989	0.988	0.988
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.988	0.987	0.985	0.978	0.970	0.961	0.960	0.958	0.948	0.943	0.940	0.934	0.922	0.907	0.879	0.603	0.258	0.192	0.159	0.135
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.115	0.101	0.090	0.081	0.074	0.068	0.064	0.061	0.055	0.048	0.040	0.033	0.031	0.030	0.029	0.024	0.020	0.023	0.030	0.043
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.046	0.039	0.032	0.031	0.032	0.034	0.033	0.029	0.023	0.016	0.010	0.006	0.003	0.001	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR780

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.002	0.031	0.194	0.492	0.736
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.864	0.916	0.940	0.952	0.957	0.961	0.964	0.965	0.966	0.969	0.971	0.972	0.974	0.975	0.976	0.977	0.978	0.980	0.981	0.982
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.982	0.982	0.984	0.984	0.984	0.984	0.985	0.985	0.986	0.986	0.987	0.987	0.987	0.989	0.990	0.989				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.586	1.573	1.566	1.562	1.559	1.557	1.556
P	0.902	0.905	0.907	0.908	0.909	0.909	0.910

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

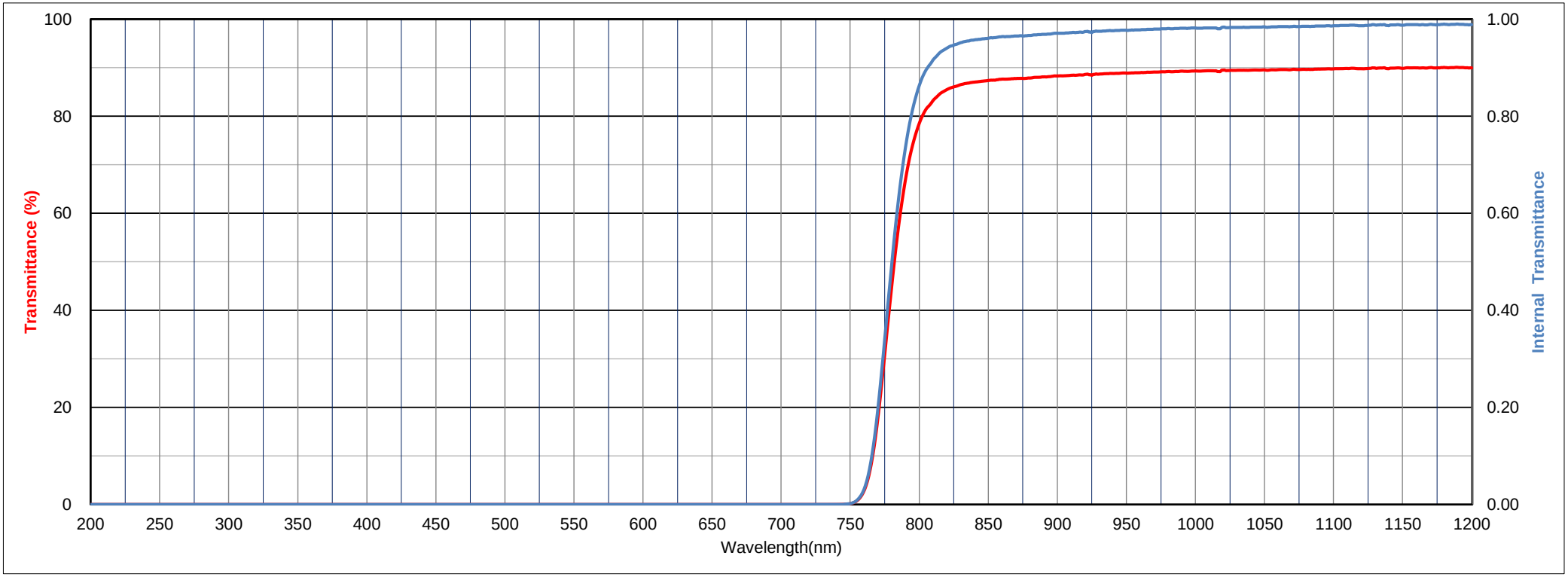
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	5	550	605	-	108	415	200	2.97

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
780±8	>690	>900



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HOYA

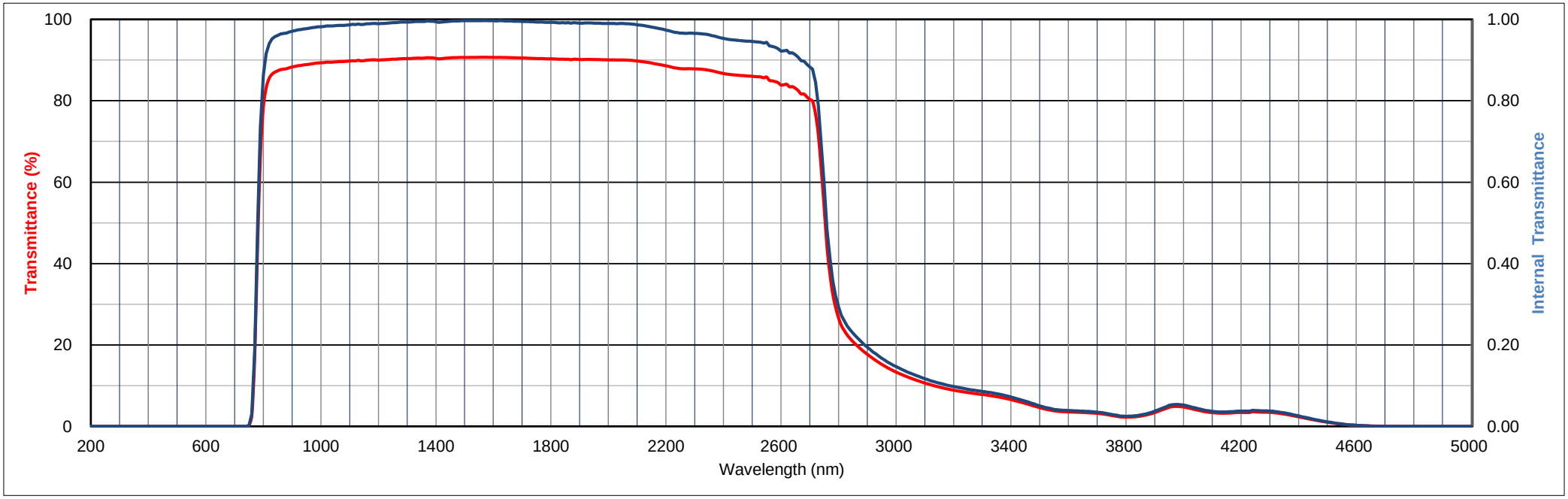
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR780

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.002	0.031	0.194	0.492	0.736
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.864	0.916	0.940	0.952	0.957	0.961	0.964	0.965	0.966	0.969	0.971	0.972	0.974	0.975	0.976	0.977	0.978	0.980	0.981	0.982
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.982	0.982	0.984	0.984	0.984	0.984	0.985	0.985	0.986	0.986	0.987	0.988	0.987	0.989	0.987	0.988	0.989	0.990	0.990	0.990
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.989	0.990	0.990	0.991	0.991	0.992	0.992	0.993	0.993	0.993	0.994	0.993	0.994	0.994	0.995	0.994	0.995	0.996	0.996	0.995
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.994	0.993	0.993	0.994	0.995	0.995	0.996	0.996	0.996	0.997	0.996	0.996	0.997	0.997	0.997	0.997	0.997	0.997	0.997	0.997
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.997	0.996	0.997	0.996	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.995	0.994	0.994	0.994	0.994	0.993	0.993	0.993	0.993
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.993	0.992	0.992	0.992	0.992	0.991	0.992	0.990	0.992	0.992	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.990	0.990
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.990	0.990	0.987	0.981	0.974	0.966	0.966	0.962	0.953	0.948	0.945	0.944	0.922	0.913	0.883	0.595	0.294	0.229	0.195	0.168
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.147	0.131	0.117	0.106	0.098	0.091	0.086	0.080	0.072	0.062	0.050	0.042	0.039	0.037	0.035	0.029	0.025	0.028	0.037	0.052
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.052	0.044	0.037	0.036	0.038	0.039	0.038	0.033	0.026	0.018	0.011	0.006	0.003	0.001	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR800

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.007	0.047	0.193
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.460	0.702	0.842	0.911	0.942	0.956	0.962	0.967	0.968	0.970	0.972	0.973	0.975	0.975	0.977	0.978	0.979	0.980	0.981	0.981
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.982	0.983	0.981	0.983	0.983	0.984	0.984	0.985	0.985	0.985	0.986	0.987	0.987	0.988	0.988	0.988				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.590	1.576	1.570	1.565	1.562	1.560	1.559
P	0.901	0.905	0.906	0.907	0.908	0.909	0.909

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

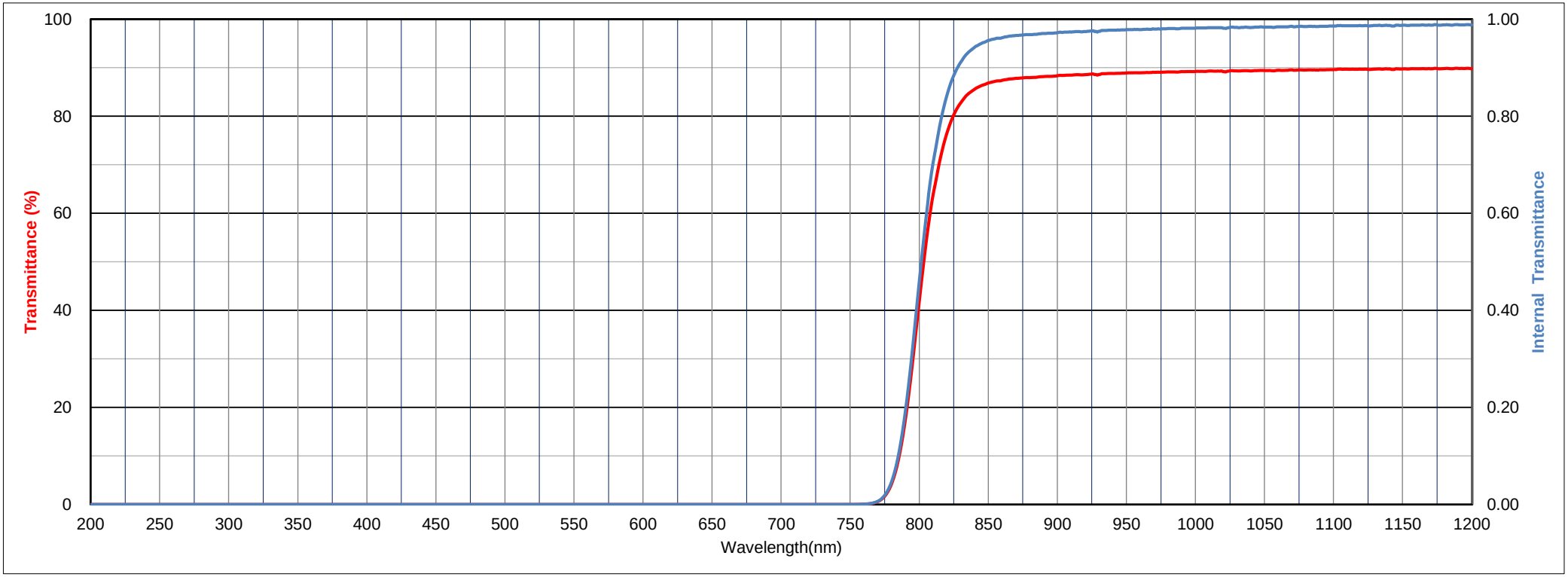
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	5	555	610	-	102	425	190	3.01

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
800±8	>710	>920



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HOYA

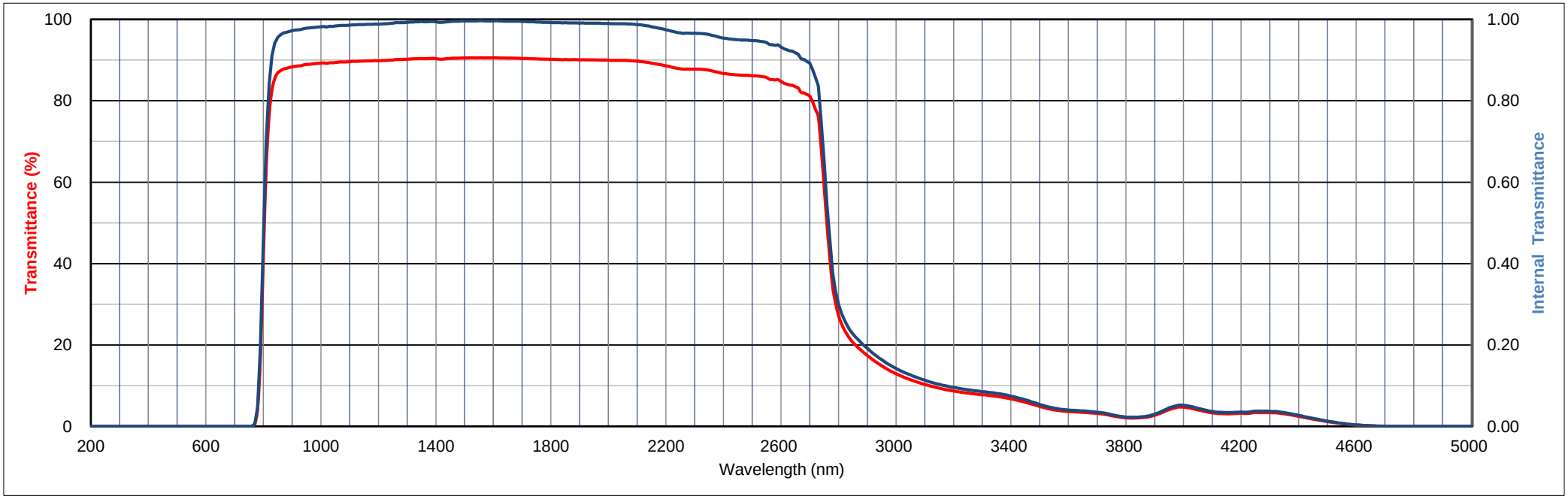
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR800

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.007	0.047	0.193
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.460	0.702	0.842	0.911	0.942	0.956	0.962	0.967	0.968	0.970	0.972	0.973	0.975	0.975	0.977	0.978	0.979	0.980	0.981	0.981
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.982	0.983	0.981	0.983	0.983	0.984	0.984	0.985	0.985	0.985	0.986	0.987	0.987	0.987	0.987	0.988	0.988	0.988	0.988	0.989
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.988	0.989	0.989	0.989	0.990	0.990	0.992	0.992	0.992	0.992	0.993	0.993	0.994	0.994	0.994	0.994	0.994	0.994	0.995	0.995
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.994	0.993	0.993	0.993	0.994	0.994	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.997	0.996	0.996	0.996	0.996
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.995	0.994	0.994	0.994	0.994	0.994	0.993	0.993	0.993	0.993
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.992	0.992	0.992	0.992	0.991	0.992	0.991	0.991	0.992	0.991	0.991	0.991	0.991	0.991	0.991	0.991	0.990	0.990	0.990	0.990
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.990	0.990	0.987	0.982	0.975	0.967	0.966	0.963	0.954	0.950	0.948	0.943	0.932	0.918	0.893	0.651	0.300	0.227	0.192	0.164
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.142	0.126	0.113	0.103	0.096	0.090	0.085	0.081	0.074	0.065	0.054	0.045	0.040	0.038	0.035	0.029	0.023	0.023	0.030	0.045
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.052	0.044	0.037	0.034	0.035	0.037	0.037	0.034	0.027	0.020	0.013	0.008	0.004	0.002	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR830

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.001
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.010	0.057	0.212	0.477	0.708	0.852	0.920	0.951	0.964	0.971	0.976	0.979	0.980	0.980	0.983	0.984	0.984	0.985	0.986	0.986
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.986	0.988	0.986	0.988	0.988	0.989	0.989	0.990	0.990	0.990	0.992	0.991	0.992	0.993	0.993	0.992				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.594	1.579	1.572	1.568	1.565	1.563	1.562
P	0.900	0.904	0.906	0.907	0.907	0.908	0.908

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

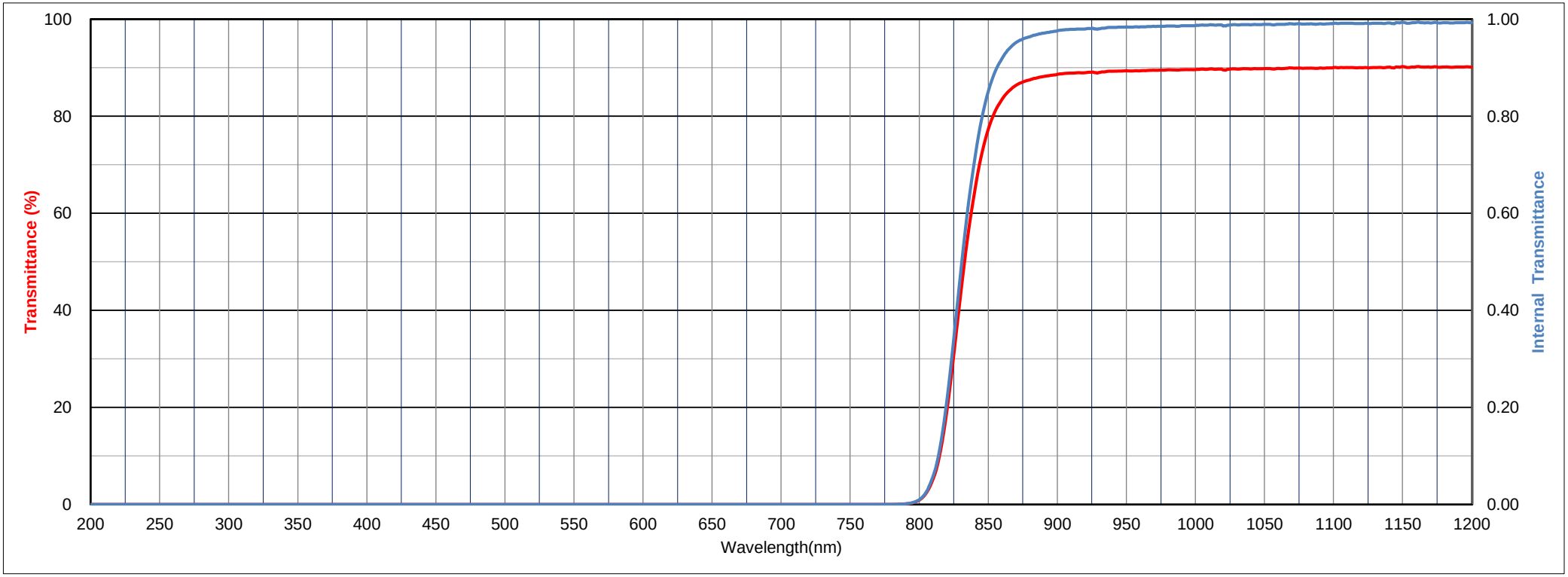
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	5	545	615	-	104	425	190	3.03

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
830±8	>730	>950



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The content of this catalog is accurate as of October ,2020

HOYA

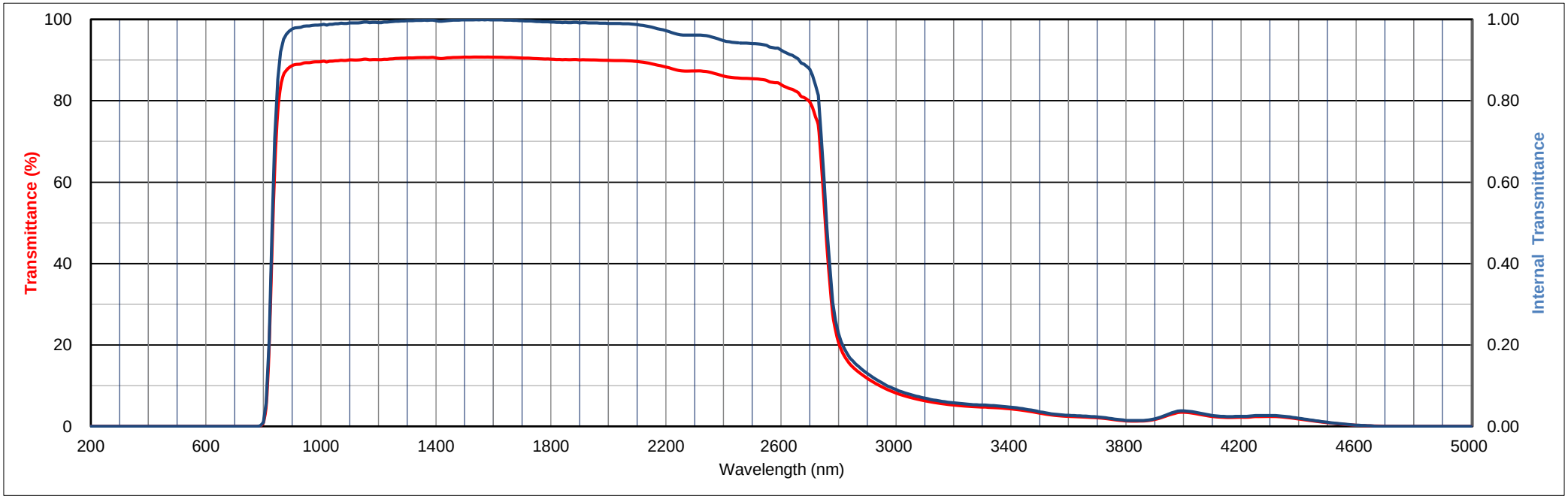
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR830

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.001
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.010	0.057	0.212	0.477	0.708	0.852	0.920	0.951	0.964	0.971	0.976	0.979	0.980	0.980	0.983	0.984	0.984	0.985	0.986	0.986
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.986	0.988	0.986	0.988	0.988	0.989	0.989	0.990	0.990	0.990	0.992	0.991	0.991	0.991	0.992	0.994	0.993	0.992	0.993	0.993
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.992	0.992	0.993	0.993	0.994	0.994	0.995	0.996	0.996	0.996	0.997	0.997	0.997	0.997	0.998	0.998	0.998	0.998	0.998	0.998
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.997	0.996	0.995	0.996	0.997	0.997	0.998	0.998	0.998	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.999	0.999	0.999	0.999	0.998	0.998	0.998	0.998	0.997	0.997	0.997	0.996	0.996	0.996	0.995	0.995	0.995	0.994	0.994	0.994
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.993	0.993	0.993	0.993	0.992	0.993	0.992	0.992	0.993	0.993	0.992	0.992	0.992	0.992	0.991	0.991	0.991	0.991	0.991	0.990
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.990	0.990	0.987	0.981	0.972	0.962	0.962	0.959	0.948	0.943	0.941	0.936	0.925	0.907	0.878	0.602	0.228	0.160	0.130	0.107
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.090	0.078	0.069	0.063	0.058	0.054	0.052	0.050	0.047	0.042	0.036	0.030	0.027	0.025	0.023	0.019	0.015	0.015	0.019	0.031
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.038	0.033	0.027	0.024	0.025	0.026	0.027	0.025	0.020	0.015	0.010	0.006	0.003	0.001	0.001	0.001	<1E-05	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR850

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	<1E-05	0.001	0.010	0.069	0.253	0.530	0.738	0.846	0.897	0.925	0.940	0.948	0.953	0.956	0.961	0.963	0.965	0.967	0.969	0.970
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.971	0.973	0.972	0.975	0.976	0.978	0.978	0.979	0.980	0.981	0.982	0.983	0.984	0.986	0.986	0.987				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.596	1.582	1.575	1.570	1.567	1.565	1.564
P	0.900	0.903	0.905	0.906	0.907	0.907	0.908

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

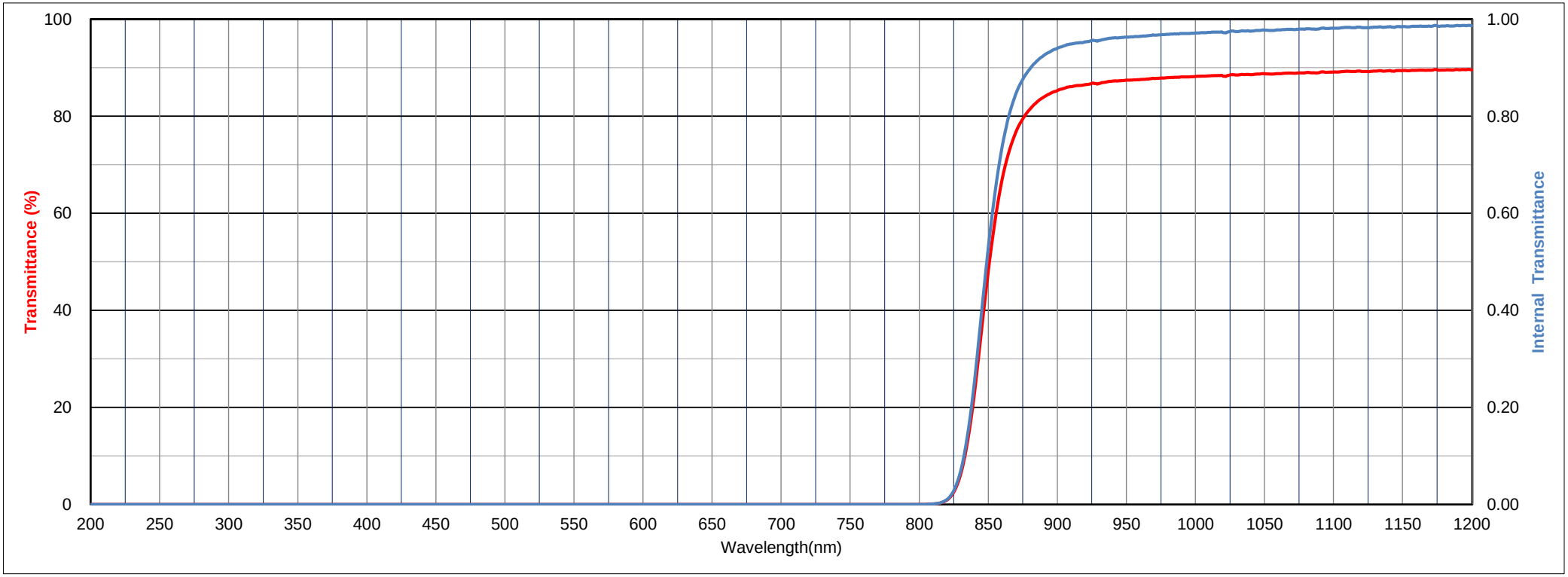
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	5	550	610	-	104	420	190	3.04

Tolerance of Transmittance (τ)

$\lambda\tau_{0.5}$ (nm)	λL (nm)	λH (nm)
850±8	>740	>950



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HOYA

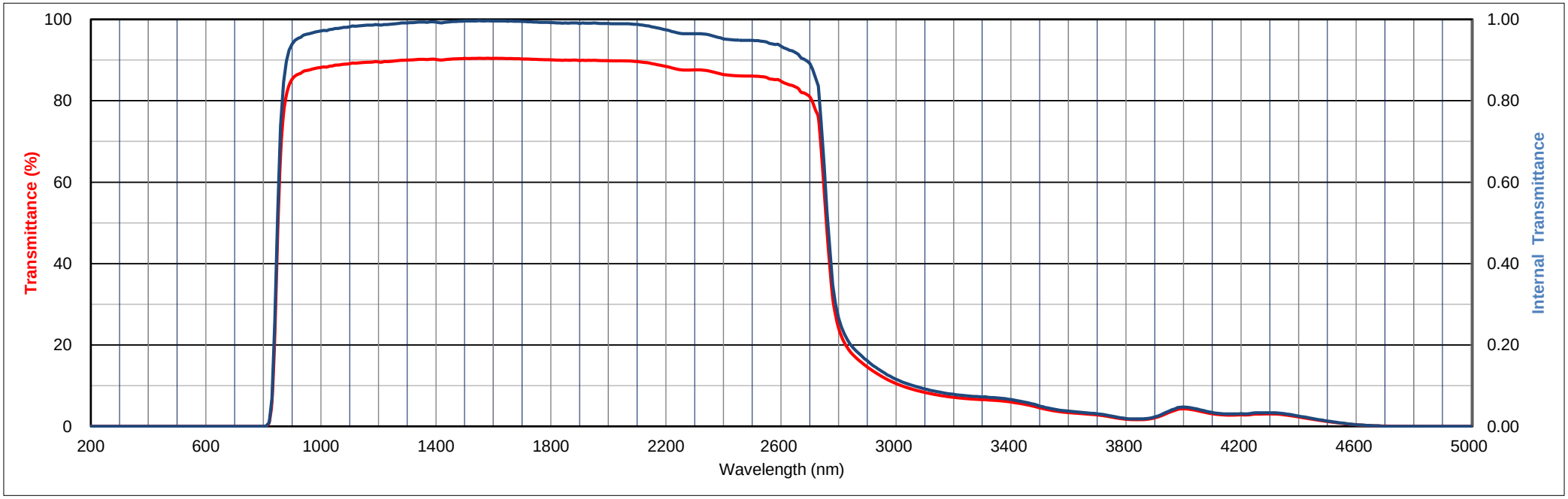
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

W-IR850

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	<1E-05	0.001	0.010	0.069	0.253	0.530	0.738	0.846	0.897	0.925	0.940	0.948	0.953	0.956	0.961	0.963	0.965	0.967	0.969	0.970
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.971	0.973	0.972	0.975	0.976	0.978	0.978	0.979	0.980	0.981	0.982	0.984	0.983	0.984	0.984	0.985	0.986	0.986	0.986	0.987
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.987	0.986	0.987	0.987	0.988	0.989	0.989	0.990	0.991	0.991	0.992	0.992	0.992	0.993	0.993	0.994	0.993	0.993	0.994	0.994
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.993	0.992	0.992	0.993	0.993	0.994	0.995	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.997	0.996
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.995	0.995	0.995	0.994	0.994	0.994	0.994	0.993	0.994	0.993	0.993	0.992	0.993
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.992	0.992	0.991	0.991	0.991	0.992	0.991	0.991	0.992	0.991	0.990	0.991	0.990	0.991	0.991	0.991	0.991	0.990	0.990	0.990
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.990	0.989	0.988	0.982	0.974	0.965	0.965	0.962	0.952	0.949	0.948	0.944	0.934	0.919	0.892	0.642	0.267	0.194	0.161	0.135
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.116	0.102	0.092	0.084	0.079	0.075	0.072	0.070	0.066	0.059	0.050	0.042	0.037	0.034	0.031	0.025	0.019	0.018	0.023	0.038
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.047	0.042	0.034	0.030	0.031	0.033	0.034	0.031	0.025	0.019	0.013	0.008	0.004	0.002	0.001	0.001	0.001	<1E-05	<1E-05	<1E-05
λnm	5000																			
τ	<1E-05																			



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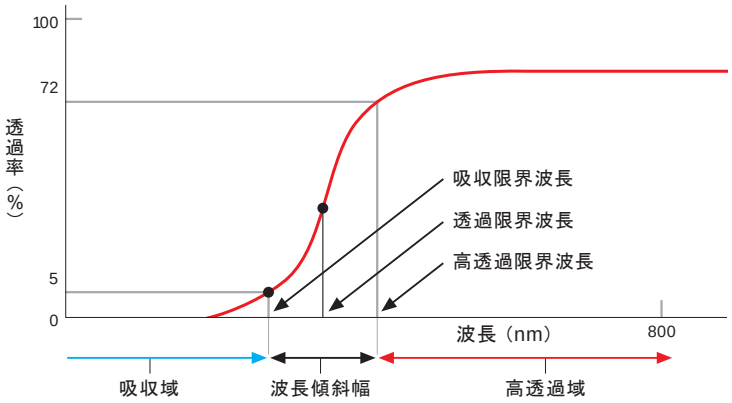
UVフィルター（UVシリーズ）

UVフィルターには紫外域において、ある波長以下の光を吸収しそれより長波長の光を透過させるUV28N、UV30N、UV32N、UV34N、UV36Nの5つの硝種があります。二桁の数値がおおよその透過限界波長を示しています。例えばUV28Nは、透過限界波長が約280nmです。



波長傾斜幅(Δλ)
透過限界波長(λT)
高透過域の透過率(TH)
吸収域の透過率(TA)

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV28N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.2	2.3	10.2	27.7	50.2	68.3	79.3	84.4	86.7	88.4	88.6	89.3	89.2	89.2	89.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	89.6	89.6	89.8	89.8	89.7	89.8	89.7	89.9	90.0	90.0	89.9	89.9	90.0	89.8	90.0	90.0	90.1	90.1	90.0	90.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	90.0	90.1	90.0	90.0	90.1	90.1	89.9	90.1	90.2	90.2	90.1	90.1	90.2	90.1	89.9	90.1	90.1	90.5	90.5	90.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	90.5	90.5	90.4	90.5	90.6	90.7	90.9	91.1	91.0	91.1	91.2	91.2	91.3	91.3	91.4	91.5	91.5	91.6	91.6	91.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	91.6	91.7	91.8	91.7	91.8	91.8	91.9	91.9	91.9	91.9	92.0	92.0	92.1	92.1	92.1	92.2				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.536	1.524	1.518	1.514	1.512	1.510	1.509
P	0.914	0.917	0.919	0.920	0.920	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

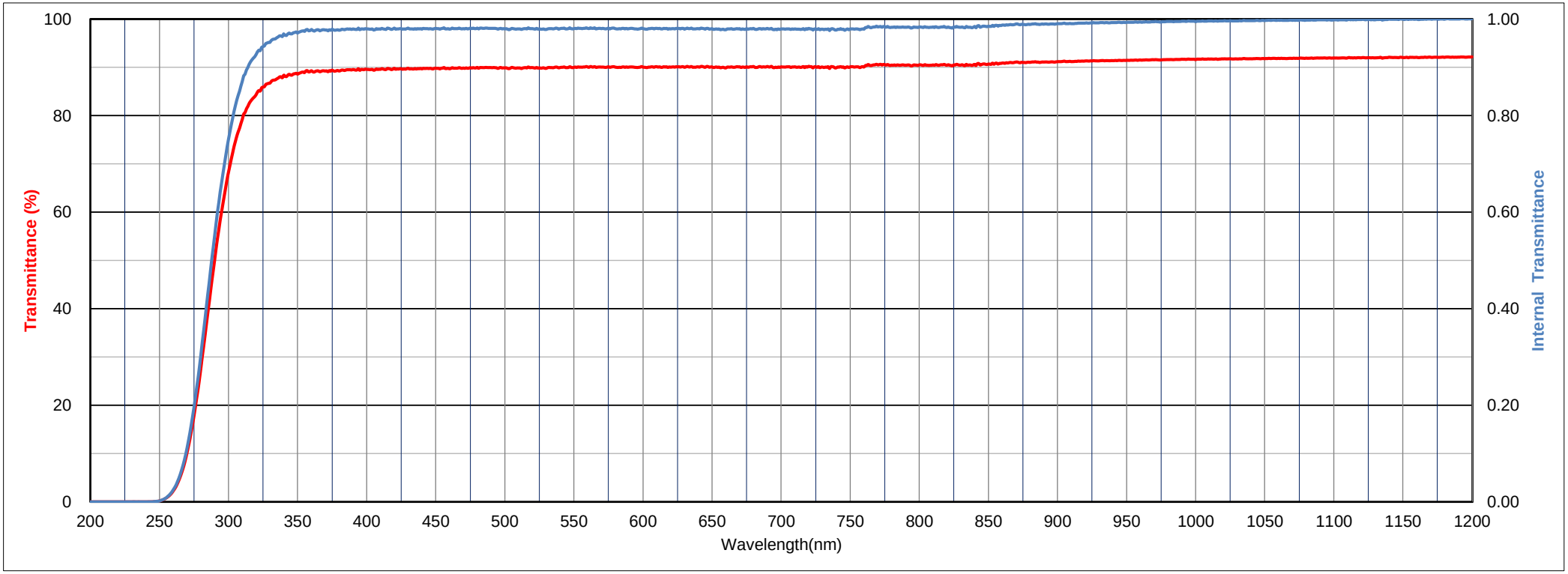
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	572	642	73	87	525	100	2.61

Tolerance of Transmittance (T)

Transition Wavelength	Transition Interval	Average High Transmittance
λT	Δλ	Th(%)
280±7 nm	< 45 nm	> 85 %



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HOYA

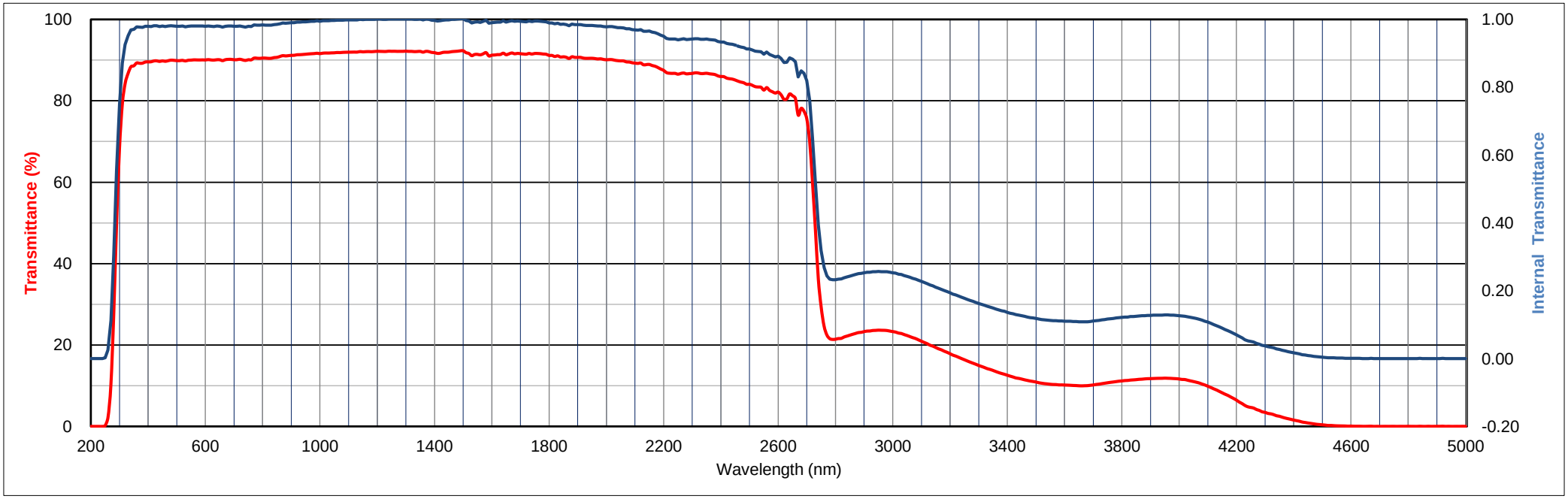
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV28N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.2	2.3	10.2	27.7	50.2	68.3	79.3	84.4	86.7	88.4	88.6	89.3	89.2	89.2	89.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	89.6	89.6	89.8	89.8	89.7	89.8	89.7	89.9	90.0	90.0	89.9	89.9	90.0	89.8	90.0	90.0	90.1	90.1	90.0	90.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	90.0	90.1	90.0	90.0	90.1	90.1	89.9	90.1	90.2	90.2	90.1	90.1	90.2	90.1	89.9	90.1	90.1	90.5	90.5	90.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	90.5	90.5	90.4	90.5	90.6	90.7	90.9	91.1	91.0	91.1	91.2	91.2	91.3	91.3	91.4	91.5	91.5	91.6	91.6	91.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	91.6	91.7	91.8	91.7	91.8	91.8	91.9	91.9	91.9	91.9	92.0	92.0	92.0	92.0	92.1	92.0	92.1	92.1	92.1	92.1
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	92.2	92.2	92.1	92.1	92.2	92.2	92.2	92.2	92.2	92.2	92.2	92.2	92.2	92.1	92.1	92.2	92.0	92.2	92.1	91.9
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	91.8	91.7	91.7	91.9	91.9	92.0	92.1	92.1	92.2	92.3	92.3	91.8	91.6	91.1	91.4	91.4	91.3	91.6	91.8	91.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	91.2	91.3	91.4	91.4	91.7	91.3	91.5	91.8	91.6	91.7	91.6	91.5	91.5	91.6	91.5	91.6	91.6	91.6	91.5	91.4
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	91.2	91.2	90.9	91.0	90.8	90.8	90.7	90.4	90.8	90.7	90.7	90.7	90.5	90.4	90.4	90.5	90.4	90.3	90.3	90.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	90.1	89.8	89.3	88.9	87.5	86.5	86.7	86.8	86.0	85.1	84.1	82.6	82.1	81.2	75.5	29.3	21.4	22.4	23.3	23.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	23.3	22.3	20.9	19.4	17.9	16.4	15.0	13.8	12.6	11.6	10.9	10.4	10.2	10.0	10.2	10.7	11.2	11.5	11.7	11.9
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	11.7	11.0	9.9	8.3	6.5	4.7	3.5	2.5	1.6	0.8	0.4	0.1	0.1	0.0	-0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV30N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	18.5	59.3	79.6	87.0	89.2	90.3	90.5	90.8	91.0	90.9	91.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	91.1	91.3	91.4	91.4	91.5	91.3	91.5	91.5	91.6	91.5	91.7	91.7	91.8	91.8	91.8	92.0	91.9	92.0	92.0	92.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	92.2	92.2	92.3	92.4	92.4	92.4	92.6	92.6	92.6	92.7	92.8	92.9	92.9	93.1	93.0	93.0	93.2	92.4	92.3	92.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	92.3	92.4	92.4	92.5	92.5	92.5	92.8	92.5	92.5	92.5	92.6	92.7	92.7	92.8	92.8	92.8	92.9	93.0	92.9	93.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	93.1	93.1	93.1	93.1	93.1	93.2	93.2	93.2	93.2	93.3	93.3	93.3	93.4	93.5	93.4	93.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.524	1.509	1.501	1.497	1.494	1.492	1.491
P	0.917	0.921	0.923	0.924	0.925	0.925	0.925

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

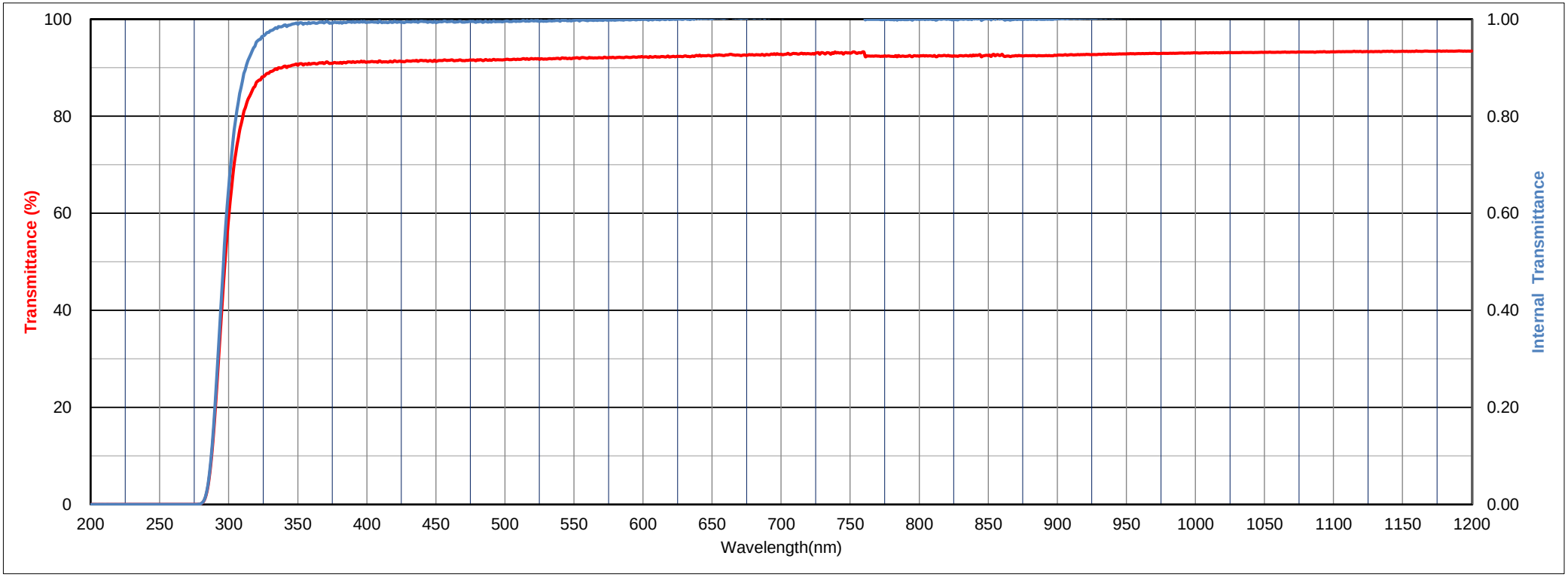
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	533	622	60	65	515	80	2.50

Tolerance of Transmittance (T)

Transition Wavelength	Transition Interval	Average High Transmittance
λT	Δλ	Th(%)
300±7 nm	< 40 nm	> 85 %



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HOYA

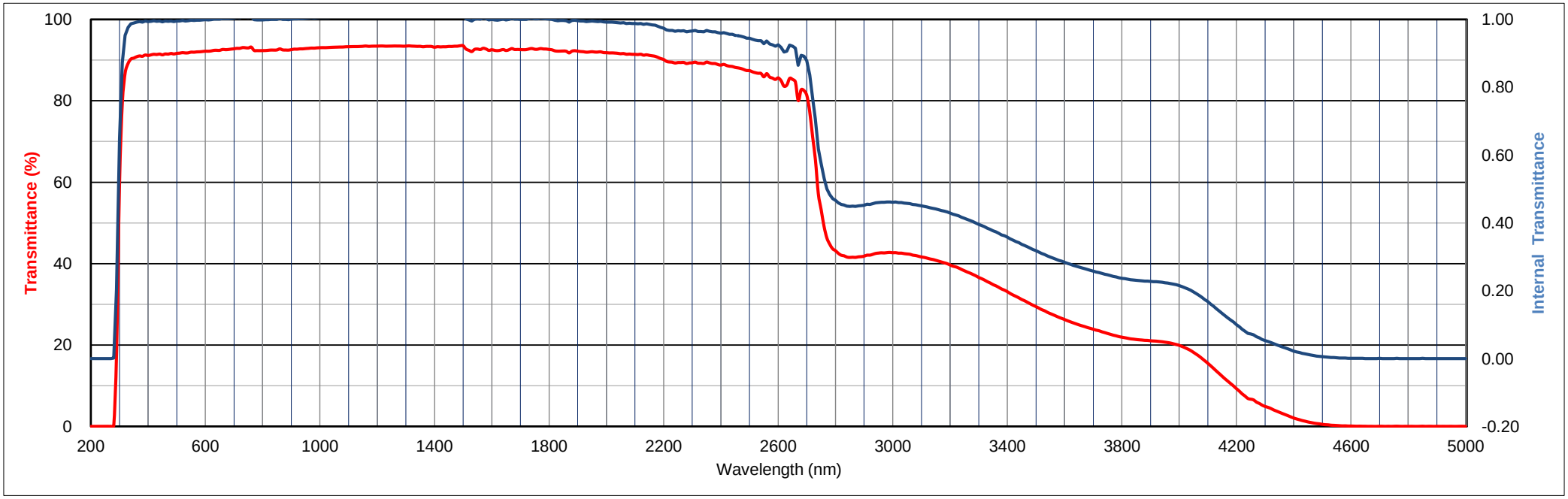
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV30N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	18.5	59.3	79.6	87.0	89.2	90.3	90.5	90.8	91.0	90.9	91.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	91.1	91.3	91.4	91.4	91.5	91.3	91.5	91.5	91.6	91.5	91.7	91.7	91.8	91.8	91.8	92.0	91.9	92.0	92.0	92.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	92.2	92.2	92.3	92.4	92.4	92.4	92.6	92.6	92.6	92.7	92.8	92.9	92.9	93.1	93.0	93.0	93.2	92.4	92.3	92.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	92.3	92.4	92.4	92.5	92.5	92.5	92.8	92.5	92.5	92.5	92.6	92.7	92.7	92.8	92.8	92.8	92.9	93.0	92.9	93.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	93.1	93.1	93.1	93.1	93.1	93.2	93.2	93.2	93.2	93.3	93.3	93.3	93.3	93.3	93.4	93.4	93.5	93.4	93.4	93.4
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	93.4	93.5	93.5	93.4	93.4	93.5	93.5	93.5	93.5	93.4	93.4	93.5	93.5	93.4	93.4	93.4	93.3	93.4	93.4	93.4
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	93.2	93.3	93.2	93.3	93.3	93.4	93.4	93.4	93.4	93.5	93.5	92.7	92.4	92.1	92.6	92.7	92.6	92.9	92.7	92.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	92.6	92.4	92.3	92.4	92.6	92.4	92.6	92.8	92.6	92.6	92.6	92.6	92.6	92.7	92.9	92.7	92.7	92.8	92.7	92.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	92.6	92.5	92.3	92.2	92.2	92.2	92.2	91.8	92.2	92.3	92.2	92.1	92.1	92.0	92.0	92.1	92.0	92.0	92.0	91.8
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	91.8	91.6	91.4	91.2	90.2	89.4	89.3	89.5	88.8	88.2	87.4	85.9	85.6	85.3	81.3	53.2	43.2	41.5	41.8	42.6
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	42.7	42.4	41.6	40.8	39.7	38.3	36.6	34.8	33.1	31.2	29.4	27.7	26.3	25.0	23.9	22.8	21.9	21.4	21.0	20.7
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	19.9	18.2	15.5	12.3	9.3	6.7	4.9	3.5	2.1	1.1	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV32N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	6.5	32.5	57.8	72.6	81.0	84.9	87.1	88.1	88.3	89.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	89.2	89.4	89.5	89.6	89.5	89.7	89.7	89.8	89.9	89.9	89.9	90.0	90.1	90.0	90.2	90.3	90.3	90.3	90.3	90.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	90.3	90.4	90.4	90.4	90.6	90.5	90.3	90.5	90.5	90.6	90.6	90.6	90.8	90.7	90.6	90.7	90.7	90.7	90.9	90.7
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	90.8	90.7	90.7	90.6	90.8	90.9	90.7	90.7	90.6	90.6	90.8	90.9	91.0	91.0	91.1	91.1	91.1	91.2	91.2	91.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	91.2	91.3	91.4	91.4	91.4	91.4	91.5	91.5	91.5	91.6	91.6	91.7	91.7	91.8	91.8	91.8				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.600	1.586	1.579	1.574	1.571	1.570	1.568
P	0.899	0.902	0.904	0.905	0.906	0.906	0.907

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

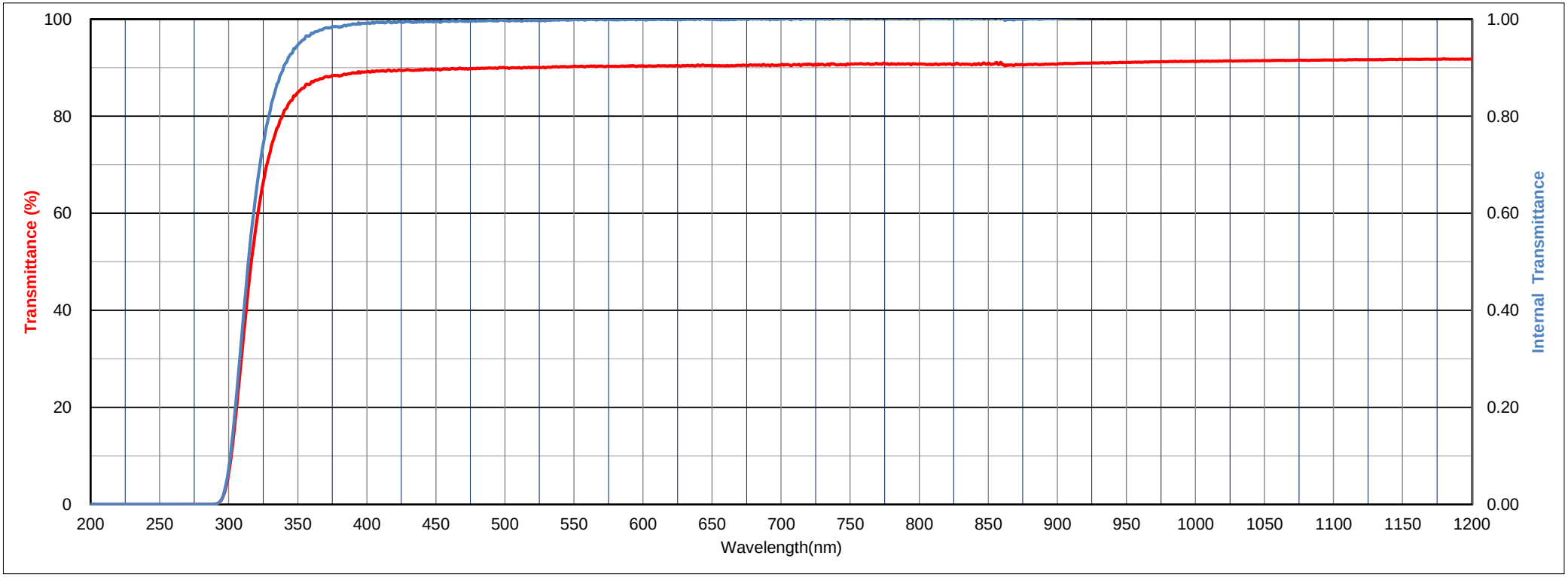
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	2	572	630	69	83	495	130	3.23

Tolerance of Transmittance (T)

Transition Wavelength	Transition Interval	Average High Transmittance
λT	Δλ	Th(%)
320±7 nm	< 40 nm	> 85 %



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HOYA

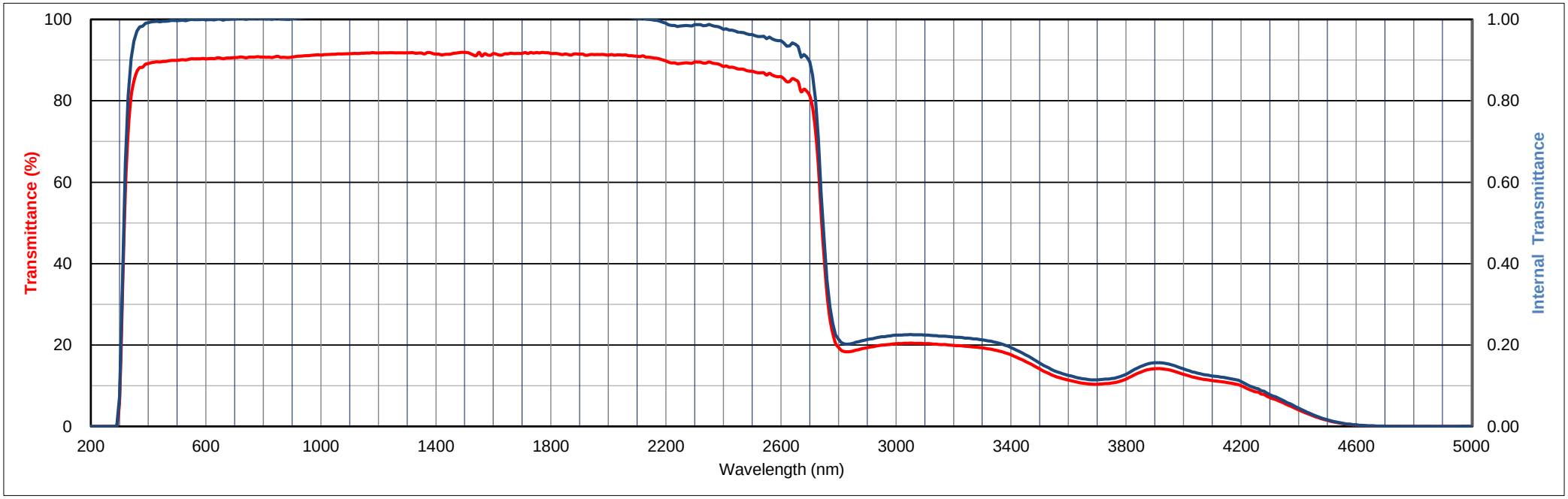
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV32N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	6.5	32.5	57.8	72.6	81.0	84.9	87.1	88.1	88.3	89.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	89.2	89.4	89.5	89.6	89.5	89.7	89.7	89.8	89.9	89.9	89.9	90.0	90.1	90.0	90.2	90.3	90.3	90.3	90.3	90.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	90.3	90.4	90.4	90.4	90.6	90.5	90.3	90.5	90.5	90.6	90.6	90.6	90.8	90.7	90.6	90.7	90.7	90.7	90.9	90.7
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	90.8	90.7	90.7	90.6	90.8	90.9	90.7	90.7	90.6	90.6	90.8	90.9	91.0	91.0	91.1	91.1	91.1	91.2	91.2	91.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	91.2	91.3	91.4	91.4	91.4	91.4	91.5	91.5	91.5	91.6	91.6	91.6	91.7	91.6	91.7	91.7	91.8	91.7	91.8	91.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	91.8	91.8	91.8	91.8	91.8	91.8	91.8	91.8	91.8	91.8	91.8	91.8	91.8	91.7	91.7	91.7	91.5	91.9	91.8	91.6
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	91.5	91.5	91.3	91.4	91.4	91.4	91.7	91.7	91.8	91.9	91.9	91.9	91.6	91.3	91.1	91.9	91.0	91.6	91.3	91.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	91.6	91.5	91.2	91.3	91.6	91.5	91.7	91.6	91.6	91.6	91.7	91.9	91.6	91.9	91.7	91.9	91.8	91.9	91.8	91.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	91.6	91.6	91.6	91.5	91.4	91.5	91.4	91.2	91.5	91.5	91.5	91.5	91.2	91.3	91.4	91.3	91.4	91.4	91.4	91.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	91.2	91.2	91.0	90.6	89.8	89.2	89.5	89.5	88.4	87.8	87.3	86.3	85.9	85.2	81.2	41.6	19.4	18.5	19.3	20.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	20.3	20.5	20.3	20.1	19.9	19.7	19.3	18.7	17.6	16.0	14.1	12.4	11.4	10.6	10.4	10.7	11.6	13.3	14.2	13.9
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	12.8	11.8	11.3	10.8	10.0	8.5	7.1	5.7	4.1	2.6	1.5	0.7	0.4	0.1	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV34N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	14.4	43.4	62.8	73.1	78.8	81.8	83.9
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	85.2	85.8	86.1	86.3	86.4	86.5	86.7	86.7	87.1	87.1	87.3	87.5	87.6	87.6	87.8	87.9	87.9	88.0	87.9	87.8
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	87.9	87.9	87.8	88.0	87.8	87.8	87.9	87.9	88.0	88.1	88.2	88.3	88.3	88.5	88.5	88.6	88.6	88.7	88.6	88.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	88.7	88.5	88.6	88.7	88.6	88.6	88.6	88.6	88.6	88.5	88.6	88.8	88.9	88.9	89.0	89.1	89.2	89.2	89.2	89.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.4	89.4	89.4	89.4	89.5	89.5	89.6	89.6	89.6	89.7	89.6	89.7	89.7	89.8	89.8	89.9				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.704	1.678	1.665	1.657	1.652	1.649	1.647
P	0.873	0.880	0.883	0.885	0.886	0.887	0.887

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

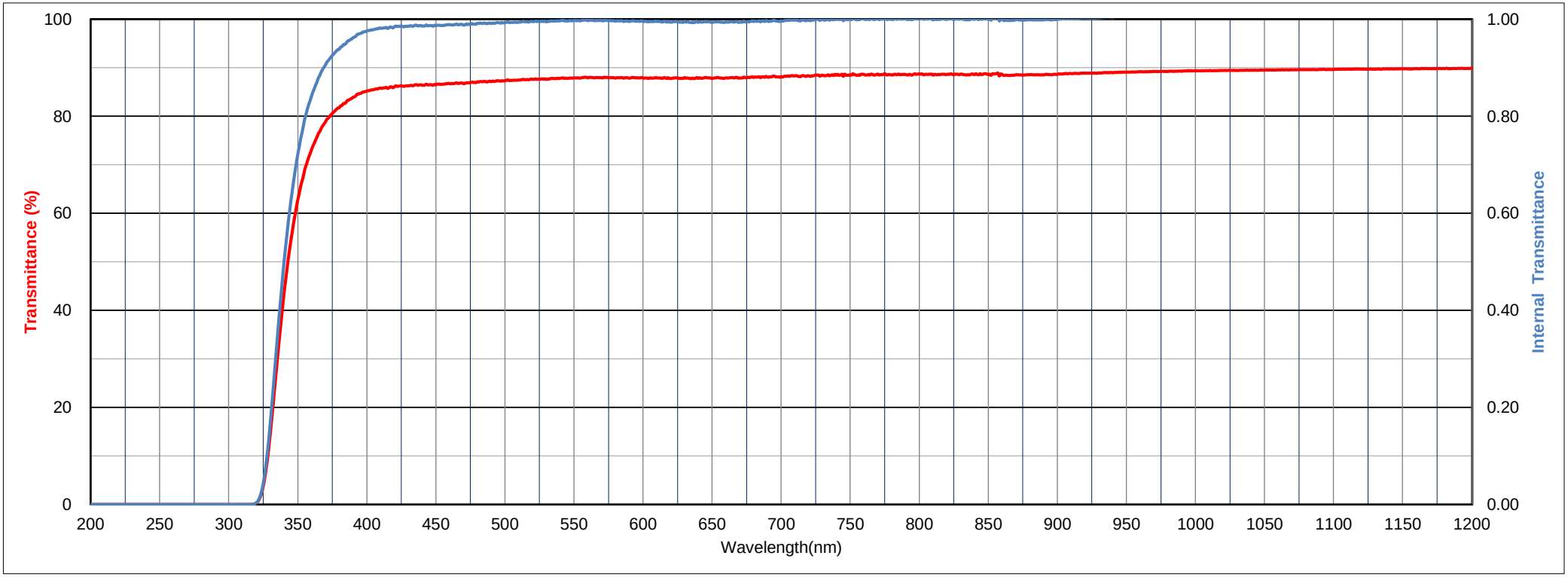
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	447	490	79	91	415	150	4.01

Tolerance of Transmittance (T)

Transition Wavelength	Transition Interval	Average High Transmittance
λT	Δλ	Th(%)
340±7 nm	< 40 nm	> 85 %



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The content of this catalog is accurate as of October ,2020

HOYA

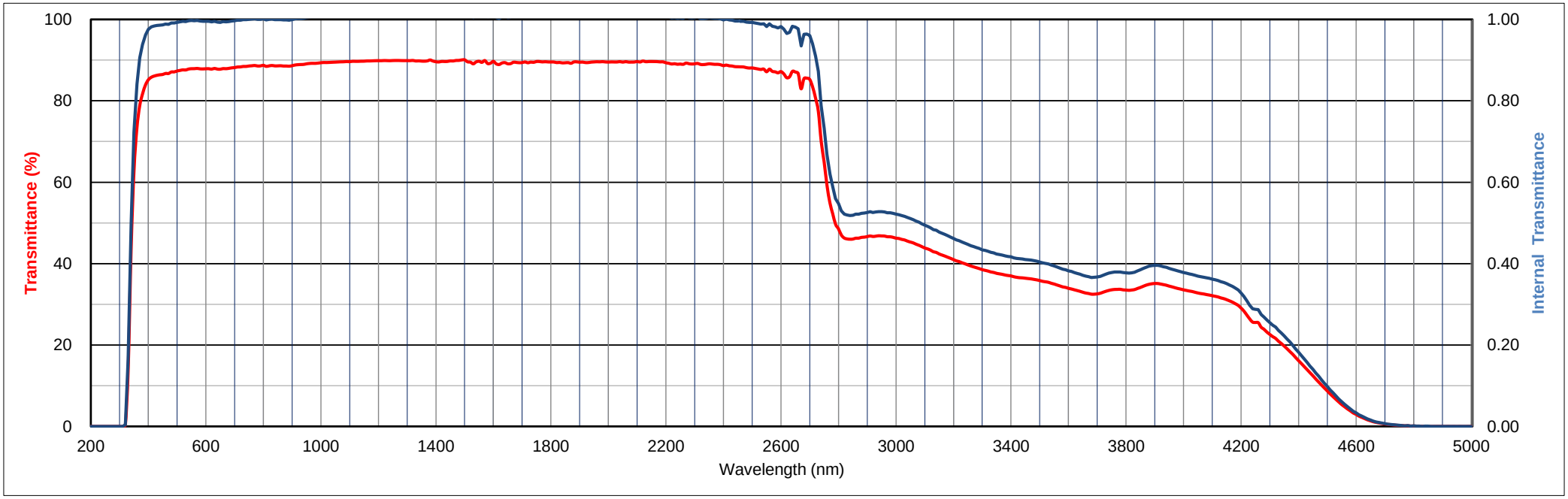
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV34N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	14.4	43.4	62.8	73.1	78.8	81.8	83.9
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	85.2	85.8	86.1	86.3	86.4	86.5	86.7	86.7	87.1	87.1	87.3	87.5	87.6	87.6	87.8	87.9	87.9	88.0	87.9	87.8
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	87.9	87.9	87.8	88.0	87.8	87.8	87.9	87.9	88.0	88.1	88.2	88.3	88.3	88.5	88.5	88.6	88.6	88.7	88.6	88.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	88.7	88.5	88.6	88.7	88.6	88.6	88.6	88.6	88.6	88.5	88.6	88.8	88.9	88.9	89.0	89.1	89.2	89.2	89.2	89.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.4	89.4	89.4	89.4	89.5	89.5	89.6	89.6	89.6	89.7	89.6	89.7	89.7	89.7	89.7	89.7	89.8	89.8	89.8	89.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.8	89.8	89.8	89.7	89.8	90.0	89.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	89.6	89.6	89.7	89.7	89.7	89.8	89.8	89.9	89.9	90.1	90.1	89.6	89.5	89.1	89.6	89.7	89.4	89.9	89.2	89.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.7	89.1	88.9	89.3	89.4	89.1	89.1	89.5	89.4	89.4	89.4	89.5	89.4	89.5	89.5	89.7	89.7	89.6	89.6	89.6
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	89.5	89.5	89.4	89.4	89.3	89.4	89.4	89.2	89.6	89.6	89.5	89.5	89.4	89.4	89.5	89.6	89.6	89.6	89.6	89.5
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	89.5	89.5	89.6	89.7	89.3	89.0	89.1	89.1	88.7	88.4	88.1	87.1	87.2	87.1	85.3	65.0	48.6	46.0	46.6	46.8
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	46.3	45.3	43.8	42.4	41.0	39.7	38.5	37.6	37.0	36.4	35.8	35.0	33.9	33.0	32.6	33.6	33.5	34.1	35.1	34.5
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	33.6	32.8	32.1	31.1	29.1	25.5	22.6	19.7	16.2	12.4	8.7	5.4	3.0	1.4	0.6	0.2	0.1	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV36N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	33.3	68.3	81.6	86.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	88.2	89.0	89.5	89.8	90.0	90.1	90.1	90.3	90.3	90.4	90.4	90.5	90.7	90.5	90.7	90.8	90.8	90.9	90.9	90.9
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	90.9	91.0	91.1	91.0	91.2	91.2	91.3	91.4	91.4	91.6	91.6	91.6	91.8	91.7	91.9	92.0	91.9	91.4	91.3	91.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	91.5	91.5	91.3	91.4	91.6	91.4	91.5	91.7	91.7	91.7	91.7	91.8	91.9	91.9	92.0	92.1	92.1	92.1	92.2	92.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	92.2	92.3	92.3	92.3	92.3	92.4	92.4	92.5	92.5	92.5	92.5	92.6	92.6	92.6	92.6	92.7				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.532	1.521	1.515	1.512	1.510	1.508	1.507
P	0.915	0.918	0.919	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

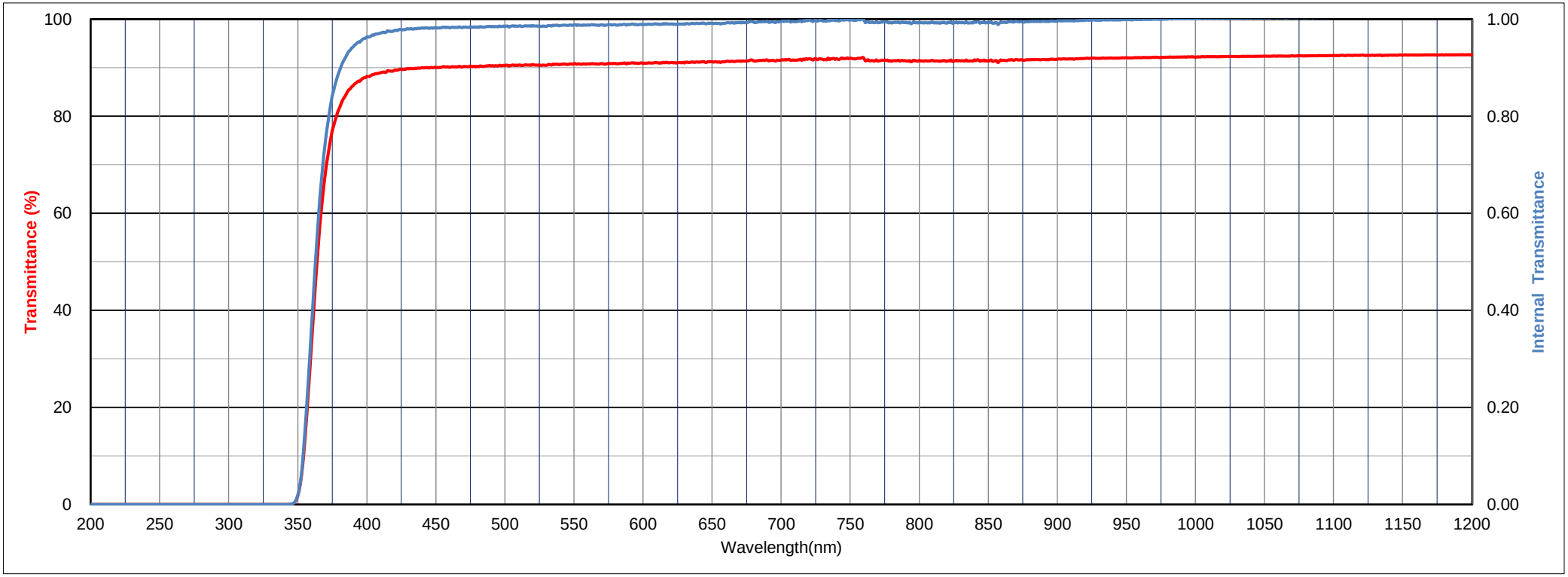
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	2	587	646	69	84	600	90	2.52

Tolerance of Transmittance (T)

Transition Wavelength	Transition Interval	Average High Transmittance
λT	Δλ	Th(%)
360±7 nm	< 40 nm	> 85 %



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HOYA

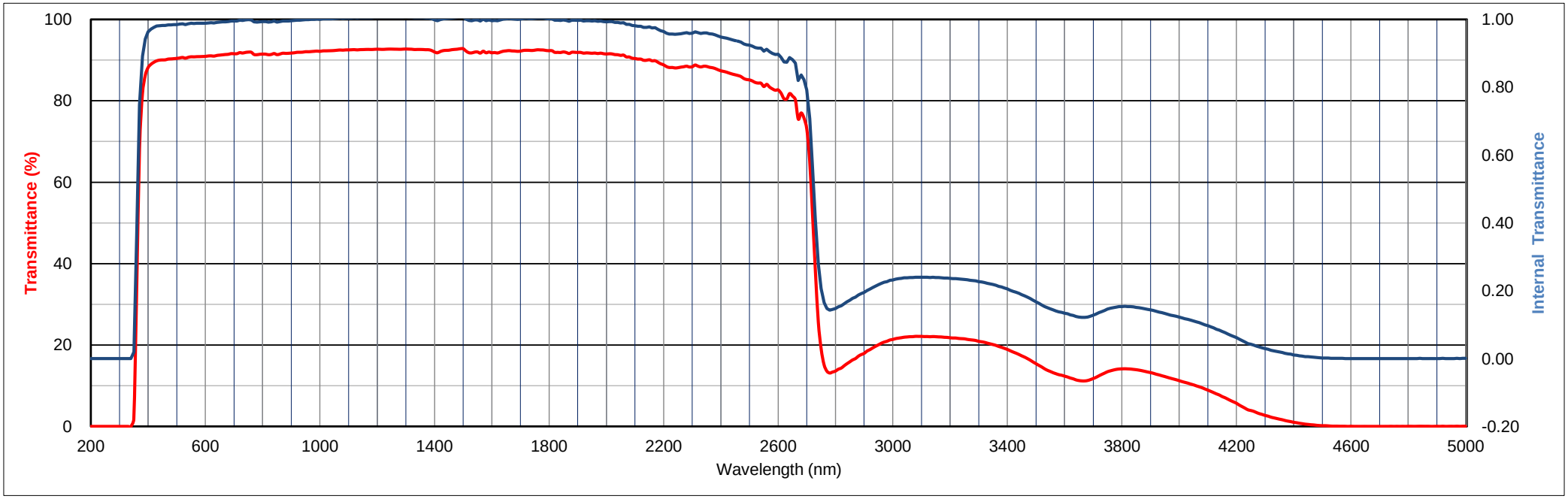
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UV36N

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	33.3	68.3	81.6	86.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	88.2	89.0	89.5	89.8	90.0	90.1	90.1	90.3	90.3	90.4	90.4	90.5	90.7	90.5	90.7	90.8	90.8	90.9	90.9	90.9
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	90.9	91.0	91.1	91.0	91.2	91.2	91.3	91.4	91.4	91.6	91.6	91.6	91.8	91.7	91.9	92.0	91.9	91.4	91.3	91.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	91.5	91.5	91.3	91.4	91.6	91.4	91.5	91.7	91.7	91.7	91.7	91.8	91.9	91.9	92.0	92.1	92.1	92.1	92.2	92.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	92.2	92.3	92.3	92.3	92.3	92.4	92.4	92.5	92.5	92.5	92.5	92.6	92.6	92.5	92.6	92.6	92.6	92.6	92.6	92.7
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	92.7	92.7	92.6	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.7	92.6	92.6	92.6	92.6	92.6	92.6	92.4
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	92.0	91.8	92.1	92.3	92.4	92.4	92.6	92.6	92.7	92.8	92.8	92.2	91.8	91.8	92.0	92.0	91.7	92.2	91.8	92.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	91.8	91.9	91.8	92.0	92.2	92.3	92.3	92.3	92.2	92.2	92.2	92.4	92.4	92.4	92.4	92.4	92.5	92.5	92.5	92.4
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	92.3	92.3	91.9	91.9	91.9	92.0	91.9	91.6	91.9	91.9	91.9	91.9	91.7	91.8	91.7	91.7	91.7	91.6	91.7	91.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	91.5	91.2	90.4	90.1	88.8	88.1	88.4	88.5	87.4	86.4	85.1	83.5	82.7	81.2	73.0	19.0	13.6	15.9	17.9	20.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	21.4	22.0	22.1	22.0	21.8	21.5	20.9	20.1	18.9	17.3	15.4	13.5	12.3	11.3	11.8	13.4	14.1	13.9	13.2	12.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	11.2	10.2	8.9	7.3	5.7	3.9	2.7	1.8	1.0	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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青フィルター

青の波長範囲を中心に、比較的狭い帯域を透過させるフィルターです。
頭文字の後に続く三桁の数値は、透過率が最大に近くなる波長を示しています。例えば、E-B390は、透過率が最大となる波長が390nm付近となります。
紫外域近傍でのバンドパス特性を有しており吸収タイプの特性を持っております。

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

B370

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	7.4	26.6	46.9	62.3	71.8	78.0	81.3	81.8	81.2	77.1
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	67.4	56.5	43.5	30.1	18.9	9.3	3.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	5.2	25.3	51.8	71.0	81.1	85.4	87.0	87.5	87.3	87.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	86.6	86.1	85.5	84.9	84.2	83.4	82.5	81.6	80.6	79.5	78.3	77.0	75.5	73.8	71.9	69.8	67.4	64.6	61.5	58.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	54.0	49.9	45.3	40.6	35.9	31.0	26.2	22.0	17.9	14.3	11.1	6.4	3.5	1.8	1.0	0.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.541	1.533	1.528	1.526	1.524	1.522	1.521
P	0.913	0.915	0.916	0.917	0.917	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

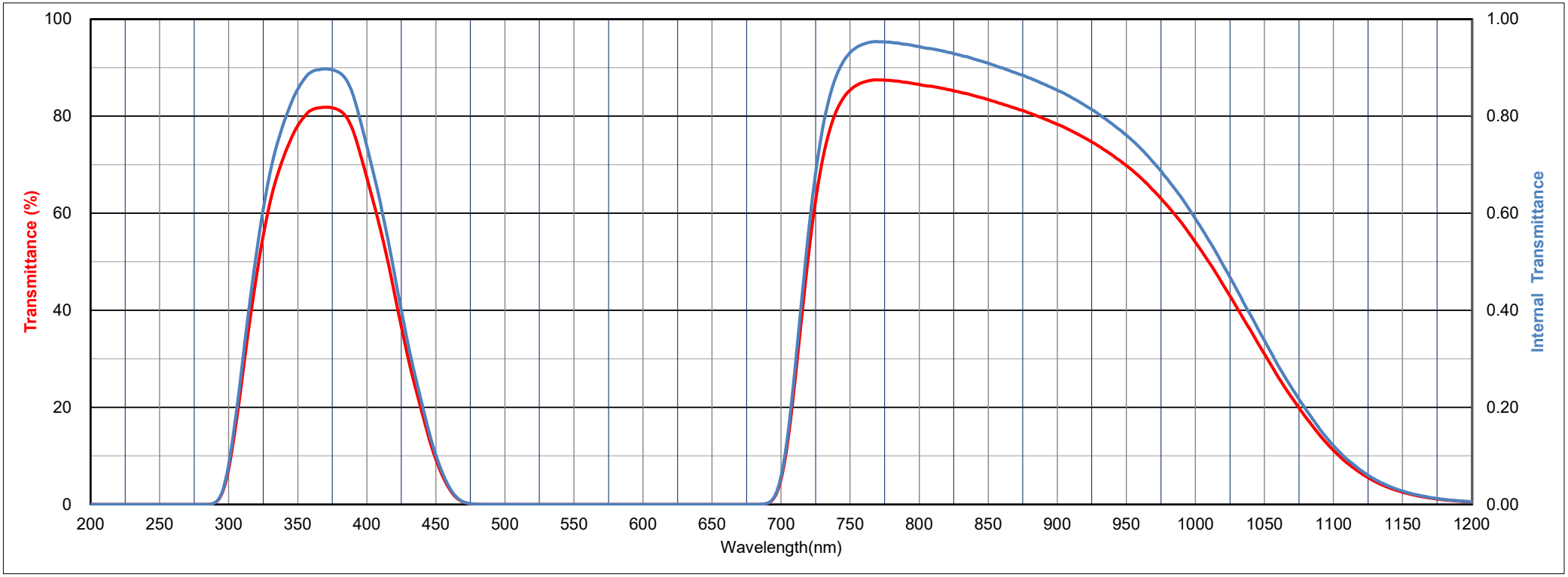
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	515	565	-	102	540	110	2.62

Tolerance of Transmittance (T)

Maximum Transmittance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
82±3	>290	<480



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The content of this catalog is accurate as of October ,2020

HOYA

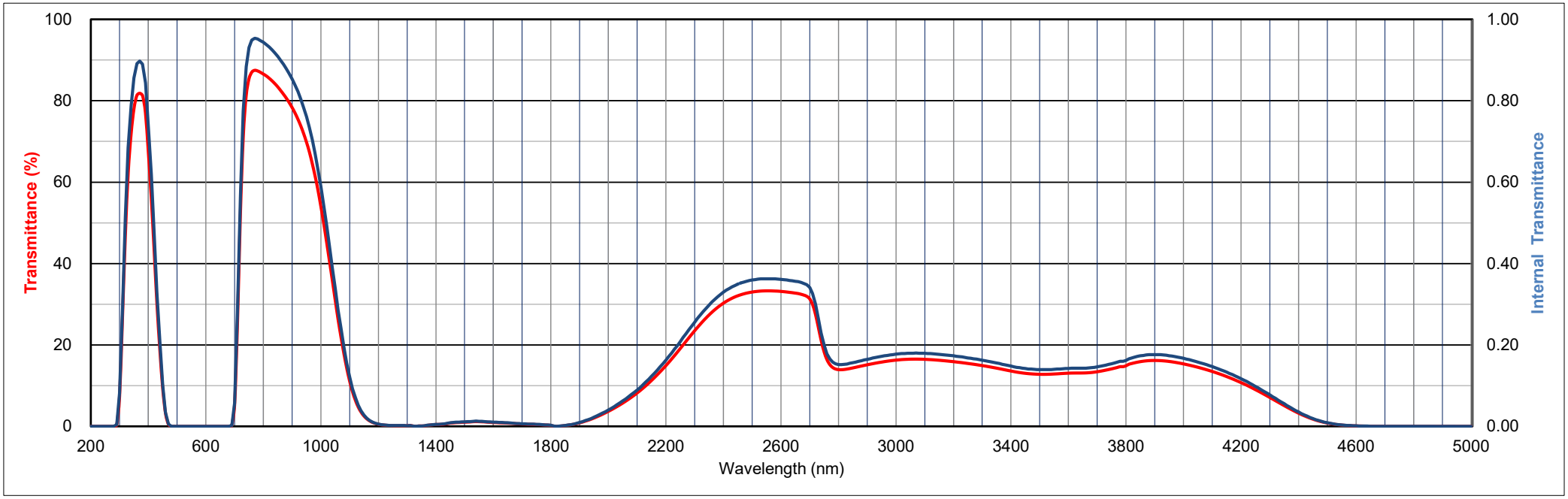
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

B370

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	7.4	26.6	46.9	62.3	71.8	78.0	81.3	81.8	81.2	77.1
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	67.4	56.5	43.5	30.1	18.9	9.3	3.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	5.2	25.3	51.8	71.0	81.1	85.4	87.0	87.5	87.3	87.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	86.6	86.1	85.5	84.9	84.2	83.4	82.5	81.6	80.6	79.5	78.3	77.0	75.5	73.8	71.9	69.8	67.4	64.6	61.5	58.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	54.0	49.9	45.3	40.6	35.9	31.0	26.2	22.0	17.9	14.3	11.1	8.5	6.4	4.7	3.5	2.5	1.8	1.3	1.0	0.7
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.1	0.2	0.3	0.4
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	0.4	0.5	0.5	0.6	0.7	0.8	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.1	1.1	1.0	1.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	0.2	0.1	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.1	1.3	1.5	1.8	2.0	2.4	2.7	3.0	3.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	3.7	5.7	8.2	11.3	14.9	19.1	23.5	27.4	30.3	32.1	33.0	33.3	33.2	32.7	31.3	18.3	13.9	14.4	15.1	15.8
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	16.3	16.5	16.5	16.2	15.9	15.5	14.9	14.3	13.6	13.0	12.8	12.9	13.1	13.1	13.4	14.1	14.9	15.9	16.2	15.9
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	15.3	14.5	13.5	12.2	10.7	9.0	7.1	5.1	3.2	1.8	0.8	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

E-B390

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	5.6	21.8	41.6	57.3	67.2	72.8	76.3	78.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	77.5	75.4	72.3	67.3	61.4	52.9	41.9	26.2	12.4	4.6	1.7	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	2.3	3.5	3.9	3.9	3.8	3.6	3.5	3.4	3.3	3.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	3.3	3.4	3.4	3.5	3.6	3.7	3.9	4.1	4.3	4.5	4.8	5.1	5.4	5.8	6.1	6.5	6.9	7.3	7.8	8.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	8.6	9.0	9.3	9.7	9.9	10.1	10.3	10.3	10.2	10.1	9.8	9.1	8.0	6.8	5.6	4.6				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.528	1.519	1.514	1.512	1.510	1.509	1.508
P	0.916	0.919	0.920	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

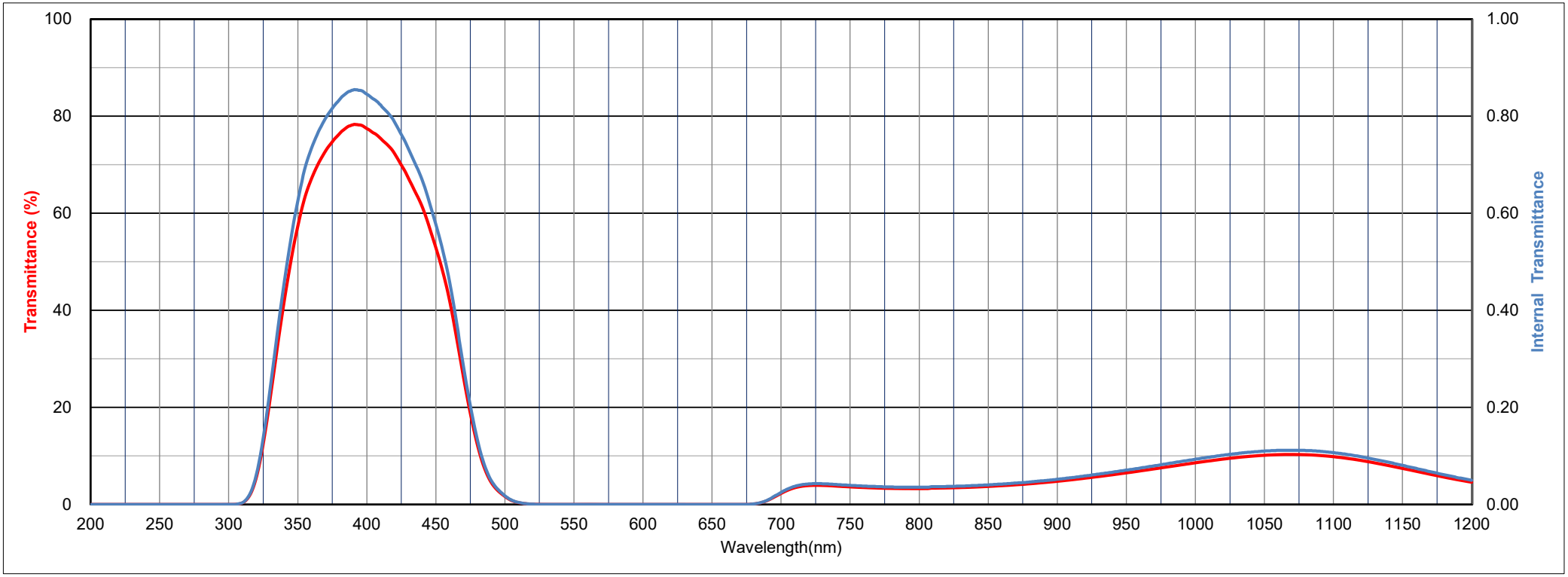
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	0.156	0.023	1	452	99
D65	0.155	0.024	1	453	99

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	485	535	92	104	510	110	2.57

Tolerance of Transmittance (T)

Maximum Transmittance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
78±3	>310	<510



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HOYA

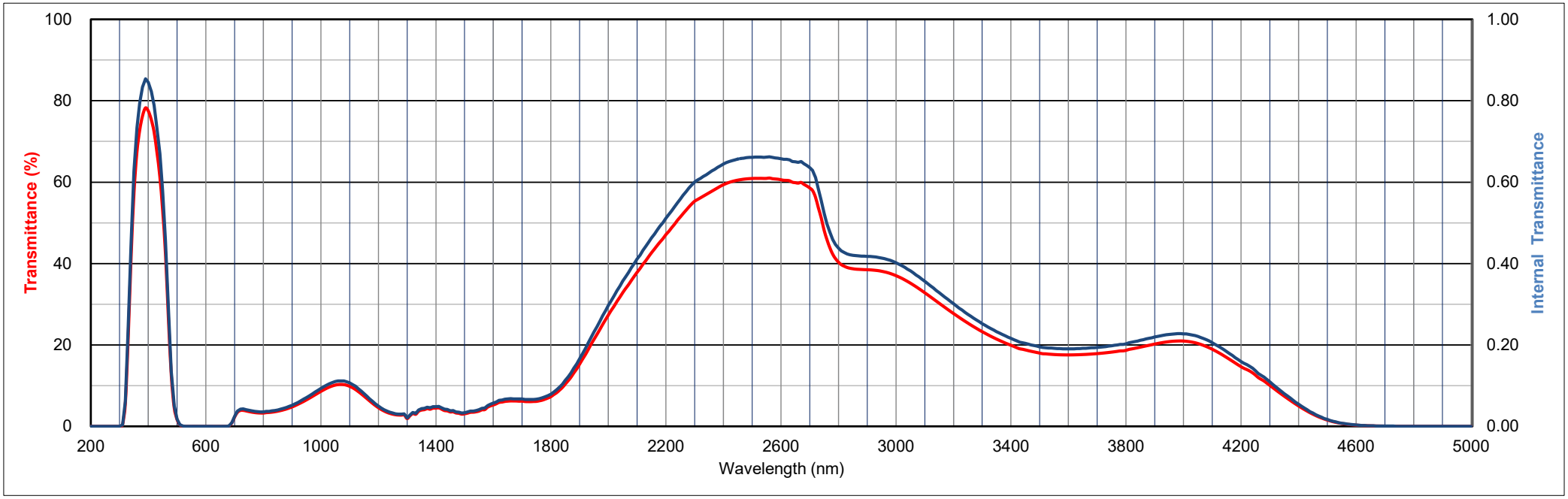
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

E-B390

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	5.6	21.8	41.6	57.3	67.2	72.8	76.3	78.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	77.5	75.4	72.3	67.3	61.4	52.9	41.9	26.2	12.4	4.6	1.7	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.8	2.3	3.5	3.9	3.9	3.8	3.6	3.5	3.4	3.3	3.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	3.3	3.4	3.4	3.5	3.6	3.7	3.9	4.1	4.3	4.5	4.8	5.1	5.4	5.8	6.1	6.5	6.9	7.3	7.8	8.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	8.6	9.0	9.3	9.7	9.9	10.1	10.3	10.3	10.2	10.1	9.8	9.5	9.1	8.6	8.0	7.4	6.8	6.2	5.6	5.1
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	4.6	4.1	3.8	3.4	3.2	3.0	2.8	2.8	2.8	2.8	1.9	2.6	3.1	3.0	3.7	4.0	4.1	4.3	4.2	4.5
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	4.5	4.5	4.2	3.9	3.8	3.5	3.6	3.3	3.2	3.0	3.1	3.2	3.4	3.5	3.6	3.7	4.1	4.1	4.7	5.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	5.3	5.5	5.9	6.0	6.1	6.2	6.2	6.2	6.2	6.2	6.2	6.1	6.1	6.1	6.1	6.1	6.3	6.4	6.7	7.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	7.3	7.8	8.3	8.9	9.5	10.4	11.2	12.1	13.2	14.1	15.3	16.5	17.6	18.9	20.2	21.4	22.6	23.8	25.0	26.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	27.4	32.9	37.9	42.7	47.1	51.4	55.3	57.4	59.4	60.5	60.9	60.9	60.6	59.9	58.6	48.2	40.4	38.7	38.5	38.1
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	37.0	35.2	32.8	30.3	27.7	25.4	23.3	21.4	19.9	18.8	18.0	17.6	17.6	17.6	17.9	18.2	18.7	19.5	20.2	20.8
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	21.0	20.4	18.9	16.9	14.7	12.6	10.1	7.4	5.0	3.0	1.5	0.7	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

B410

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	1.3	7.8	17.5	29.3	43.1	57.1	68.7	77.3	83.2	86.9	89.3	90.8	91.5	92.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	91.9	91.8	91.5	90.9	89.7	88.6	87.5	85.3	81.7	76.8	70.7	63.6	55.5	47.0	38.9	29.9	21.5	15.1	10.5	7.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	4.1	1.7	1.0	0.9	1.0	0.8	0.4	0.5	0.6	0.7	1.2	4.3	13.8	29.5	50.3	72.4	85.1	89.9	91.3	91.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	91.9	91.9	91.9	91.9	91.9	91.8	91.7	91.7	91.6	91.5	91.5	91.4	91.3	91.1	91.0	90.8	90.7	90.5	90.3	90.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.8	89.5	89.3	89.0	88.6	88.4	88.0	87.5	87.3	86.8	86.3	85.3	84.2	83.1	81.7	80.2				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.486	1.473	1.467	1.463	1.460	1.459	1.457
P	0.926	0.929	0.931	0.932	0.932	0.933	0.933

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

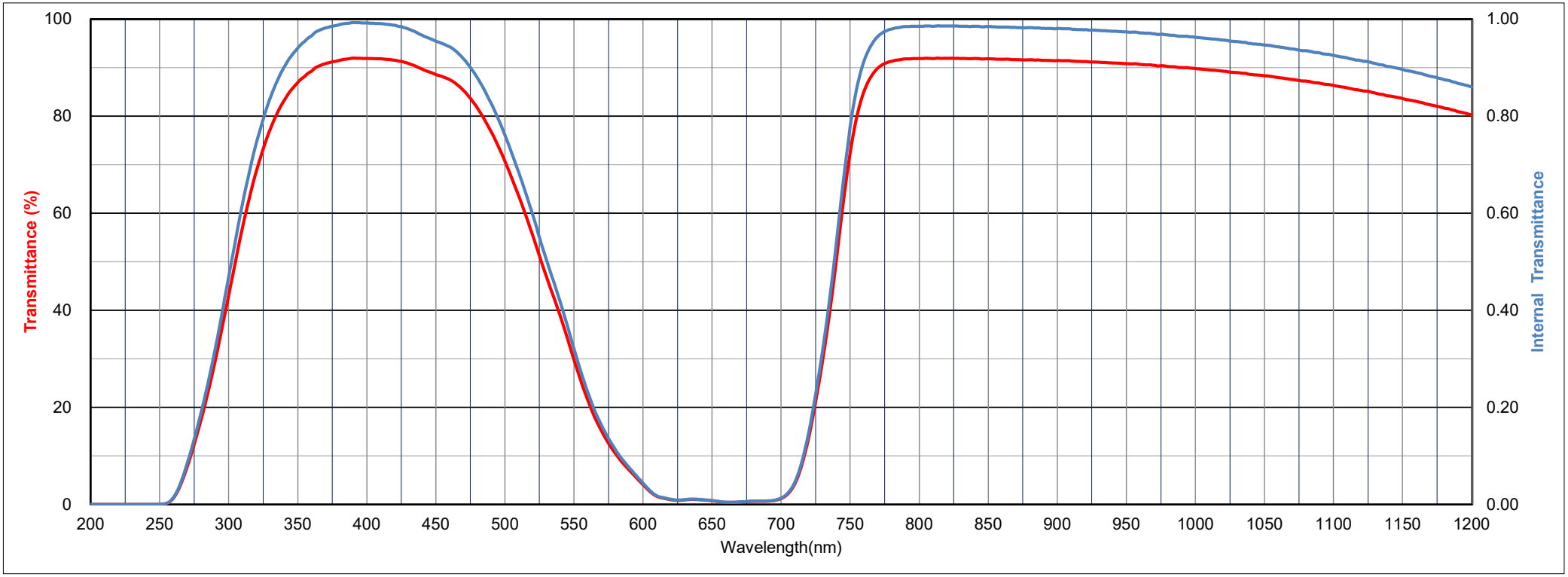
	x	y	Y	λ_d	P_e
A	0.198	0.339	22	490	62
C	0.162	0.190	30	480	68
D65	0.162	0.205	30	481	67

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	4	410	500	70	79	420	120	2.27

Tolerance of Transmittance (T)

Maximum Transmitance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
90±3	>250	<600



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HOYA

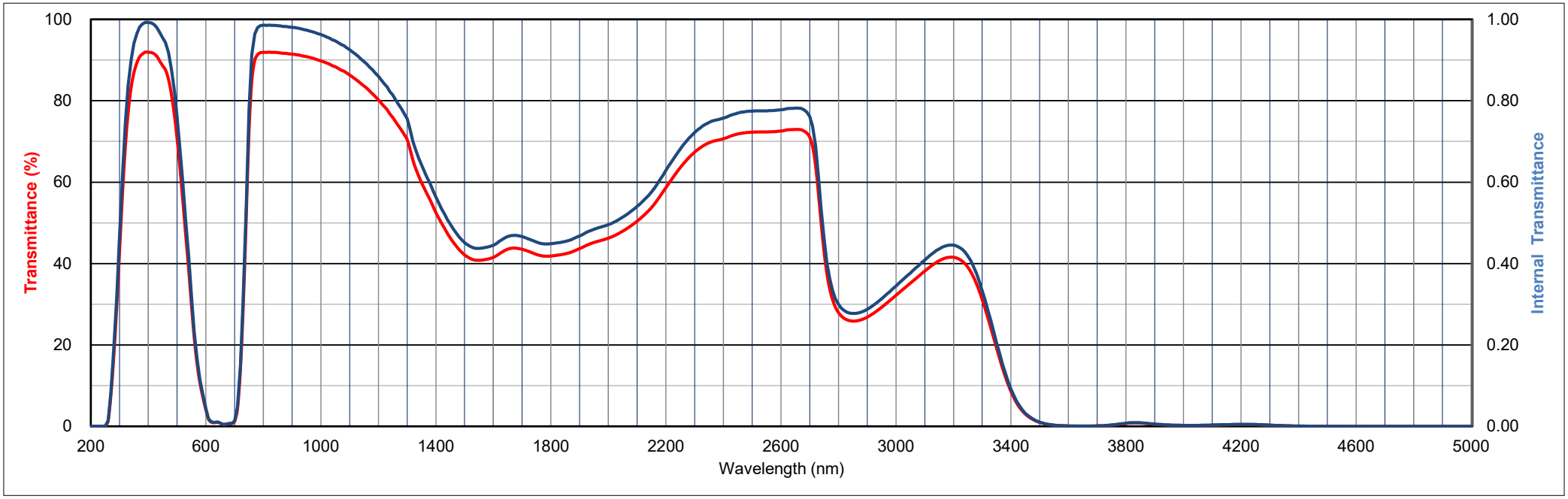
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

B410

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	1.3	7.8	17.5	29.3	43.1	57.1	68.7	77.3	83.2	86.9	89.3	90.8	91.5	92.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	91.9	91.8	91.5	90.9	89.7	88.6	87.5	85.3	81.7	76.8	70.7	63.6	55.5	47.0	38.9	29.9	21.5	15.1	10.5	7.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	4.1	1.7	1.0	0.9	1.0	0.8	0.4	0.5	0.6	0.7	1.2	4.3	13.8	29.5	50.3	72.4	85.1	89.9	91.3	91.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	91.9	91.9	91.9	91.9	91.9	91.8	91.7	91.7	91.6	91.5	91.5	91.4	91.3	91.1	91.0	90.8	90.7	90.5	90.3	90.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.8	89.5	89.3	89.0	88.6	88.4	88.0	87.5	87.3	86.8	86.3	85.8	85.3	84.8	84.2	83.6	83.1	82.4	81.7	81.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	80.2	79.4	78.6	77.8	76.8	75.9	74.8	73.8	72.8	71.7	70.5	68.1	65.4	63.3	61.6	59.9	58.5	57.0	55.6	54.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	52.5	51.2	49.9	48.7	47.4	46.3	45.3	44.4	43.5	42.8	42.1	41.6	41.2	41.0	40.8	40.8	40.8	41.0	41.1	41.3
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	41.5	41.9	42.4	42.8	43.2	43.5	43.7	43.8	43.8	43.7	43.5	43.3	43.0	42.8	42.5	42.2	42.0	41.9	41.8	41.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	41.8	41.9	42.0	42.1	42.3	42.4	42.6	42.8	43.1	43.4	43.7	44.0	44.3	44.7	44.9	45.2	45.4	45.6	45.8	46.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	46.2	48.0	50.4	53.8	58.7	63.6	67.4	69.7	70.7	71.8	72.3	72.3	72.6	73.0	71.0	42.9	28.0	25.9	26.8	29.2
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	32.2	35.2	38.1	40.7	41.5	39.1	31.1	19.2	8.6	3.0	1.0	0.3	0.1	0.1	0.1	0.3	0.7	0.8	0.5	0.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	0.2	0.2	0.3	0.4	0.5	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

B440

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	4.3	12.4	22.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	30.9	38.1	43.4	46.3	47.2	45.2	40.1	30.1	18.7	9.9	5.1	2.1	0.7	0.3	0.2	0.4	0.6	0.2	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	1.9	2.5	2.7	2.7	2.6	2.4	2.4	2.3	2.3	2.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	2.3	2.3	2.4	2.5	2.5	2.7	2.8	3.0	3.2	3.4	3.6	3.9	4.2	4.5	4.8	5.2	5.6	6.0	6.4	6.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	7.2	7.6	8.1	8.5	8.8	9.2	9.5	9.7	9.9	10.0	10.1	10.0	9.7	9.2	8.5	7.9				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.549	1.539	1.534	1.531	1.529	1.528	1.527
P	0.911	0.914	0.915	0.916	0.916	0.916	0.917

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

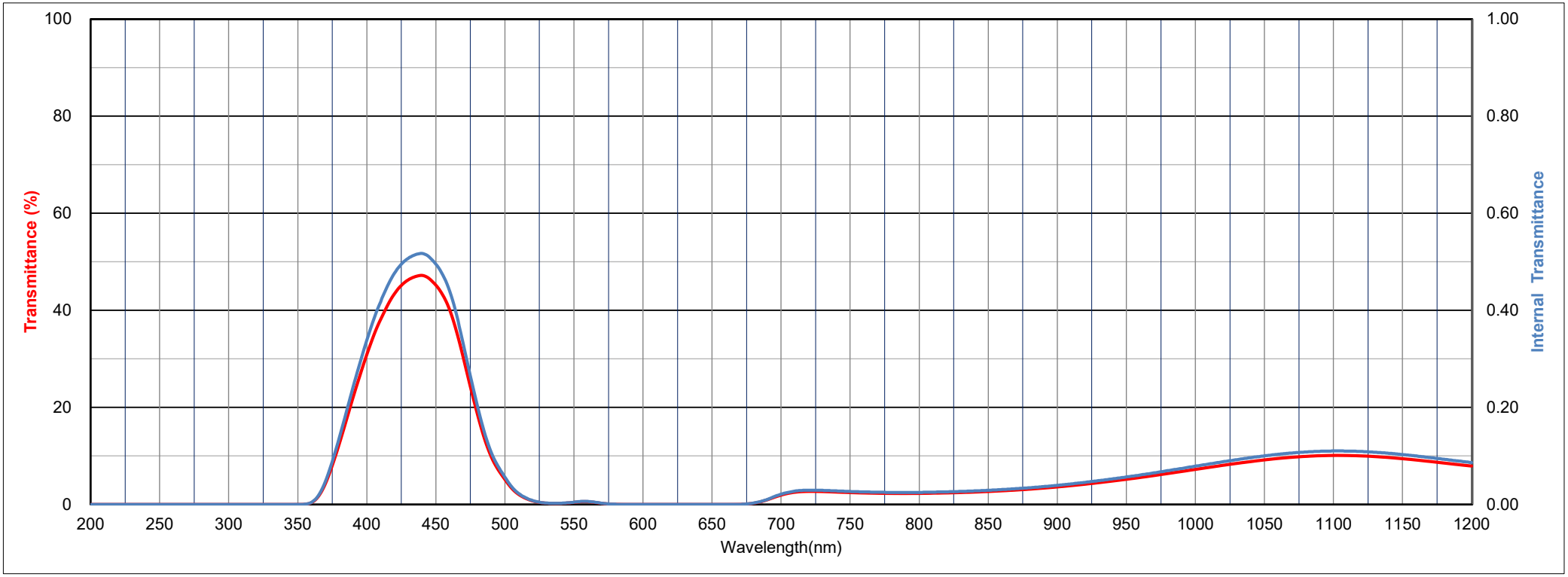
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	0.151	0.038	2	459	97
D65	0.150	0.039	2	460	97

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	480	535	90	105	530	110	2.70

Tolerance of Transmittance (T)

Maximum Transmitance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
47±3	>350	<520



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HOYA

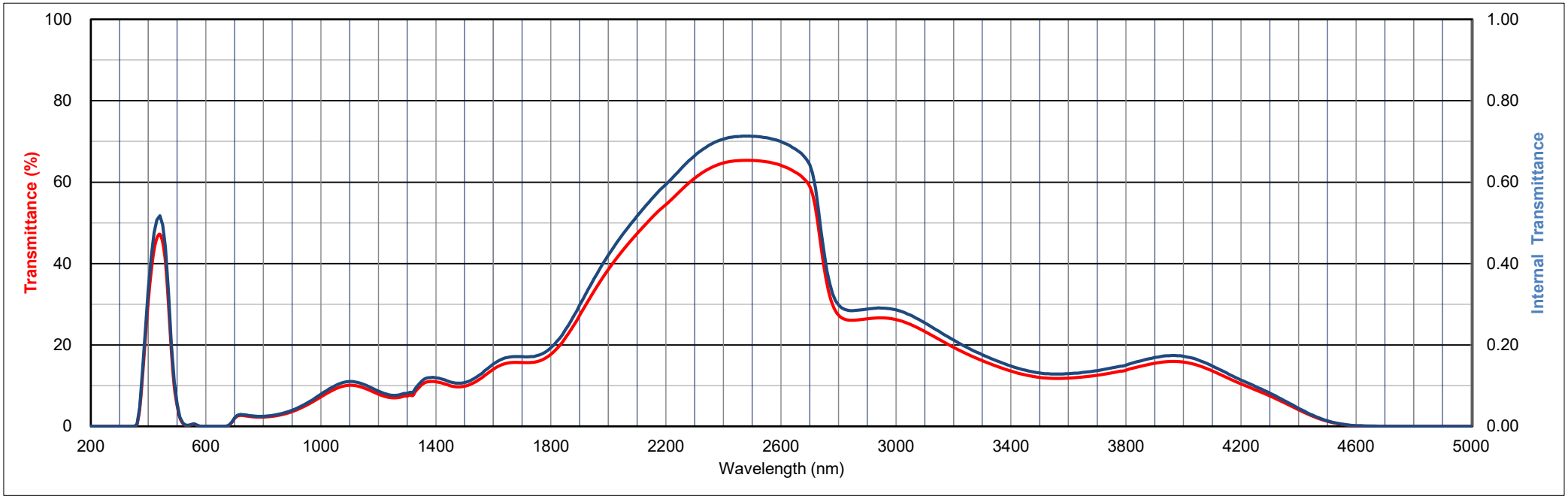
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

B440

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	4.3	12.4	22.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	30.9	38.1	43.4	46.3	47.2	45.2	40.1	30.1	18.7	9.9	5.1	2.1	0.7	0.3	0.2	0.4	0.6	0.2	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	1.9	2.5	2.7	2.7	2.6	2.4	2.4	2.3	2.3	2.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	2.3	2.3	2.4	2.5	2.5	2.7	2.8	3.0	3.2	3.4	3.6	3.9	4.2	4.5	4.8	5.2	5.6	6.0	6.4	6.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	7.2	7.6	8.1	8.5	8.8	9.2	9.5	9.7	9.9	10.0	10.1	10.1	10.0	9.9	9.7	9.4	9.2	8.9	8.5	8.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	7.9	7.6	7.4	7.2	7.1	7.0	7.0	7.1	7.2	7.4	7.4	7.7	7.6	8.7	9.4	10.2	10.7	10.9	11.0	11.0
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	10.9	10.8	10.7	10.4	10.2	10.0	9.8	9.7	9.7	9.8	9.9	10.0	10.3	10.6	11.0	11.5	11.9	12.5	13.0	13.5
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	14.0	14.5	14.9	15.2	15.4	15.6	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.9	16.1	16.4	16.7	17.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	17.7	18.3	19.0	19.8	20.7	21.7	22.7	23.8	24.9	26.0	27.3	28.5	29.7	30.9	32.0	33.2	34.3	35.4	36.5	37.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	38.6	43.2	47.4	51.2	54.5	57.8	61.0	63.3	64.7	65.3	65.3	65.0	64.1	62.4	59.0	39.1	27.3	26.1	26.4	26.6
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	26.2	25.1	23.3	21.4	19.4	17.7	16.1	14.8	13.6	12.6	12.0	11.8	11.9	12.1	12.6	13.1	13.8	14.7	15.5	15.9
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	15.8	15.0	13.6	12.0	10.4	9.0	7.5	5.8	4.1	2.5	1.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

B460

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.4	17.0	34.2	49.6	60.6	67.9	73.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	76.6	79.1	81.1	82.4	83.5	84.2	84.6	84.3	83.6	81.9	79.3	75.3	70.1	63.7	56.7	49.2	41.8	34.7	28.3	22.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	18.0	14.1	11.0	8.6	6.7	5.2	4.1	3.4	2.7	2.3	1.9	1.7	1.5	1.3	1.2	1.1	1.1	1.1	1.0	1.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.6	2.8	3.1	3.4	3.8	4.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	4.5	4.9	5.3	5.8	6.2	6.7	7.3	7.8	8.4	9.0	9.6	11.0	12.4	13.8	15.4	17.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.543	1.533	1.527	1.523	1.521	1.520	1.519
P	0.913	0.915	0.917	0.918	0.918	0.918	0.919

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

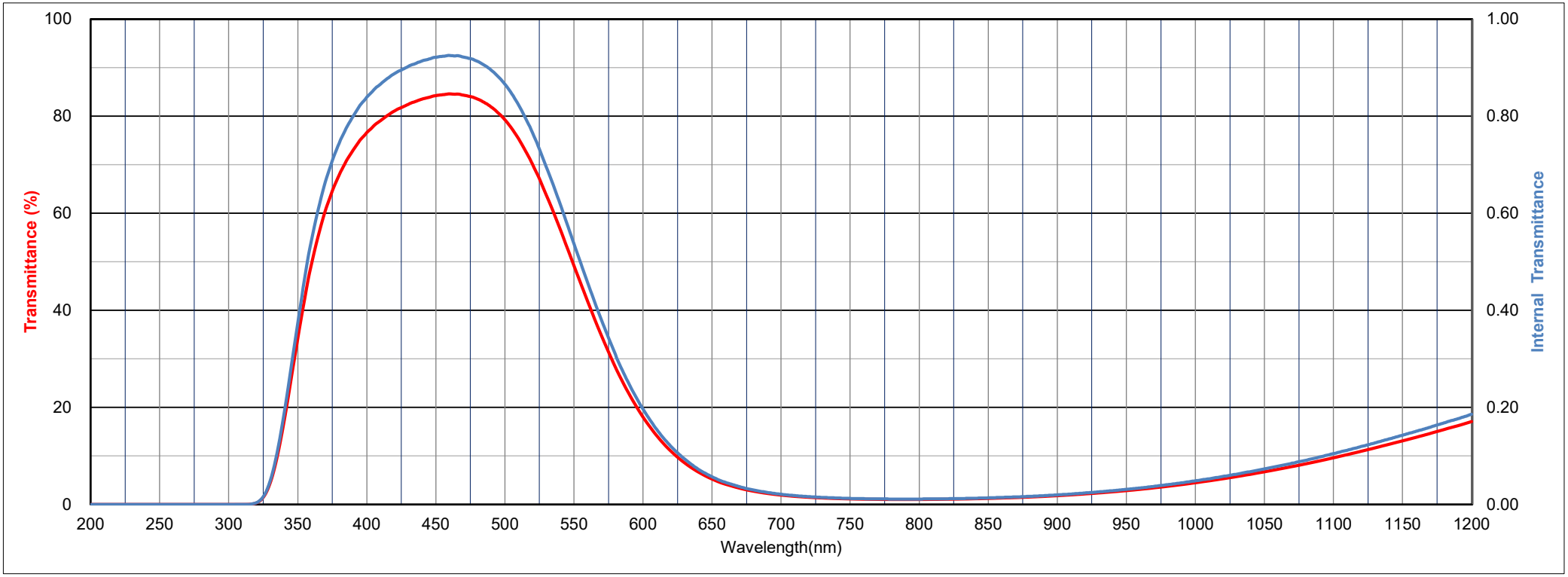
	x	y	Y	λ_d	P_e
A	0.282	0.399	37	494	39
C	0.199	0.251	45	484	47
D65	0.200	0.267	45	485	46

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	505	555	94	109	540	110	2.60

Tolerance of Transmittance (T)

Maximum Transmitance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
85±3	>320	<700



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HOYA

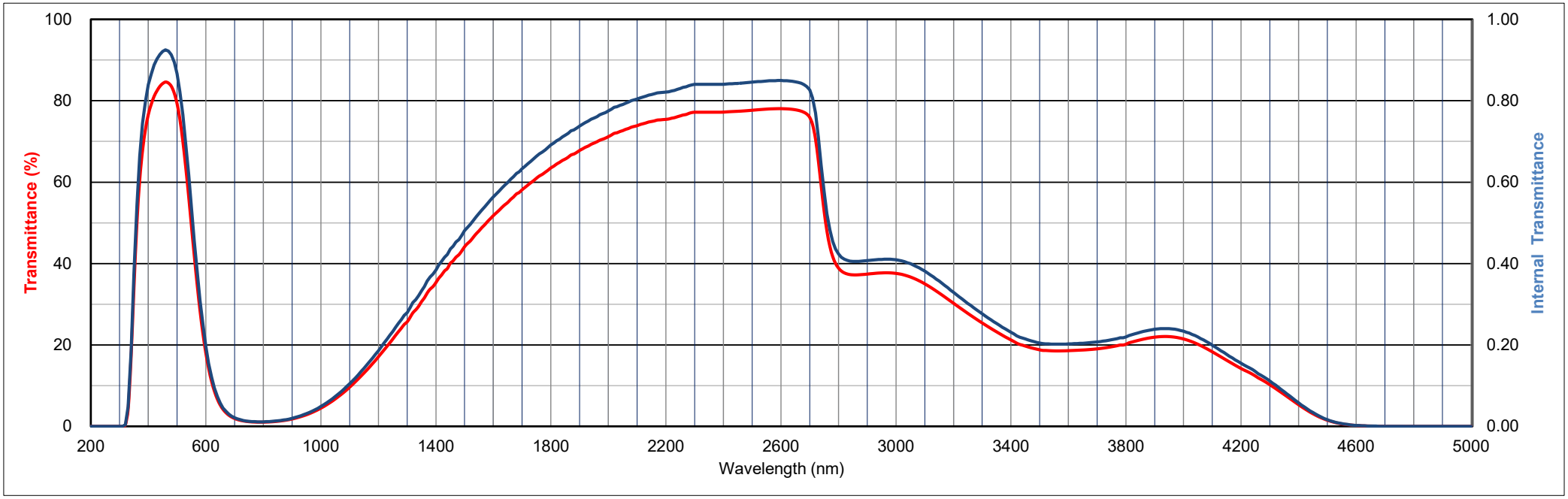
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

B460

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.4	17.0	34.2	49.6	60.6	67.9	73.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	76.6	79.1	81.1	82.4	83.5	84.2	84.6	84.3	83.6	81.9	79.3	75.3	70.1	63.7	56.7	49.2	41.8	34.7	28.3	22.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	18.0	14.1	11.0	8.6	6.7	5.2	4.1	3.4	2.7	2.3	1.9	1.7	1.5	1.3	1.2	1.1	1.1	1.1	1.0	1.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.6	2.8	3.1	3.4	3.8	4.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	4.5	4.9	5.3	5.8	6.2	6.7	7.3	7.8	8.4	9.0	9.6	10.3	11.0	11.7	12.4	13.1	13.8	14.6	15.4	16.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	17.1	17.9	18.8	19.7	20.5	21.4	22.4	23.3	24.1	25.0	25.7	26.7	27.9	28.6	29.5	30.6	31.6	32.8	33.7	34.3
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	35.3	36.4	37.2	38.2	38.8	40.0	40.7	41.6	42.2	43.1	44.2	44.9	45.6	46.4	47.3	48.0	48.8	49.5	50.3	51.1
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	51.8	52.4	53.1	53.8	54.5	55.0	55.8	56.4	57.1	57.5	58.1	58.7	59.3	59.9	60.4	61.0	61.5	61.9	62.4	62.9
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	63.5	63.9	64.5	64.9	65.3	65.7	66.1	66.7	66.9	67.3	67.8	68.2	68.6	68.9	69.3	69.6	69.9	70.3	70.6	70.8
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	71.2	72.7	73.9	74.9	75.4	76.3	77.2	77.2	77.2	77.4	77.7	77.9	78.1	77.8	75.9	53.0	38.9	37.2	37.4	37.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	37.6	36.7	35.0	32.8	30.3	27.8	25.4	23.2	21.2	19.7	18.8	18.5	18.6	18.8	19.0	19.6	20.2	21.3	21.9	22.0
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	21.5	20.2	18.3	16.2	14.2	12.4	10.2	7.8	5.3	3.1	1.5	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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緑フィルター

緑の波長範囲を中心に、比較的狭い帯域を透過させるフィルターです。
頭文字の後に続く三桁の数値は、透過率が最大に近くなる波長を示しています。例えば、G530は、透過率が最大となる波長が530nm付近となります。
バンドパスフィルター、RGB分解用フィルター等に利用されています。

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

G530

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	1.4	3.6	7.5	12.6	17.1	18.9	17.1	12.7	7.9	4.2	1.9	0.8
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.5	0.7	1.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.597	1.581	1.573	1.568	1.565	1.564	1.562
P	0.900	0.904	0.906	0.907	0.907	0.908	0.908

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

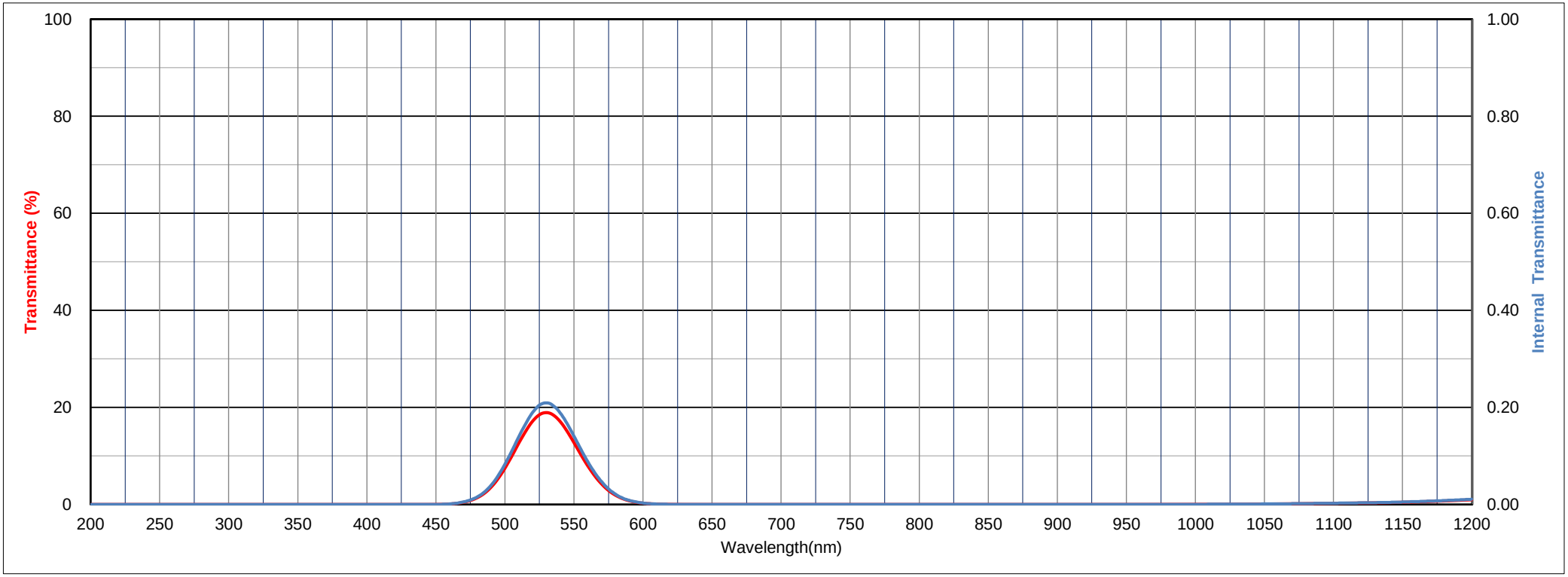
	x	y	Y	λ_d	P_e
A	0.247	0.690	6	532	73
C	0.221	0.686	8	536	80
D65	0.216	0.693	8	535	80

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	450	495	94	100	500	130	3.12

Tolerance of Transmittance (T)

Maximum Transmitance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
18±3	>470	<580



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

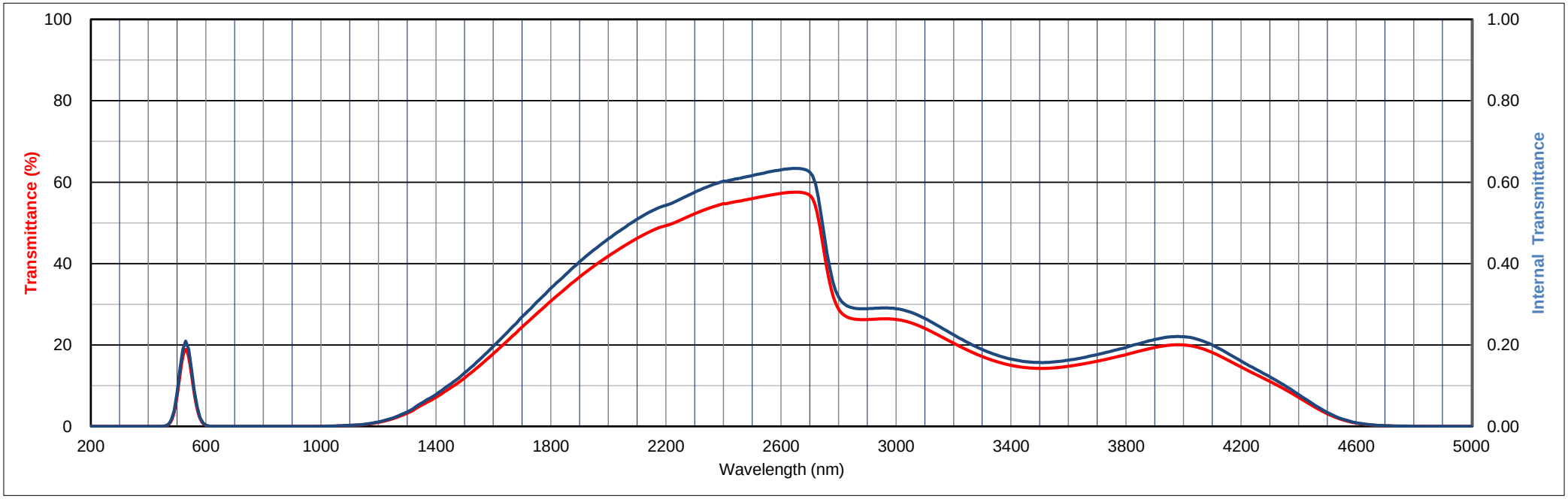
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

G530

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	1.4	3.6	7.5	12.6	17.1	18.9	17.1	12.7	7.9	4.2	1.9	0.8
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.7	0.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.2	3.5	3.9	4.4	4.8	5.2	5.6	6.0	6.3	6.7
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	7.1	7.6	8.0	8.5	8.9	9.4	9.9	10.3	10.8	11.4	11.9	12.5	13.1	13.6	14.2	14.8	15.4	16.0	16.6	17.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	17.9	18.5	19.2	19.8	20.4	21.1	21.8	22.4	23.0	23.8	24.4	25.1	25.7	26.3	27.0	27.6	28.3	28.9	29.5	30.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	30.8	31.4	32.0	32.6	33.2	33.8	34.4	35.0	35.6	36.1	36.7	37.3	37.8	38.4	38.9	39.4	39.9	40.4	40.9	41.4
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	41.8	44.1	46.2	48.0	49.3	50.7	52.2	53.6	54.7	55.3	56.0	56.7	57.2	57.5	56.8	42.8	28.9	26.4	26.2	26.4
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	26.3	25.5	24.1	22.3	20.4	18.7	17.2	15.9	15.0	14.4	14.2	14.4	14.8	15.3	16.0	16.8	17.6	18.6	19.4	19.9
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	20.0	19.4	18.1	16.4	14.6	12.8	11.1	9.2	7.1	5.0	3.1	1.7	0.8	0.4	0.2	0.1	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

G533

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.1	0.5	1.7	4.7	9.8	16.8	25.7	35.3	44.1	50.6	53.8	53.3	49.4	43.3	35.9	28.3	21.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	15.7	11.4	8.3	6.2	5.0	4.2	3.5	3.3	3.2	2.8	2.8	2.9	3.0	3.2	3.3	3.4	3.5	3.7	3.8	3.9
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	4.0	4.1	4.2	4.4	4.5	4.7	4.9	5.2	5.4	5.7	6.1	6.4	6.9	7.3	7.8	8.2	8.8	9.3	9.9	10.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	11.2	11.8	12.5	13.3	14.0	14.8	15.6	16.4	17.2	18.0	18.9	20.7	22.5	24.3	26.1	28.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.551	1.541	1.536	1.533	1.531	1.529	1.529
P	0.911	0.913	0.915	0.915	0.916	0.916	0.916

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

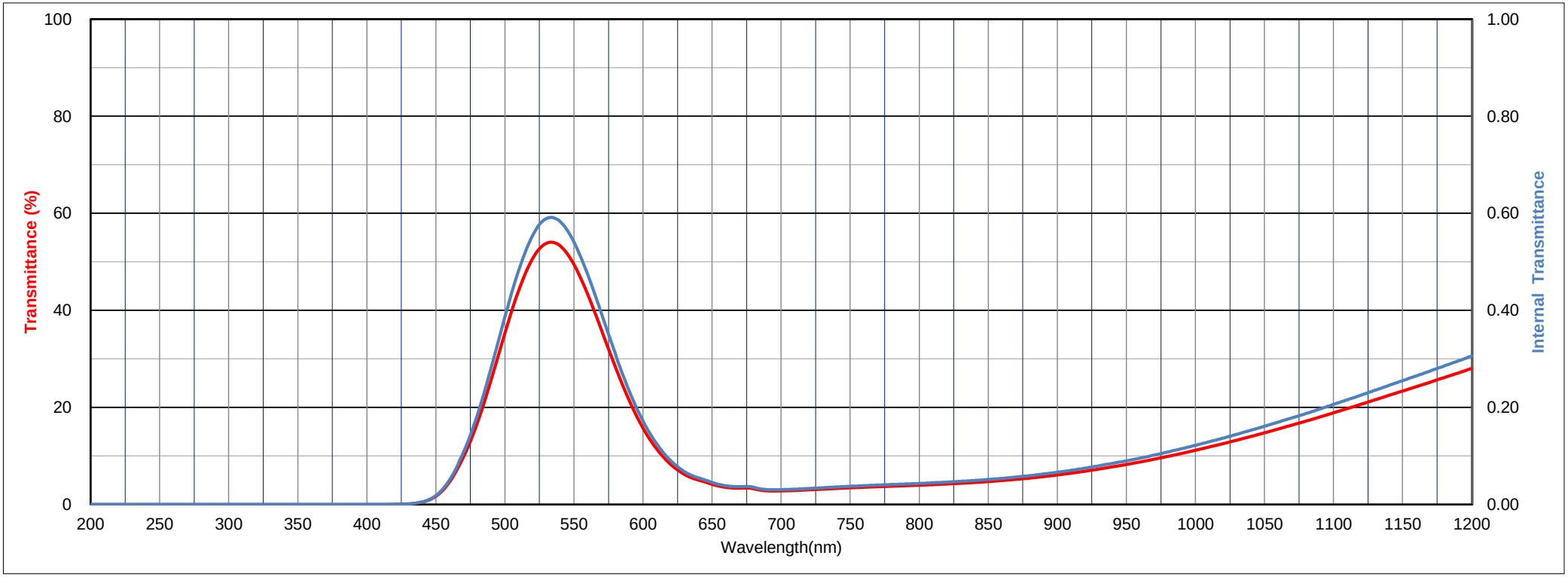
	x	y	Y	λ_d	P_e
A	0.367	0.566	31	551	56
C	0.303	0.564	35	550	65
D65	0.299	0.572	35	549	65

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	550	600	87	103	580	140	2.60

Tolerance of Transmittance (T)

Maximum Transmittance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
18±3	>470	<580



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HOYA

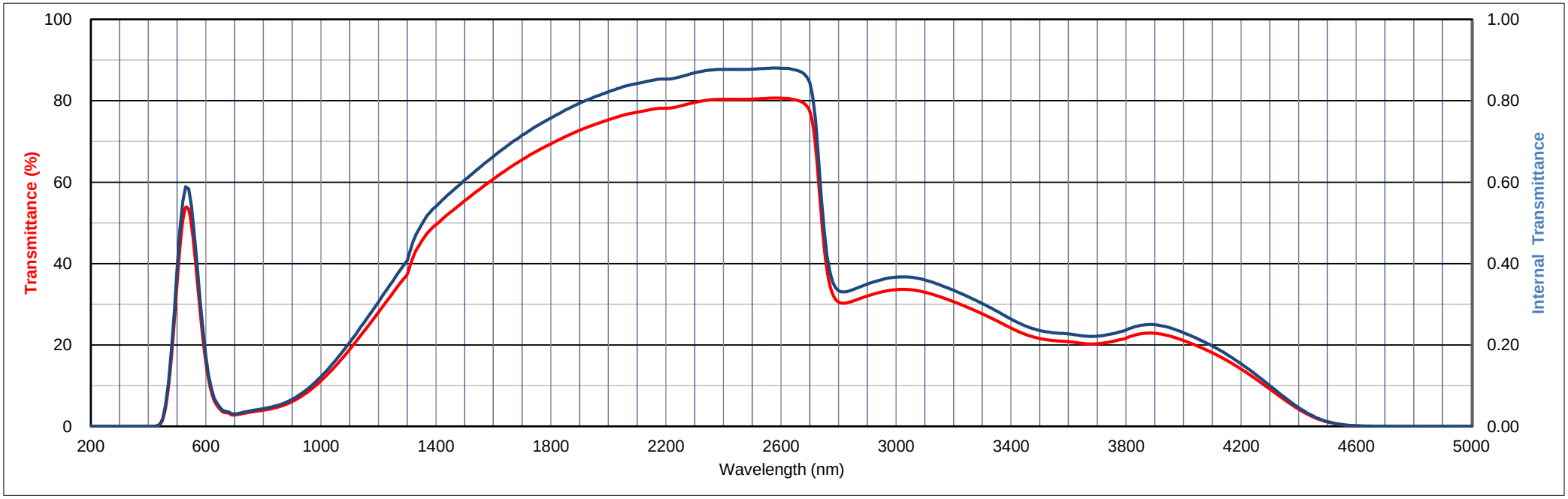
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

G533

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.1	0.5	1.7	4.7	9.8	16.8	25.7	35.3	44.1	50.6	53.8	53.3	49.4	43.3	35.9	28.3	21.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	15.7	11.4	8.3	6.2	5.0	4.2	3.5	3.3	3.2	2.8	2.8	2.9	3.0	3.2	3.3	3.4	3.5	3.7	3.8	3.9
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	4.0	4.1	4.2	4.4	4.5	4.7	4.9	5.2	5.4	5.7	6.1	6.4	6.9	7.3	7.8	8.2	8.8	9.3	9.9	10.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	11.2	11.8	12.5	13.3	14.0	14.8	15.6	16.4	17.2	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.1
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	28.0	29.0	29.9	30.9	31.8	32.7	33.7	34.7	35.5	36.4	37.3	39.5	41.4	43.1	44.3	45.4	46.5	47.5	48.2	49.0
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	49.5	50.1	50.8	51.4	52.0	52.6	53.1	53.7	54.3	54.8	55.4	56.0	56.5	57.1	57.6	58.1	58.7	59.2	59.7	60.3
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	60.8	61.3	61.8	62.3	62.7	63.2	63.7	64.2	64.6	65.1	65.5	65.9	66.4	66.8	67.2	67.6	68.0	68.4	68.7	69.1
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	69.4	69.8	70.1	70.5	70.8	71.2	71.5	71.8	72.1	72.5	72.8	73.0	73.3	73.6	73.9	74.1	74.4	74.6	74.8	75.1
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	75.3	76.4	77.2	77.9	78.2	78.7	79.6	80.2	80.4	80.4	80.4	80.6	80.6	80.2	77.4	44.3	30.6	30.8	32.0	33.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	33.6	33.6	33.0	31.9	30.6	29.2	27.7	26.0	24.2	22.6	21.6	21.1	20.8	20.4	20.3	20.8	21.7	22.7	22.9	22.2
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	21.1	19.7	18.1	16.2	14.1	11.7	9.2	6.6	4.2	2.3	1.1	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

G545

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	2.6	6.5	11.2	14.5	14.6	11.7	7.8	4.4	2.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.9	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.8	2.0	2.2	2.8	3.5	4.3	5.2	6.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.601	1.585	1.576	1.572	1.569	1.567	1.565
P	0.899	0.903	0.905	0.906	0.907	0.907	0.907

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

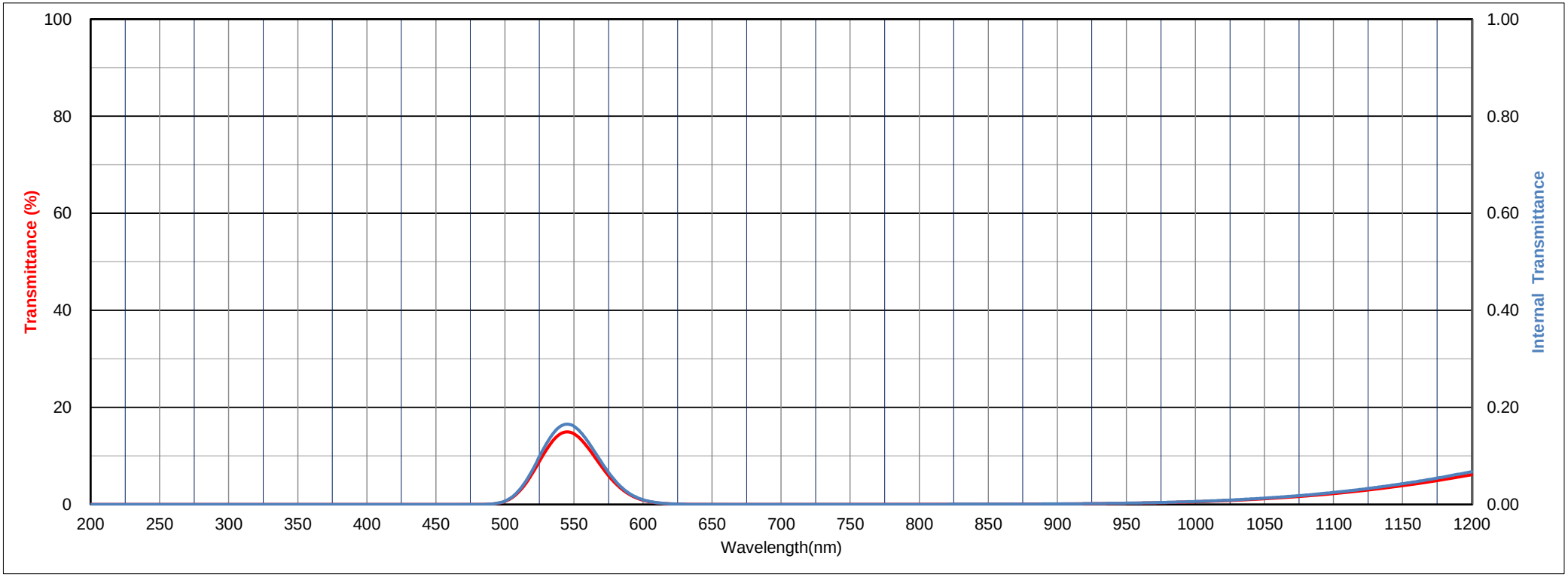
	x	y	Y	λ_d	P_e
A	0.338	0.646	6	554	92
C	0.317	0.663	7	552	96
D65	0.312	0.667	7	551	96

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	1	460	510	92	103	500	130	3.10

Tolerance of Transmittance (T)

Maximum Transmitance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
18±3	>470	<580



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HOYA

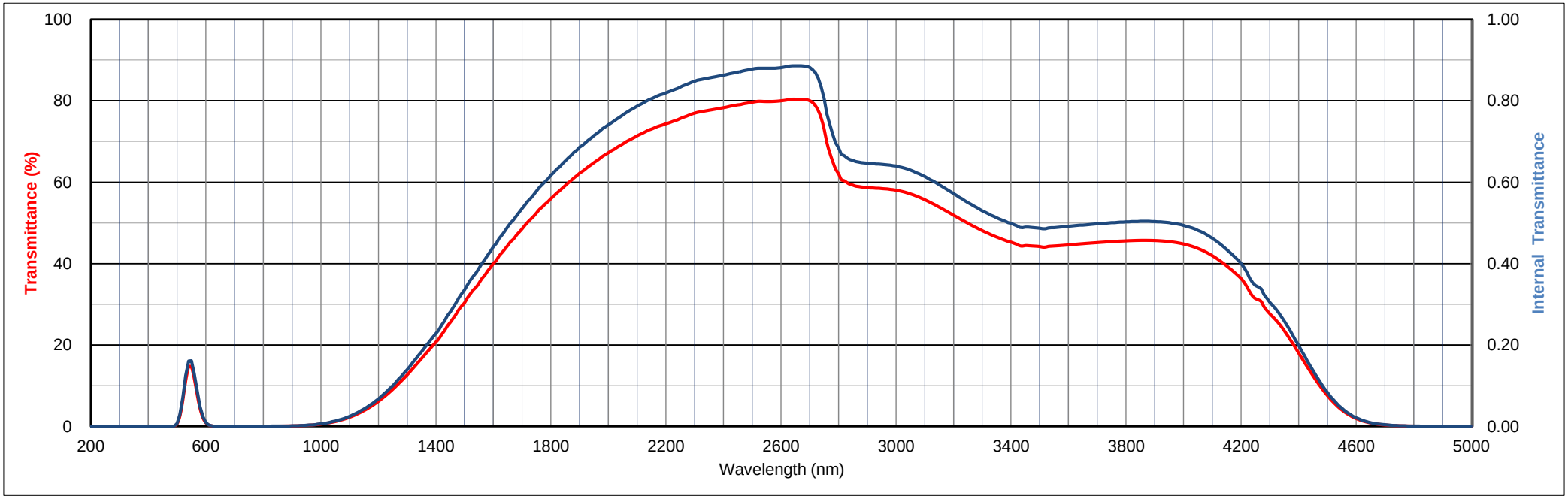
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

G545

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	2.6	6.5	11.2	14.5	14.6	11.7	7.8	4.4	2.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.9	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.5	1.8	2.0	2.2	2.5	2.8	3.2	3.5	3.9	4.3	4.7	5.2	5.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	6.1	6.7	7.3	7.8	8.5	9.1	9.8	10.5	11.2	11.9	12.6	13.4	14.2	15.0	15.9	16.7	17.5	18.3	19.1	19.9
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	20.7	21.5	22.6	23.5	24.7	25.5	26.5	27.5	28.7	29.6	30.4	31.6	32.6	33.5	34.2	35.2	36.3	37.1	38.2	39.1
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	40.0	40.8	41.9	42.7	43.6	44.5	45.4	46.0	47.0	47.8	48.5	49.4	50.2	50.9	51.6	52.4	53.3	53.9	54.6	55.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	56.0	56.6	57.3	57.9	58.5	59.2	59.8	60.4	61.0	61.6	62.2	62.7	63.2	63.8	64.3	64.8	65.3	65.8	66.4	66.8
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	67.3	69.4	71.4	73.1	74.4	75.6	77.0	77.7	78.3	79.0	79.6	79.8	80.0	80.4	80.0	73.1	62.1	59.3	58.7	58.4
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	58.0	57.1	55.7	53.9	51.9	49.9	48.1	46.5	45.3	44.4	44.2	44.3	44.6	44.9	45.1	45.4	45.6	45.7	45.7	45.4
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	44.8	43.7	41.9	39.4	36.3	31.4	27.7	23.5	18.1	12.5	7.6	4.1	1.9	0.8	0.3	0.1	0.1	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

G550

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.1	0.5	1.6	4.0	8.9	17.0	27.2	37.3	47.6	57.1	65.4	72.0	76.8	79.6	80.7	80.0	77.8	74.5	70.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	65.3	60.4	55.9	52.3	50.5	50.2	49.4	51.0	54.8	53.7	56.2	60.0	64.1	68.1	71.8	75.1	78.0	80.4	82.4	83.9
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	85.1	86.0	86.5	87.0	87.3	87.7	87.9	88.1	88.2	88.4	88.5	88.7	88.8	89.0	89.0	89.1	89.2	89.3	89.4	89.4
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.5	89.5	89.6	89.7	89.8	89.8	89.8	89.9	89.9	90.0	90.1	90.2	90.2	90.3	90.4	90.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.538	1.530	1.525	1.523	1.521	1.520	1.519
P	0.914	0.916	0.917	0.918	0.918	0.918	0.919

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

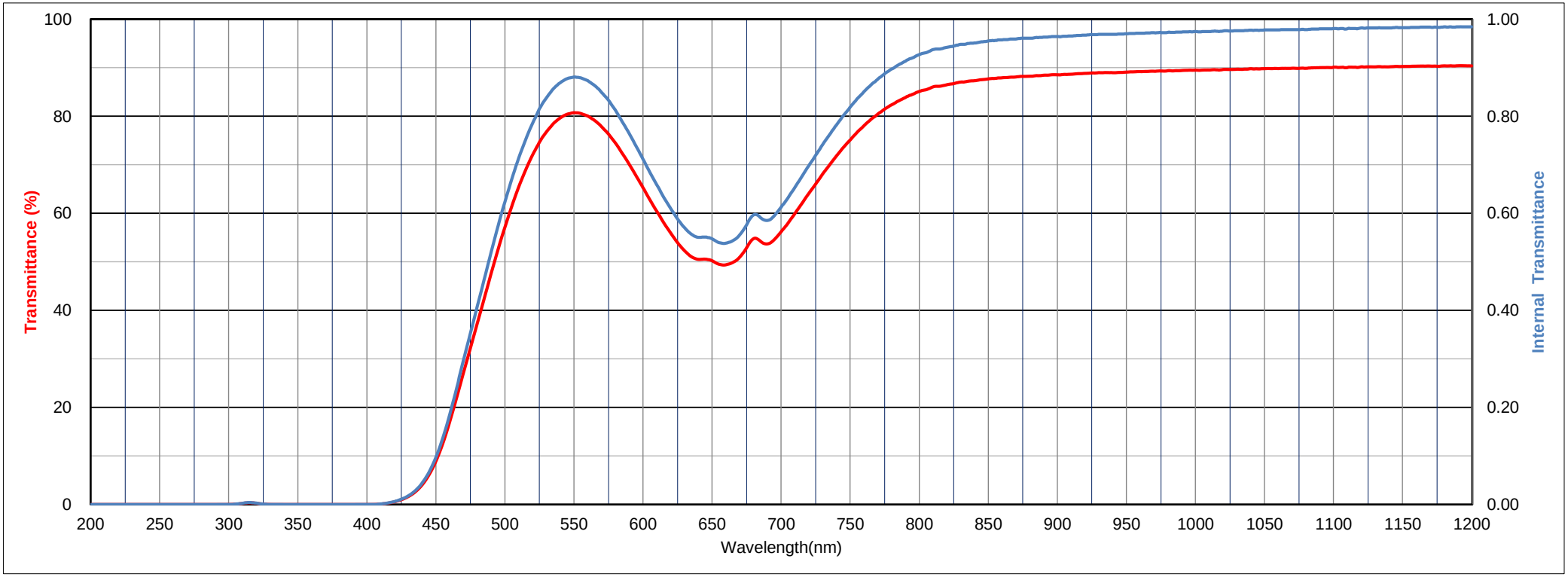
	x	y	Y	λ_d	P_e
A	0.467	0.478	70	575	63
C	0.379	0.481	69	567	63
D65	0.377	0.489	70	566	63

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	1	545	590	90	104	560	130	2.58

Tolerance of Transmittance (T)

Maximum Transmitance	Less than 1% Wavelength at Short wave Side	Less than 5% Wavelength at Long wave Side
Tmax(%)	λs1(nm)	λl5(nm)
18±3	>470	<580



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HOYA

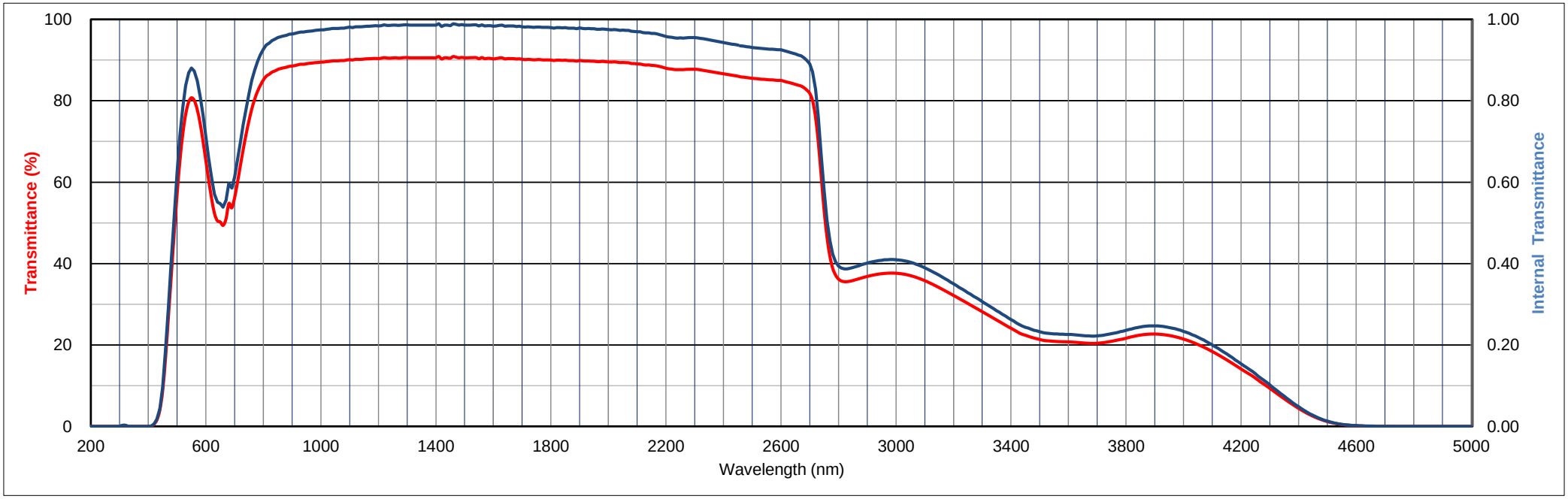
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

G550

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.1	0.5	1.6	4.0	8.9	17.0	27.2	37.3	47.6	57.1	65.4	72.0	76.8	79.6	80.7	80.0	77.8	74.5	70.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	65.3	60.4	55.9	52.3	50.5	50.2	49.4	51.0	54.8	53.7	56.2	60.0	64.1	68.1	71.8	75.1	78.0	80.4	82.4	83.9
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	85.1	86.0	86.5	87.0	87.3	87.7	87.9	88.1	88.2	88.4	88.5	88.7	88.8	89.0	89.0	89.1	89.2	89.3	89.4	89.4
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.5	89.5	89.6	89.7	89.8	89.8	89.8	89.9	89.9	90.0	90.1	90.0	90.2	90.2	90.2	90.3	90.3	90.3	90.4	90.4
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	90.4	90.5	90.6	90.5	90.5	90.5	90.6	90.5	90.5	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6	90.6
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.6	90.9	90.3	90.6	90.5	90.5	90.9	90.7	90.5	90.7	90.5	90.6	90.6	90.6	90.6	90.3	90.6	90.3	90.4	90.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	90.3	90.4	90.5	90.5	90.3	90.4	90.3	90.4	90.3	90.3	90.2	90.1	90.2	90.1	90.1	90.1	90.1	90.0	90.0	90.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	90.0	89.9	90.0	90.0	89.9	90.0	89.9	89.9	89.9	89.7	89.9	89.8	89.8	89.8	89.7	89.7	89.6	89.6	89.7	89.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	89.6	89.4	89.0	88.7	88.0	87.7	87.7	87.2	86.6	86.1	85.5	85.2	85.0	84.0	81.8	53.1	36.2	35.8	36.8	37.5
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	37.6	37.0	35.8	34.1	32.2	30.2	28.2	26.1	24.1	22.4	21.3	20.9	20.7	20.5	20.4	20.9	21.7	22.4	22.7	22.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	21.4	20.1	18.4	16.3	14.1	11.9	9.4	6.8	4.4	2.5	1.2	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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色温度変換フィルター

光を発する物質の温度と色には相関があり数値に置き換えることができます。この時の温度を「色温度」と呼びます。例えば、PCのモニターの基準となる色温度は6500Kと決められており目視ではやや黄色い「色」です。太陽表面の温度が約6000Kですからほぼ同じ温度です。
「色温度」の逆数の10^6倍を単位にとり、これをミレッド（Mired： micro reciprocal degree）と呼び、色温度の変換能力を示す単位として用いられます。
オリジナル光源の色温度がK1で、フィルターを通過した光の色温度をK2とするとこのフィルターの色温度変換能力は以下のように求められます。

$$\left(\frac{10^6}{K_2} - \frac{10^6}{K_1}\right) \text{ミレッド}$$

この値は、アンバー系（赤）のフイルターでは＋となり色温度を低下させ、ブルー系（青）では－となって色温度を上昇させます。

色温度変換能力

「色温度変換能力」の定義は以下のようになっています。
B-R変換能力（v）
$V=22.1(\log T_r - \log T_b)$ デカミレッド

Tr：波長610nm,635nmおよび655nmでのフィルタの透過率の平均値（%）

$$T_r = \frac{(T_{610}+T_{635}+T_{655})}{3}$$

Tb：波長405nm,435nmおよび465nmでのフィルタの透過率の平均値（%）

$$T_b = \frac{(T_{405}+T_{435}+T_{465})}{3}$$

G-R変換能力（w）
$W=61.6(\log T_r - \log T_g)$ デカミレッド

Tg：波長510nm,545nmおよび565nmでのフィルタの透過率の平均値（%）

$$T_g = \frac{(T_{510}+T_{545}+T_{565})}{3}$$

肉厚と色温度変換能力
色温度変換能力と肉厚の関係は以下のようになります。

$$\frac{v1}{v2} = \frac{t1}{t2}$$

v1：肉厚t1における変換能力
v2：肉厚t2における変換能力
この関係を利用して肉厚を変化させてして所定の色温度変換能力を得ることができます。

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LA20

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	3.3	16.2	32.0	46.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	56.3	61.9	62.6	63.4	63.3	63.0	62.9	63.0	63.3	63.9	64.4	65.2	66.0	66.7	67.9	69.3	70.6	71.9	72.7	73.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	74.3	75.0	75.6	75.9	76.4	77.2	78.4	79.9	81.6	83.3	84.4	85.1	85.7	86.3	86.8	87.2	87.5	87.8	88.0	88.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	88.5	88.3	88.2	88.3	88.5	88.7	88.8	88.9	89.1	89.2	89.3	89.5	89.6	89.7	89.8	90.0	90.0	90.1	90.2	90.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	90.2	90.3	90.3	90.3	90.3	90.4	90.3	90.3	90.3	90.4	90.4	90.4	90.4	90.4	90.5	90.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.569	1.555	1.547	1.543	1.540	1.538	1.537
P	0.907	0.910	0.912	0.913	0.913	0.914	0.914

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

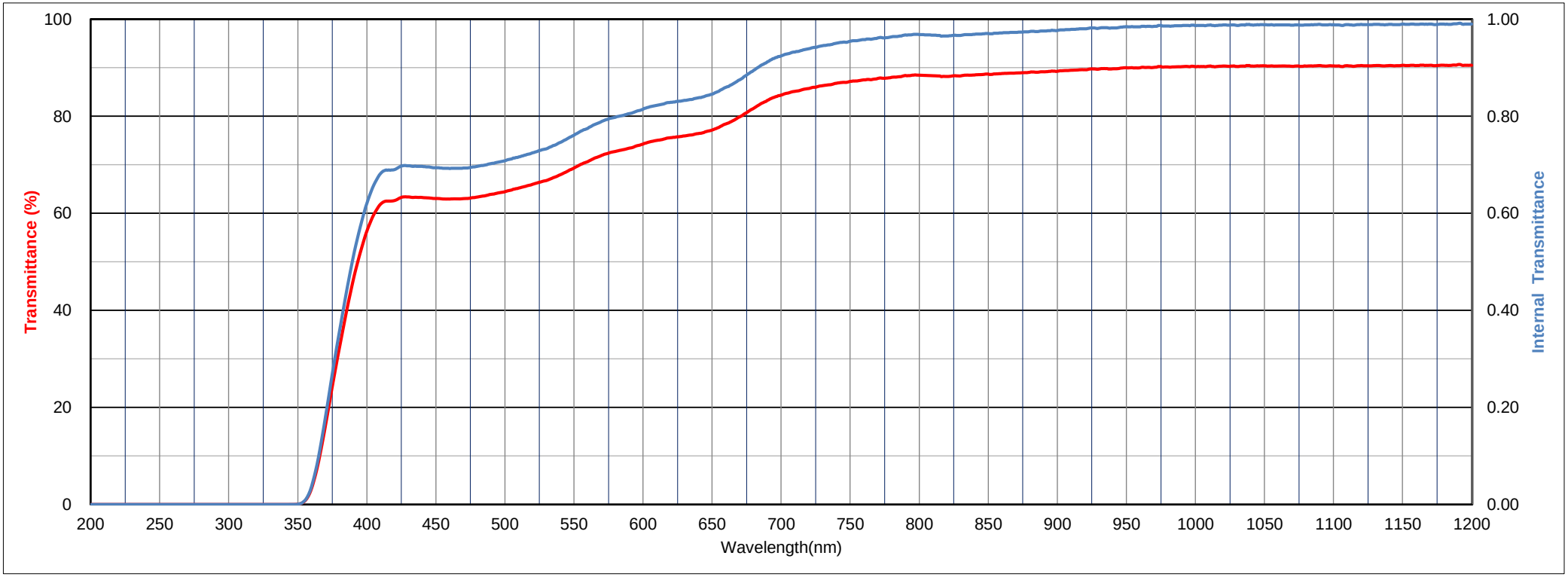
	x	y	Y	λ_d	P_e
A	0.463	0.408	71	591	11
C	0.326	0.326	70	584	7
D65	0.329	0.339	70	584	7

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	505	545	89	102	520	130	2.73

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
20±5



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HOYA

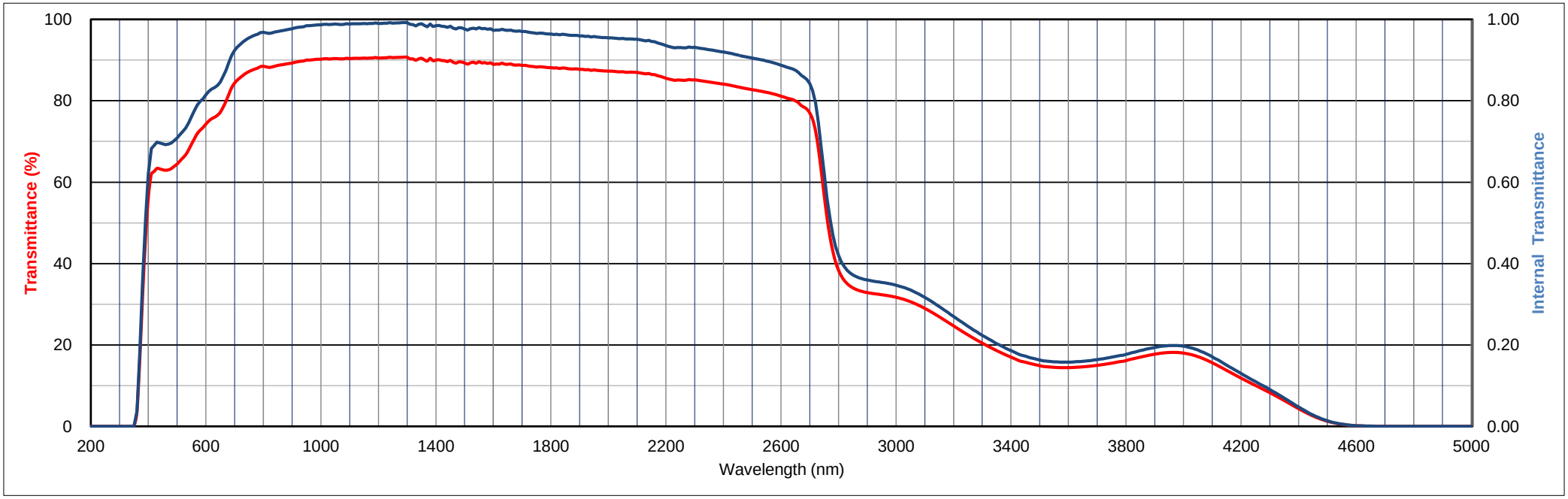
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LA20

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	3.3	16.2	32.0	46.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	56.3	61.9	62.6	63.4	63.3	63.0	62.9	63.0	63.3	63.9	64.4	65.2	66.0	66.7	67.9	69.3	70.6	71.9	72.7	73.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	74.3	75.0	75.6	75.9	76.4	77.2	78.4	79.9	81.6	83.3	84.4	85.1	85.7	86.3	86.8	87.2	87.5	87.8	88.0	88.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	88.5	88.3	88.2	88.3	88.5	88.7	88.8	88.9	89.1	89.2	89.3	89.5	89.6	89.7	89.8	90.0	90.0	90.1	90.2	90.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	90.2	90.3	90.3	90.3	90.3	90.4	90.3	90.3	90.3	90.4	90.4	90.4	90.4	90.4	90.4	90.5	90.4	90.5	90.5	90.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	90.5	90.5	90.6	90.6	90.7	90.6	90.6	90.7	90.7	90.7	90.7	90.3	90.3	90.0	90.3	90.4	90.1	89.8	90.4	89.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.0	90.1	89.9	89.9	89.6	89.9	89.5	89.3	89.6	89.5	89.3	89.0	89.3	89.5	89.2	89.6	89.3	89.4	89.2	89.3
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.0	89.0	89.0	89.2	89.0	89.0	89.0	88.8	88.8	88.8	88.7	88.7	88.6	88.5	88.4	88.3	88.4	88.3	88.2	88.1
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	88.1	88.0	88.1	87.9	88.1	88.0	87.9	87.8	87.8	87.8	87.7	87.7	87.6	87.7	87.5	87.6	87.5	87.4	87.4	87.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	87.3	87.1	87.0	86.5	85.5	85.1	85.2	84.6	84.1	83.4	82.7	82.1	81.1	80.0	77.0	56.9	38.4	34.0	32.9	32.3
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	31.7	30.6	29.0	26.9	24.7	22.5	20.5	18.6	17.0	15.8	14.9	14.5	14.4	14.6	15.0	15.5	16.2	17.0	17.7	18.2
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	18.0	17.1	15.6	13.8	11.9	10.1	8.3	6.4	4.4	2.6	1.3	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LA40

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	3.2	11.5	23.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	35.0	44.1	48.8	53.2	56.1	58.6	60.6	62.2	63.7	65.1	66.4	67.6	68.7	69.9	71.1	72.4	73.7	74.9	75.8	76.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	77.2	77.9	78.3	78.6	79.1	79.7	80.7	81.9	83.3	84.5	85.3	86.0	86.4	86.8	87.1	87.4	87.6	87.8	87.9	88.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	88.3	88.5	88.6	88.6	88.8	88.9	88.9	89.1	89.1	89.2	89.4	89.5	89.6	89.7	89.7	89.9	89.9	90.0	90.1	90.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	90.1	90.2	90.3	90.2	90.2	90.3	90.3	90.2	90.3	90.3	90.3	90.4	90.4	90.5	90.5	90.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.576	1.561	1.554	1.549	1.546	1.544	1.543
P	0.905	0.908	0.910	0.911	0.912	0.912	0.913

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

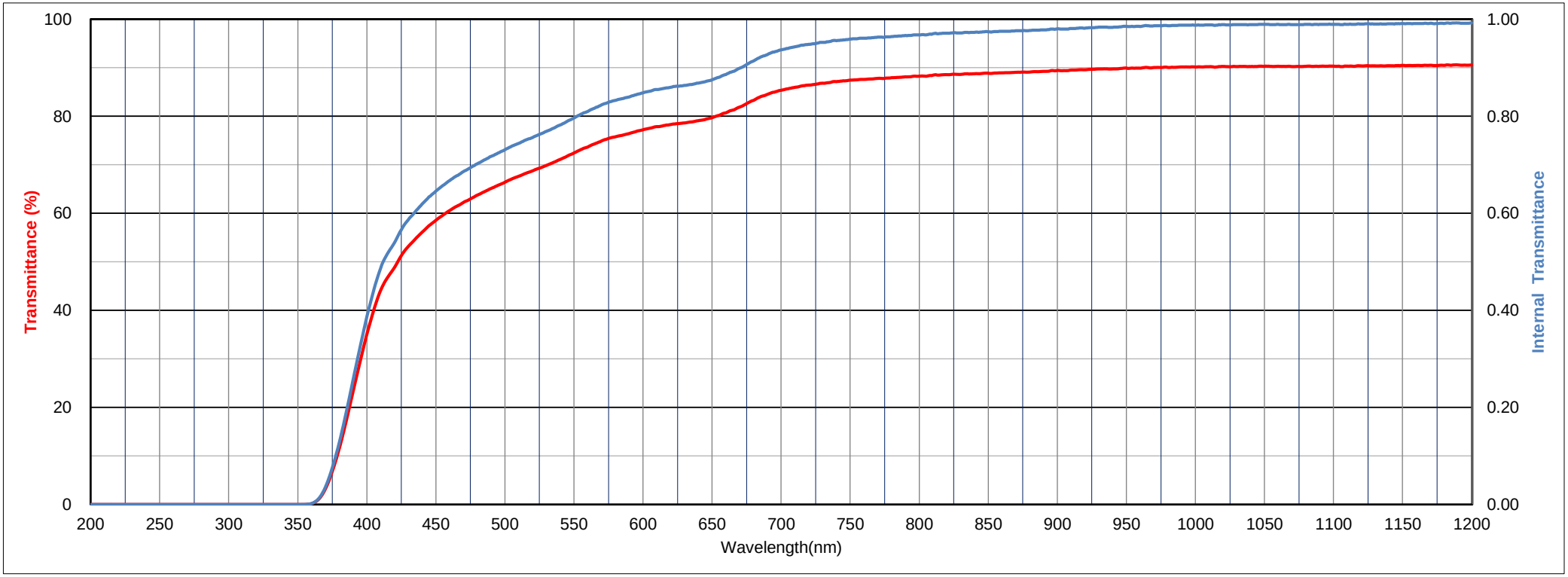
	x	y	Y	λ_d	P_e
A	0.467	0.414	74	586	18
C	0.334	0.341	73	577	13
D65	0.336	0.353	73	576	13

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	505	550	88	102	520	130	2.76

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
40±5



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

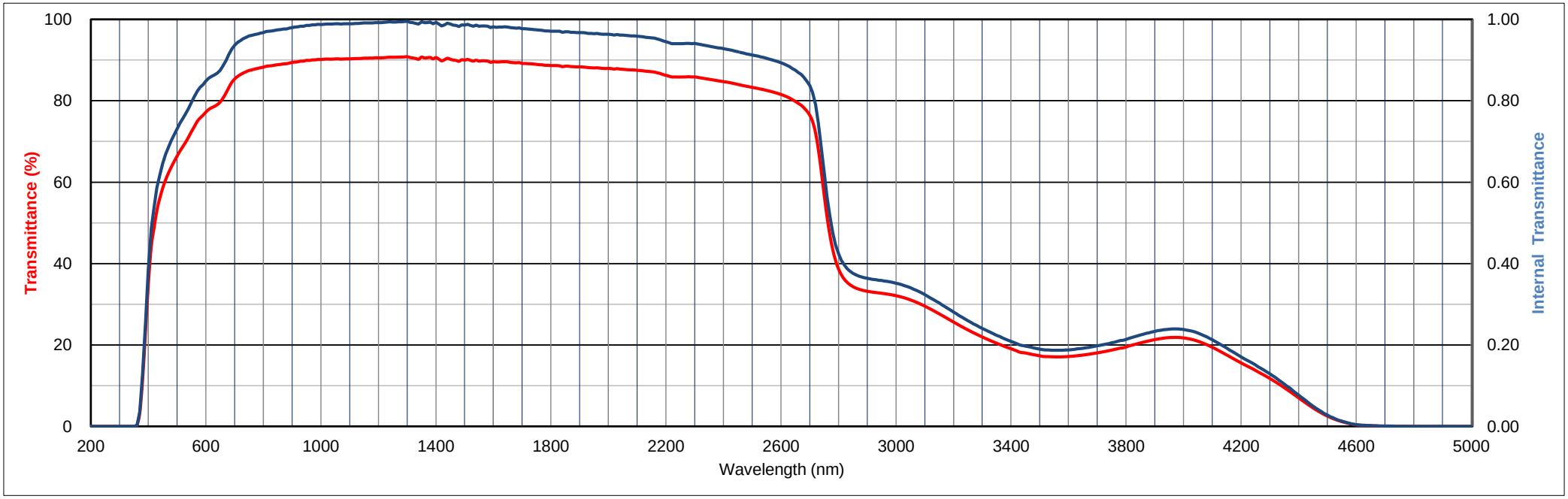
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LA40

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	3.2	11.5	23.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	35.0	44.1	48.8	53.2	56.1	58.6	60.6	62.2	63.7	65.1	66.4	67.6	68.7	69.9	71.1	72.4	73.7	74.9	75.8	76.4
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	77.2	77.9	78.3	78.6	79.1	79.7	80.7	81.9	83.3	84.5	85.3	86.0	86.4	86.8	87.1	87.4	87.6	87.8	87.9	88.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	88.3	88.5	88.6	88.6	88.8	88.9	88.9	89.1	89.1	89.2	89.4	89.5	89.6	89.7	89.7	89.9	89.9	90.0	90.1	90.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	90.1	90.2	90.3	90.2	90.2	90.3	90.3	90.2	90.3	90.3	90.3	90.3	90.4	90.4	90.4	90.5	90.5	90.5	90.5	90.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	90.5	90.5	90.6	90.7	90.7	90.7	90.7	90.7	90.7	90.8	90.8	90.6	90.5	90.4	90.2	90.7	90.5	90.6	90.7	90.3
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.6	90.3	89.8	90.1	90.4	90.2	90.0	89.9	89.7	90.1	90.0	90.2	89.9	89.8	90.0	89.7	89.8	89.8	89.8	89.5
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.6	89.5	89.5	89.6	89.6	89.6	89.4	89.4	89.3	89.4	89.2	89.2	89.1	89.1	89.0	88.9	88.9	88.8	88.7	88.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	88.7	88.7	88.6	88.6	88.4	88.5	88.5	88.4	88.4	88.3	88.3	88.3	88.2	88.2	88.1	88.1	88.1	88.0	88.0	87.9
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	88.0	87.7	87.5	87.1	86.3	85.8	85.9	85.3	84.7	84.0	83.3	82.5	81.5	79.8	76.5	57.0	38.7	34.3	33.2	32.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	32.1	31.1	29.5	27.7	25.6	23.7	22.0	20.4	19.1	18.0	17.3	17.1	17.2	17.5	18.1	18.7	19.5	20.5	21.3	21.8
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	21.7	20.9	19.4	17.5	15.6	13.8	11.8	9.5	7.0	4.6	2.5	1.2	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA80

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	2.9	4.7	5.8	5.9	5.8	6.3	7.8	11.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	16.2	23.1	30.6	37.6	42.9	46.2	48.0	48.9	49.5	50.3	51.6	53.5	56.2	59.5	63.1	66.7	70.2	73.3	76.1	78.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	80.4	81.9	83.0	83.9	84.3	84.4	84.2	83.9	83.2	82.3	81.5	80.5	79.6	78.8	78.1	77.7	77.5	77.4	77.6	78.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	78.6	79.3	80.0	80.9	81.9	82.9	83.9	84.8	85.6	86.4	87.0	87.7	88.1	88.5	88.9	89.1	89.3	89.5	89.6	89.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.8	89.9	89.9	90.0	90.1	90.1	90.1	90.2	90.2	90.3	90.3	90.4	90.5	90.5	90.6	90.7				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.540	1.531	1.526	1.523	1.521	1.520	1.519
P	0.913	0.916	0.917	0.918	0.918	0.918	0.919

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

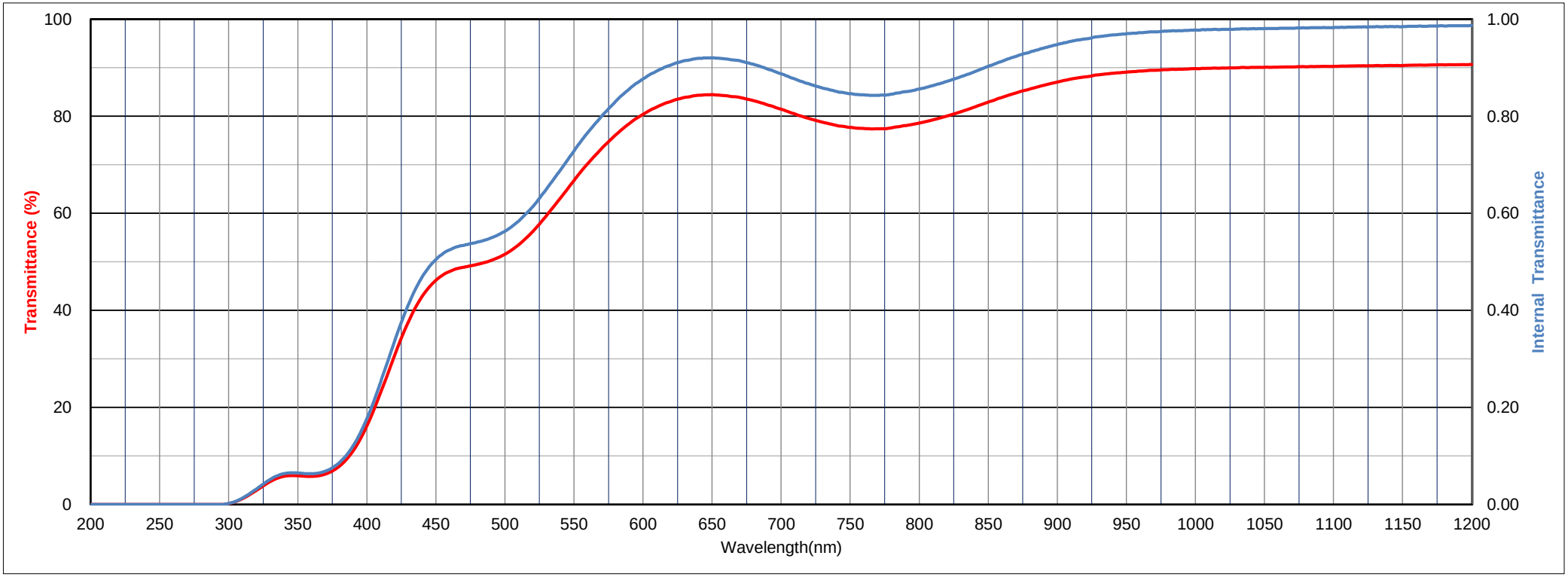
	x	y	Y	λ_d	P_e
A	0.490	0.415	72	589	34
C	0.364	0.358	68	581	26
D65	0.366	0.369	68	581	26

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	510	560	100	113	530	130	2.67

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
80±5



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

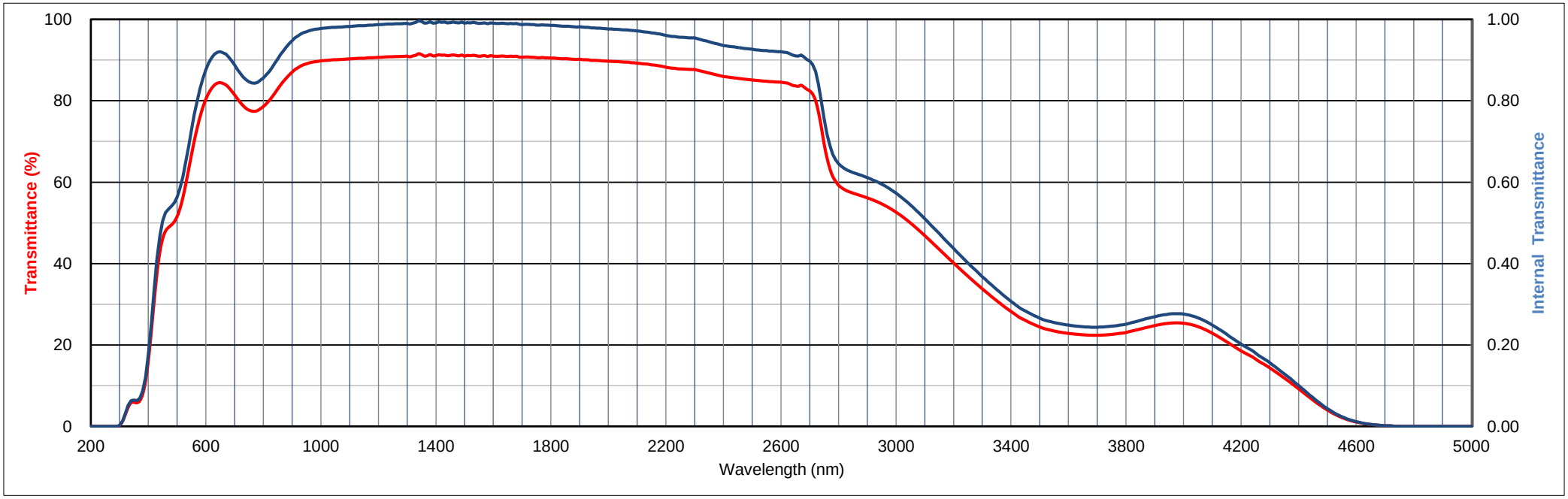
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA80

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2	2.9	4.7	5.8	5.9	5.8	6.3	7.8	11.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	16.2	23.1	30.6	37.6	42.9	46.2	48.0	48.9	49.5	50.3	51.6	53.5	56.2	59.5	63.1	66.7	70.2	73.3	76.1	78.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	80.4	81.9	83.0	83.9	84.3	84.4	84.2	83.9	83.2	82.3	81.5	80.5	79.6	78.8	78.1	77.7	77.5	77.4	77.6	78.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	78.6	79.3	80.0	80.9	81.9	82.9	83.9	84.8	85.6	86.4	87.0	87.7	88.1	88.5	88.9	89.1	89.3	89.5	89.6	89.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.8	89.9	89.9	90.0	90.1	90.1	90.1	90.2	90.2	90.3	90.3	90.3	90.4	90.4	90.5	90.4	90.5	90.6	90.6	90.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	90.7	90.7	90.8	90.8	90.8	90.8	90.9	90.9	90.9	90.9	90.9	90.8	91.0	91.2	91.6	91.4	91.0	91.1	91.3	91.0
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	91.1	91.3	91.2	91.2	91.1	91.2	91.3	91.1	91.1	91.2	91.0	91.1	91.1	91.2	91.1	90.9	91.0	91.1	90.9	91.1
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	91.0	90.9	90.9	91.0	90.9	90.9	91.0	90.9	90.9	90.7	90.7	90.7	90.8	90.7	90.7	90.6	90.6	90.6	90.5	90.5
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	90.5	90.5	90.4	90.4	90.3	90.3	90.3	90.2	90.2	90.2	90.2	90.1	90.1	90.1	89.9	89.9	89.9	89.9	89.8	89.8
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	89.7	89.5	89.2	88.8	88.2	87.8	87.7	86.8	86.0	85.5	85.1	84.8	84.6	83.7	82.4	69.4	59.3	57.3	56.1	54.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	52.6	50.0	46.9	43.5	40.2	36.9	33.8	30.9	28.2	26.0	24.4	23.4	22.8	22.5	22.4	22.6	23.1	23.9	24.8	25.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	25.3	24.5	22.9	20.8	18.5	16.6	14.4	11.9	9.2	6.5	4.0	2.2	1.1	0.5	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA100

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.2	2.2	2.8	2.9	2.8	3.1	4.1	6.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	10.3	16.1	23.0	29.7	35.1	38.6	40.5	41.4	42.1	43.0	44.3	46.5	49.4	53.1	57.2	61.4	65.5	69.2	72.5	75.3
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	77.6	79.5	80.9	81.9	82.5	82.6	82.4	81.9	81.1	80.0	78.9	77.7	76.6	75.7	74.9	74.4	74.1	74.0	74.2	74.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	75.4	76.2	77.2	78.3	79.4	80.7	81.9	83.0	84.0	85.0	85.8	86.6	87.1	87.7	88.1	88.4	88.6	88.8	89.0	89.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	89.3	89.4	89.4	89.5	89.6	89.6	89.6	89.7	89.7	89.8	89.9	90.0	90.1	90.2	90.2	90.3				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.530	1.527	1.525	1.524	1.523	1.523	1.523
P	0.916	0.917	0.917	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

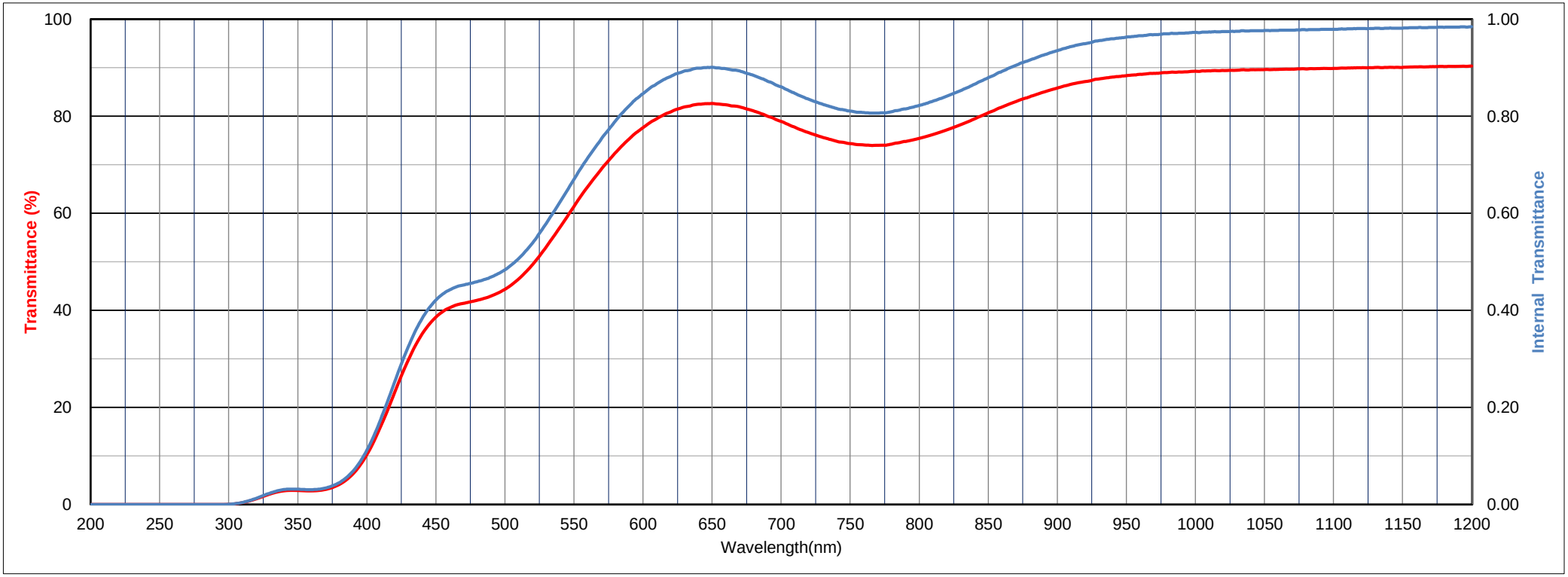
	x	y	Y	λ_d	P_e
A	0.500	0.415	67	590	42
C	0.378	0.367	63	582	32
D65	0.380	0.377	63	581	32

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	510	560	100	113	530	130	2.67

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
100±5



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HOYA

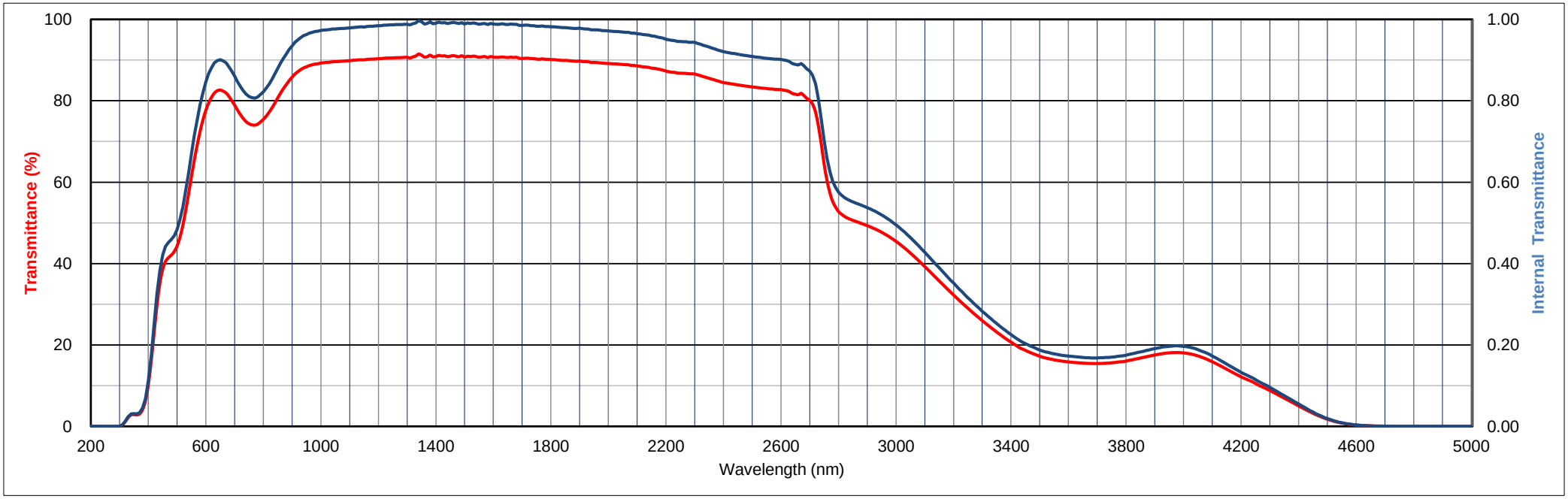
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA100

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.2	2.2	2.8	2.9	2.8	3.1	4.1	6.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	10.3	16.1	23.0	29.7	35.1	38.6	40.5	41.4	42.1	43.0	44.3	46.5	49.4	53.1	57.2	61.4	65.5	69.2	72.5	75.3
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	77.6	79.5	80.9	81.9	82.5	82.6	82.4	81.9	81.1	80.0	78.9	77.7	76.6	75.7	74.9	74.4	74.1	74.0	74.2	74.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	75.4	76.2	77.2	78.3	79.4	80.7	81.9	83.0	84.0	85.0	85.8	86.6	87.1	87.7	88.1	88.4	88.6	88.8	89.0	89.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	89.3	89.4	89.4	89.5	89.6	89.6	89.6	89.7	89.7	89.8	89.9	89.9	90.0	90.0	90.1	90.1	90.2	90.2	90.2	90.3
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	90.3	90.4	90.4	90.5	90.5	90.5	90.6	90.6	90.6	90.7	90.7	90.5	90.8	91.0	91.5	91.2	90.7	90.8	91.2	90.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.9	91.1	91.0	91.1	90.9	91.0	91.1	90.9	90.8	91.1	90.7	90.9	90.9	91.0	90.9	90.7	90.8	90.9	90.6	90.9
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	90.7	90.7	90.7	90.8	90.7	90.6	90.7	90.6	90.7	90.4	90.4	90.4	90.5	90.4	90.4	90.3	90.2	90.3	90.2	90.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	90.1	90.1	90.0	90.0	89.9	89.9	89.9	89.8	89.7	89.7	89.8	89.6	89.6	89.6	89.4	89.4	89.4	89.3	89.3	89.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	89.2	88.9	88.5	88.0	87.3	86.8	86.6	85.5	84.5	83.9	83.4	83.0	82.7	81.6	80.1	64.5	52.8	50.6	49.3	47.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	45.5	42.6	39.3	35.8	32.3	29.0	26.0	23.2	20.7	18.7	17.2	16.4	15.8	15.5	15.4	15.6	16.0	16.8	17.5	18.1
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	18.1	17.3	15.9	14.0	12.2	10.6	8.8	6.9	5.0	3.2	1.8	0.8	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA120

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.9	1.3	1.3	1.3	1.4	2.0	3.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	6.2	10.8	16.8	23.0	28.3	31.7	33.7	34.6	35.3	36.2	37.6	39.8	43.0	46.9	51.4	56.1	60.7	64.9	68.7	72.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	74.8	77.0	78.6	79.8	80.5	80.7	80.4	79.9	78.9	77.6	76.3	74.9	73.5	72.4	71.5	70.9	70.6	70.5	70.8	71.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	72.2	73.1	74.2	75.5	76.9	78.4	79.8	81.2	82.3	83.5	84.5	85.5	86.1	86.8	87.3	87.6	88.0	88.2	88.4	88.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	88.7	88.8	88.9	89.0	89.1	89.1	89.2	89.2	89.3	89.4	89.4	89.6	89.7	89.8	89.9	90.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.528	1.525	1.524	1.523	1.522	1.522	1.522
P	0.916	0.917	0.917	0.918	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

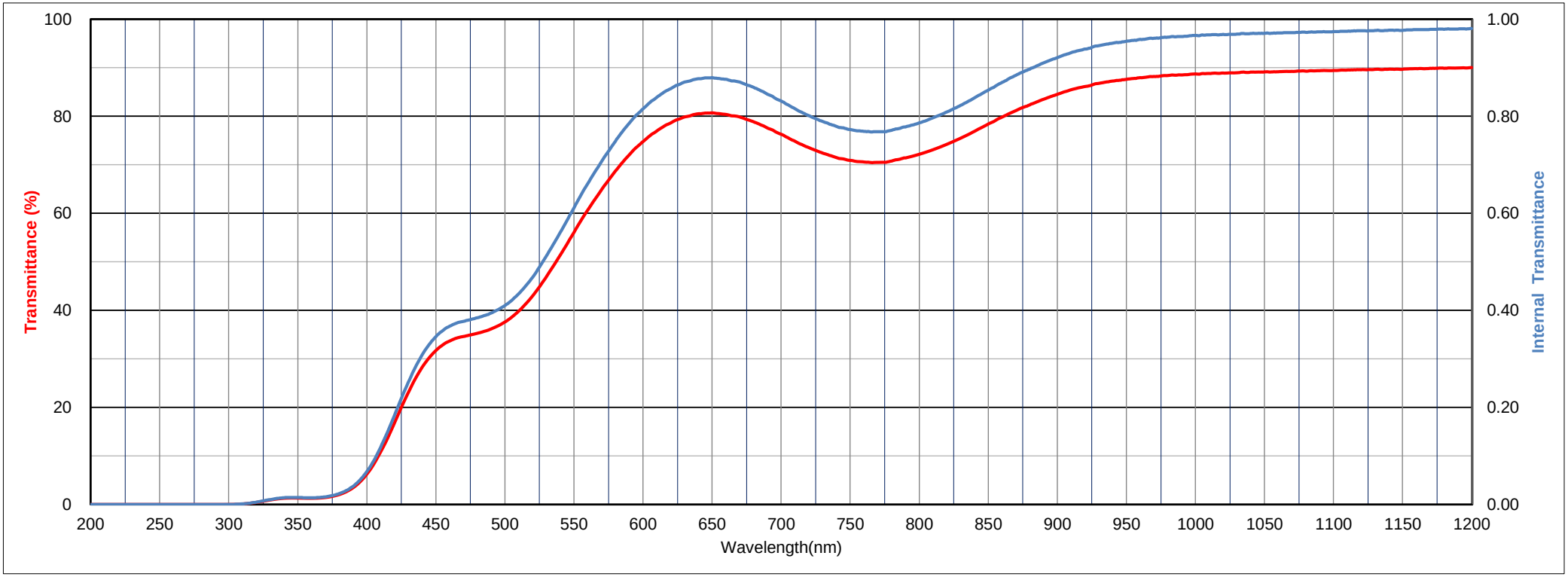
	x	y	Y	λ_d	P_e
A	0.510	0.415	63	590	49
C	0.393	0.375	58	582	38
D65	0.394	0.385	58	582	38

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	515	565	99	110	530	130	2.68

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
120±5



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

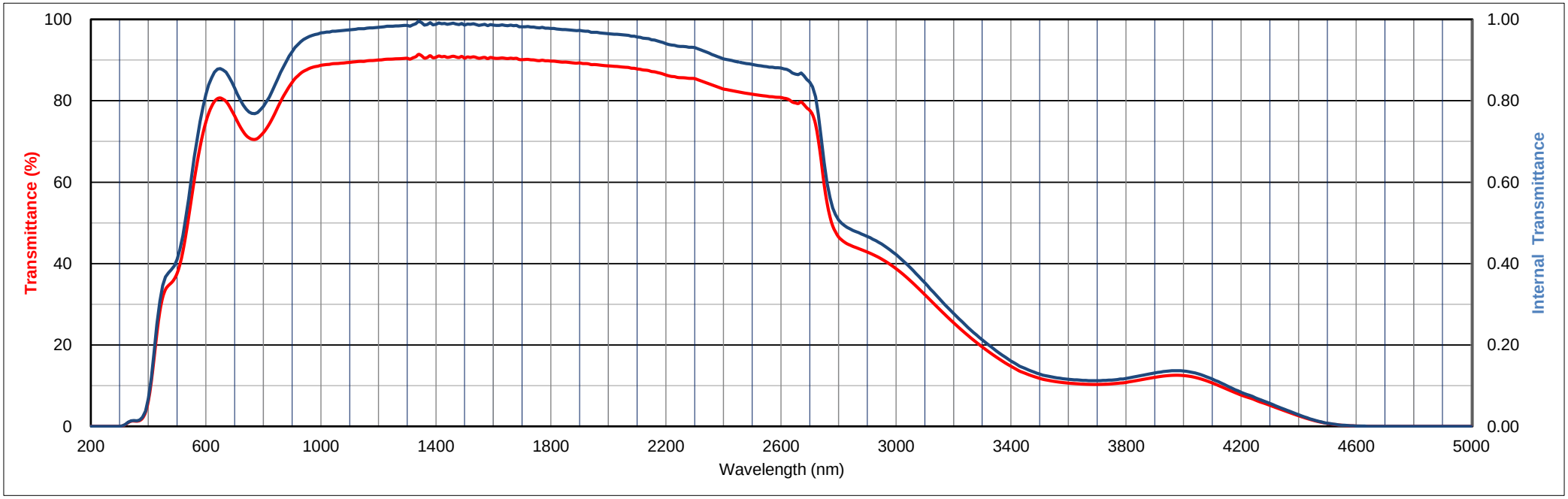
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA120

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.9	1.3	1.3	1.3	1.4	2.0	3.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	6.2	10.8	16.8	23.0	28.3	31.7	33.7	34.6	35.3	36.2	37.6	39.8	43.0	46.9	51.4	56.1	60.7	64.9	68.7	72.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	74.8	77.0	78.6	79.8	80.5	80.7	80.4	79.9	78.9	77.6	76.3	74.9	73.5	72.4	71.5	70.9	70.6	70.5	70.8	71.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	72.2	73.1	74.2	75.5	76.9	78.4	79.8	81.2	82.3	83.5	84.5	85.5	86.1	86.8	87.3	87.6	88.0	88.2	88.4	88.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	88.7	88.8	88.9	89.0	89.1	89.1	89.2	89.2	89.3	89.4	89.4	89.5	89.6	89.7	89.7	89.7	89.8	89.9	89.9	89.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	90.0	90.0	90.2	90.2	90.2	90.3	90.3	90.3	90.4	90.4	90.4	90.2	90.6	90.8	91.4	91.1	90.5	90.6	91.1	90.6
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.7	91.0	90.8	90.9	90.7	90.8	90.9	90.8	90.6	90.9	90.5	90.8	90.7	90.8	90.6	90.4	90.6	90.7	90.4	90.6
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	90.5	90.4	90.4	90.5	90.4	90.4	90.5	90.4	90.4	90.1	90.1	90.1	90.2	90.1	90.0	89.9	89.8	90.0	89.8	89.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	89.7	89.7	89.6	89.6	89.5	89.5	89.4	89.4	89.3	89.2	89.3	89.2	89.1	89.1	88.9	88.9	88.9	88.8	88.7	88.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	88.6	88.3	87.8	87.2	86.3	85.7	85.5	84.2	82.9	82.2	81.6	81.1	80.8	79.5	77.7	59.5	46.6	44.2	42.8	41.1
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	38.8	35.8	32.4	28.9	25.5	22.4	19.5	17.0	14.8	13.0	11.8	11.1	10.6	10.4	10.3	10.5	10.8	11.4	12.0	12.5
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	12.5	11.9	10.7	9.2	7.7	6.5	5.2	3.9	2.6	1.5	0.7	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA140

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.6	0.6	0.7	1.0	1.9
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	3.8	7.2	12.2	17.8	22.6	26.0	27.9	28.8	29.5	30.3	31.8	34.0	37.2	41.3	46.0	51.1	56.1	60.8	65.1	68.8
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	71.9	74.5	76.4	77.8	78.5	78.8	78.4	77.8	76.6	75.2	73.7	72.0	70.5	69.3	68.2	67.5	67.2	67.1	67.4	68.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	69.0	70.0	71.3	72.7	74.4	76.1	77.8	79.3	80.7	82.0	83.2	84.3	85.1	85.9	86.4	86.8	87.2	87.5	87.8	87.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	88.1	88.3	88.4	88.4	88.6	88.6	88.7	88.8	88.8	88.9	89.0	89.2	89.3	89.4	89.5	89.7				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.528	1.525	1.524	1.523	1.522	1.522	1.522
P	0.916	0.917	0.917	0.918	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

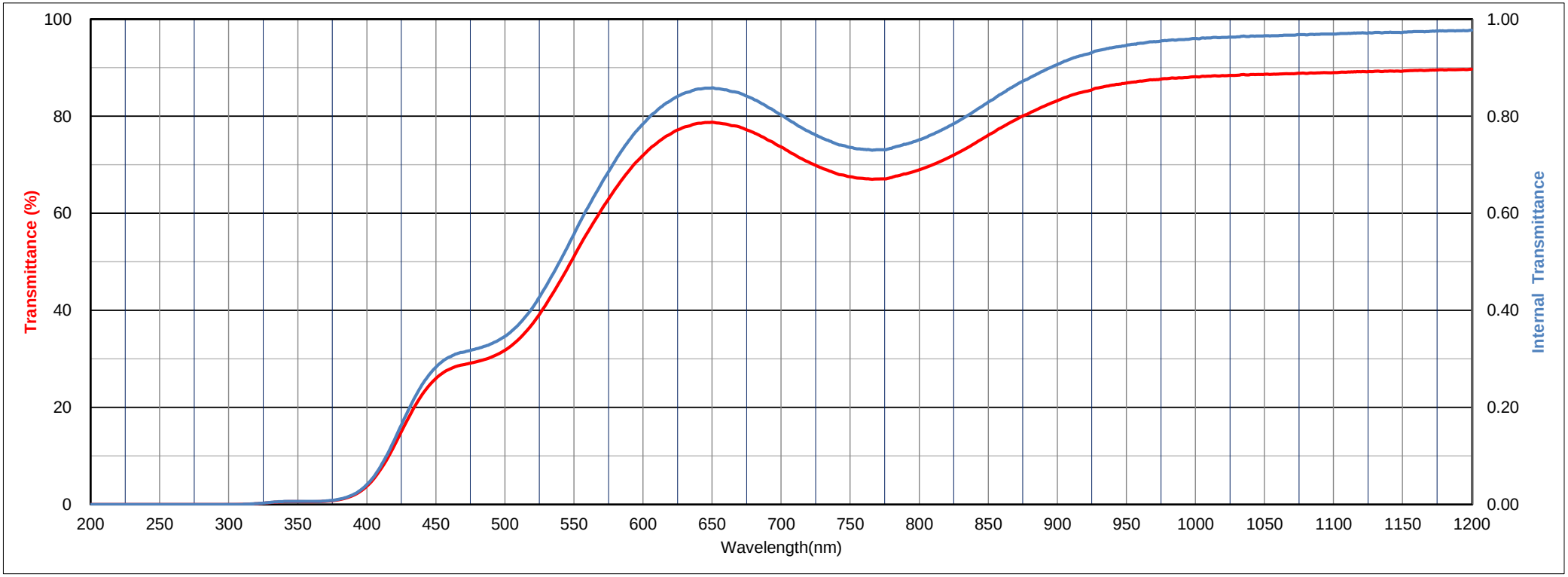
	x	y	Y	λ_d	P_e
A	0.519	0.415	59	591	55
C	0.408	0.383	54	583	44
D65	0.409	0.392	54	583	45

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	515	565	99	110	530	130	2.68

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
140±5



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

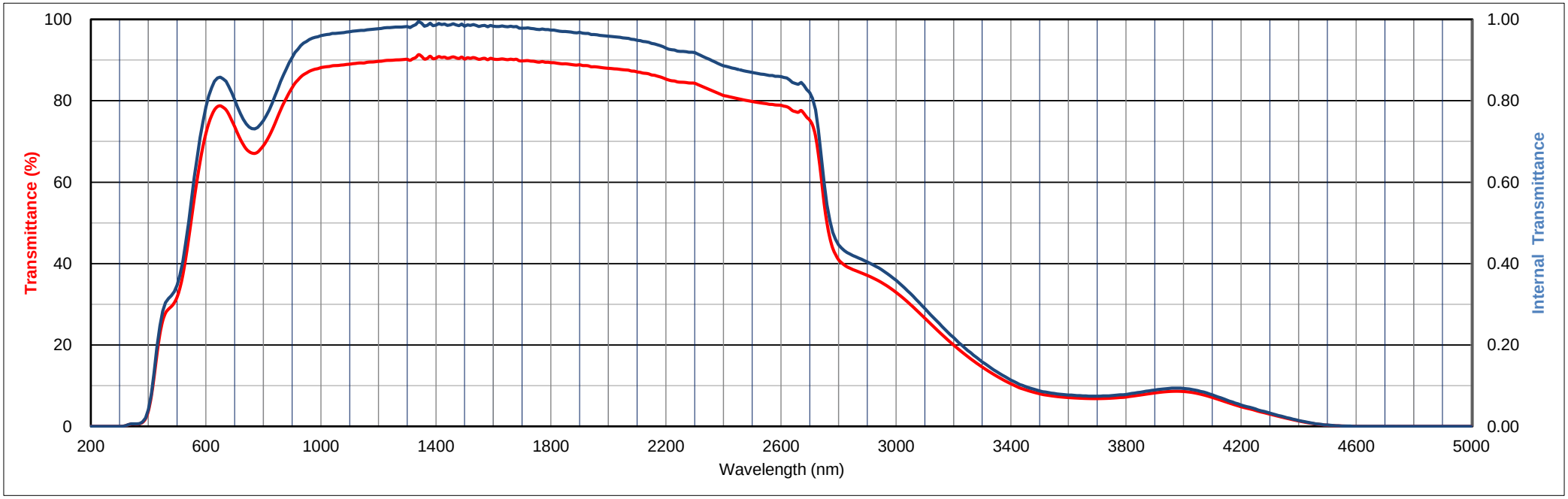
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA140

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.6	0.6	0.7	1.0	1.9
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	3.8	7.2	12.2	17.8	22.6	26.0	27.9	28.8	29.5	30.3	31.8	34.0	37.2	41.3	46.0	51.1	56.1	60.8	65.1	68.8
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	71.9	74.5	76.4	77.8	78.5	78.8	78.4	77.8	76.6	75.2	73.7	72.0	70.5	69.3	68.2	67.5	67.2	67.1	67.4	68.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	69.0	70.0	71.3	72.7	74.4	76.1	77.8	79.3	80.7	82.0	83.2	84.3	85.1	85.9	86.4	86.8	87.2	87.5	87.8	87.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	88.1	88.3	88.4	88.4	88.6	88.6	88.7	88.8	88.8	88.9	89.0	89.1	89.2	89.3	89.3	89.3	89.4	89.5	89.5	89.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	89.7	89.7	89.8	89.9	89.9	90.0	90.0	90.1	90.1	90.2	90.2	89.9	90.3	90.6	91.3	90.9	90.3	90.4	90.9	90.4
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.5	90.9	90.6	90.7	90.4	90.6	90.8	90.6	90.4	90.7	90.3	90.6	90.4	90.6	90.4	90.2	90.3	90.4	90.1	90.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	90.3	90.2	90.2	90.3	90.2	90.1	90.2	90.1	90.2	89.8	89.8	89.8	89.9	89.7	89.7	89.6	89.5	89.6	89.5	89.5
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	89.4	89.4	89.2	89.2	89.1	89.1	89.0	88.9	88.8	88.8	88.9	88.7	88.7	88.6	88.4	88.4	88.3	88.2	88.1	88.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	88.0	87.6	87.1	86.3	85.3	84.6	84.3	82.8	81.3	80.5	79.8	79.3	78.9	77.3	75.2	54.8	41.0	38.5	37.1	35.3
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	32.9	30.0	26.6	23.2	20.0	17.1	14.6	12.3	10.5	9.0	8.0	7.4	7.1	6.9	6.8	6.9	7.2	7.7	8.2	8.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	8.6	8.1	7.1	5.9	4.8	3.9	3.0	2.1	1.3	0.7	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA200

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.7	2.0	4.4	7.7	11.1	13.7	15.3	16.0	16.6	17.3	18.6	20.6	23.6	27.6	32.5	38.0	43.8	49.4	54.7	59.6
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	63.7	67.0	69.6	71.6	72.7	73.0	72.4	71.6	70.0	68.0	66.0	63.8	61.8	60.1	58.7	57.9	57.4	57.3	57.6	58.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	59.7	61.1	62.8	64.7	66.9	69.3	71.5	73.7	75.6	77.5	79.2	80.8	82.0	83.1	83.9	84.5	85.1	85.5	85.9	86.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	86.4	86.6	86.8	86.9	87.1	87.2	87.2	87.4	87.4	87.6	87.7	88.0	88.1	88.4	88.5	88.7				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.536	1.532	1.529	1.528	1.527	1.526	1.526
P	0.915	0.916	0.916	0.916	0.917	0.917	0.917

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

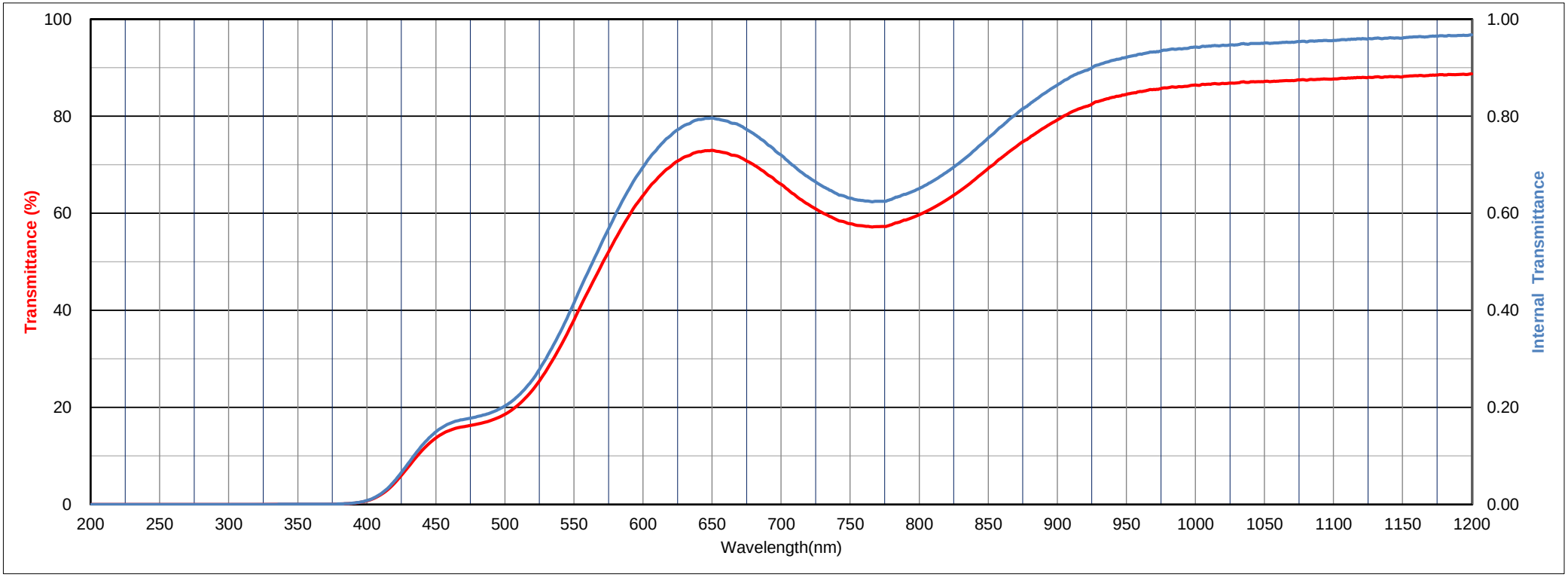
	x	y	Y	λ_d	P_e
A	0.546	0.411	49	592	70
C	0.452	0.401	43	585	61
D65	0.453	0.408	42	585	61

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	515	565	99	110	530	130	2.68

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
200±5



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The content of this catalog is accurate as of October ,2020

HOYA

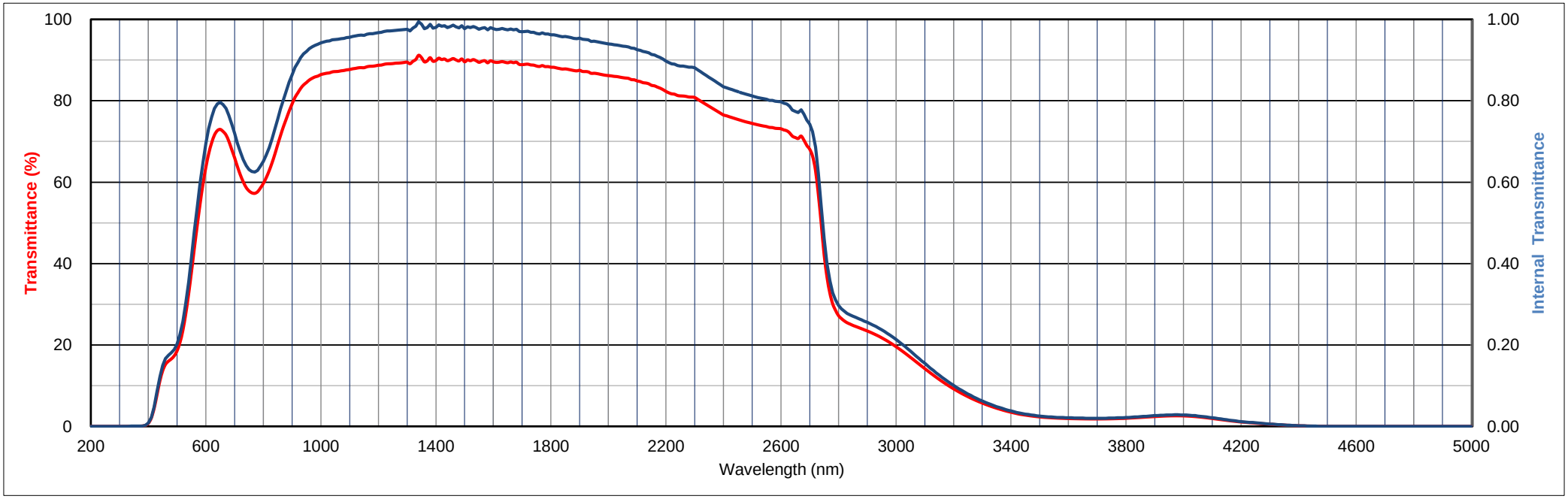
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

E-LA200

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.7	2.0	4.4	7.7	11.1	13.7	15.3	16.0	16.6	17.3	18.6	20.6	23.6	27.6	32.5	38.0	43.8	49.4	54.7	59.6
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	63.7	67.0	69.6	71.6	72.7	73.0	72.4	71.6	70.0	68.0	66.0	63.8	61.8	60.1	58.7	57.9	57.4	57.3	57.6	58.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	59.7	61.1	62.8	64.7	66.9	69.3	71.5	73.7	75.6	77.5	79.2	80.8	82.0	83.1	83.9	84.5	85.1	85.5	85.9	86.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	86.4	86.6	86.8	86.9	87.1	87.2	87.2	87.4	87.4	87.6	87.7	87.9	88.0	88.1	88.1	88.1	88.4	88.5	88.5	88.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	88.7	88.8	89.0	89.1	89.1	89.1	89.2	89.3	89.3	89.4	89.5	89.1	89.7	90.1	91.2	90.6	89.6	89.8	90.6	89.7
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	89.9	90.5	90.1	90.3	89.9	90.1	90.4	90.0	89.8	90.3	89.6	90.0	89.8	90.1	89.8	89.5	89.7	89.9	89.3	89.8
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.6	89.4	89.5	89.6	89.5	89.3	89.5	89.4	89.5	88.9	88.9	88.9	89.0	88.8	88.8	88.5	88.4	88.6	88.4	88.4
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	88.2	88.2	88.1	87.9	87.8	87.8	87.7	87.6	87.4	87.3	87.5	87.2	87.2	87.1	86.7	86.8	86.7	86.5	86.4	86.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	86.2	85.7	84.9	83.8	82.3	81.2	80.8	78.6	76.5	75.4	74.4	73.7	73.1	71.0	68.1	42.3	27.2	24.8	23.4	21.8
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	19.6	17.0	14.2	11.6	9.2	7.3	5.7	4.5	3.5	2.8	2.3	2.1	1.9	1.8	1.8	1.9	2.0	2.2	2.4	2.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	2.6	2.3	1.9	1.5	1.1	0.8	0.5	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB20

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.3	19.7	40.8	58.5	70.2	77.5	82.1	84.5	86.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	87.4	87.6	86.5	86.4	86.0	85.7	85.2	84.5	84.0	83.2	82.5	81.5	80.5	79.2	78.4	78.4	78.5	77.8	75.8	73.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	72.6	72.1	71.3	70.2	69.0	68.3	68.4	69.0	70.0	70.7	71.0	70.8	70.6	70.3	70.0	69.8	69.7	69.6	69.5	69.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	69.6	69.7	69.9	70.1	70.3	70.5	70.8	71.0	71.4	71.7	72.1	72.5	72.8	73.2	73.7	74.1	74.5	74.9	75.3	75.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	76.0	76.4	76.8	77.2	77.5	77.8	78.2	78.5	78.8	79.0	79.3	79.8	80.4	80.7	81.2	81.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.527	1.524	1.522	1.521	1.520	1.519	1.519
P	0.917	0.917	0.918	0.918	0.918	0.918	0.919

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

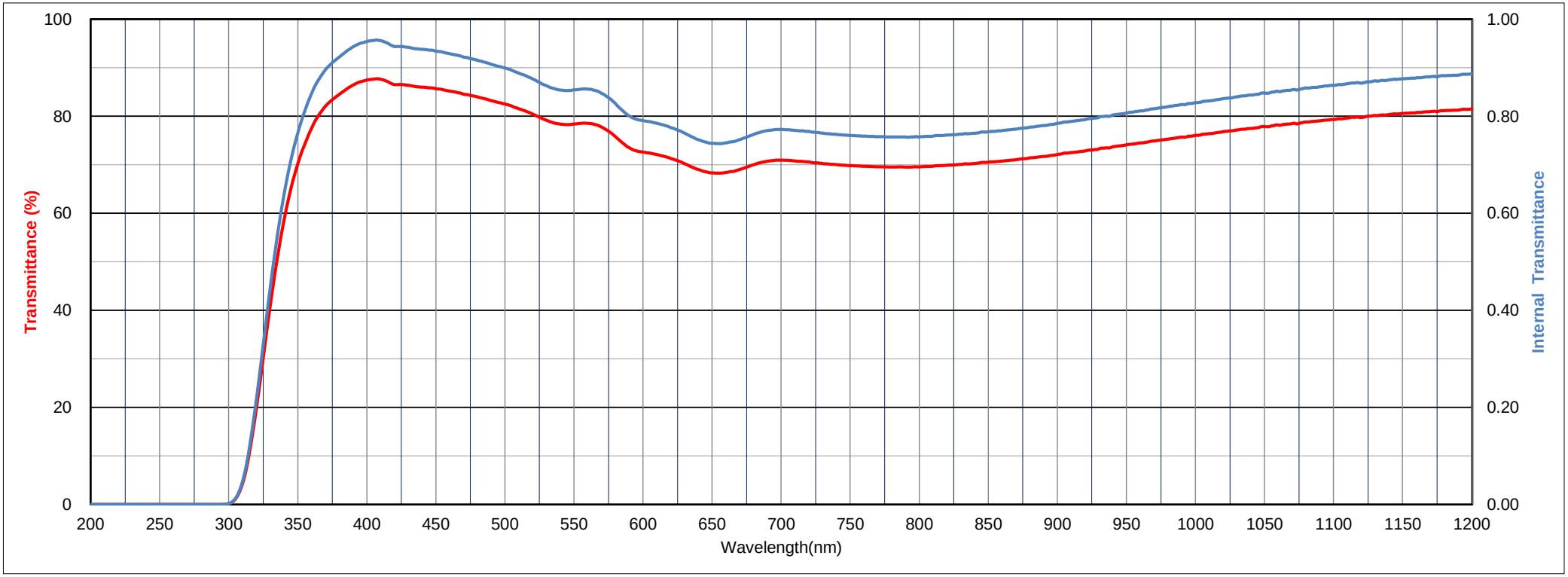
	x	y	Y	λ_d	P_e
A	0.433	0.406	76	493	4
C	0.296	0.306	77	482	6
D65	0.298	0.319	77	483	6

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	1	470	515	95	117	490	110	2.81

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
-20±5



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The content of this catalog is accurate as of October ,2020

HOYA

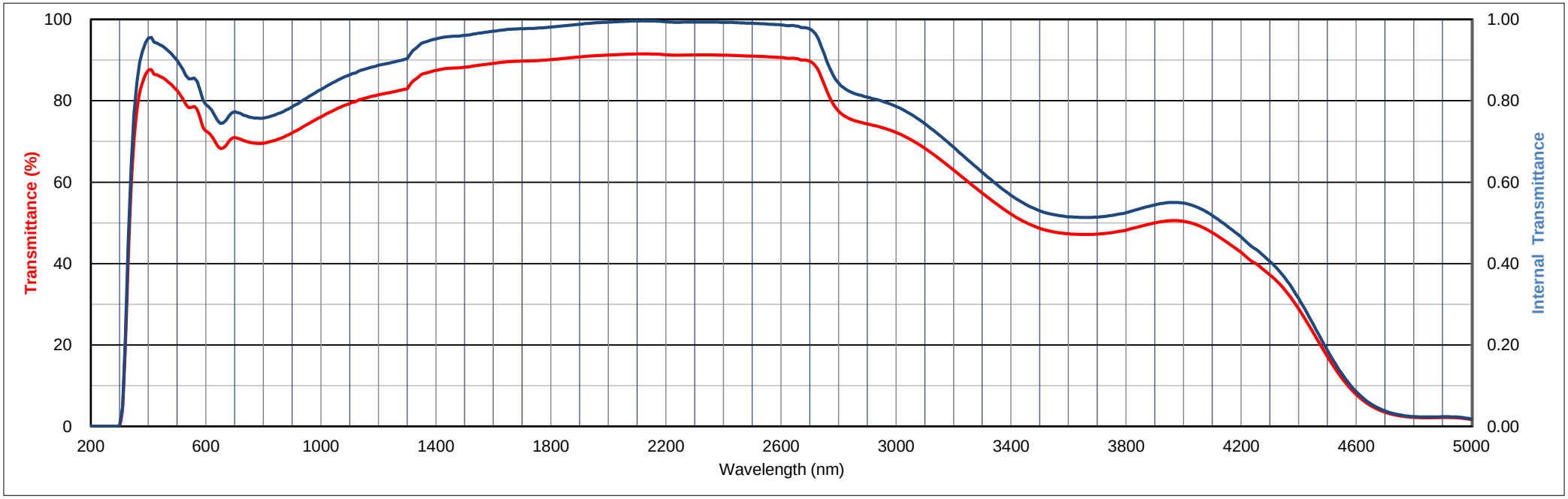
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB20

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	4.3	19.7	40.8	58.5	70.2	77.5	82.1	84.5	86.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	87.4	87.6	86.5	86.4	86.0	85.7	85.2	84.5	84.0	83.2	82.5	81.5	80.5	79.2	78.4	78.4	78.5	77.8	75.8	73.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	72.6	72.1	71.3	70.2	69.0	68.3	68.4	69.0	70.0	70.7	71.0	70.8	70.6	70.3	70.0	69.8	69.7	69.6	69.5	69.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	69.6	69.7	69.9	70.1	70.3	70.5	70.8	71.0	71.4	71.7	72.1	72.5	72.8	73.2	73.7	74.1	74.5	74.9	75.3	75.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	76.0	76.4	76.8	77.2	77.5	77.8	78.2	78.5	78.8	79.0	79.3	79.6	79.8	80.1	80.4	80.6	80.7	81.0	81.2	81.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	81.5	81.6	81.7	81.9	82.0	82.2	82.3	82.5	82.6	82.8	83.0	84.0	84.8	85.3	85.9	86.5	86.7	86.9	87.1	87.3
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	87.4	87.6	87.7	87.9	88.0	88.0	88.0	88.1	88.1	88.2	88.2	88.3	88.4	88.5	88.6	88.7	88.8	88.9	89.0	89.1
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.2	89.3	89.4	89.5	89.5	89.6	89.6	89.7	89.7	89.7	89.8	89.8	89.8	89.8	89.8	89.8	89.9	89.9	90.0	90.1
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	90.1	90.2	90.2	90.3	90.4	90.4	90.5	90.6	90.6	90.7	90.8	90.8	90.9	91.0	91.0	91.1	91.1	91.1	91.2	91.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	91.2	91.4	91.5	91.5	91.3	91.2	91.3	91.3	91.2	91.1	91.0	90.8	90.6	90.4	89.7	84.1	77.5	75.3	74.3	73.4
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	72.2	70.5	68.3	65.8	63.0	60.1	57.3	54.6	52.2	50.2	48.7	47.8	47.3	47.2	47.2	47.6	48.2	49.1	50.0	50.5
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	50.4	49.4	47.6	45.3	42.8	40.1	37.2	33.7	28.9	23.2	17.2	11.9	7.9	5.1	3.5	2.6	2.2	2.1	2.2	2.1
λnm	5000																			
T	1.7																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB40

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.7	19.2	38.8	55.5	67.5	75.5	80.0	83.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	85.5	85.7	83.6	83.2	82.4	81.8	80.8	79.7	78.5	77.0	75.7	73.9	71.9	69.7	68.2	68.2	68.5	67.1	63.8	60.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	58.5	57.7	56.5	54.8	52.9	51.8	51.9	52.8	54.4	55.6	55.9	55.6	55.2	54.8	54.4	54.1	53.9	53.7	53.6	53.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	53.7	53.9	54.2	54.5	54.7	55.1	55.5	55.9	56.5	56.9	57.5	58.1	58.7	59.2	60.0	60.6	61.2	61.8	62.5	63.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	63.7	64.3	64.9	65.5	66.1	66.7	67.1	67.7	68.3	68.7	69.2	70.0	70.9	71.6	72.3	72.9				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.530	1.516	1.509	1.505	1.502	1.500	1.499
P	0.916	0.919	0.921	0.922	0.923	0.923	0.923

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

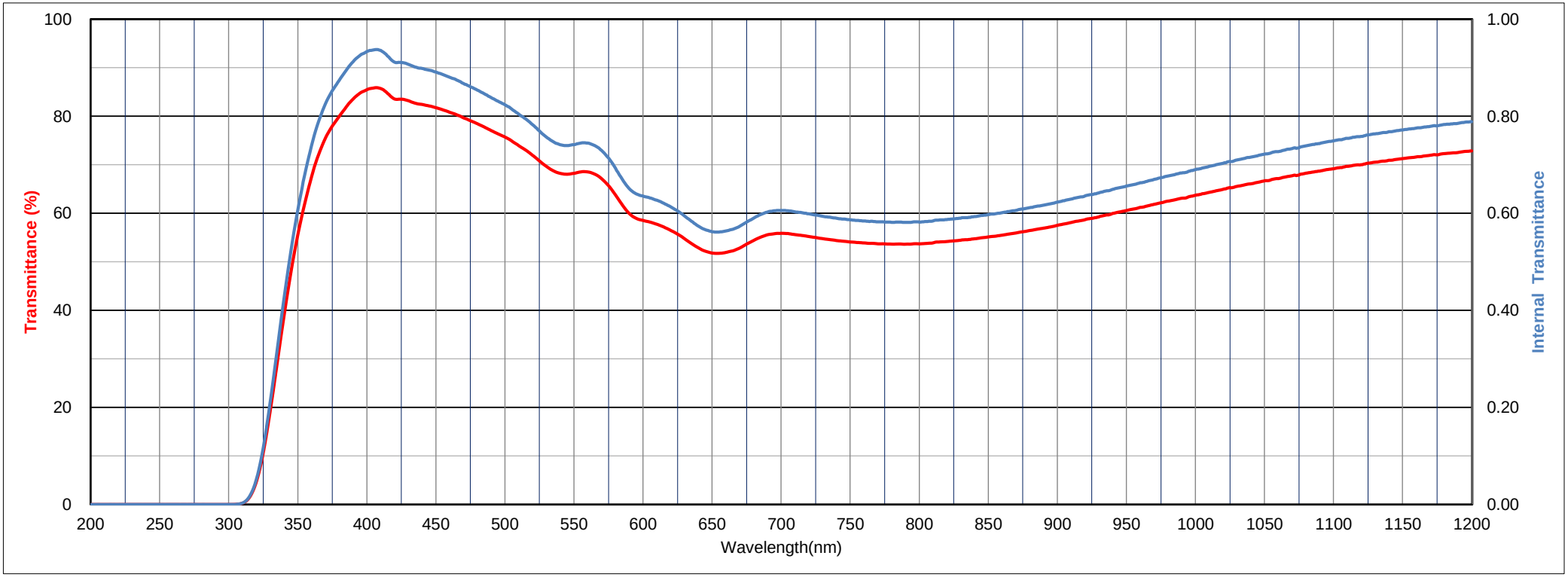
	x	y	Y	λ_d	P_e
A	0.417	0.404	64	493	7
C	0.282	0.295	67	481	13
D65	0.285	0.309	67	482	12

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	460	515	92	115	490	110	2.81

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
-40±5



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The content of this catalog is accurate as of October ,2020

HOYA

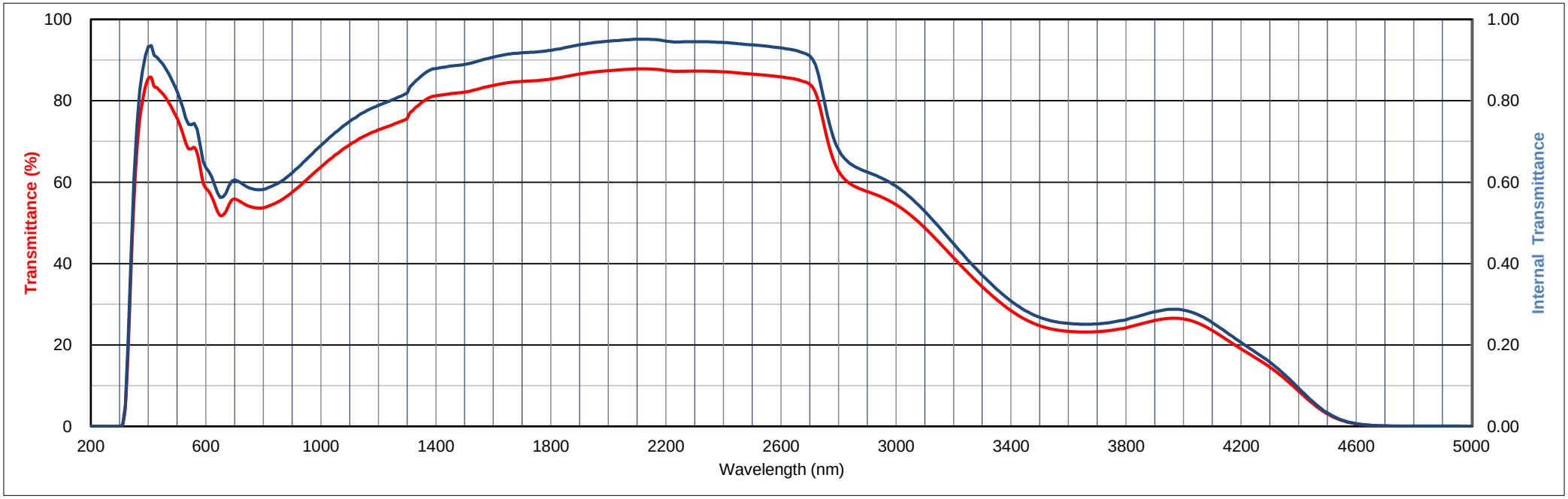
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB40

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.7	19.2	38.8	55.5	67.5	75.5	80.0	83.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	85.5	85.7	83.6	83.2	82.4	81.8	80.8	79.7	78.5	77.0	75.7	73.9	71.9	69.7	68.2	68.2	68.5	67.1	63.8	60.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	58.5	57.7	56.5	54.8	52.9	51.8	51.9	52.8	54.4	55.6	55.9	55.6	55.2	54.8	54.4	54.1	53.9	53.7	53.6	53.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	53.7	53.9	54.2	54.5	54.7	55.1	55.5	55.9	56.5	56.9	57.5	58.1	58.7	59.2	60.0	60.6	61.2	61.8	62.5	63.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	63.7	64.3	64.9	65.5	66.1	66.7	67.1	67.7	68.3	68.7	69.2	69.7	70.0	70.5	70.9	71.3	71.6	72.0	72.3	72.5
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	72.9	73.1	73.4	73.6	73.8	74.1	74.4	74.7	75.0	75.3	75.7	77.0	77.7	78.4	78.9	79.5	80.0	80.5	80.8	81.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	81.2	81.3	81.4	81.5	81.6	81.7	81.8	81.9	82.0	82.0	82.1	82.2	82.4	82.6	82.7	82.9	83.1	83.3	83.5	83.6
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	83.8	83.9	84.1	84.2	84.3	84.4	84.5	84.6	84.7	84.7	84.8	84.8	84.8	84.9	84.9	84.9	85.0	85.1	85.2	85.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	85.3	85.4	85.5	85.7	85.8	85.9	86.1	86.2	86.3	86.5	86.6	86.7	86.8	86.9	87.0	87.1	87.1	87.2	87.3	87.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	87.4	87.6	87.8	87.8	87.4	87.2	87.3	87.3	87.1	86.8	86.6	86.3	85.9	85.3	84.1	74.0	62.8	59.2	57.7	56.3
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	54.5	51.9	48.8	45.2	41.5	37.8	34.3	31.2	28.4	26.3	24.7	23.8	23.3	23.2	23.3	23.6	24.2	25.1	26.0	26.5
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	26.4	25.4	23.6	21.3	19.0	16.9	14.6	11.8	8.7	5.6	3.1	1.5	0.6	0.3	0.1	0.1	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB80

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	6.6	21.3	39.0	54.5	65.9	73.0	78.7
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	81.9	82.2	78.4	77.3	75.5	73.9	71.9	69.8	67.7	65.6	63.5	61.0	58.2	55.0	52.9	52.5	52.5	50.3	46.0	41.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	39.1	37.7	35.8	33.5	31.1	29.6	29.2	29.6	30.5	31.1	31.0	30.4	29.8	29.2	28.7	28.3	28.0	27.8	27.7	27.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	27.7	27.9	28.2	28.4	28.8	29.2	29.6	30.2	30.7	31.3	32.0	32.7	33.5	34.3	35.1	35.9	36.7	37.6	38.5	39.4
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	40.3	41.2	42.0	42.9	43.8	44.6	45.5	46.3	47.1	47.9	48.7	50.2	51.8	53.0	54.3	55.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.553	1.545	1.541	1.538	1.537	1.535	1.535
P	0.910	0.912	0.913	0.914	0.914	0.915	0.915

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

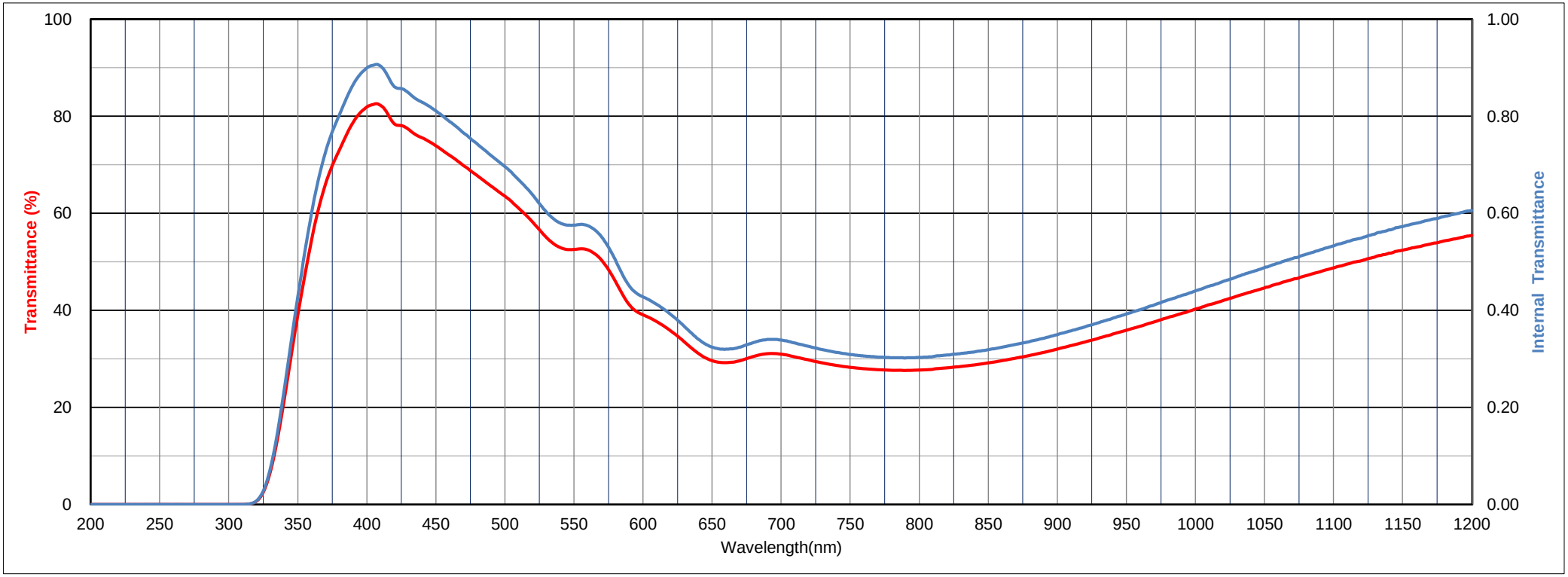
	x	y	Y	λ_d	P_e
A	0.388	0.398	47	492	15
C	0.258	0.275	50	481	23
D65	0.261	0.289	51	482	23

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	460	510	99	116	490	110	2.83

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
-80±5



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HOYA

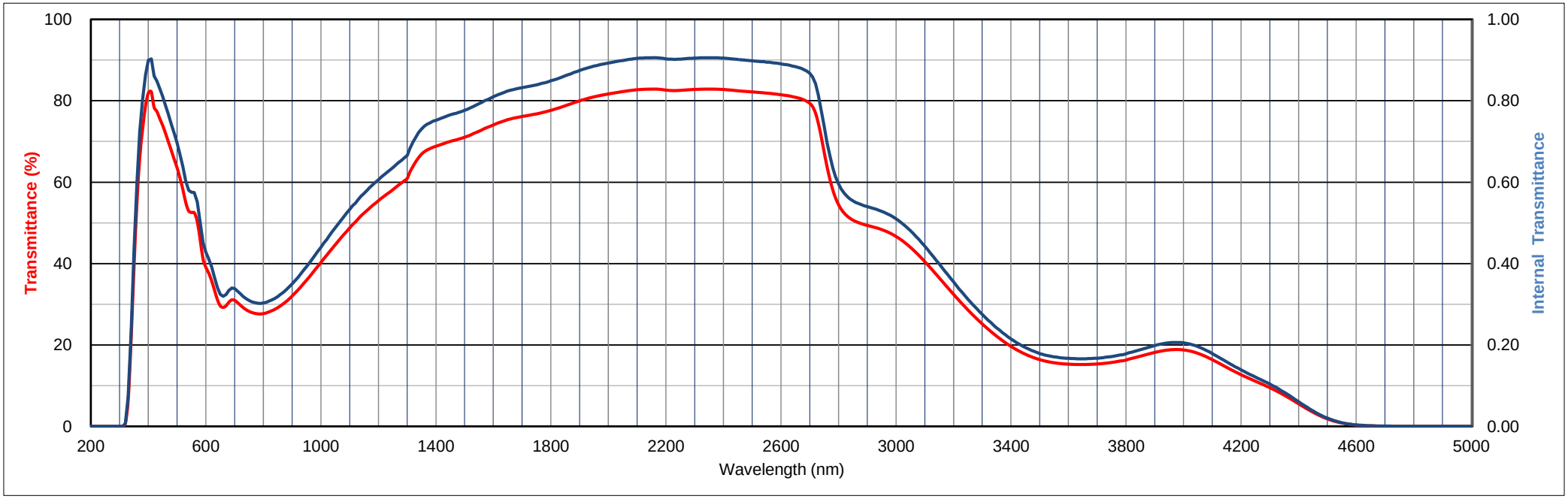
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB80

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	6.6	21.3	39.0	54.5	65.9	73.0	78.7
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	81.9	82.2	78.4	77.3	75.5	73.9	71.9	69.8	67.7	65.6	63.5	61.0	58.2	55.0	52.9	52.5	52.5	50.3	46.0	41.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	39.1	37.7	35.8	33.5	31.1	29.6	29.2	29.6	30.5	31.1	31.0	30.4	29.8	29.2	28.7	28.3	28.0	27.8	27.7	27.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	27.7	27.9	28.2	28.4	28.8	29.2	29.6	30.2	30.7	31.3	32.0	32.7	33.5	34.3	35.1	35.9	36.7	37.6	38.5	39.4
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	40.3	41.2	42.0	42.9	43.8	44.6	45.5	46.3	47.1	47.9	48.7	49.6	50.2	51.0	51.8	52.4	53.0	53.7	54.3	54.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	55.4	56.0	56.5	57.1	57.6	58.1	58.7	59.3	59.8	60.3	60.9	62.5	63.8	65.0	66.0	66.9	67.5	67.9	68.3	68.6
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	68.8	69.1	69.3	69.5	69.8	70.0	70.2	70.4	70.6	70.8	71.1	71.3	71.6	71.9	72.2	72.5	72.8	73.2	73.5	73.8
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	74.1	74.4	74.6	74.9	75.1	75.4	75.5	75.7	75.9	76.0	76.1	76.3	76.4	76.5	76.7	76.8	76.9	77.1	77.3	77.5
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	77.7	77.9	78.1	78.3	78.5	78.8	79.0	79.3	79.5	79.8	80.0	80.2	80.4	80.6	80.8	81.0	81.1	81.3	81.4	81.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	81.7	82.3	82.7	82.9	82.6	82.6	82.8	82.9	82.8	82.5	82.2	81.9	81.5	80.9	79.4	67.5	54.5	50.7	49.4	48.3
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	46.7	44.0	40.5	36.5	32.5	28.6	25.2	22.2	19.7	17.7	16.4	15.6	15.3	15.2	15.3	15.7	16.3	17.2	18.2	18.8
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	18.8	17.9	16.4	14.5	12.7	11.1	9.5	7.7	5.6	3.5	1.8	0.8	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB100

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	12.6	35.3	55.6	67.5	74.1	77.8	79.2	81.7
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	82.1	79.3	71.3	67.6	63.3	59.3	55.4	52.0	48.9	46.3	44.1	41.6	39.0	36.2	35.0	36.0	37.1	35.7	31.5	27.3
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	26.3	25.8	24.7	23.1	21.4	20.6	21.0	22.2	24.1	25.7	26.3	26.2	25.9	25.6	25.3	25.2	25.1	25.1	25.2	25.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	25.6	25.9	26.4	26.8	27.3	27.8	28.4	29.1	29.8	30.5	31.3	32.2	33.0	33.9	34.9	35.8	36.7	37.7	38.7	39.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	40.6	41.5	42.5	43.4	44.3	45.2	46.1	47.0	47.8	48.6	49.4	50.8	52.2	53.3	54.4	55.3				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.541	1.537	1.534	1.533	1.532	1.531	1.531
P	0.913	0.914	0.915	0.915	0.915	0.916	0.916

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

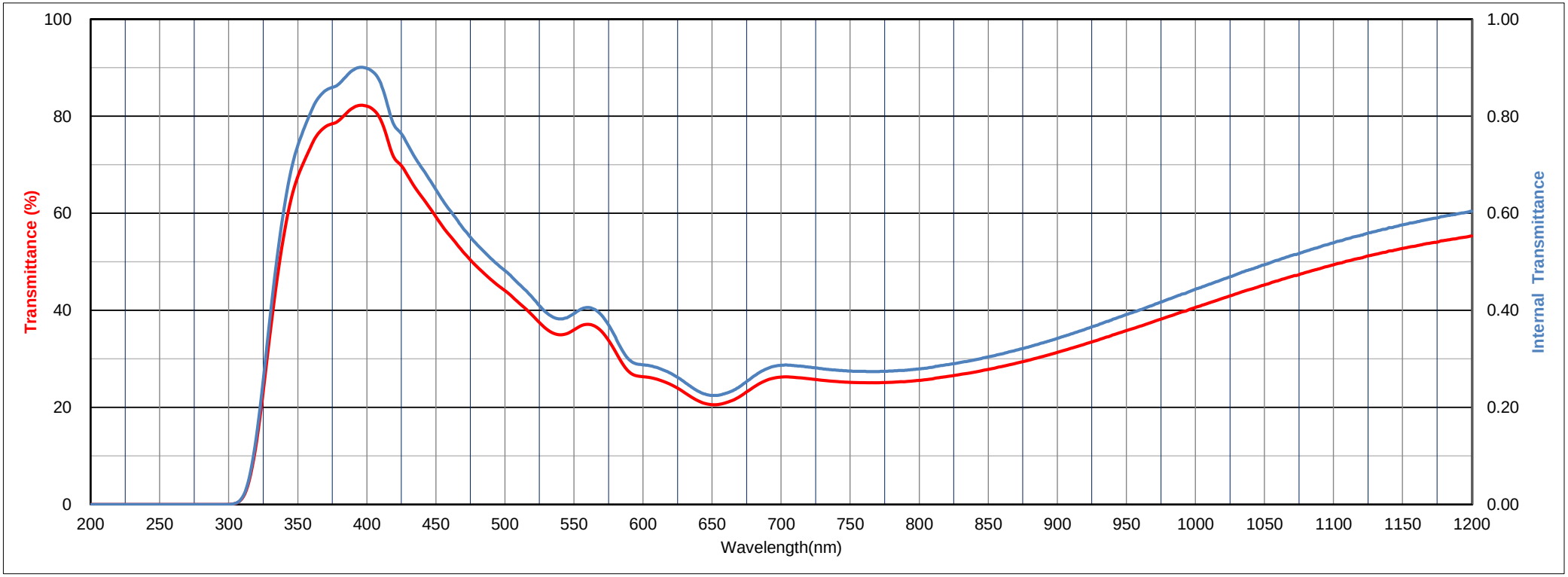
	x	y	Y	λ_d	P_e
A	0.380	0.384	32	489	17
C	0.250	0.252	35	476	29
D65	0.253	0.265	35	477	28

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	460	505	97	114	490	110	2.81

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
-100±5



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

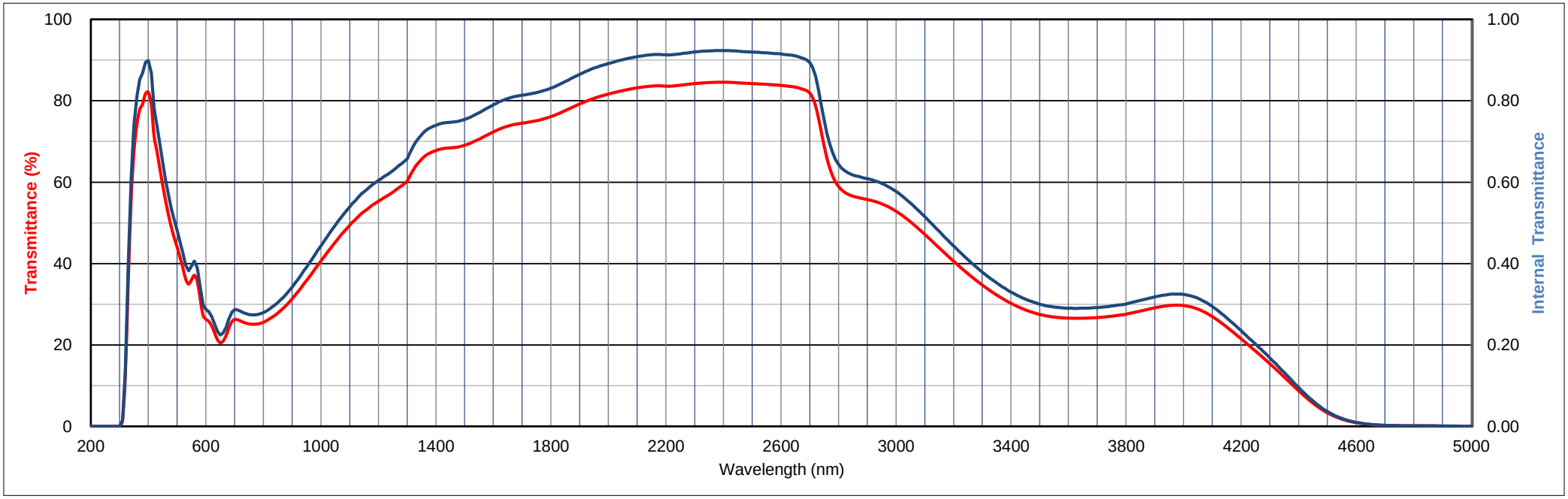
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB100

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	12.6	35.3	55.6	67.5	74.1	77.8	79.2	81.7
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	82.1	79.3	71.3	67.6	63.3	59.3	55.4	52.0	48.9	46.3	44.1	41.6	39.0	36.2	35.0	36.0	37.1	35.7	31.5	27.3
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	26.3	25.8	24.7	23.1	21.4	20.6	21.0	22.2	24.1	25.7	26.3	26.2	25.9	25.6	25.3	25.2	25.1	25.1	25.2	25.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	25.6	25.9	26.4	26.8	27.3	27.8	28.4	29.1	29.8	30.5	31.3	32.2	33.0	33.9	34.9	35.8	36.7	37.7	38.7	39.7
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	40.6	41.5	42.5	43.4	44.3	45.2	46.1	47.0	47.8	48.6	49.4	50.2	50.8	51.5	52.2	52.8	53.3	53.9	54.4	54.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	55.3	55.8	56.2	56.6	57.0	57.5	58.1	58.6	59.1	59.6	60.2	61.6	62.8	64.0	64.8	65.6	66.3	66.8	67.2	67.5
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	67.8	68.0	68.2	68.3	68.4	68.4	68.5	68.6	68.7	68.9	69.1	69.3	69.6	69.9	70.2	70.5	70.9	71.3	71.6	72.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	72.4	72.7	73.0	73.3	73.5	73.8	74.0	74.1	74.3	74.4	74.5	74.6	74.7	74.8	75.0	75.1	75.3	75.5	75.6	75.9
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	76.1	76.4	76.7	77.0	77.3	77.6	77.9	78.2	78.6	78.9	79.2	79.5	79.8	80.1	80.4	80.6	80.8	81.1	81.3	81.5
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	81.7	82.5	83.2	83.6	83.6	83.8	84.2	84.5	84.6	84.4	84.2	84.0	83.8	83.3	81.9	69.0	59.0	56.6	55.7	54.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	52.9	50.3	47.2	43.9	40.6	37.5	34.7	32.3	30.2	28.6	27.5	26.9	26.6	26.6	26.7	27.1	27.5	28.3	29.1	29.7
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	29.7	28.8	27.0	24.4	21.5	18.5	15.4	12.1	8.8	5.7	3.3	1.8	0.9	0.4	0.2	0.2	0.1	0.1	0.1	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB120

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	8.3	28.7	50.0	63.5	71.2	75.7	77.3	80.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	81.1	78.1	69.4	65.6	61.3	57.2	53.3	49.7	46.5	43.7	41.2	38.5	35.7	32.6	31.3	32.1	33.2	31.5	27.1	22.9
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	21.8	21.2	20.0	18.4	16.8	16.0	16.3	17.3	19.0	20.3	20.7	20.6	20.3	20.0	19.7	19.5	19.4	19.4	19.4	19.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	19.7	20.0	20.4	20.8	21.2	21.7	22.3	22.9	23.6	24.3	25.0	25.8	26.7	27.5	28.5	29.3	30.3	31.2	32.2	33.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	34.1	35.1	36.1	37.1	38.0	38.9	39.8	40.7	41.6	42.4	43.2	44.8	46.3	47.5	48.7	49.7				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.537	1.524	1.517	1.513	1.510	1.509	1.507
P	0.914	0.917	0.919	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

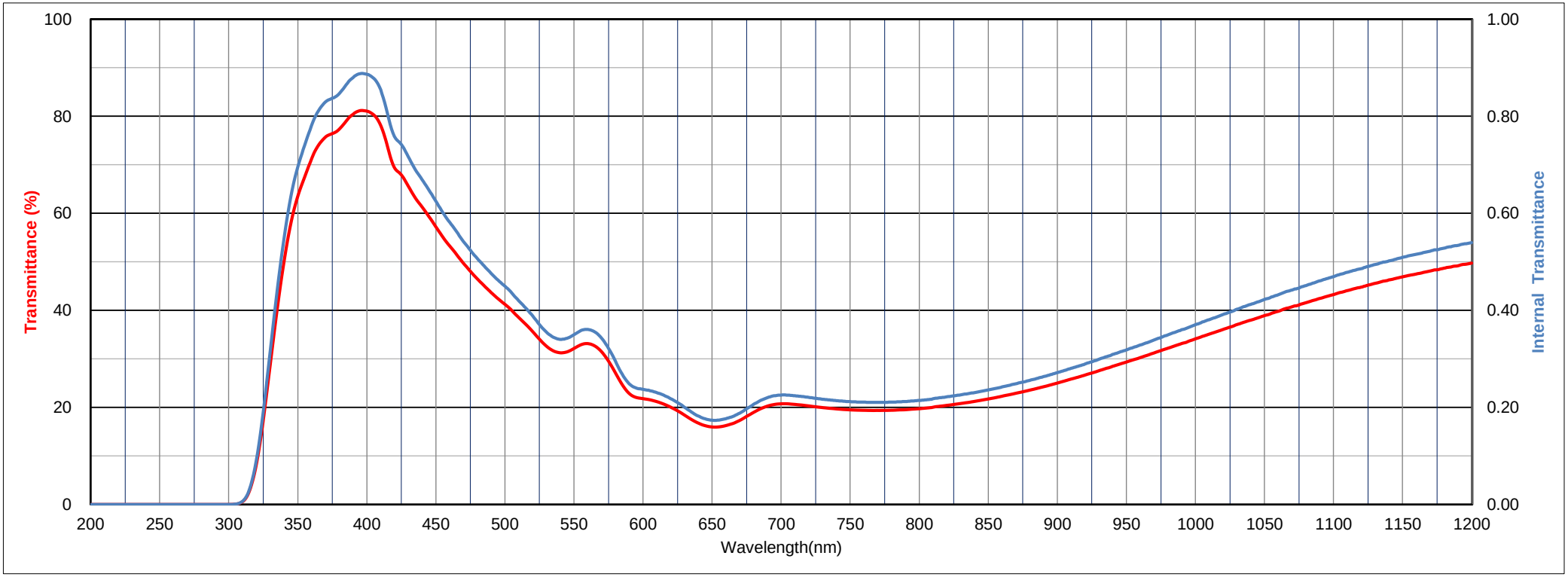
	x	y	Y	λ_d	P_e
A	0.365	0.379	28	489	21
C	0.240	0.242	31	476	34
D65	0.243	0.255	31	477	33

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	480	535	94	105	520	130	2.57

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
-120±5



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

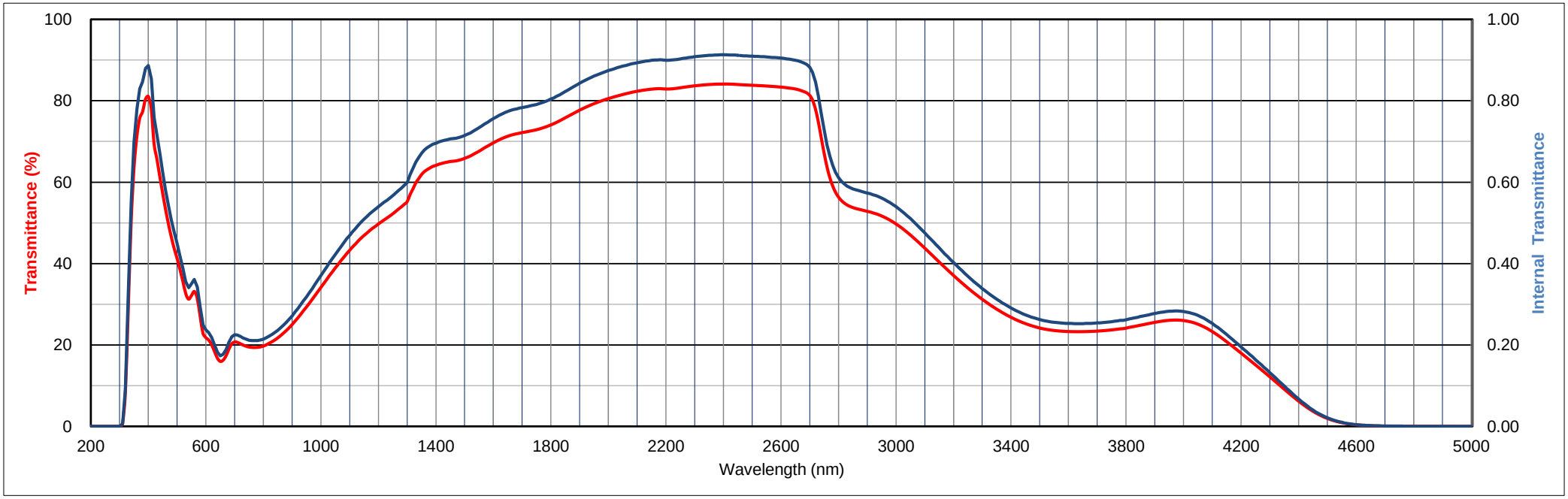
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB120

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	8.3	28.7	50.0	63.5	71.2	75.7	77.3	80.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	81.1	78.1	69.4	65.6	61.3	57.2	53.3	49.7	46.5	43.7	41.2	38.5	35.7	32.6	31.3	32.1	33.2	31.5	27.1	22.9
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	21.8	21.2	20.0	18.4	16.8	16.0	16.3	17.3	19.0	20.3	20.7	20.6	20.3	20.0	19.7	19.5	19.4	19.4	19.4	19.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	19.7	20.0	20.4	20.8	21.2	21.7	22.3	22.9	23.6	24.3	25.0	25.8	26.7	27.5	28.5	29.3	30.3	31.2	32.2	33.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	34.1	35.1	36.1	37.1	38.0	38.9	39.8	40.7	41.6	42.4	43.2	44.1	44.8	45.6	46.3	46.9	47.5	48.1	48.7	49.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	49.7	50.2	50.7	51.2	51.7	52.2	52.8	53.4	53.9	54.6	55.2	56.9	58.3	59.8	60.9	61.9	62.6	63.1	63.5	63.9
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	64.1	64.4	64.6	64.8	64.9	65.1	65.1	65.2	65.4	65.6	65.9	66.1	66.4	66.8	67.2	67.6	68.0	68.5	68.9	69.3
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	69.7	70.1	70.4	70.7	71.0	71.3	71.5	71.7	71.9	72.0	72.2	72.3	72.4	72.6	72.7	72.9	73.1	73.3	73.5	73.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	74.1	74.4	74.7	75.1	75.4	75.8	76.2	76.6	77.0	77.3	77.7	78.0	78.4	78.7	79.0	79.3	79.6	79.8	80.1	80.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	80.5	81.5	82.3	82.9	82.9	83.2	83.7	84.0	84.1	84.0	83.8	83.6	83.4	82.9	81.3	67.2	56.3	53.8	52.8	51.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	49.7	47.0	43.8	40.4	37.1	34.0	31.2	28.8	26.8	25.3	24.2	23.6	23.3	23.3	23.4	23.7	24.1	24.8	25.6	26.1
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	26.0	25.1	23.3	20.8	18.0	15.1	12.2	9.1	6.2	3.7	2.0	0.9	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB140

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	5.9	24.3	45.8	60.3	68.8	73.7	75.5	79.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	79.7	76.5	66.7	62.6	57.9	53.5	49.3	45.5	42.1	39.2	36.7	33.9	31.1	28.1	26.7	27.6	28.6	26.9	22.7	18.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	17.6	17.1	16.0	14.6	13.1	12.4	12.6	13.6	15.0	16.2	16.7	16.6	16.3	16.0	15.7	15.5	15.4	15.4	15.5	15.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	15.7	16.0	16.4	16.7	17.1	17.6	18.1	18.7	19.3	19.9	20.7	21.4	22.2	23.0	23.9	24.8	25.7	26.6	27.6	28.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	29.5	30.5	31.4	32.4	33.3	34.3	35.2	36.1	37.0	37.9	38.7	40.3	41.8	43.1	44.3	45.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.524	1.517	1.513	1.511	1.509	1.508	1.507
P	0.917	0.919	0.920	0.921	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

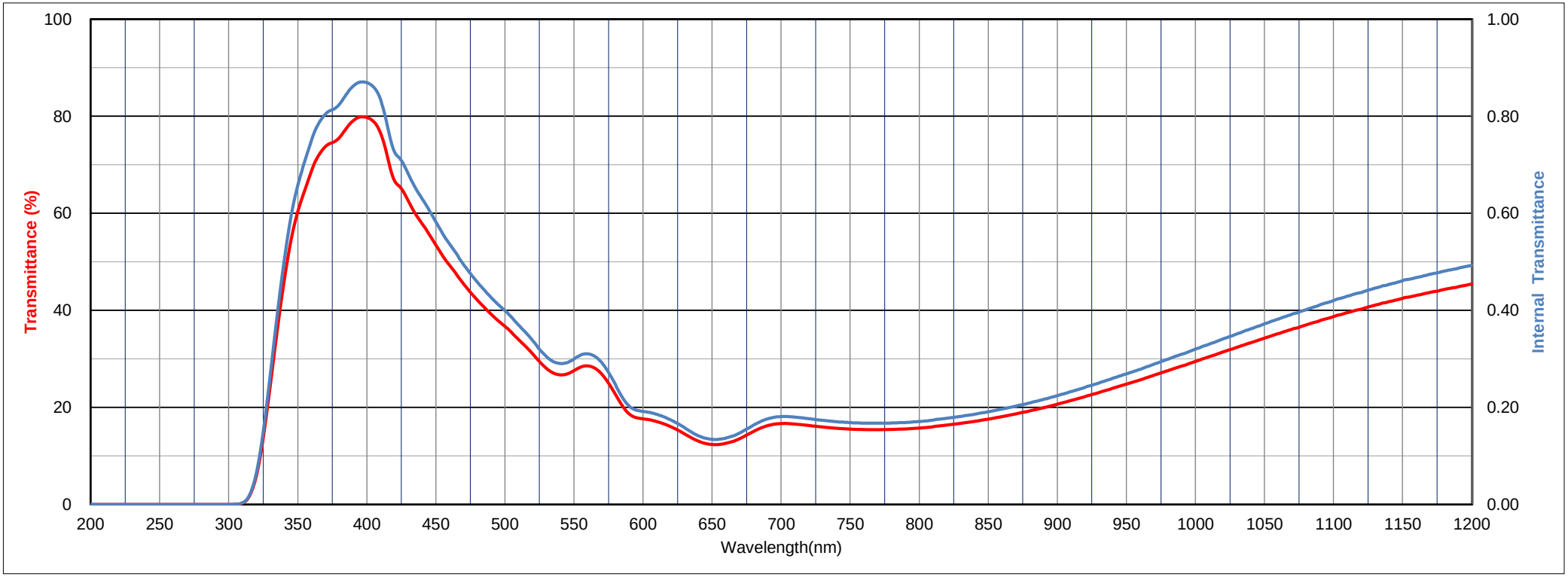
	x	y	Y	λ_d	P_e
A	0.353	0.372	24	488	24
C	0.232	0.230	26	476	38
D65	0.234	0.244	26	477	37

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	480	535	95	107	520	130	2.57

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
-140±5



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

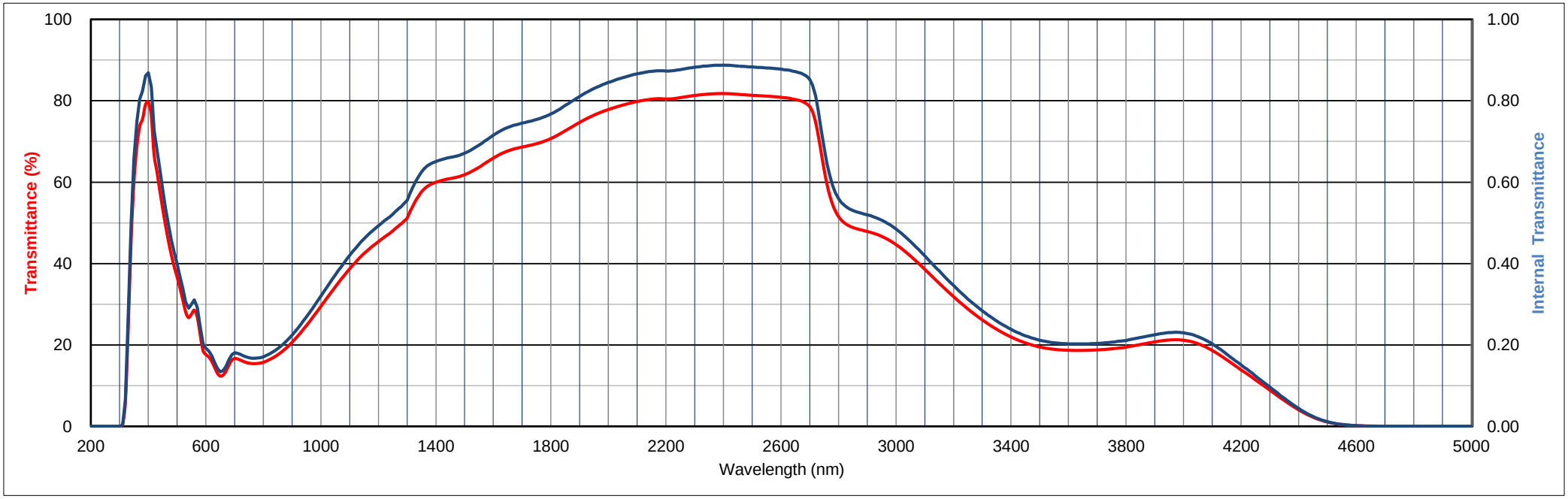
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB140

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	5.9	24.3	45.8	60.3	68.8	73.7	75.5	79.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	79.7	76.5	66.7	62.6	57.9	53.5	49.3	45.5	42.1	39.2	36.7	33.9	31.1	28.1	26.7	27.6	28.6	26.9	22.7	18.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	17.6	17.1	16.0	14.6	13.1	12.4	12.6	13.6	15.0	16.2	16.7	16.6	16.3	16.0	15.7	15.5	15.4	15.4	15.5	15.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	15.7	16.0	16.4	16.7	17.1	17.6	18.1	18.7	19.3	19.9	20.7	21.4	22.2	23.0	23.9	24.8	25.7	26.6	27.6	28.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	29.5	30.5	31.4	32.4	33.3	34.3	35.2	36.1	37.0	37.9	38.7	39.5	40.3	41.1	41.8	42.5	43.1	43.7	44.3	44.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	45.4	45.9	46.5	47.0	47.5	48.0	48.7	49.2	49.8	50.5	51.2	52.8	54.1	55.5	56.6	57.6	58.4	59.0	59.4	59.7
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	60.0	60.2	60.4	60.6	60.8	60.9	61.0	61.2	61.4	61.6	61.8	62.1	62.5	62.9	63.3	63.6	64.1	64.6	65.0	65.5
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	65.9	66.3	66.7	67.1	67.4	67.7	67.9	68.1	68.3	68.5	68.6	68.8	68.9	69.1	69.3	69.4	69.7	69.9	70.1	70.4
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	70.7	71.1	71.4	71.8	72.2	72.6	73.0	73.5	73.9	74.3	74.7	75.1	75.5	75.8	76.2	76.5	76.8	77.1	77.4	77.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	77.8	78.9	79.8	80.4	80.4	80.8	81.3	81.7	81.8	81.6	81.3	81.1	80.8	80.3	78.6	63.1	51.6	48.9	47.9	46.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	44.7	41.9	38.6	35.2	31.9	28.9	26.2	23.9	22.0	20.5	19.5	18.9	18.7	18.7	18.8	19.1	19.4	20.1	20.8	21.2
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	21.2	20.3	18.6	16.4	13.9	11.4	8.9	6.4	4.1	2.3	1.1	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB200

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	13.1	31.3	46.8	57.1	63.8	67.0	71.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	72.6	68.7	56.7	51.1	45.1	39.6	34.8	30.8	27.5	24.9	22.7	20.5	18.2	16.0	15.0	15.6	16.3	15.0	12.0	9.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	8.5	8.0	7.3	6.3	5.4	5.0	5.0	5.5	6.2	6.7	6.9	6.7	6.5	6.3	6.1	6.0	5.9	5.9	5.9	6.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	6.1	6.2	6.4	6.6	6.8	7.1	7.4	7.7	8.1	8.5	9.0	9.5	10.0	10.6	11.2	11.8	12.4	13.1	13.9	14.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	15.4	16.1	16.9	17.7	18.5	19.4	20.2	21.0	21.8	22.6	23.4	25.0	26.5	27.9	29.2	30.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.521	1.516	1.514	1.512	1.511	1.511	1.510
P	0.918	0.919	0.920	0.920	0.920	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

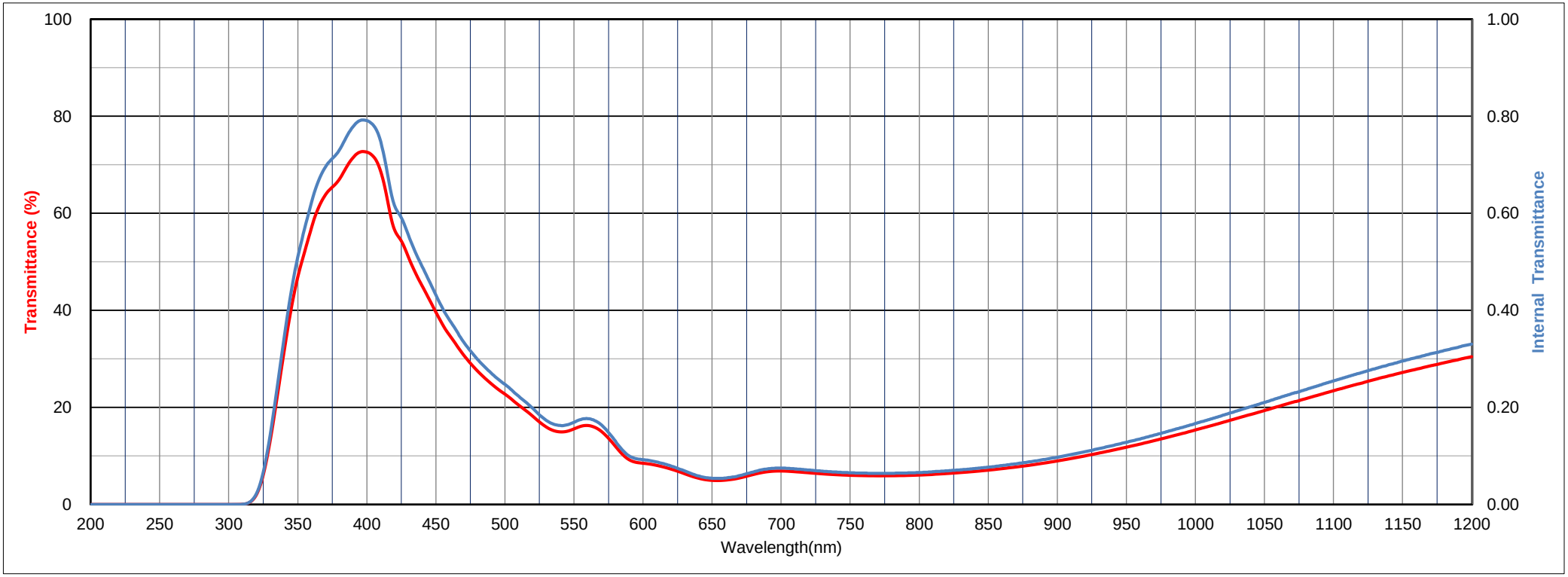
	x	y	Y	λ_d	P_e
A	0.317	0.344	13	486	34
C	0.211	0.194	15	473	51
D65	0.213	0.207	15	474	50

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	480	530	92	105	520	130	2.57

Tolerances of Transmittance(T)

B-R Conversion Value
V(mired)
-200±7



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The content of this catalog is accurate as of October ,2020

HOYA

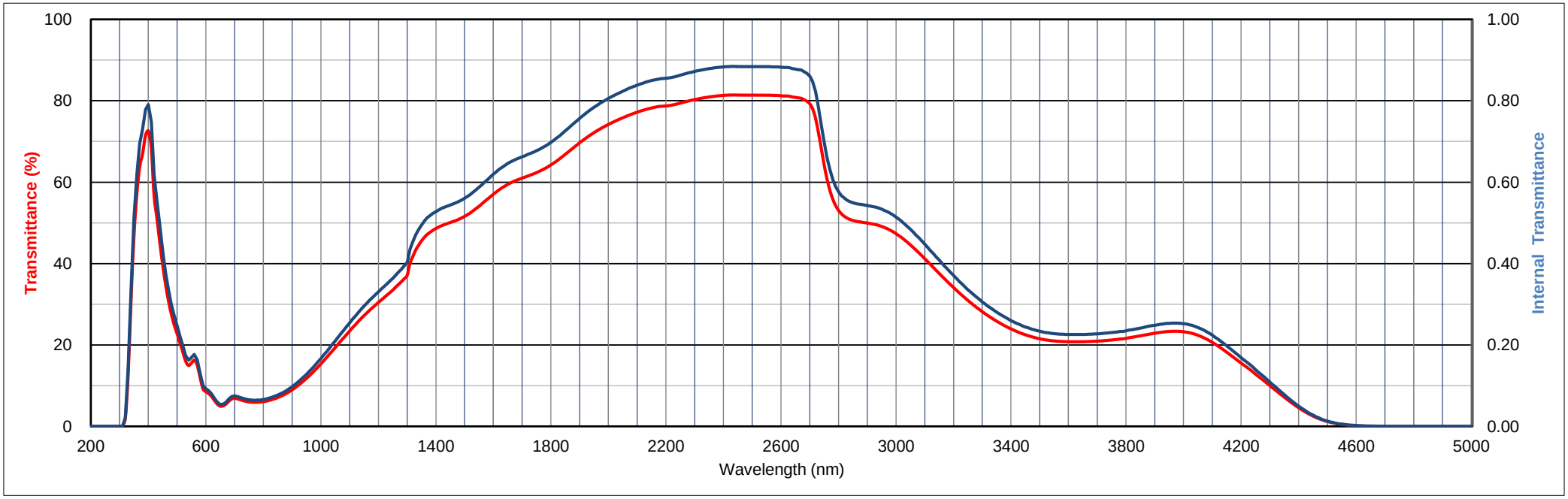
HOYA CORPORATION OPTICS SECTION

Thickness (−) mm

LB200

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	13.1	31.3	46.8	57.1	63.8	67.0	71.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	72.6	68.7	56.7	51.1	45.1	39.6	34.8	30.8	27.5	24.9	22.7	20.5	18.2	16.0	15.0	15.6	16.3	15.0	12.0	9.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	8.5	8.0	7.3	6.3	5.4	5.0	5.0	5.5	6.2	6.7	6.9	6.7	6.5	6.3	6.1	6.0	5.9	5.9	5.9	6.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	6.1	6.2	6.4	6.6	6.8	7.1	7.4	7.7	8.1	8.5	9.0	9.5	10.0	10.6	11.2	11.8	12.4	13.1	13.9	14.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	15.4	16.1	16.9	17.7	18.5	19.4	20.2	21.0	21.8	22.6	23.4	24.2	25.0	25.8	26.5	27.2	27.9	28.6	29.2	29.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	30.4	31.0	31.6	32.3	32.9	33.5	34.2	34.9	35.5	36.3	37.1	40.1	41.8	43.4	44.5	45.6	46.5	47.2	47.7	48.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	48.6	49.0	49.3	49.6	49.8	50.1	50.3	50.6	50.9	51.2	51.6	52.0	52.5	53.0	53.5	54.1	54.7	55.3	55.9	56.5
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	57.0	57.6	58.1	58.6	59.0	59.5	59.8	60.2	60.5	60.7	61.0	61.2	61.5	61.8	62.1	62.3	62.7	63.0	63.4	63.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	64.2	64.7	65.2	65.7	66.3	66.9	67.4	68.0	68.5	69.1	69.7	70.2	70.7	71.2	71.7	72.2	72.6	73.0	73.4	73.8
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	74.2	75.8	77.2	78.2	78.7	79.4	80.3	80.9	81.3	81.4	81.4	81.4	81.2	80.8	79.3	64.3	53.1	50.6	50.0	49.1
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	47.3	44.6	41.2	37.6	34.1	31.0	28.2	25.8	23.9	22.5	21.5	21.0	20.8	20.8	20.9	21.2	21.6	22.3	22.9	23.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	23.2	22.4	20.6	18.2	15.6	12.8	10.0	7.2	4.6	2.5	1.2	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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近赤外吸収フィルター（色補正用フィルター）

赤部及び近赤外部を選択的に吸収するフィルターです。撮像感度補正用、露出計感度補正用などに使用します。
近赤外吸収性能と合わせて、可視域での透過率を高めながら、同時に高い耐候性性能を実現しています。

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 1.00 mm

C500S

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.31	4.34	17.77	37.01	54.21	66.33	73.84	78.32	81.00
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	82.72	84.03	84.85	85.63	86.19	86.77	87.25	87.67	88.00	88.29	88.44	88.39	88.10	87.44	86.28	84.40	81.70	77.98	73.29	67.71
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	61.39	54.59	47.65	40.97	34.66	28.83	23.60	19.34	15.55	12.44	9.93	7.91	6.34	5.12	4.16	3.43	2.86	2.42	2.08	1.81
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.61	1.44	1.33	1.22	1.15	1.09	1.04	1.00	0.99	0.97	0.98	0.99	1.01	1.04	1.09	1.14	1.19	1.28	1.37	1.47
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	1.59	1.73	1.88	2.05	2.24	2.45	2.68	2.92	3.19	3.47	3.79	4.48	5.27	6.13	7.09	8.14				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.528	1.519	1.514	1.511	1.509	1.508	1.507
P	0.916	0.919	0.920	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
0

Color Specification

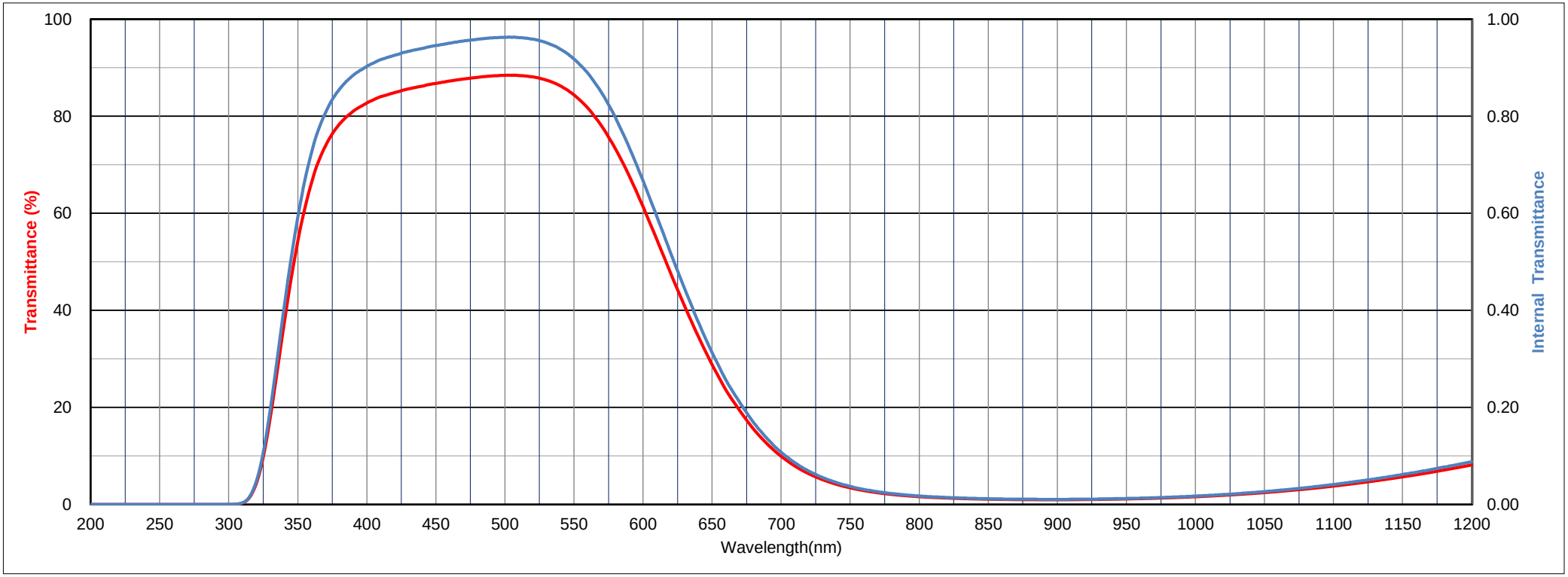
	x	y	Y	λ_d	P_e
A	0.389	0.426	71	500	13
C	0.269	0.312	76	490	16
D65	0.271	0.326	77	491	15

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	615	675	54	70	485	120	2.54

Tolerance of Transmittance (T)

Transmittance at 400nm	Transmittance at 500nm	Transmittance at 600nm
T400(%)	T500(%)	T600(%)
≧80	≧88	≧58



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The content of this catalog is accurate as of October ,2020

HOYA

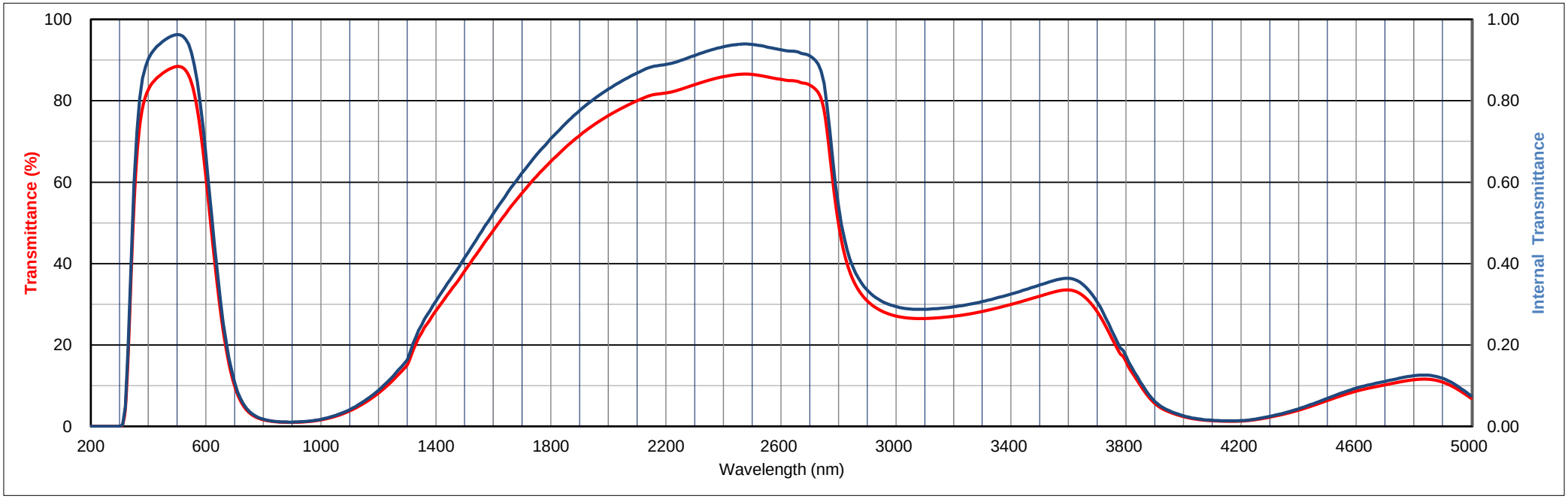
HOYA CORPORATION OPTICS SECTION

Thickness 1.00 mm

C500S

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	0.00	0.00	0.31	4.34	17.77	37.01	54.21	66.33	73.84	78.32	81.00
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	82.72	84.03	84.85	85.63	86.19	86.77	87.25	87.67	88.00	88.29	88.44	88.39	88.10	87.44	86.28	84.40	81.70	77.98	73.29	67.71
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	61.39	54.59	47.65	40.97	34.66	28.83	23.60	19.34	15.55	12.44	9.93	7.91	6.34	5.12	4.16	3.43	2.86	2.42	2.08	1.81
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.61	1.44	1.33	1.22	1.15	1.09	1.04	1.00	0.99	0.97	0.98	0.99	1.01	1.04	1.09	1.14	1.19	1.28	1.37	1.47
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	1.59	1.73	1.88	2.05	2.24	2.45	2.68	2.92	3.19	3.47	3.79	4.13	4.48	4.86	5.27	5.69	6.13	6.59	7.09	7.61
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	8.14	8.73	9.33	9.95	10.60	11.28	12.02	12.76	13.48	14.25	15.05	16.65	18.59	20.19	21.77	22.93	24.27	25.23	26.26	27.41
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	28.40	29.38	30.34	31.32	32.32	33.25	34.23	35.10	36.08	37.13	38.18	39.17	40.17	41.25	42.18	43.20	44.23	45.29	46.24	47.19
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	48.16	49.15	50.11	51.08	51.96	52.96	53.92	54.78	55.65	56.50	57.37	58.20	59.04	59.88	60.70	61.43	62.24	62.95	63.67	64.39
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	65.13	65.82	66.46	67.14	67.83	68.49	69.14	69.72	70.36	70.91	71.45	72.08	72.60	73.13	73.62	74.11	74.59	75.05	75.50	75.93
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	76.37	78.30	80.02	81.39	81.92	82.79	83.96	85.06	85.94	86.47	86.47	85.91	85.27	84.86	83.87	77.63	49.85	36.10	30.83	28.35
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	27.10	26.57	26.50	26.70	27.05	27.55	28.23	29.05	29.96	30.95	32.00	33.02	33.52	32.13	28.15	21.76	15.91	10.06	5.65	3.55
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	2.39	1.70	1.38	1.25	1.30	1.65	2.26	3.02	3.96	5.10	6.34	7.56	8.64	9.47	10.18	10.88	11.44	11.57	10.90	9.23
λnm	5000																			
T	6.90																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 1.00 mm

C5000

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	0.00	0.00	0.01	0.20	5.37	25.50	50.41	67.52	76.89	81.67	84.09	85.48
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	86.39	87.09	87.63	88.09	88.48	88.82	89.16	89.36	89.56	89.65	89.67	89.54	89.13	88.42	87.21	85.35	82.67	79.14	74.61	69.19
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	62.93	56.14	49.00	42.01	35.27	29.06	23.45	18.92	14.92	11.74	9.19	7.21	5.70	4.56	3.68	3.02	2.53	2.16	1.88	1.68
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.54	1.44	1.38	1.34	1.33	1.34	1.38	1.43	1.50	1.60	1.71	1.85	2.01	2.19	2.39	2.61	2.86	3.13	3.44	3.76
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	4.13	4.52	4.95	5.41	5.90	6.43	6.99	7.60	8.22	8.89	9.62	11.18	12.92	14.77	16.81	18.98				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.525	1.518	1.514	1.511	1.509	1.509	1.508
P	0.917	0.919	0.920	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
0

Color Specification

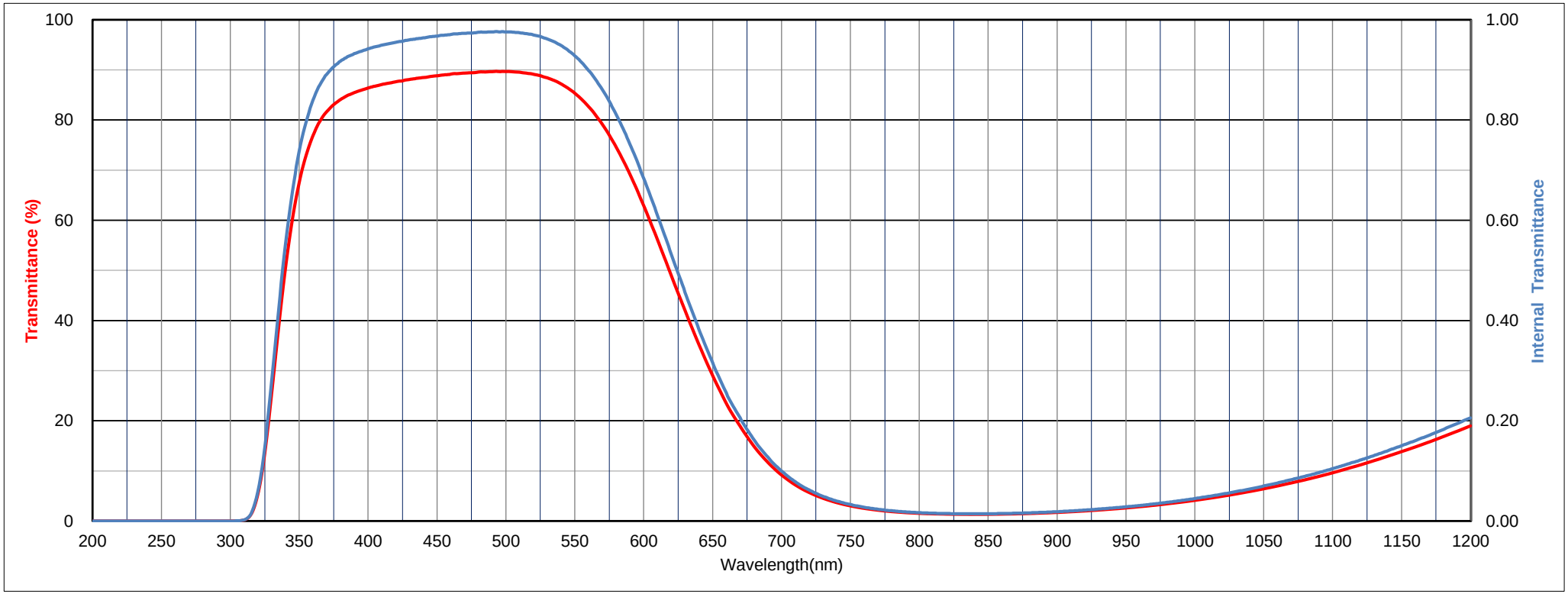
	x	y	Y	λ_d	P_e
A	0.390	0.425	72	500	13
C	0.269	0.310	77	489	16
D65	0.272	0.325	78	490	15

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	4	370	405	127	158	380	520	3.40

Tolerance of Transmittance (T)

Transmittance at 400nm	Transmittance at 500nm	Transmittance at 600nm
T400(%)	T500(%)	T600(%)
≧86	≧89	≧60



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The content of this catalog is accurate as of October ,2020

HOYA

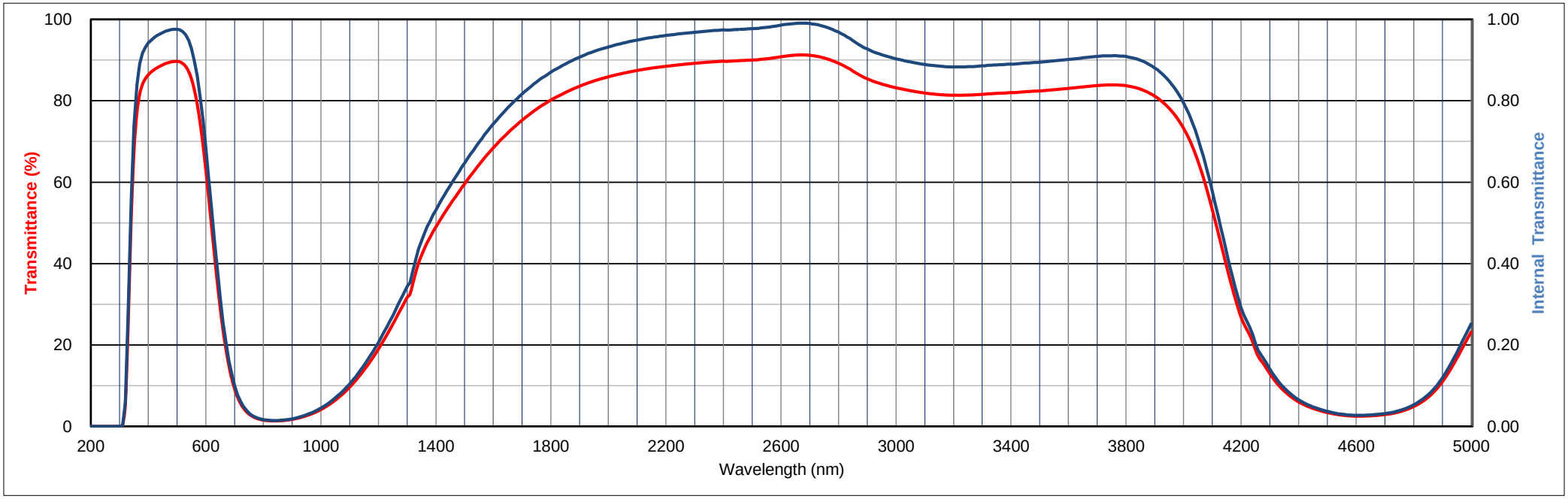
HOYA CORPORATION OPTICS SECTION

Thickness 1.00 mm

C5000

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	0.00	0.00	0.01	0.20	5.37	25.50	50.41	67.52	76.89	81.67	84.09	85.48
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	86.39	87.09	87.63	88.09	88.48	88.82	89.16	89.36	89.56	89.65	89.67	89.54	89.13	88.42	87.21	85.35	82.67	79.14	74.61	69.19
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	62.93	56.14	49.00	42.01	35.27	29.06	23.45	18.92	14.92	11.74	9.19	7.21	5.70	4.56	3.68	3.02	2.53	2.16	1.88	1.68
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.54	1.44	1.38	1.34	1.33	1.34	1.38	1.43	1.50	1.60	1.71	1.85	2.01	2.19	2.39	2.61	2.86	3.13	3.44	3.76
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	4.13	4.52	4.95	5.41	5.90	6.43	6.99	7.60	8.22	8.89	9.62	10.40	11.18	12.04	12.92	13.84	14.77	15.76	16.81	17.87
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	18.98	20.16	21.34	22.55	23.83	25.07	26.40	27.75	29.04	30.35	31.68	32.51	35.16	37.83	40.20	42.02	43.67	45.20	46.46	47.84
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	48.99	50.16	51.29	52.44	53.49	54.58	55.62	56.57	57.62	58.67	59.57	60.61	61.55	62.47	63.38	64.29	65.17	66.07	66.88	67.68
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	68.47	69.22	69.99	70.73	71.37	72.08	72.78	73.40	74.02	74.65	75.23	75.82	76.35	76.91	77.45	77.93	78.45	78.89	79.32	79.76
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	80.20	80.59	80.95	81.30	81.66	82.02	82.36	82.68	83.00	83.29	83.58	83.88	84.13	84.40	84.64	84.88	85.09	85.31	85.51	85.70
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	85.89	86.74	87.46	88.02	88.47	88.86	89.21	89.50	89.74	89.84	90.00	90.31	90.81	91.21	91.17	90.51	89.22	87.30	85.40	84.13
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	83.19	82.47	81.90	81.53	81.37	81.40	81.58	81.82	82.00	82.23	82.41	82.72	83.04	83.40	83.74	83.90	83.71	82.85	81.13	78.14
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	73.25	65.20	53.24	39.27	26.82	18.81	12.98	8.70	6.01	4.42	3.40	2.76	2.50	2.59	2.89	3.55	4.86	7.12	10.94	16.66
λnm	5000																			
T	23.17																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 0.45 mm

CD700

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	2E-06	5E-05	2E-03	6E-02	1.97	15.29	39.20	59.72	71.92	78.24	81.45	83.27
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	84.42	85.31	85.95	86.53	87.11	87.56	87.96	88.24	88.49	88.67	88.75	88.58	88.13	87.26	85.86	83.75	80.78	76.87	72.03	66.29
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	59.82	52.96	45.83	38.92	32.32	26.27	20.92	16.66	12.90	9.92	7.61	5.84	4.50	3.49	2.74	2.18	1.78	1.47	1.24	1.08
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.96	0.87	0.83	0.79	0.77	0.76	0.79	0.80	0.85	0.88	0.96	1.02	1.12	1.20	1.35	1.45	1.61	1.78	1.95	2.16
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	2.38	2.63	2.89	3.19	3.50	3.85	4.22	4.62	5.03	5.49	5.98	7.06	8.30	9.65	11.20	12.90				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.554	1.544	1.539	1.535	1.533	1.532	1.532
P	0.910	0.913	0.914	0.915	0.915	0.915	0.916

Classes of Bubbles and Inclusions

Bubble Class
0

Color Specification

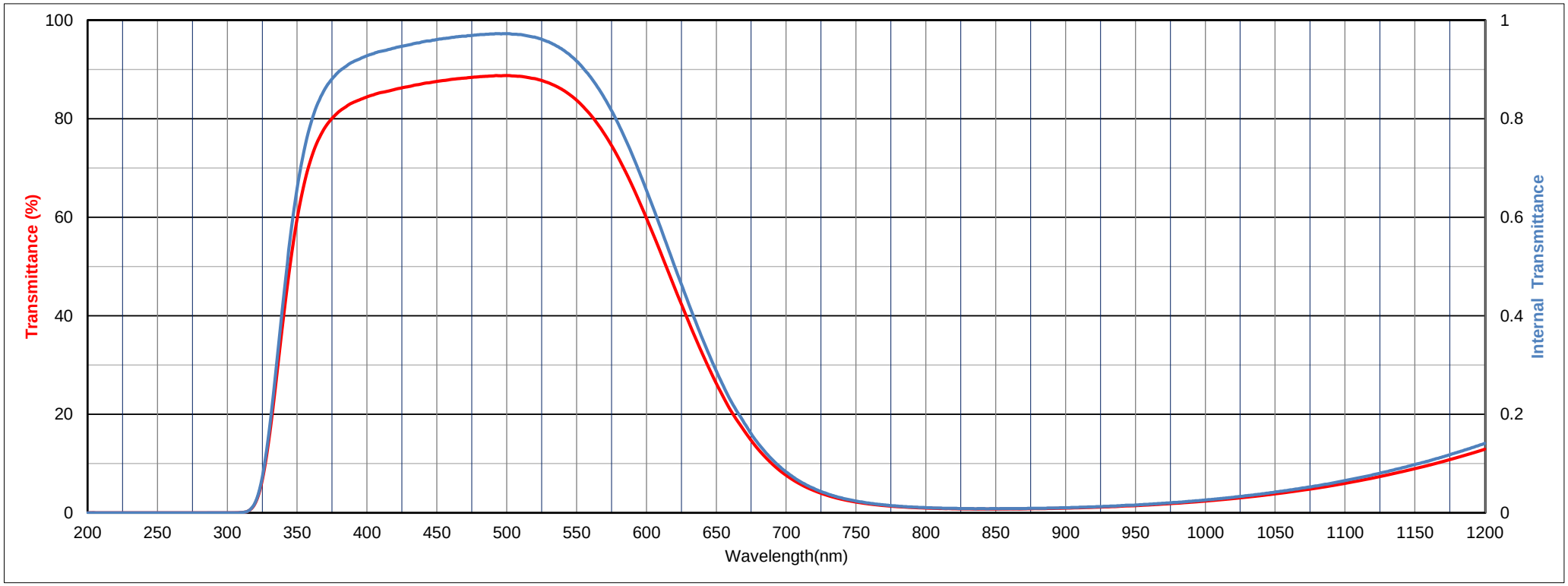
	x	y	Y	λ_d	P_e
A	0.385	0.426	70	500	14
C	0.266	0.310	76	489	17
D65	0.268	0.324	76	490	17

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	4	425	471	117	141	370	490	3.08

Tolerance of Transmittance (T)

Transmittance at 400nm	Transmittance at 500nm	Transmittance at 600nm
T400(%)	T500(%)	T600(%)
≧83	≧87	≧57



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The content of this catalog is accurate as of October ,2020

HOYA

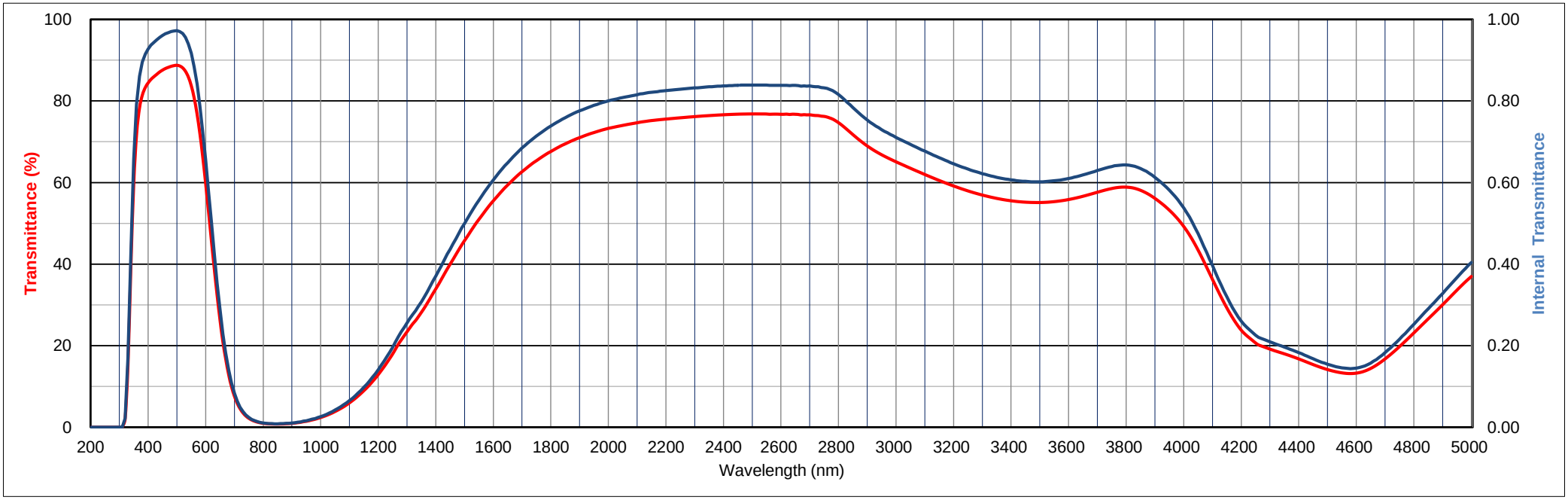
HOYA CORPORATION OPTICS SECTION

Thickness 0.45 mm

CD700

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	2E-06	5E-05	2E-03	6E-02	1.97	15.29	39.20	59.72	71.92	78.24	81.45	83.27
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	84.42	85.31	85.95	86.53	87.11	87.56	87.96	88.24	88.49	88.67	88.75	88.58	88.13	87.26	85.86	83.75	80.78	76.87	72.03	66.29
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	59.82	52.96	45.83	38.92	32.32	26.27	20.92	16.66	12.90	9.92	7.61	5.84	4.50	3.49	2.74	2.18	1.78	1.47	1.24	1.08
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.96	0.87	0.83	0.79	0.77	0.76	0.79	0.80	0.85	0.88	0.96	1.02	1.12	1.20	1.35	1.45	1.61	1.78	1.95	2.16
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	2.38	2.63	2.89	3.19	3.50	3.85	4.22	4.62	5.03	5.49	5.98	6.51	7.06	7.66	8.30	8.96	9.65	10.40	11.20	12.02
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	12.90	13.84	14.80	15.82	16.87	17.94	19.15	20.36	21.39	22.40	23.40	24.39	25.36	26.16	27.14	28.17	29.21	30.36	31.53	32.75
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	33.91	35.08	36.33	37.58	38.82	39.99	41.13	42.34	43.52	44.67	45.75	46.80	47.90	48.96	50.00	50.96	51.89	52.85	53.78	54.68
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	55.51	56.31	57.13	57.93	58.70	59.39	60.08	60.77	61.44	62.08	62.66	63.22	63.81	64.36	64.89	65.35	65.85	66.32	66.78	67.23
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	67.60	68.01	68.41	68.79	69.16	69.48	69.81	70.14	70.45	70.75	71.01	71.28	71.55	71.80	72.04	72.25	72.48	72.70	72.91	73.10
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	73.28	74.01	74.66	75.20	75.56	75.88	76.17	76.41	76.62	76.76	76.82	76.81	76.74	76.74	76.61	76.22	74.68	71.76	68.97	66.81
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	65.08	63.51	61.97	60.51	59.16	57.95	56.93	56.11	55.52	55.19	55.10	55.32	55.83	56.63	57.62	58.53	58.87	58.10	56.11	53.23
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	49.24	43.45	36.26	29.26	23.80	20.66	19.15	17.99	16.75	15.36	14.14	13.33	13.26	14.41	16.74	19.75	23.12	26.57	30.03	33.61
λnm	5000																			
T	36.96																			



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The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 1.00 mm

CM700

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	0.00	3.43E-03	0.79	10.68	34.15	56.71	70.74	77.85	81.44	83.47
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	84.75	85.46	86.16	86.65	87.33	87.73	88.10	88.21	88.58	88.71	88.70	88.35	87.57	86.28	84.25	81.19	77.10	71.83	65.55	58.33
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	50.55	42.72	34.99	27.93	21.64	16.33	11.98	8.78	6.21	4.35	3.06	2.14	1.52	1.08	0.78	0.58	0.44	0.35	0.28	0.24
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.20	0.18	0.17	0.16	0.15	0.15	0.16	0.16	0.18	0.19	0.21	0.23	0.26	0.30	0.33	0.38	0.43	0.49	0.56	0.64
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	0.73	0.83	0.94	1.07	1.22	1.38	1.56	1.76	1.97	2.21	2.49	3.11	3.84	4.70	5.73	6.93				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.554	1.544	1.539	1.536	1.534	1.533	1.532
P	0.910	0.913	0.914	0.915	0.915	0.915	0.915

Classes of Bubbles and Inclusions

Bubble Class
0

Color Specification

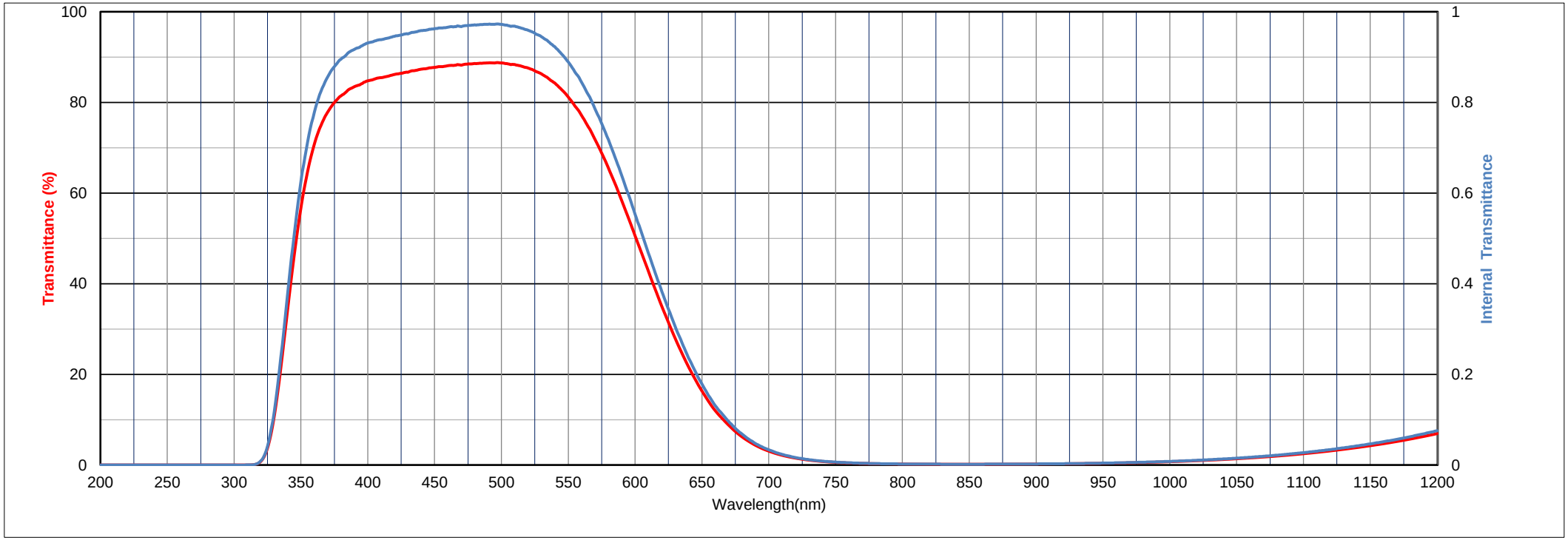
	x	y	Y	λ_d	P_e
A	0.364	0.429	65	499	19
C	0.252	0.305	71	489	22
D65	0.254	0.320	72	490	22

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	4	429	474	118	141	375	490	3.07

Tolerance of Transmittance (T)

Transmittance at 400nm	Transmittance at 500nm	Transmittance at 700nm
T400(%)	T500(%)	T700(%)
≧82	≧86	≦6



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

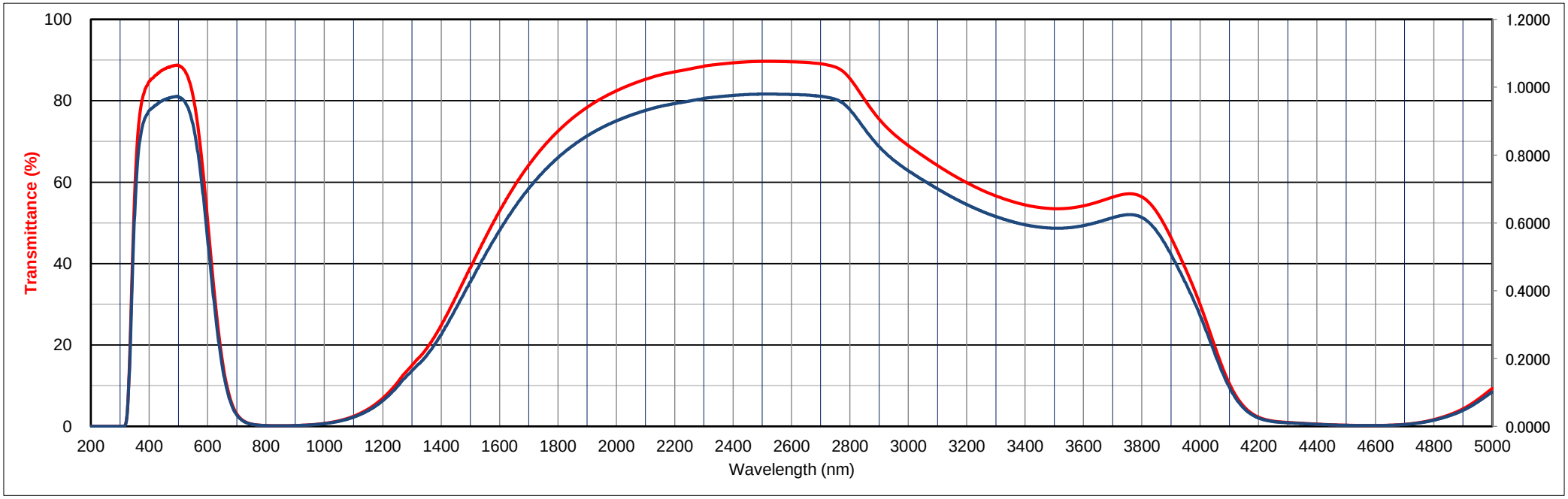
HOYA CORPORATION OPTICS SECTION

Thickness 1.00 mm

CM700

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	0.00	3.4E-03	0.79	10.68	34.15	56.71	70.74	77.85	81.44	83.47
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	84.75	85.46	86.16	86.65	87.33	87.73	88.10	88.21	88.58	88.71	88.70	88.35	87.57	86.28	84.25	81.19	77.10	71.83	65.55	58.33
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	50.55	42.72	34.99	27.93	21.64	16.33	11.98	8.78	6.21	4.35	3.06	2.14	1.52	1.08	0.78	0.58	0.44	0.35	0.28	0.24
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.20	0.18	0.17	0.16	0.15	0.15	0.16	0.16	0.18	0.19	0.21	0.23	0.26	0.30	0.33	0.38	0.43	0.49	0.56	0.64
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	0.73	0.83	0.94	1.07	1.22	1.38	1.56	1.76	1.97	2.21	2.49	2.78	3.11	3.46	3.84	4.26	4.70	5.19	5.73	6.30
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	6.93	7.59	8.31	9.08	9.87	10.73	11.70	12.65	13.41	14.19	15.00	15.82	16.57	17.34	18.20	19.06	20.09	21.20	22.36	23.61
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	24.76	26.09	27.49	28.91	30.35	31.67	33.16	34.66	36.16	37.67	38.94	40.35	41.85	43.32	44.79	46.16	47.52	48.90	50.30	51.62
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	52.89	54.12	55.38	56.61	57.83	58.93	60.02	61.12	62.21	63.25	64.21	65.14	66.09	67.01	67.90	68.68	69.52	70.31	71.09	71.82
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	72.48	73.18	73.87	74.53	75.15	75.70	76.29	76.85	77.40	77.93	78.37	78.87	79.33	79.79	80.21	80.58	81.01	81.37	81.77	82.08
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	82.45	83.98	85.27	86.32	87.12	87.80	88.45	88.97	89.32	89.57	89.68	89.66	89.58	89.44	89.10	88.29	85.47	80.34	75.51	71.87
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	68.99	66.49	64.11	61.89	59.90	58.12	56.62	55.39	54.41	53.78	53.48	53.61	54.18	55.15	56.32	57.12	56.39	52.78	46.39	38.68
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	29.88	19.68	10.52	4.86	2.26	1.29	0.96	0.75	0.55	0.39	0.28	0.22	0.21	0.29	0.50	0.92	1.66	2.76	4.31	6.55
λnm	5000																			
T	9.30																			



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ニュートラルデンシティフィルター

可視域において分光透過率がほぼ平坦なフィルターで、400nmから700nmの平均透過率により分類されております。例えば、ND50は平均透過率が50%であることを表します。
特定波長の光を選択的に吸収することなく光の強さをコントロールするため、光量調整などに広く用いられています。
製品市場での一般呼称 / 弊社呼称と減光性能の関係は以下の通りです。

<table>
<tr><th>光量</th><th>透過率(%)</th><th>OD値</th><th>弊社呼称</th><th>一般呼称</th></tr>
<tr><td>1/2</td><td>50.0</td><td>0.3</td><td>ND50</td><td>ND2</td></tr>
<tr><td>1/4</td><td>25.0</td><td>0.6</td><td>ND25</td><td>ND4</td></tr>
<tr><td>1/8</td><td>12.5</td><td>0.9</td><td>ND13</td><td>ND8</td></tr>
<tr><td>1/16</td><td>6.3</td><td>1.2</td><td>受注生産品</td><td>ND16</td></tr>
<tr><td>1/32</td><td>3.1</td><td>1.5</td><td>ND3</td><td>ND32</td></tr>
<tr><td>1/64</td><td>1.6</td><td>1.8</td><td>受注生産品</td><td>ND64</td></tr>
<tr><td>1/100
(1/128)</td><td>1.0
0.8</td><td>2.0
2.1</td><td>ND1</td><td>ND100</td></tr>
<tr><td>1/200
(1/256)</td><td>0.5
0.4</td><td>2.3
2.4</td><td rowspan="2">ND0.3</td><td>ND200</td></tr>
<tr><td>1/500
(1/512)</td><td>0.3
0.2</td><td>2.6
2.7</td><td>ND500</td></tr>
<tr><td>1/1000
(1/1024)</td><td>0.1
0.1</td><td>2.9
3.0</td><td>ND0.1</td><td>ND1000</td></tr>
</table>

注　製品市場では光量の減光特性にあわせ1/2 → ND2と呼ぶことがあります。弊社の製品名は透過率の水準50% → ND50と呼びます。
本製品は、透過率特性を重視する場合は肉厚を任意に変化させて透過率特性を実現します。

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.50) mm

ND0

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.592	1.568	1.555	1.548	1.544	1.541	1.539
P	0.901	0.907	0.910	0.912	0.913	0.913	0.914

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

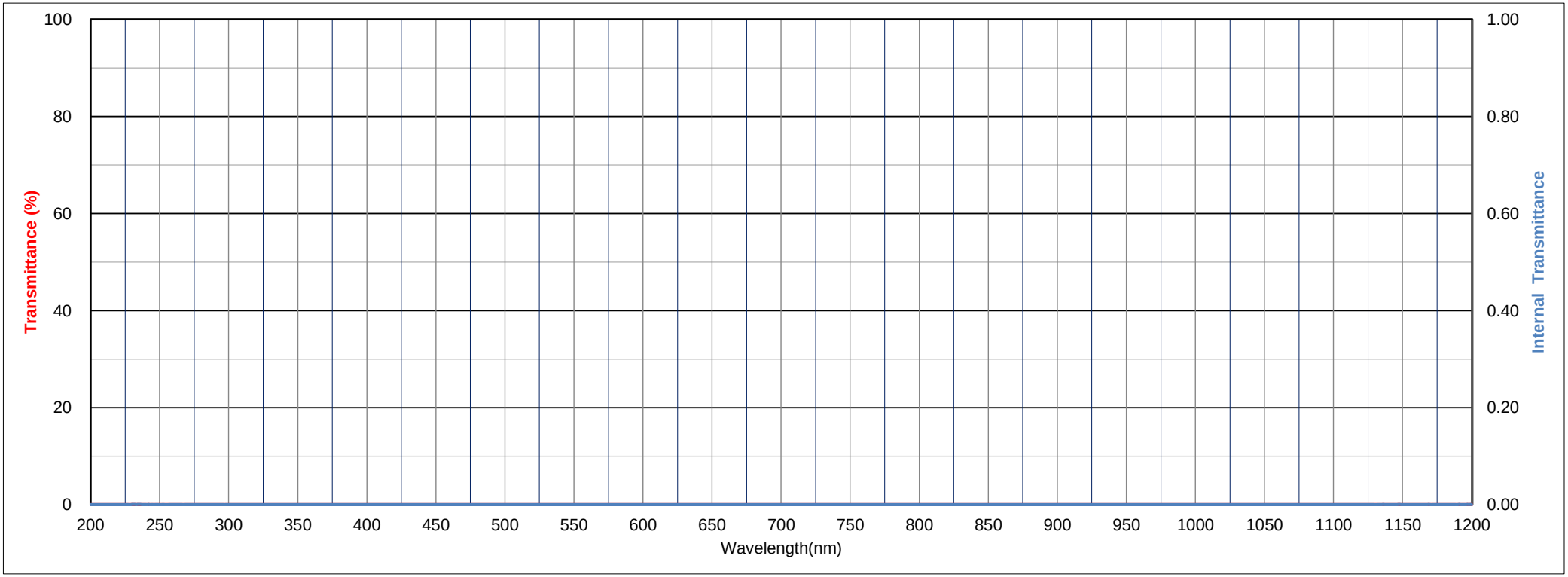
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	1	542	622	-	76	-	-	2.47

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
<0.01	>4



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HOYA

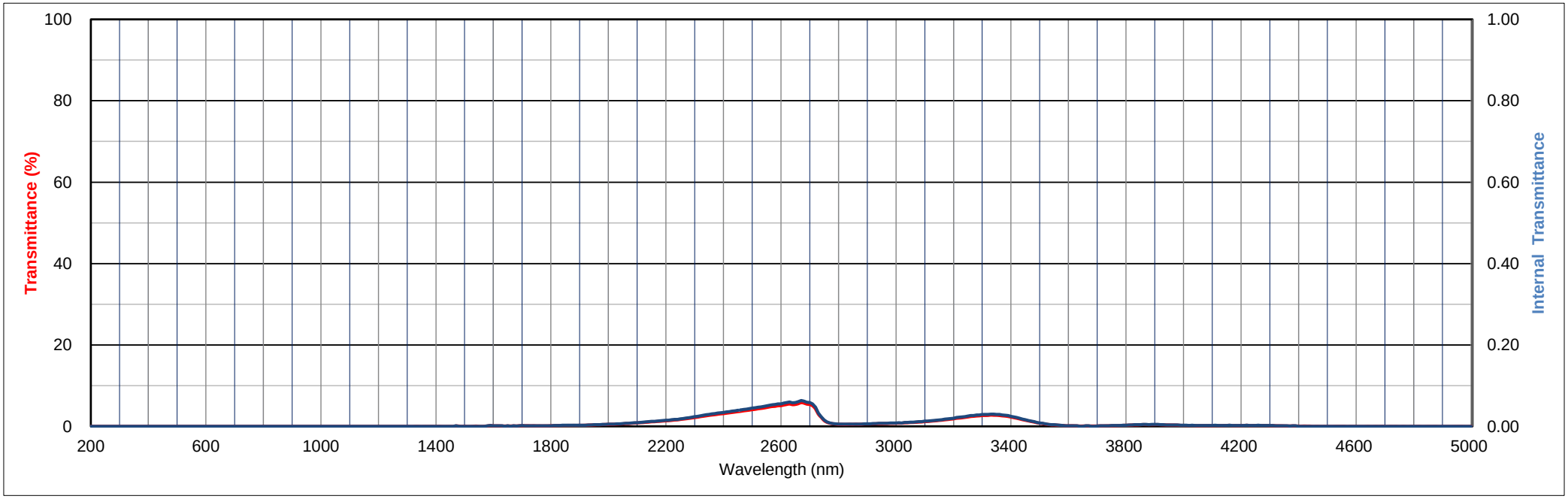
HOYA CORPORATION OPTICS SECTION

Thickness (2.50) mm

ND0

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.001	<1E-05	0.001	0.001	0.001	0.001
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	<1E-05	0.001	0.001	<1E-05	0.001	<1E-05	<1E-05	0.001	0.001	<1E-05	0.001	<1E-05	0.001	0.001	0.001	0.001	<1E-05	0.001	0.001	0.002
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.005	0.005
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.005	0.007	0.009	0.012	0.015	0.019	0.024	0.029	0.034	0.039	0.045	0.051	0.055	0.059	0.059	0.016	0.005	0.005	0.006	0.007
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.008	0.010	0.013	0.016	0.020	0.025	0.029	0.030	0.025	0.016	0.008	0.004	0.002	0.001	0.001	0.002	0.003	0.004	0.005	0.004
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	<1E-05	0.001	0.001	0.001	0.001	<1E-05	<1E-05	0.001	<1E-05	0.001
λnm	5000																			
τ	0.001																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (3.1) mm

ND0.1

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	0.001	<1E-05	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.004	0.006	0.009	0.011	0.012	0.014	0.015	0.017	0.018	0.019	0.020
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.021	0.021	0.022	0.022	0.022	0.023	0.023	0.023	0.024	0.022	0.023	0.024	0.022	0.023	0.022	0.022	0.021	0.021	0.020	0.021
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.022	0.023	0.024	0.026				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.534	1.520	1.513	1.509	1.506	1.504	1.503
P	0.915	0.918	0.920	0.921	0.922	0.922	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

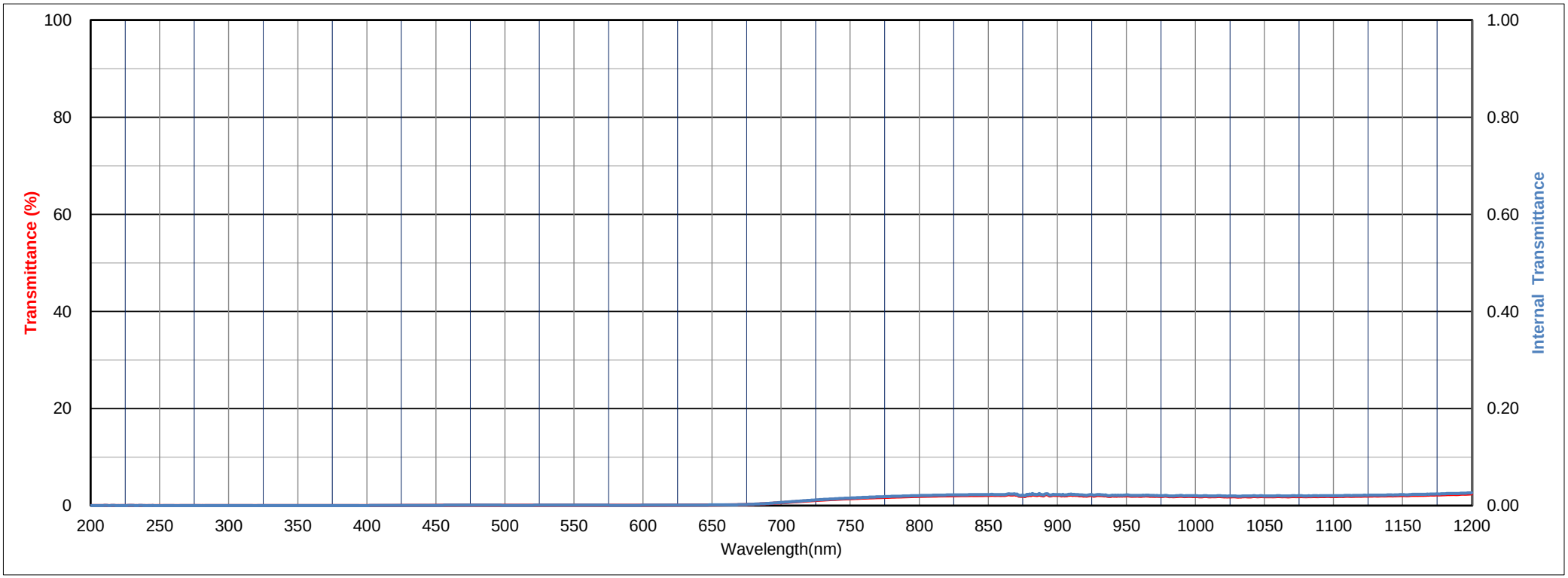
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	490	565	-	65	530	100	2.41

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
0.1±0.05	3 ±0.3



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HOYA

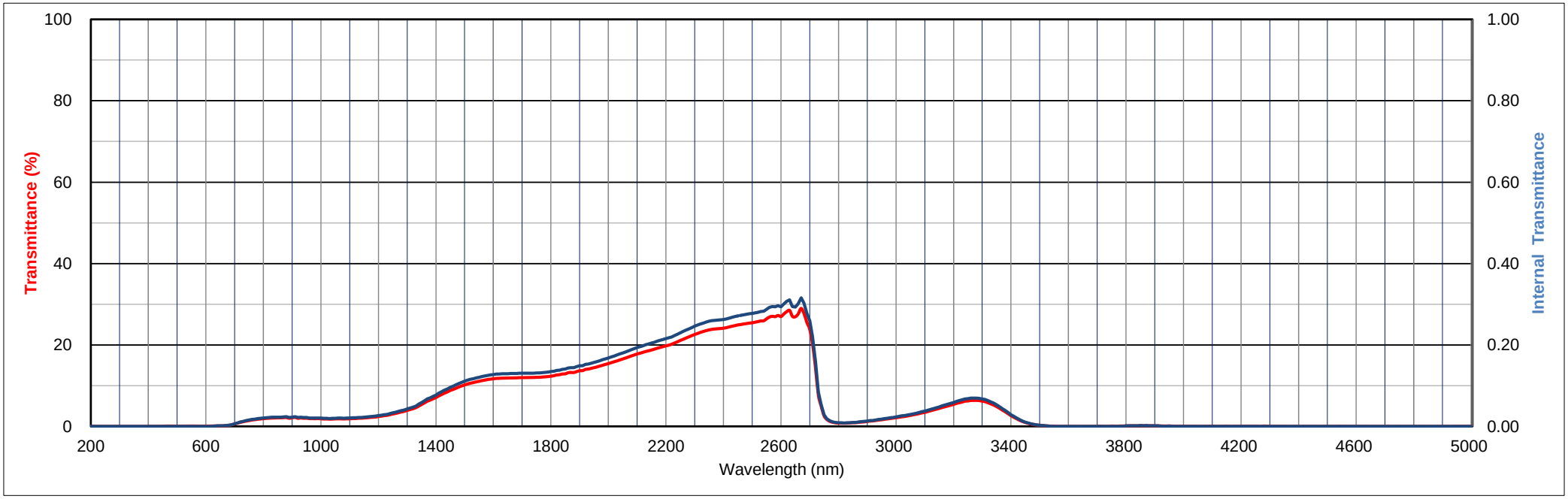
HOYA CORPORATION OPTICS SECTION

Thickness (3.13) mm

ND0.1

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	0.001	<1E-05	0.001	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	<1E-05	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.003	0.004	0.006	0.009	0.011	0.012	0.014	0.015	0.017	0.018	0.019	0.020
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.021	0.021	0.022	0.022	0.022	0.023	0.023	0.023	0.024	0.022	0.023	0.024	0.022	0.023	0.022	0.022	0.021	0.021	0.020	0.021
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.021	0.022	0.022	0.022	0.023	0.024	0.024	0.025
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.026	0.027	0.029	0.030	0.031	0.033	0.035	0.037	0.039	0.040	0.043	0.045	0.047	0.050	0.054	0.058	0.063	0.067	0.070	0.074
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.077	0.081	0.085	0.089	0.092	0.096	0.099	0.102	0.105	0.108	0.111	0.113	0.116	0.117	0.119	0.121	0.122	0.124	0.125	0.126
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.127	0.128	0.129	0.129	0.129	0.129	0.130	0.130	0.130	0.130	0.130	0.131	0.131	0.131	0.131	0.131	0.131	0.132	0.133	0.133
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.134	0.136	0.138	0.138	0.140	0.141	0.144	0.144	0.144	0.147	0.149	0.149	0.152	0.153	0.155	0.157	0.159	0.161	0.164	0.166
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.168	0.180	0.194	0.204	0.215	0.230	0.246	0.258	0.263	0.272	0.277	0.288	0.294	0.293	0.260	0.028	0.009	0.010	0.013	0.018
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.023	0.029	0.037	0.048	0.059	0.068	0.067	0.053	0.029	0.010	0.003	0.001	0.001	0.001	<1E-05	0.001	0.001	0.002	0.001	0.001
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.001	<1E-05	0.001	0.001	0.001	0.001	0.001	0.001	<1E-05	<1E-05	0.001	0.001	<1E-05	<1E-05	<1E-05	0.001	0.001	<1E-05	<1E-05	0.001
λnm	5000																			
τ	0.001																			



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The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.85) mm

ND0.3

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.05	0.08	0.11	0.14	0.14	0.19	0.25	0.26	0.24	0.21	0.20	0.20	0.20	0.22	0.23	0.24	0.23	0.20	0.18	0.18
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.19	0.22	0.25	0.27	0.29	0.32	0.37	0.46	0.64	0.94	1.30	1.69	2.04	2.33	2.57	2.77	2.94	3.09	3.21	3.31
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	3.40	3.48	3.54	3.58	3.61	3.62	3.62	3.60	3.58	3.54	3.50	3.46	3.41	3.35	3.31	3.26	3.21	3.17	3.13	3.09
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	3.06	3.02	3.00	2.98	2.96	2.95	2.94	2.95	2.95	2.96	2.98	3.03	3.12	3.24	3.40	3.60				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.531	1.520	1.514	1.511	1.508	1.507	1.506
P	0.916	0.918	0.920	0.921	0.921	0.921	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

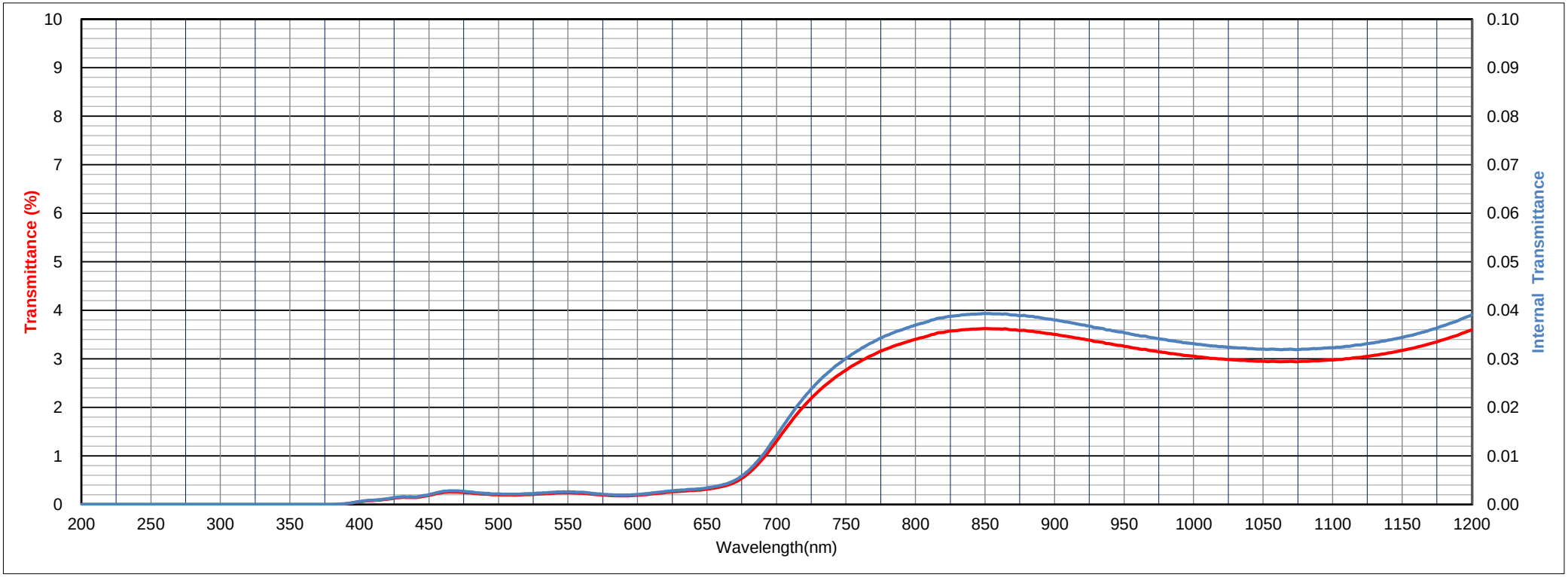
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	490	565	-	65	530	100	2.41

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
0.3±0.05	2.5±0.1



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HOYA

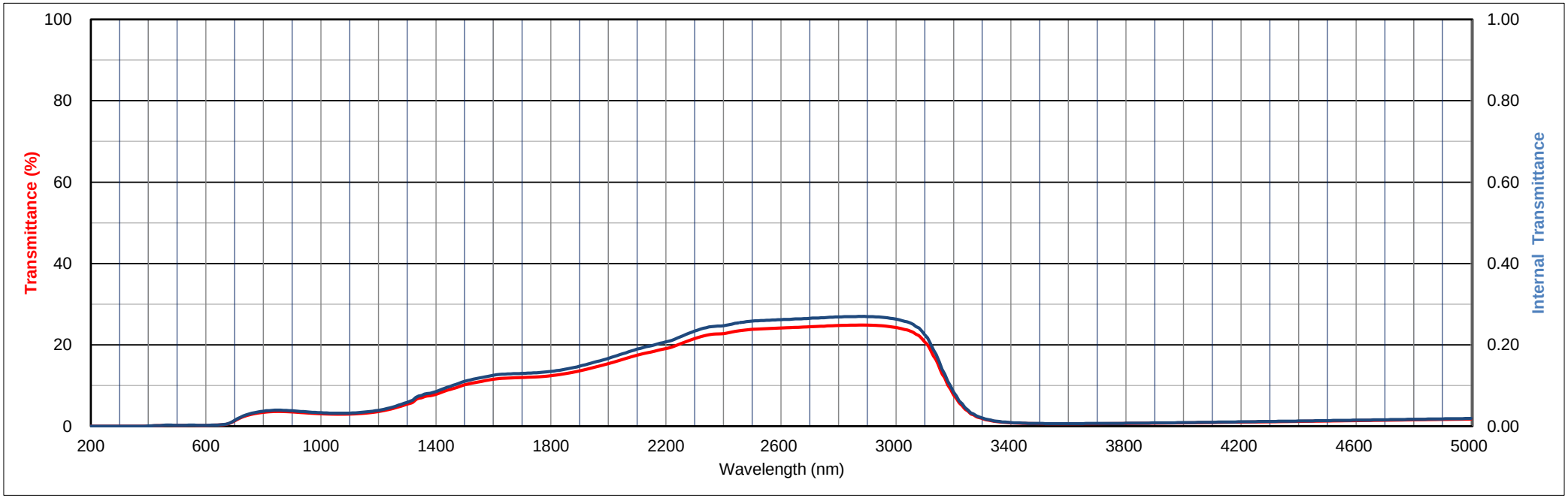
HOYA CORPORATION OPTICS SECTION

Thickness (2.85) mm

ND0.3

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.6	0.9	1.3	1.7	2.0	2.3	2.6	2.8	2.9	3.1	3.2	3.3
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	3.4	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5	3.5	3.4	3.4	3.3	3.3	3.2	3.2	3.1	3.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	3.1	3.0	3.0	3.0	3.0	3.0	2.9	2.9	3.0	3.0	3.0	3.0	3.0	3.1	3.1	3.2	3.2	3.3	3.4	3.5
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	3.6	3.7	3.9	4.0	4.2	4.3	4.5	4.7	4.9	5.2	5.4	5.6	5.9	6.5	6.9	7.0	7.3	7.4	7.5	7.6
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	7.8	8.1	8.3	8.6	8.9	9.0	9.3	9.5	9.7	9.9	10.2	10.3	10.5	10.6	10.8	10.9	11.0	11.2	11.3	11.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	11.5	11.6	11.7	11.8	11.8	11.8	11.9	11.9	11.9	11.9	12.0	12.0	12.0	12.1	12.1	12.1	12.2	12.2	12.3	12.3
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	12.4	12.5	12.6	12.7	12.8	12.9	13.0	13.2	13.3	13.4	13.6	13.8	13.9	14.1	14.3	14.5	14.6	14.8	15.0	15.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	15.4	16.4	17.5	18.3	19.1	20.2	21.5	22.5	22.8	23.4	23.8	24.0	24.1	24.3	24.4	24.6	24.8	24.8	24.9	24.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	24.3	23.4	20.7	14.6	7.7	3.7	1.9	1.1	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.8	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.7
λnm	5000																			
τ	1.8																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.22) mm

ND1

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.3	0.4	0.5	0.6	0.6	0.7	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.7	0.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.5	1.9	2.6	3.3	4.1	4.7	5.2	5.7	6.0	6.3	6.5	6.7	6.9
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	7.1	7.2	7.3	7.3	7.4	7.4	7.4	7.4	7.3	7.3	7.2	7.1	7.1	7.0	6.9	6.8	6.7	6.7	6.6	6.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	6.5	6.4	6.4	6.4	6.3	6.3	6.3	6.3	6.3	6.3	6.4	6.4	6.6	6.8	7.0	7.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.532	1.520	1.514	1.510	1.508	1.506	1.505
P	0.915	0.918	0.920	0.921	0.921	0.922	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

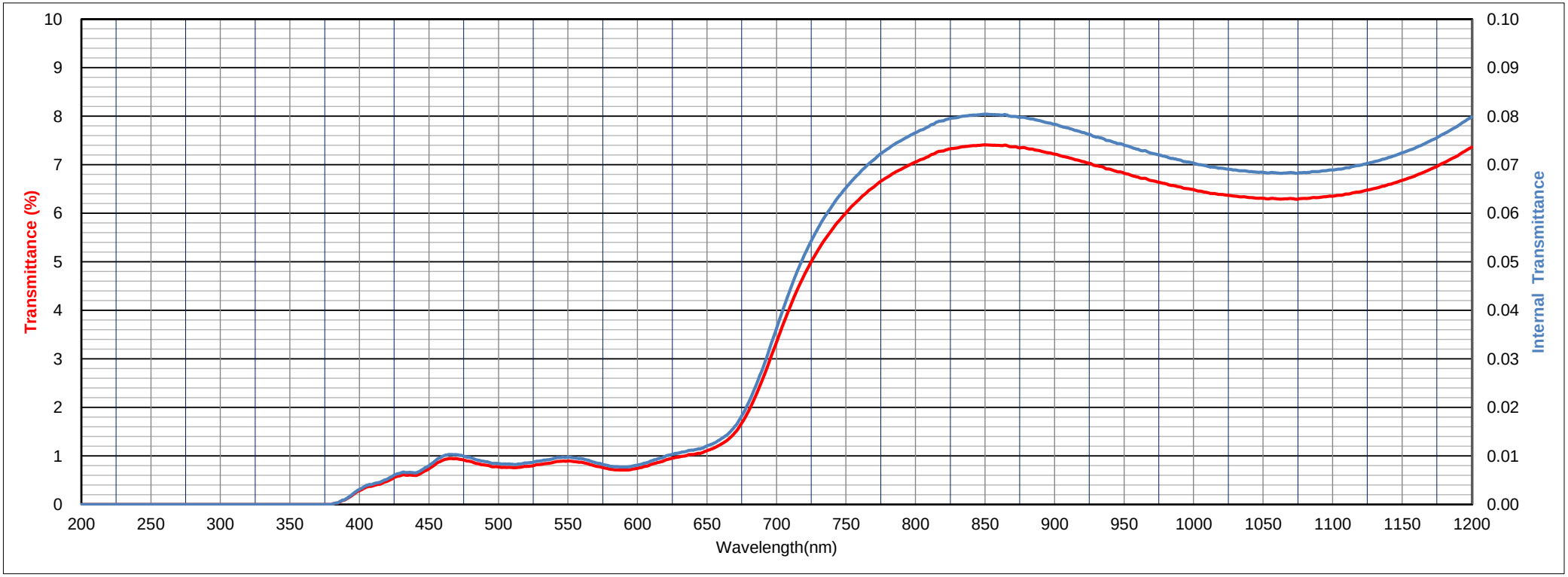
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	490	565	-	65	530	100	2.41

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
1±0.5	2 ±0.3



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HOYA

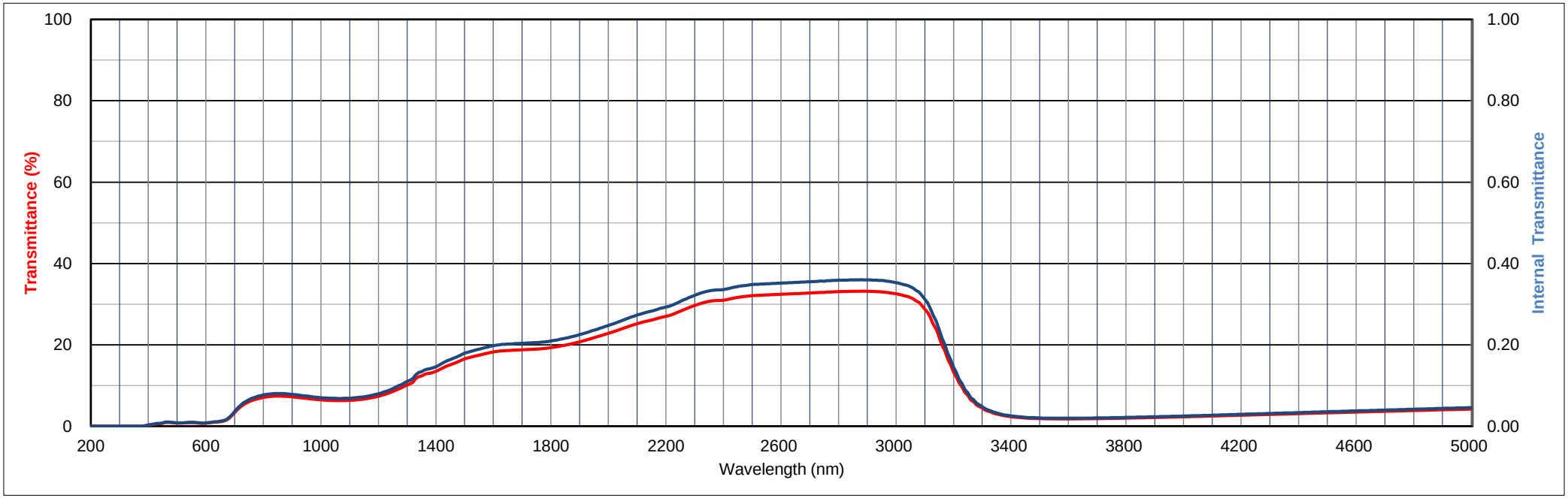
HOYA CORPORATION OPTICS SECTION

Thickness (2.22) mm

ND1

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.3	0.4	0.5	0.6	0.6	0.7	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.8	0.7	0.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.5	1.9	2.6	3.3	4.1	4.7	5.2	5.7	6.0	6.3	6.5	6.7	6.9
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	7.1	7.2	7.3	7.3	7.4	7.4	7.4	7.4	7.3	7.3	7.2	7.1	7.1	7.0	6.9	6.8	6.7	6.7	6.6	6.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	6.5	6.4	6.4	6.4	6.3	6.3	6.3	6.3	6.3	6.3	6.4	6.4	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	7.4	7.6	7.8	8.0	8.2	8.5	8.8	9.1	9.4	9.8	10.1	10.4	10.8	11.7	12.2	12.3	12.7	12.9	13.0	13.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	13.5	13.8	14.2	14.5	14.9	15.1	15.4	15.6	15.9	16.3	16.6	16.8	16.9	17.1	17.3	17.5	17.6	17.8	18.0	18.1
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	18.3	18.4	18.5	18.5	18.6	18.6	18.6	18.7	18.7	18.7	18.8	18.8	18.9	18.9	18.9	19.0	19.0	19.1	19.1	19.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	19.3	19.4	19.5	19.7	19.8	19.9	20.1	20.2	20.4	20.6	20.7	20.9	21.1	21.3	21.5	21.8	22.0	22.2	22.4	22.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	22.8	24.0	25.2	26.1	27.0	28.3	29.7	30.7	31.0	31.7	32.1	32.3	32.4	32.6	32.8	32.9	33.1	33.2	33.2	33.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	32.6	31.6	28.8	21.9	13.3	7.6	4.5	3.0	2.3	2.0	1.9	1.8	1.8	1.8	1.9	1.9	2.0	2.1	2.1	2.2
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.7	3.8	3.9	4.0	4.1
λnm	5000																			
T	4.2																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (1.65) mm

ND3

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	1.2	1.6	1.8	2.2	2.2	2.5	3.0	3.0	2.9	2.7	2.6	2.6	2.7	2.8	2.9	2.9	2.9	2.7	2.5	2.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	2.6	2.8	3.0	3.1	3.3	3.4	3.7	4.3	5.2	6.5	7.8	9.1	10.1	10.9	11.6	12.1	12.5	12.9	13.2	13.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	13.6	13.8	14.0	14.1	14.1	14.2	14.1	14.1	14.1	14.0	13.9	13.8	13.7	13.5	13.4	13.3	13.2	13.1	13.0	12.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	12.8	12.7	12.7	12.6	12.6	12.5	12.5	12.5	12.5	12.6	12.6	12.7	13.0	13.2	13.6	14.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.533	1.522	1.516	1.513	1.511	1.509	1.508
P	0.915	0.918	0.919	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

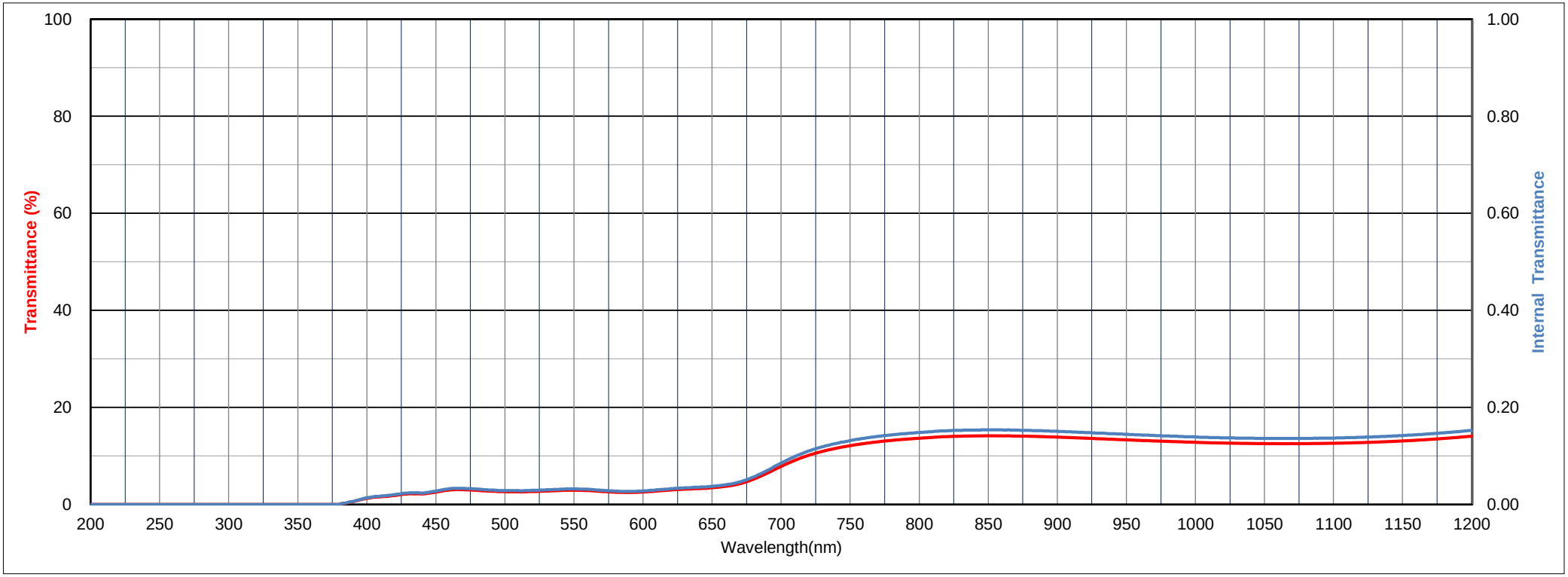
	x	y	Y	λ_d	P_e
A	0.460	0.405	3	600	7
C	0.319	0.325	3	578	5
D65	0.322	0.337	3	577	5

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	490	565	-	65	530	100	2.41

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
3±0.5	1.5 ±0.1



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The content of this catalog is accurate as of October ,2020

HOYA

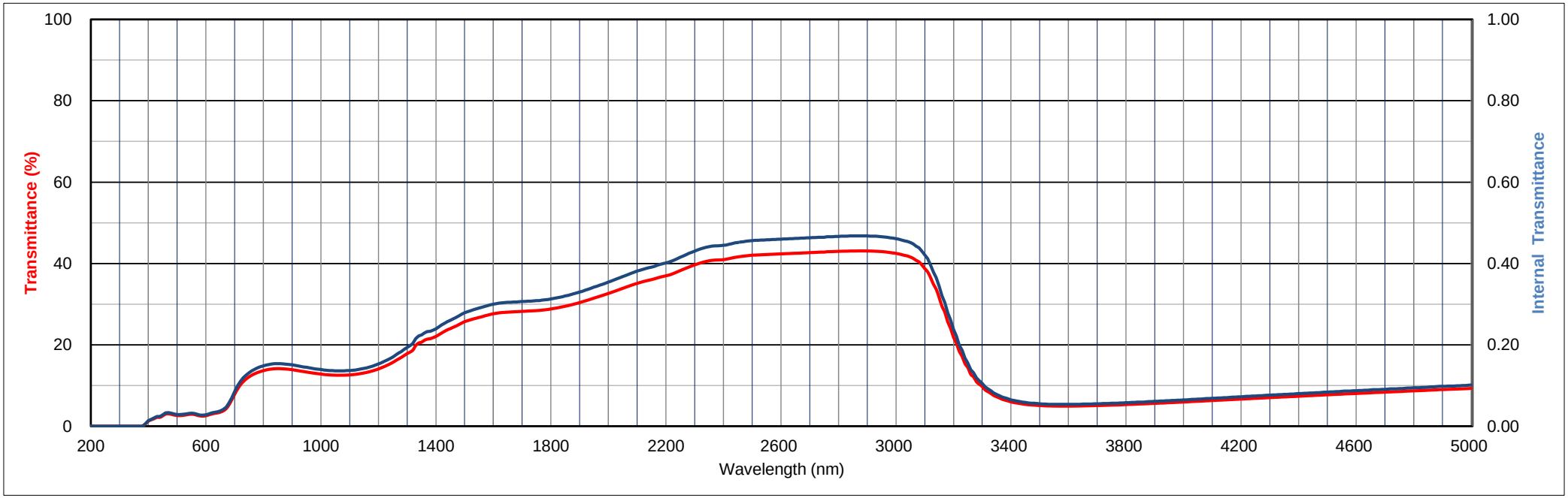
HOYA CORPORATION OPTICS SECTION

Thickness (1.65) mm

ND3

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	1.2	1.6	1.8	2.2	2.2	2.5	3.0	3.0	2.9	2.7	2.6	2.6	2.7	2.8	2.9	2.9	2.9	2.7	2.5	2.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	2.6	2.8	3.0	3.1	3.3	3.4	3.7	4.3	5.2	6.5	7.8	9.1	10.1	10.9	11.6	12.1	12.5	12.9	13.2	13.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	13.6	13.8	14.0	14.1	14.1	14.2	14.1	14.1	14.1	14.0	13.9	13.8	13.7	13.5	13.4	13.3	13.2	13.1	13.0	12.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	12.8	12.7	12.7	12.6	12.6	12.5	12.5	12.5	12.5	12.6	12.6	12.7	12.7	12.8	13.0	13.1	13.2	13.4	13.6	13.8
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	14.1	14.3	14.6	15.0	15.3	15.7	16.1	16.5	16.9	17.4	17.8	18.2	18.7	19.8	20.4	20.7	21.1	21.4	21.5	21.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	22.1	22.5	22.9	23.3	23.7	24.0	24.3	24.6	25.0	25.4	25.7	25.9	26.2	26.4	26.5	26.7	26.9	27.1	27.3	27.5
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	27.6	27.8	27.9	27.9	28.0	28.0	28.1	28.1	28.2	28.2	28.2	28.3	28.3	28.3	28.4	28.4	28.5	28.5	28.6	28.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	28.8	28.9	29.1	29.2	29.3	29.5	29.7	29.8	30.0	30.2	30.4	30.6	30.8	31.0	31.3	31.5	31.7	31.9	32.2	32.4
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	32.6	33.9	35.1	36.0	37.0	38.3	39.7	40.7	40.9	41.6	42.0	42.2	42.4	42.5	42.7	42.8	43.0	43.1	43.1	42.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	42.5	41.6	38.8	31.7	21.9	14.4	9.7	7.2	6.0	5.4	5.1	4.9	4.9	5.0	5.1	5.2	5.3	5.5	5.6	5.8
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	5.9	6.1	6.3	6.5	6.7	6.8	7.0	7.2	7.4	7.5	7.7	7.9	8.0	8.2	8.4	8.5	8.7	8.9	9.0	9.1
λnm	5000																			
T	9.3																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness	(1.41)	mm

ND5

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	2.3	2.8	3.3	3.8	3.8	4.3	4.9	5.0	4.8	4.6	4.4	4.4	4.5	4.6	4.8	4.9	4.8	4.5	4.3	4.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	4.3	4.6	4.9	5.1	5.3	5.6	6.0	6.7	7.9	9.5	11.2	12.7	14.0	14.9	15.7	16.3	16.8	17.2	17.5	17.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	18.0	18.2	18.4	18.5	18.6	18.6	18.6	18.5	18.5	18.4	18.3	18.2	18.0	17.9	17.8	17.6	17.5	17.4	17.3	17.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	17.1	17.0	16.9	16.8	16.8	16.8	16.7	16.8	16.8	16.8	16.8	17.0	17.2	17.5	18.0	18.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.538	1.524	1.516	1.512	1.509	1.507	1.506
P	0.914	0.917	0.919	0.920	0.921	0.921	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

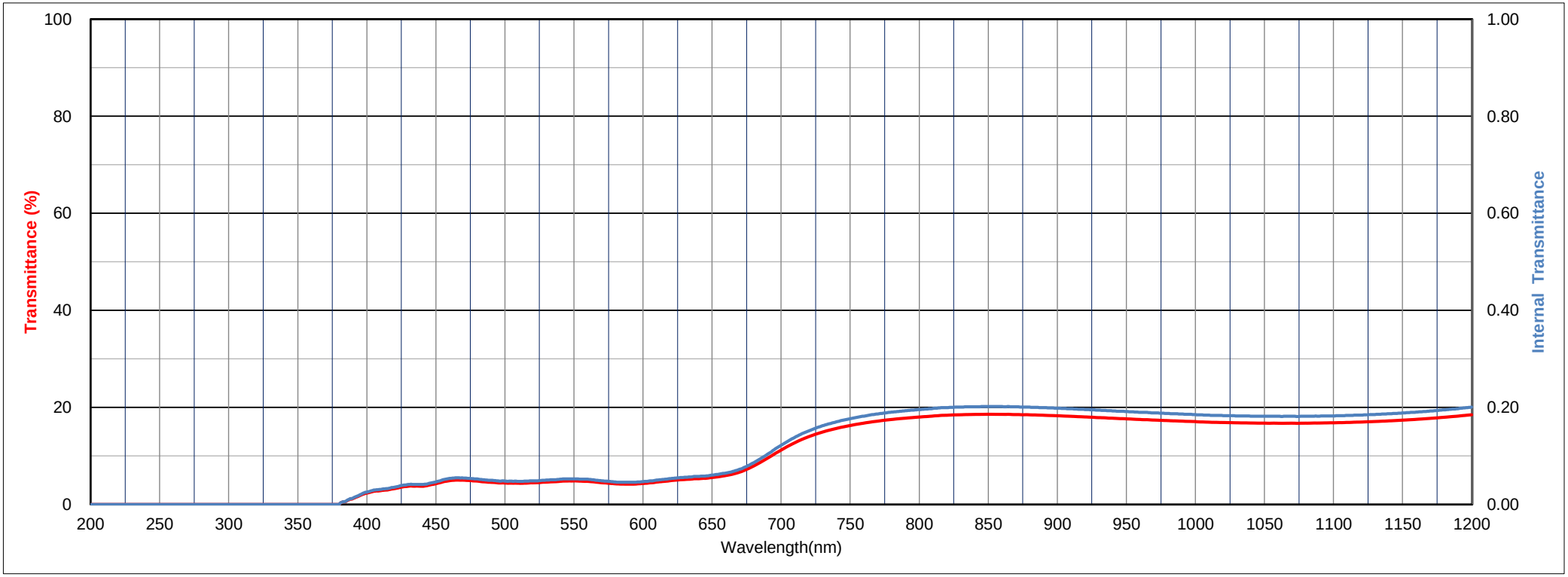
	x	y	Y	λ_d	P_e
A	0.458	0.406	5	599	6
C	0.318	0.324	5	577	4
D65	0.320	0.337	5	577	4

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	490	565	-	65	530	100	2.41

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
5±1	1.3±0.1



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HOYA

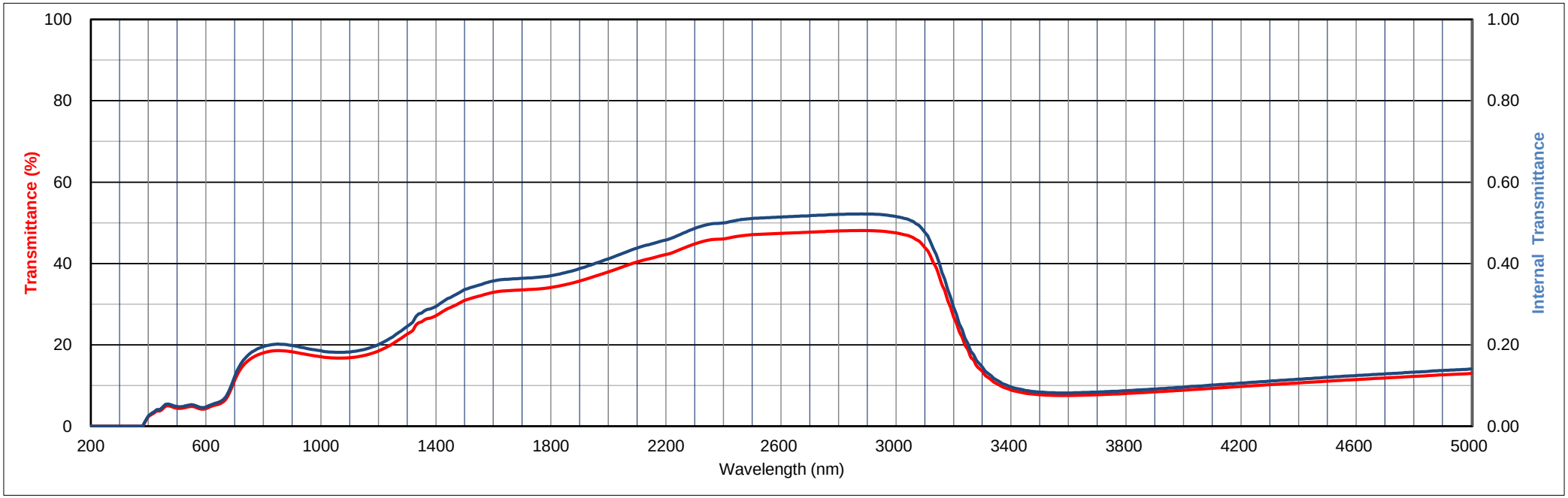
HOYA CORPORATION OPTICS SECTION

Thickness (1.41) mm

ND5

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	2.3	2.8	3.3	3.8	3.8	4.3	4.9	5.0	4.8	4.6	4.4	4.4	4.5	4.6	4.8	4.9	4.8	4.5	4.3	4.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	4.3	4.6	4.9	5.1	5.3	5.6	6.0	6.7	7.9	9.5	11.2	12.7	14.0	14.9	15.7	16.3	16.8	17.2	17.5	17.8
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	18.0	18.2	18.4	18.5	18.6	18.6	18.6	18.5	18.5	18.4	18.3	18.2	18.0	17.9	17.8	17.6	17.5	17.4	17.3	17.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	17.1	17.0	16.9	16.8	16.8	16.8	16.7	16.8	16.8	16.8	16.8	16.9	17.0	17.1	17.2	17.4	17.5	17.7	18.0	18.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	18.5	18.8	19.1	19.5	19.9	20.3	20.7	21.2	21.6	22.1	22.6	23.0	23.6	24.8	25.4	25.7	26.1	26.5	26.6	26.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	27.2	27.6	28.0	28.5	28.9	29.2	29.5	29.8	30.2	30.6	30.9	31.2	31.4	31.6	31.8	32.0	32.2	32.4	32.6	32.8
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	32.9	33.0	33.1	33.2	33.3	33.3	33.4	33.4	33.4	33.5	33.5	33.5	33.6	33.6	33.7	33.7	33.8	33.8	33.9	34.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	34.1	34.2	34.3	34.5	34.6	34.8	35.0	35.1	35.3	35.5	35.7	35.9	36.1	36.3	36.6	36.8	37.0	37.2	37.5	37.7
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	37.9	39.2	40.4	41.3	42.2	43.5	44.8	45.8	46.0	46.7	47.1	47.3	47.4	47.6	47.7	47.8	48.0	48.1	48.1	47.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	47.5	46.6	43.9	37.0	27.0	18.8	13.5	10.5	8.9	8.1	7.7	7.6	7.6	7.6	7.7	7.9	8.0	8.2	8.4	8.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	8.9	9.1	9.3	9.5	9.8	10.0	10.2	10.4	10.6	10.8	11.1	11.3	11.5	11.7	11.8	12.0	12.2	12.4	12.6	12.8
λnm	5000																			
T	13.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.75) mm

ND10

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.7	3.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	6.4	6.5	6.7	7.6	7.5	8.8	10.4	10.7	10.4	10.1	10.0	10.1	10.3	10.6	11.1	11.4	11.6	11.2	10.4	9.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	9.5	9.8	10.1	10.2	10.0	9.8	9.9	10.3	11.3	12.6	13.7	14.4	14.6	14.4	14.0	13.5	12.9	12.3	11.7	11.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	10.7	10.2	9.9	9.5	9.1	8.8	8.5	8.3	8.0	7.8	7.5	7.3	7.1	6.9	6.7	6.5	6.3	6.2	6.0	5.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	5.7	5.6	5.5	5.4	5.3	5.2	5.1	5.0	5.0	4.9	4.9	4.8	4.8	4.8	4.9	5.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.529	1.520	1.516	1.513	1.512	1.511	1.510
P	0.916	0.918	0.919	0.920	0.920	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

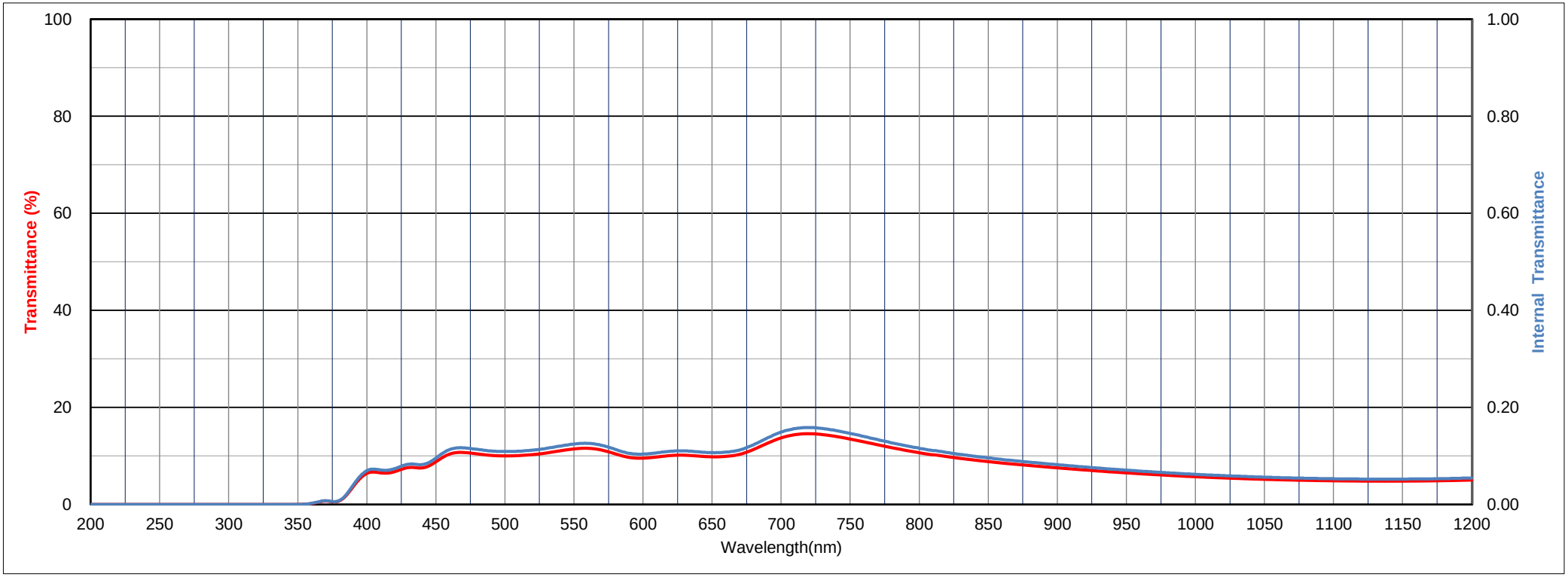
	x	y	Y	λ_d	P_e
A	0.447	0.420	11	569	8
C	0.316	0.340	11	562	8
D65	0.318	0.352	11	561	8

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	3	490	565	-	65	530	100	2.41

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
10±2	1±0.1



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HOYA

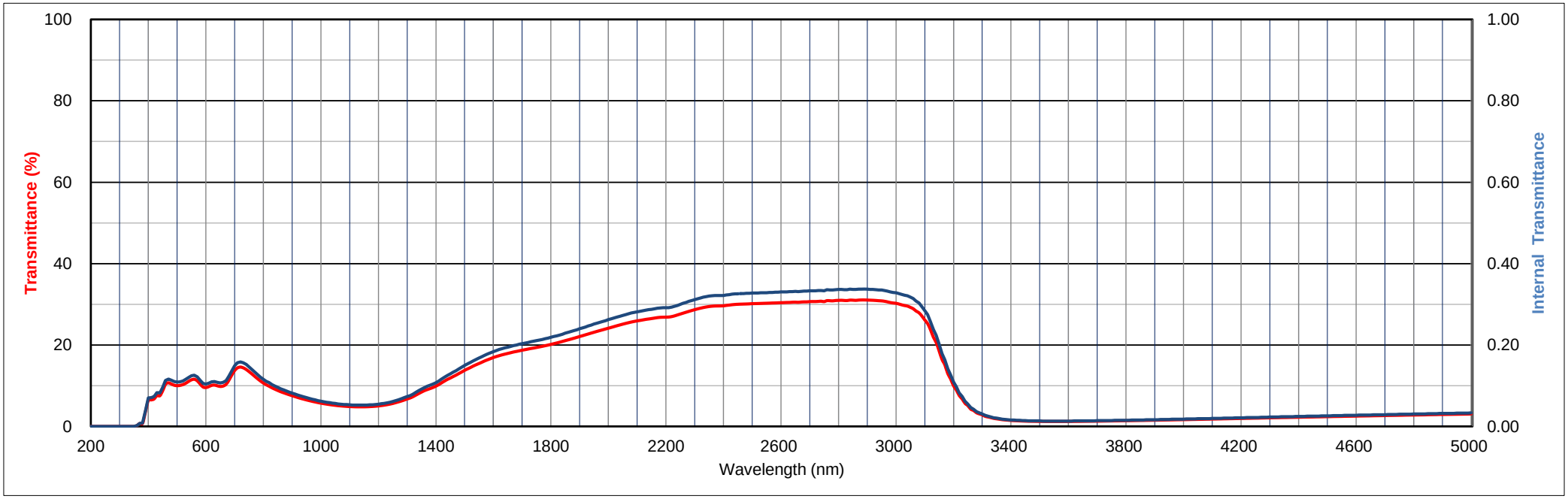
HOYA CORPORATION OPTICS SECTION

Thickness (2.75) mm

ND10

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.7	3.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	6.4	6.5	6.7	7.6	7.5	8.8	10.4	10.7	10.4	10.1	10.0	10.1	10.3	10.6	11.1	11.4	11.6	11.2	10.4	9.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	9.5	9.8	10.1	10.2	10.0	9.8	9.9	10.3	11.3	12.6	13.7	14.4	14.6	14.4	14.0	13.5	12.9	12.3	11.7	11.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	10.7	10.2	9.9	9.5	9.1	8.8	8.5	8.3	8.0	7.8	7.5	7.3	7.1	6.9	6.7	6.5	6.3	6.2	6.0	5.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	5.7	5.6	5.5	5.4	5.3	5.2	5.1	5.0	5.0	4.9	4.9	4.8	4.8	4.8	4.8	4.8	4.8	4.9	4.9	5.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	5.0	5.1	5.2	5.3	5.5	5.6	5.8	6.0	6.2	6.5	6.7	7.0	7.3	7.7	8.1	8.4	8.8	9.1	9.3	9.6
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	9.9	10.3	10.7	11.1	11.6	11.9	12.3	12.6	13.0	13.4	13.8	14.1	14.5	14.8	15.2	15.5	15.8	16.1	16.4	16.7
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	16.9	17.2	17.4	17.6	17.8	17.9	18.1	18.3	18.4	18.6	18.7	18.9	19.0	19.1	19.3	19.4	19.5	19.7	19.8	20.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	20.1	20.3	20.5	20.7	20.9	21.1	21.3	21.5	21.7	21.9	22.1	22.3	22.5	22.7	22.9	23.1	23.3	23.5	23.7	23.9
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	24.1	25.1	25.9	26.5	26.8	27.6	28.7	29.5	29.6	30.0	30.2	30.3	30.4	30.5	30.7	30.7	31.0	31.0	31.0	30.8
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	30.2	29.2	26.2	18.6	10.0	5.1	2.8	1.9	1.5	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.4	1.5	1.5	1.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	1.7	1.7	1.8	1.9	2.0	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.5	2.6	2.7	2.7	2.8	2.9	2.9	3.0
λnm	5000																			
T	3.1																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.42) mm

ND13

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.3	1.3	5.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	8.8	8.9	9.2	10.2	10.2	11.6	13.5	13.9	13.5	13.2	13.1	13.1	13.4	13.7	14.3	14.7	14.8	14.4	13.5	12.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	12.5	12.8	13.1	13.2	13.0	12.8	13.0	13.4	14.6	16.0	17.2	18.0	18.2	18.0	17.6	17.0	16.3	15.7	15.0	14.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	13.8	13.3	12.9	12.5	12.1	11.7	11.4	11.1	10.8	10.5	10.2	9.9	9.7	9.4	9.2	8.9	8.7	8.5	8.3	8.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	8.0	7.8	7.7	7.6	7.4	7.3	7.2	7.1	7.1	7.0	6.9	6.9	6.9	6.9	7.0	7.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.539	1.523	1.516	1.512	1.509	1.508	1.507
P	0.914	0.918	0.919	0.920	0.921	0.921	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

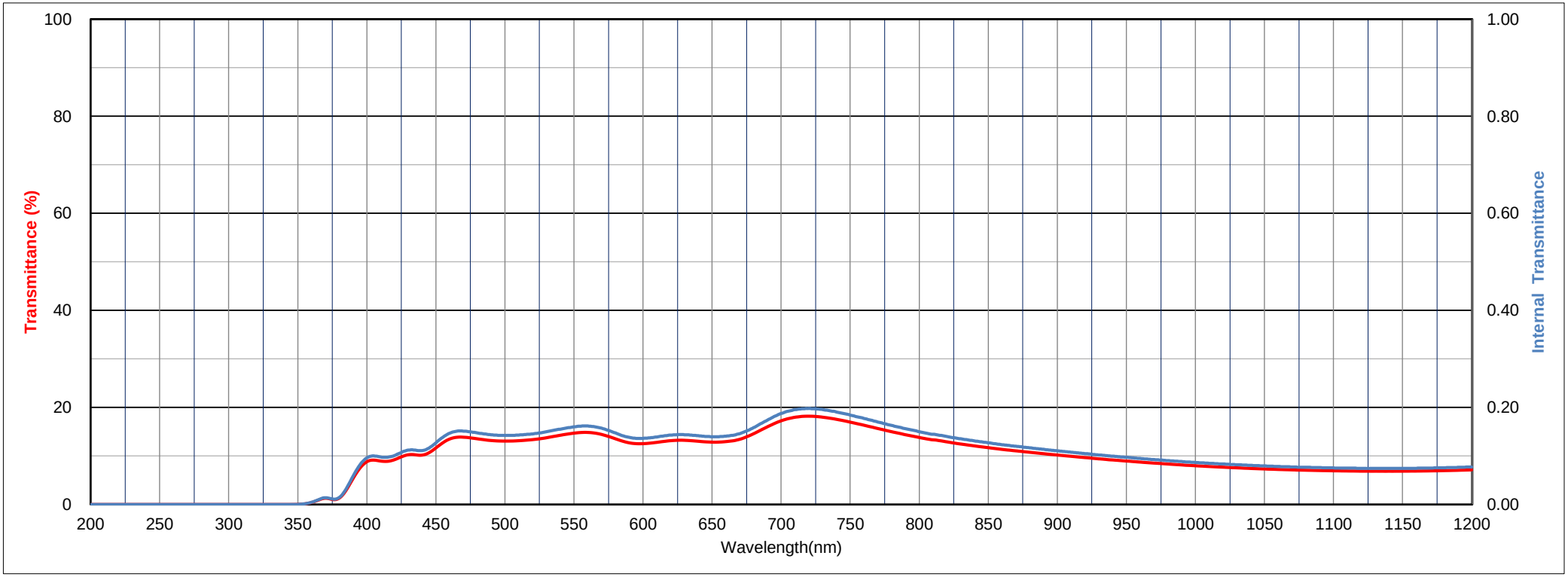
	x	y	Y	λ_d	P_e
A	0.447	0.419	14	569	7
C	0.315	0.337	14	562	7
D65	0.318	0.350	14	561	7

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	535	595	58	68	530	100	2.43

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
12.5±2	0.90±0.1



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HOYA

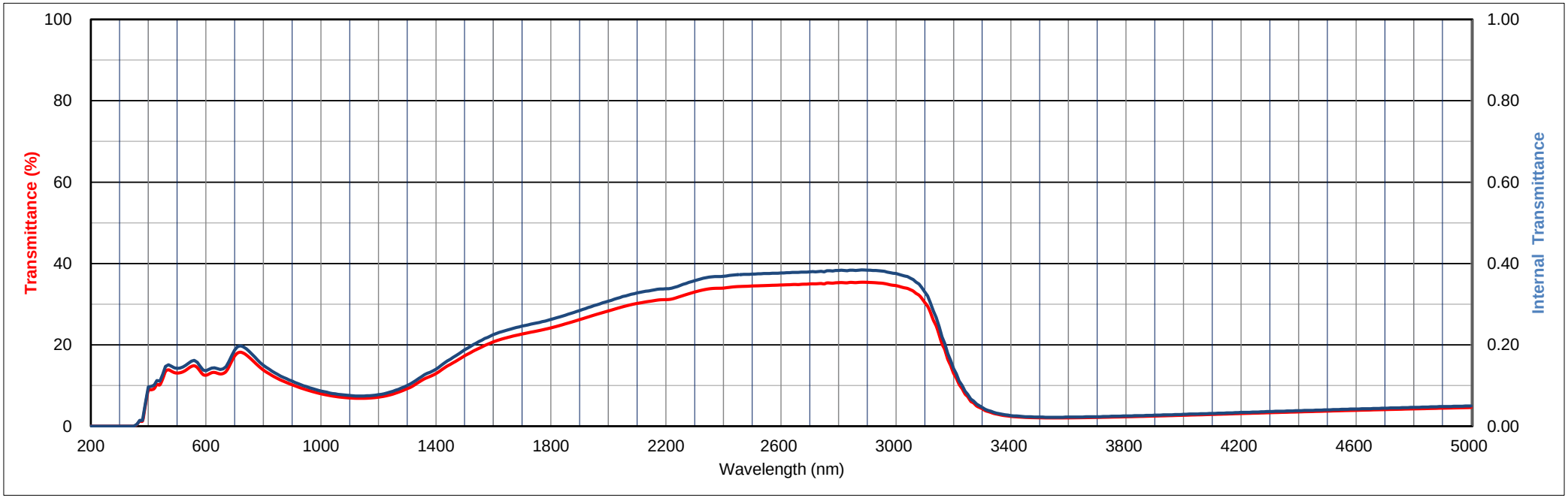
HOYA CORPORATION OPTICS SECTION

Thickness (2.42) mm

ND13

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.3	1.3	5.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	8.8	8.9	9.2	10.2	10.2	11.6	13.5	13.9	13.5	13.2	13.1	13.1	13.4	13.7	14.3	14.7	14.8	14.4	13.5	12.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	12.5	12.8	13.1	13.2	13.0	12.8	13.0	13.4	14.6	16.0	17.2	18.0	18.2	18.0	17.6	17.0	16.3	15.7	15.0	14.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	13.8	13.3	12.9	12.5	12.1	11.7	11.4	11.1	10.8	10.5	10.2	9.9	9.7	9.4	9.2	8.9	8.7	8.5	8.3	8.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	8.0	7.8	7.7	7.6	7.4	7.3	7.2	7.1	7.1	7.0	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	7.0	7.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	7.1	7.2	7.4	7.5	7.7	7.9	8.1	8.4	8.6	8.9	9.2	9.5	9.9	10.3	10.8	11.2	11.6	12.0	12.2	12.6
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	12.9	13.4	13.9	14.4	14.8	15.2	15.6	16.0	16.4	16.9	17.3	17.7	18.1	18.5	18.8	19.1	19.5	19.8	20.1	20.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	20.7	21.0	21.2	21.4	21.6	21.8	22.0	22.2	22.3	22.5	22.7	22.8	23.0	23.1	23.2	23.4	23.5	23.7	23.8	24.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	24.2	24.4	24.5	24.7	24.9	25.2	25.4	25.6	25.8	26.0	26.2	26.4	26.6	26.9	27.1	27.3	27.5	27.7	27.9	28.1
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	28.3	29.4	30.2	30.8	31.1	31.9	33.0	33.8	33.9	34.3	34.5	34.6	34.7	34.8	35.0	35.0	35.3	35.3	35.4	35.2
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	34.6	33.6	30.4	22.5	13.1	7.2	4.3	3.0	2.4	2.2	2.1	2.0	2.1	2.1	2.2	2.2	2.3	2.4	2.5	2.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.3	4.4	4.5
λnm	5000																			
T	4.6																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.24) mm

ND15

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.8	1.8	6.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	10.5	10.6	10.9	12.0	12.0	13.6	15.5	15.9	15.6	15.2	15.1	15.2	15.4	15.8	16.4	16.8	17.0	16.6	15.6	14.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	14.5	14.8	15.2	15.3	15.1	14.9	15.0	15.5	16.7	18.2	19.5	20.3	20.5	20.3	19.8	19.2	18.6	17.8	17.1	16.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	15.9	15.4	14.9	14.4	14.0	13.6	13.3	12.9	12.6	12.3	12.0	11.7	11.4	11.1	10.9	10.6	10.4	10.2	10.0	9.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	9.6	9.4	9.2	9.1	8.9	8.8	8.7	8.6	8.5	8.5	8.4	8.3	8.3	8.3	8.4	8.6				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.538	1.527	1.521	1.518	1.515	1.514	1.513
P	0.914	0.917	0.918	0.919	0.919	0.920	0.920

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

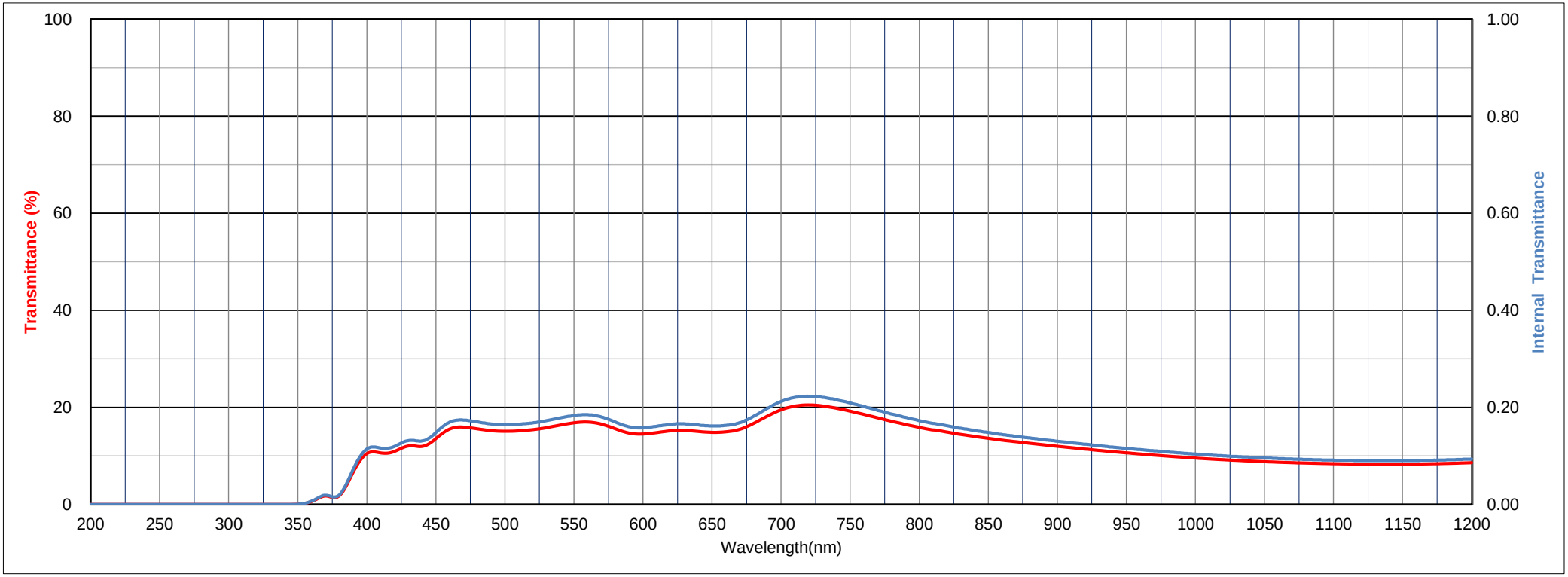
	x	y	Y	λ_d	P_e
A	0.447	0.418	16	569	7
C	0.315	0.336	16	562	7
D65	0.317	0.348	16	561	7

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	535	595	58	68	530	100	2.43

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
15±2	0.82±0.1



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HOYA

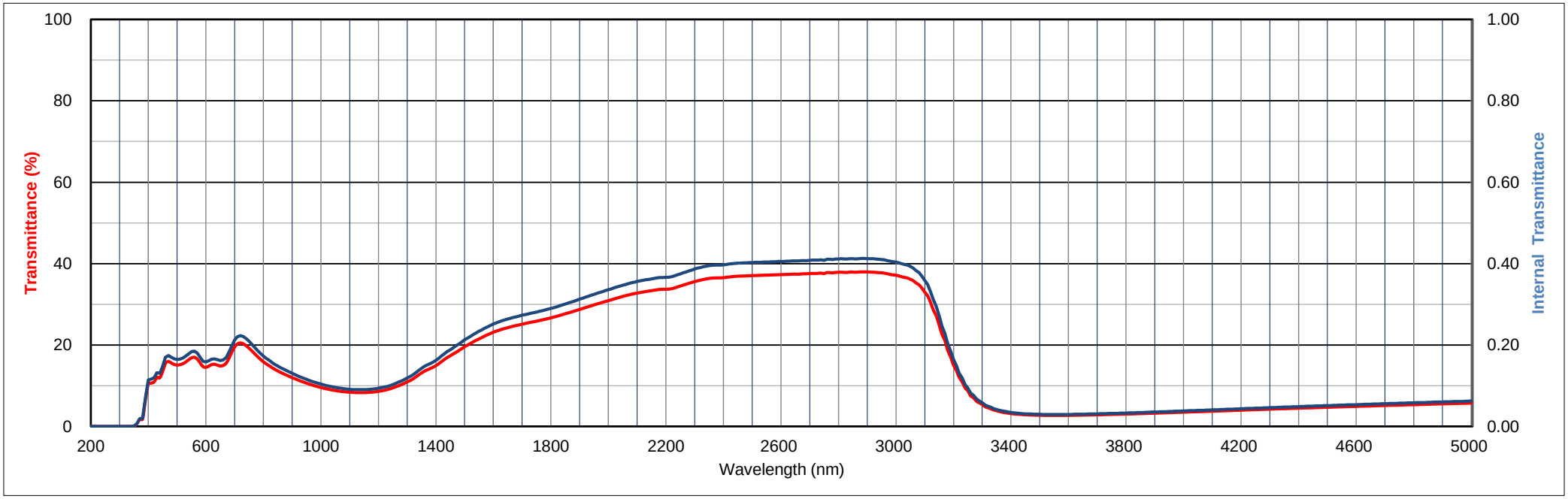
HOYA CORPORATION OPTICS SECTION

Thickness (2.24) mm

ND15

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.8	1.8	6.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	10.5	10.6	10.9	12.0	12.0	13.6	15.5	15.9	15.6	15.2	15.1	15.2	15.4	15.8	16.4	16.8	17.0	16.6	15.6	14.7
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	14.5	14.8	15.2	15.3	15.1	14.9	15.0	15.5	16.7	18.2	19.5	20.3	20.5	20.3	19.8	19.2	18.6	17.8	17.1	16.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	15.9	15.4	14.9	14.4	14.0	13.6	13.3	12.9	12.6	12.3	12.0	11.7	11.4	11.1	10.9	10.6	10.4	10.2	10.0	9.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	9.6	9.4	9.2	9.1	8.9	8.8	8.7	8.6	8.5	8.5	8.4	8.4	8.3	8.3	8.3	8.3	8.3	8.4	8.4	8.5
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	8.6	8.7	8.9	9.0	9.2	9.5	9.7	10.0	10.3	10.6	10.9	11.2	11.7	12.2	12.7	13.1	13.6	13.9	14.2	14.5
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	14.9	15.4	16.0	16.5	17.0	17.3	17.8	18.2	18.7	19.1	19.6	20.0	20.4	20.8	21.2	21.5	21.8	22.2	22.5	22.8
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	23.1	23.4	23.6	23.9	24.1	24.3	24.5	24.6	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	26.0	26.2	26.3	26.5
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	26.7	26.9	27.1	27.3	27.5	27.7	27.9	28.1	28.3	28.5	28.8	29.0	29.2	29.4	29.6	29.9	30.1	30.3	30.5	30.7
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	30.9	31.9	32.8	33.4	33.7	34.5	35.6	36.4	36.5	36.9	37.1	37.2	37.3	37.4	37.6	37.6	37.9	37.9	37.9	37.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	37.1	36.1	33.0	24.9	15.1	8.7	5.4	3.8	3.1	2.9	2.7	2.7	2.7	2.8	2.8	2.9	3.0	3.1	3.3	3.4
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	3.5	3.6	3.7	3.9	4.0	4.1	4.2	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6
λnm	5000																			
T	5.7																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (3.06) mm

ND20

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	2.6	2.3	9.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	14.8	14.7	14.9	16.4	16.3	18.5	21.3	21.9	21.6	21.2	21.1	21.3	21.5	21.9	22.4	23.0	23.2	22.7	21.4	20.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	19.8	19.9	20.1	20.0	19.5	19.0	18.9	19.2	20.2	21.3	22.0	22.2	21.8	21.1	20.1	19.0	17.9	16.9	15.9	15.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	14.2	13.6	13.0	12.4	11.9	11.5	11.0	10.6	10.3	10.0	9.6	9.4	9.0	8.8	8.5	8.3	8.1	7.9	7.7	7.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	7.3	7.1	7.0	6.9	6.8	6.6	6.5	6.5	6.4	6.3	6.3	6.2	6.2	6.2	6.3	6.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.533	1.520	1.513	1.509	1.506	1.504	1.503
P	0.915	0.918	0.920	0.921	0.922	0.922	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

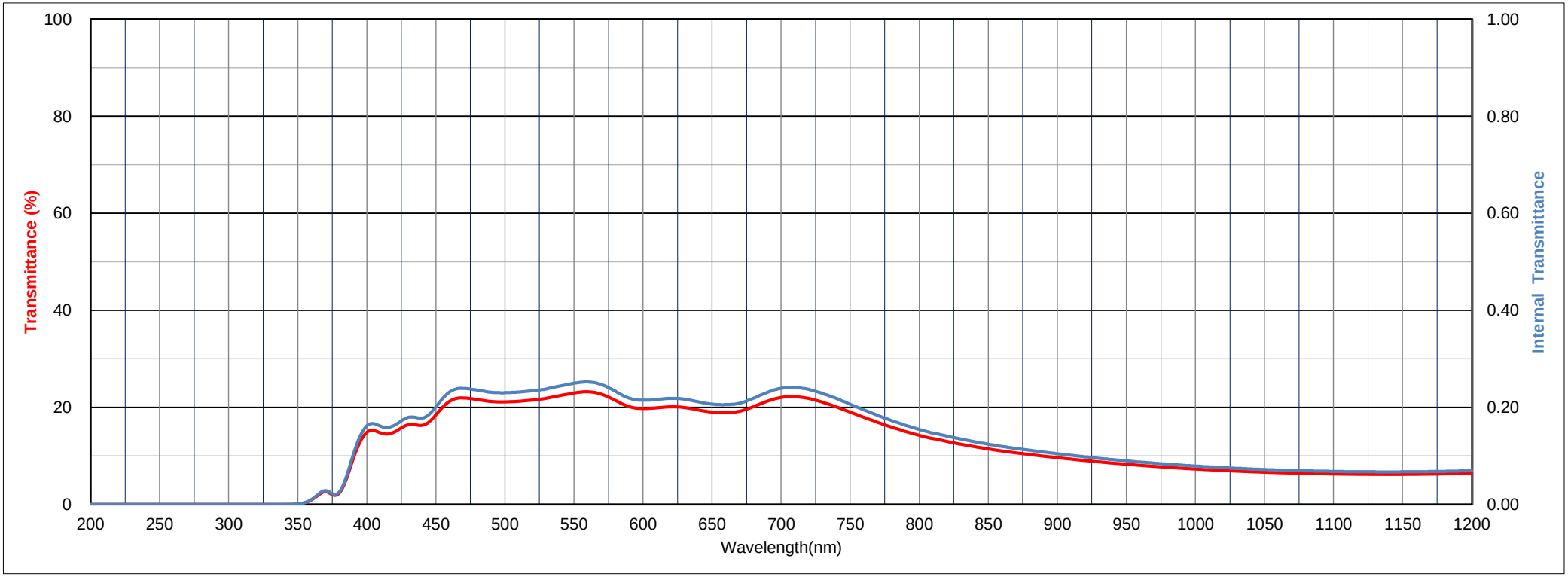
	x	y	Y	λ_d	P_e
A	0.443	0.420	21	559	6
C	0.312	0.337	22	556	6
D65	0.314	0.349	22	555	6

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	535	595	58	68	530	100	2.43

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
20±2	0.70±0.05



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HOYA

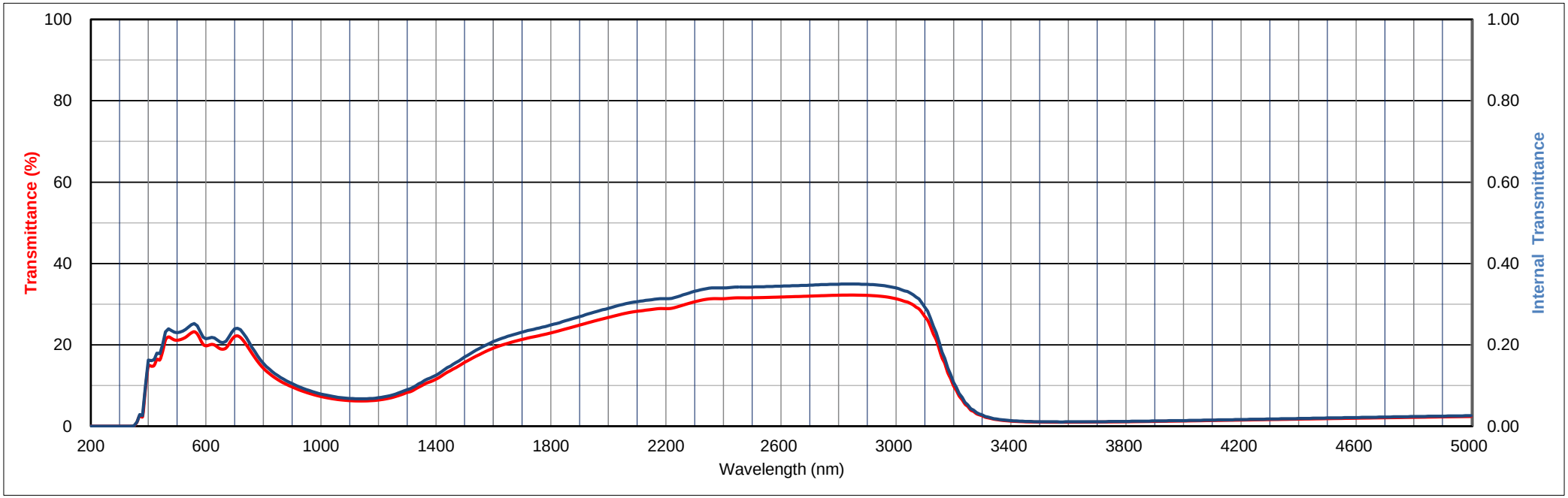
HOYA CORPORATION OPTICS SECTION

Thickness (3.06) mm

ND20

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	2.6	2.3	9.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	14.8	14.7	14.9	16.4	16.3	18.5	21.3	21.9	21.6	21.2	21.1	21.3	21.5	21.9	22.4	23.0	23.2	22.7	21.4	20.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	19.8	19.9	20.1	20.0	19.5	19.0	18.9	19.2	20.2	21.3	22.0	22.2	21.8	21.1	20.1	19.0	17.9	16.9	15.9	15.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	14.2	13.6	13.0	12.4	11.9	11.5	11.0	10.6	10.3	10.0	9.6	9.4	9.0	8.8	8.5	8.3	8.1	7.9	7.7	7.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	7.3	7.1	7.0	6.9	6.8	6.6	6.5	6.5	6.4	6.3	6.3	6.2	6.2	6.2	6.2	6.2	6.2	6.3	6.3	6.4
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	6.4	6.5	6.6	6.8	6.9	7.1	7.3	7.5	7.8	8.0	8.3	8.5	8.8	9.2	9.6	9.9	10.3	10.7	10.9	11.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	11.6	11.9	12.4	12.8	13.3	13.6	14.1	14.4	14.8	15.3	15.7	16.1	16.5	16.9	17.2	17.6	17.9	18.3	18.6	18.9
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	19.2	19.5	19.7	20.0	20.2	20.4	20.6	20.8	21.0	21.2	21.3	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	22.9	23.1	23.3	23.5	23.7	23.9	24.1	24.3	24.5	24.7	24.9	25.1	25.2	25.5	25.6	25.8	26.0	26.2	26.4	26.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	26.7	27.6	28.3	28.7	28.9	29.6	30.6	31.3	31.3	31.6	31.6	31.7	31.8	31.9	32.0	32.1	32.2	32.2	32.2	31.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	31.3	30.2	27.0	19.0	9.9	4.8	2.6	1.6	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	1.3	1.3	1.4	1.5	1.5	1.6	1.6	1.7	1.7	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3
λnm	5000																			
T	2.4																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.61) mm

ND25

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.9	4.4	4.0	13.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	19.4	19.3	19.5	21.2	21.0	23.4	26.4	27.1	26.7	26.3	26.2	26.4	26.6	27.0	27.6	28.2	28.4	27.9	26.6	25.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	24.8	24.9	25.2	25.0	24.5	24.0	23.9	24.2	25.2	26.4	27.2	27.4	27.0	26.2	25.1	24.0	22.8	21.7	20.6	19.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	18.7	18.0	17.3	16.7	16.1	15.6	15.1	14.6	14.2	13.8	13.4	13.1	12.7	12.4	12.1	11.8	11.5	11.3	11.0	10.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	10.6	10.4	10.2	10.1	9.9	9.8	9.7	9.6	9.5	9.4	9.3	9.2	9.2	9.2	9.3	9.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.536	1.523	1.516	1.512	1.510	1.508	1.507
P	0.915	0.918	0.919	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

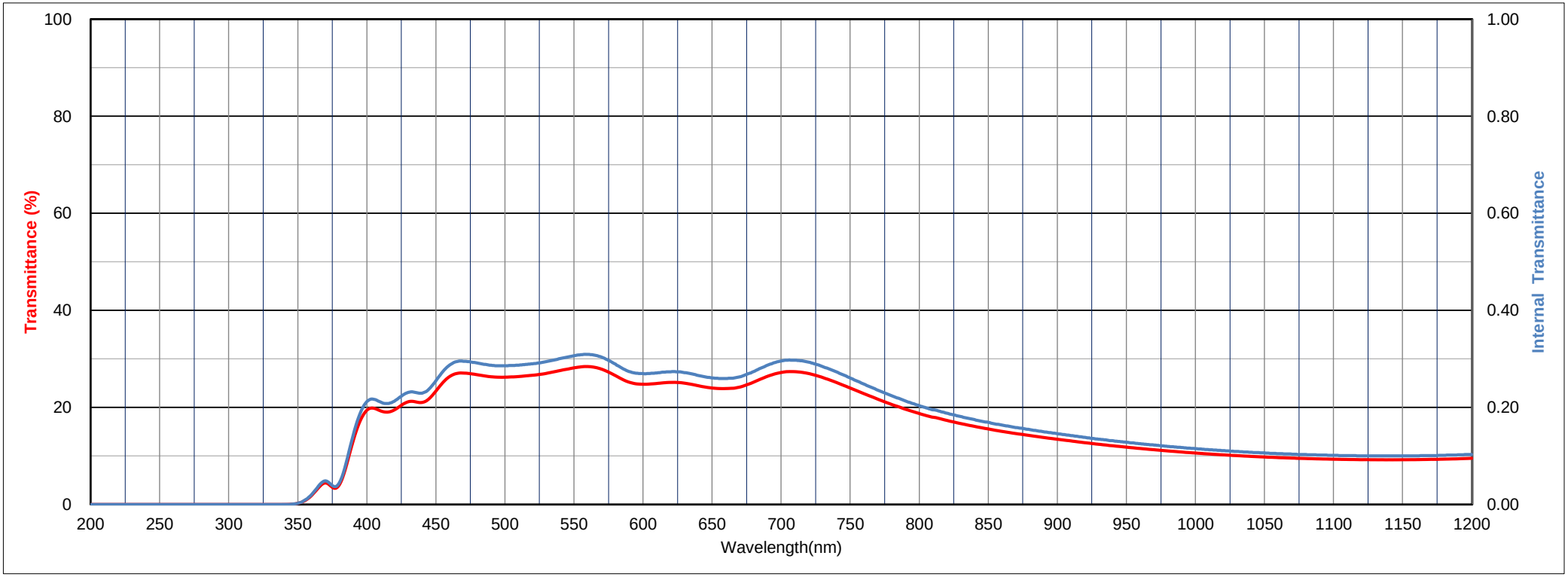
	x	y	Y	λ_d	P_e
A	0.444	0.418	26	559	5
C	0.312	0.334	27	556	5
D65	0.314	0.346	27	555	5

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	2	535	600	62	66	550	100	2.42

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
25±2.5	0.60±0.05



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The content of this catalog is accurate as of October ,2020

HOYA

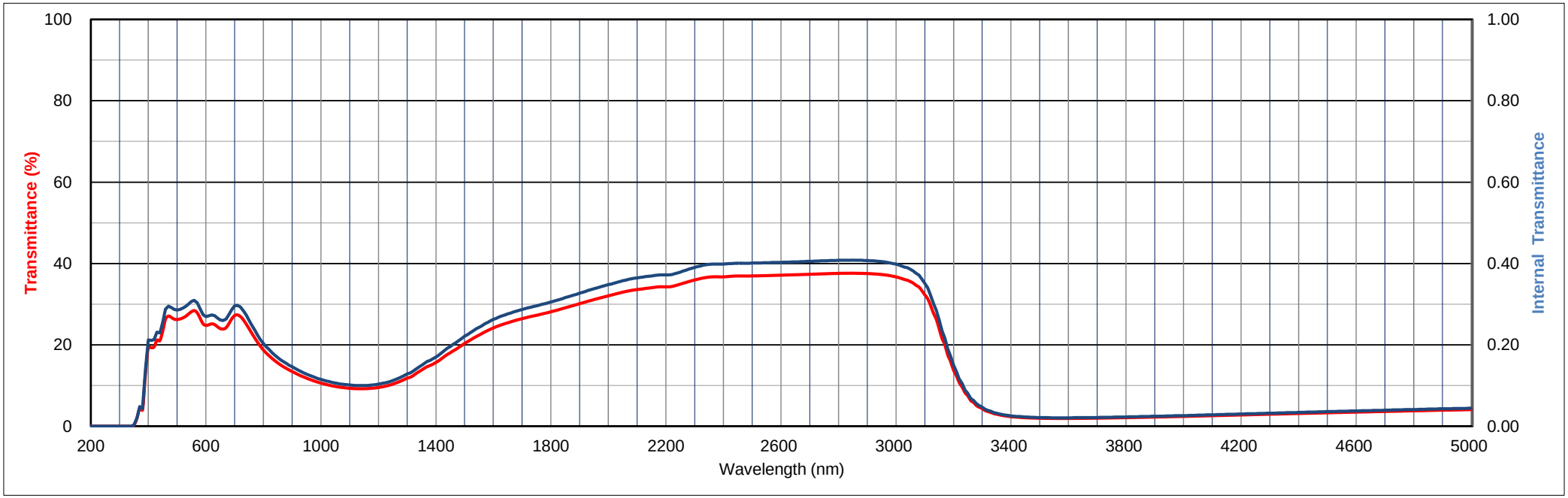
HOYA CORPORATION OPTICS SECTION

Thickness (2.61) mm

ND25

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.9	4.4	4.0	13.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	19.4	19.3	19.5	21.2	21.0	23.4	26.4	27.1	26.7	26.3	26.2	26.4	26.6	27.0	27.6	28.2	28.4	27.9	26.6	25.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	24.8	24.9	25.2	25.0	24.5	24.0	23.9	24.2	25.2	26.4	27.2	27.4	27.0	26.2	25.1	24.0	22.8	21.7	20.6	19.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	18.7	18.0	17.3	16.7	16.1	15.6	15.1	14.6	14.2	13.8	13.4	13.1	12.7	12.4	12.1	11.8	11.5	11.3	11.0	10.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	10.6	10.4	10.2	10.1	9.9	9.8	9.7	9.6	9.5	9.4	9.3	9.3	9.2	9.2	9.2	9.2	9.2	9.3	9.3	9.4
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	9.5	9.6	9.8	9.9	10.1	10.3	10.6	10.9	11.2	11.5	11.8	12.0	12.4	12.9	13.4	13.8	14.2	14.6	14.9	15.3
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	15.7	16.1	16.6	17.2	17.6	18.1	18.5	18.9	19.4	19.9	20.4	20.8	21.2	21.6	22.0	22.4	22.8	23.2	23.5	23.9
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	24.2	24.5	24.7	25.0	25.2	25.4	25.6	25.9	26.1	26.3	26.4	26.6	26.8	27.0	27.1	27.3	27.4	27.6	27.8	27.9
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	28.1	28.3	28.5	28.7	28.9	29.1	29.3	29.5	29.7	29.9	30.1	30.3	30.5	30.7	30.9	31.1	31.3	31.5	31.7	31.9
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	32.1	33.0	33.6	34.0	34.3	34.9	36.0	36.7	36.7	36.9	36.9	37.0	37.1	37.2	37.3	37.5	37.6	37.6	37.5	37.3
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	36.7	35.5	32.3	24.0	13.8	7.5	4.3	2.9	2.3	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.1	2.2	2.2	2.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	2.4	2.5	2.6	2.7	2.8	2.9	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.5	3.6	3.7	3.8	3.9	3.9	4.0
λnm	5000																			
T	4.1																			



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The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.24) mm

ND30

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	3.2	6.8	6.2	17.1
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	24.2	24.0	24.3	26.0	25.9	28.4	31.5	32.2	31.8	31.4	31.3	31.5	31.7	32.1	32.7	33.3	33.6	33.0	31.7	30.3
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	29.8	30.0	30.2	30.1	29.5	29.0	28.9	29.2	30.3	31.5	32.3	32.5	32.1	31.3	30.2	29.0	27.8	26.6	25.5	24.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	23.5	22.7	22.0	21.2	20.6	20.0	19.5	19.0	18.5	18.1	17.7	17.3	16.8	16.5	16.1	15.8	15.5	15.2	14.9	14.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	14.4	14.2	14.0	13.8	13.6	13.4	13.3	13.2	13.1	13.0	12.9	12.8	12.8	12.8	12.9	13.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.538	1.524	1.517	1.513	1.510	1.508	1.507
P	0.914	0.917	0.919	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

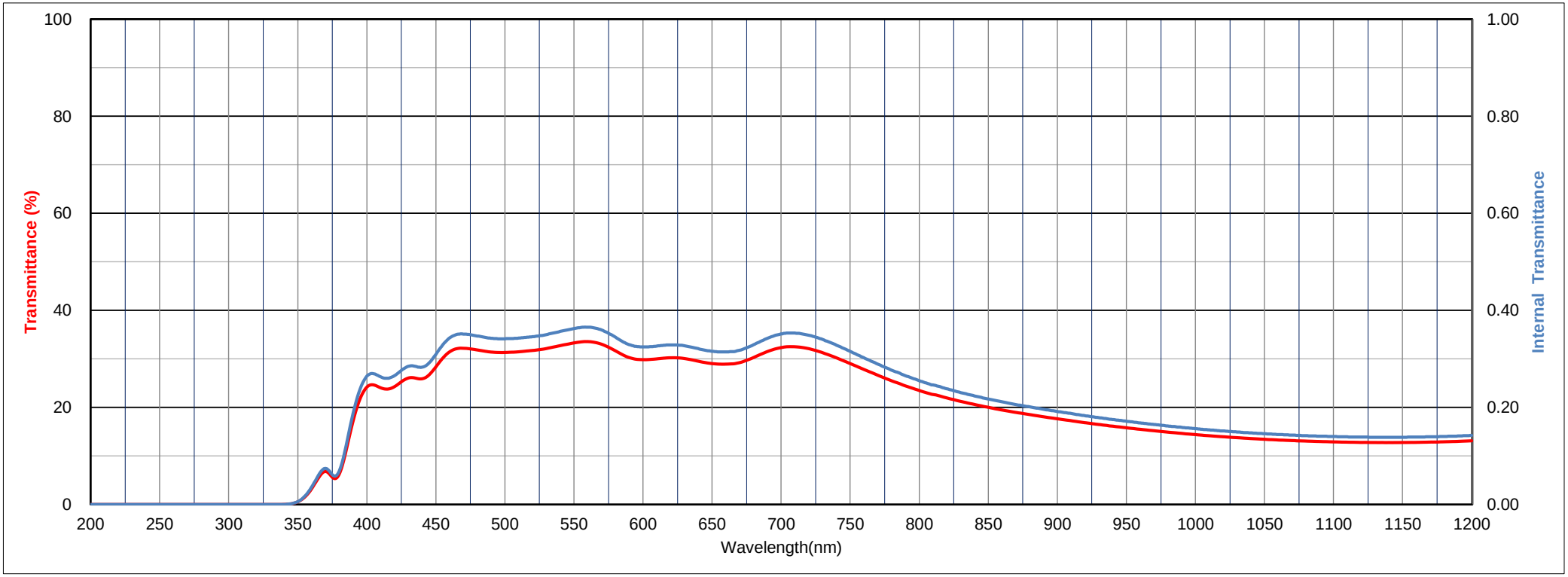
	x	y	Y	λ_d	P_e
A	0.444	0.417	32	560	4
C	0.312	0.332	32	556	5
D65	0.314	0.344	32	556	5

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	2	535	600	62	66	550	100	2.42

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
30±3	0.52±0.05



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HOYA

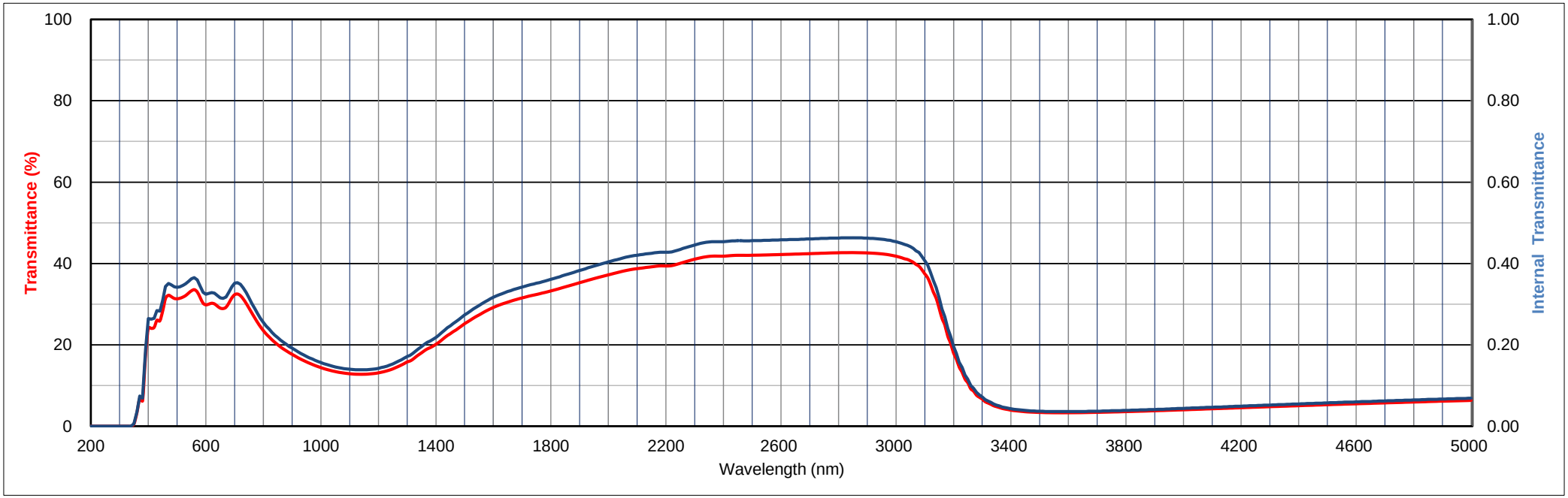
HOYA CORPORATION OPTICS SECTION

Thickness (2.24) mm

ND30

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	3.2	6.8	6.2	17.1
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	24.2	24.0	24.3	26.0	25.9	28.4	31.5	32.2	31.8	31.4	31.3	31.5	31.7	32.1	32.7	33.3	33.6	33.0	31.7	30.3
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	29.8	30.0	30.2	30.1	29.5	29.0	28.9	29.2	30.3	31.5	32.3	32.5	32.1	31.3	30.2	29.0	27.8	26.6	25.5	24.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	23.5	22.7	22.0	21.2	20.6	20.0	19.5	19.0	18.5	18.1	17.7	17.3	16.8	16.5	16.1	15.8	15.5	15.2	14.9	14.6
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	14.4	14.2	14.0	13.8	13.6	13.4	13.3	13.2	13.1	13.0	12.9	12.8	12.8	12.8	12.8	12.8	12.8	12.9	12.9	13.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	13.1	13.3	13.4	13.6	13.8	14.1	14.4	14.7	15.0	15.4	15.8	16.0	16.5	17.0	17.6	18.0	18.6	19.0	19.3	19.7
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	20.1	20.6	21.2	21.8	22.3	22.7	23.2	23.7	24.2	24.7	25.2	25.6	26.1	26.5	27.0	27.3	27.8	28.2	28.5	28.9
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	29.2	29.5	29.8	30.0	30.3	30.5	30.7	31.0	31.1	31.4	31.5	31.7	31.9	32.1	32.2	32.4	32.5	32.7	32.9	33.1
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	33.3	33.4	33.6	33.8	34.1	34.3	34.5	34.7	34.9	35.1	35.3	35.5	35.7	35.9	36.1	36.3	36.5	36.7	36.8	37.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	37.2	38.1	38.7	39.2	39.4	40.0	41.1	41.7	41.8	42.0	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.6	42.4
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	41.8	40.7	37.5	29.0	18.0	10.6	6.7	4.8	3.9	3.6	3.4	3.3	3.3	3.3	3.4	3.5	3.6	3.7	3.8	3.9
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	4.0	4.2	4.3	4.4	4.5	4.7	4.8	4.9	5.0	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.1	6.1	6.2
λnm	5000																			
T	6.4																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.73) mm

ND40

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.1	8.4	14.0	13.0	27.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	34.0	33.4	33.7	35.4	34.9	37.4	40.4	40.9	40.5	40.1	40.1	40.3	40.7	41.1	41.5	41.7	41.6	41.1	40.3	39.8
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	39.7	40.0	40.3	40.3	40.0	39.8	39.9	40.3	41.3	42.5	43.3	43.6	43.5	43.1	42.4	41.7	40.8	39.9	39.0	38.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	37.1	36.4	35.7	34.9	34.2	33.5	32.8	32.1	31.5	30.9	30.4	29.8	29.2	28.7	28.2	27.7	27.3	26.8	26.4	26.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	25.7	25.4	25.1	24.9	24.6	24.4	24.2	24.1	24.0	23.9	23.9	23.8	24.0	24.2	24.5	25.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.509	1.507	1.506	1.506	1.505	1.505	1.505
P	0.921	0.921	0.922	0.922	0.922	0.922	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

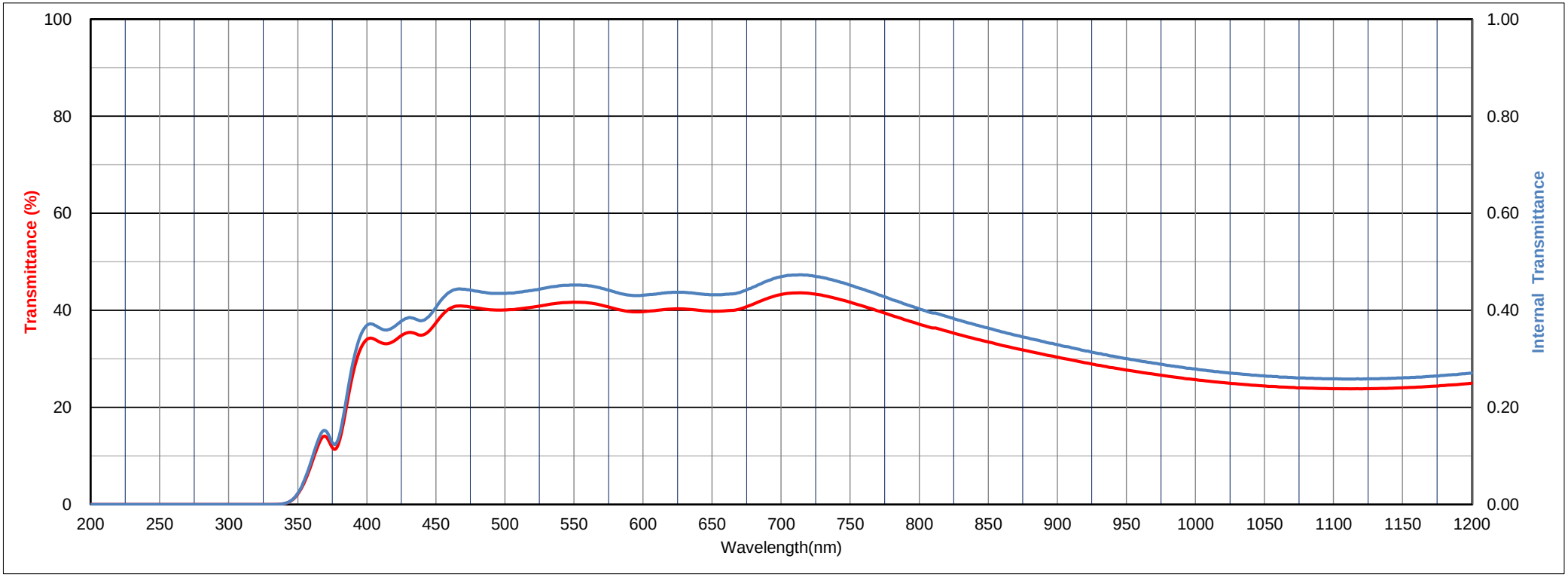
	x	y	Y	λ_d	P_e
A	0.448	0.413	41	573	4
C	0.313	0.327	41	564	4
D65	0.316	0.339	41	563	4

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	3	525	570	61	65	550	100	2.42

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
40±4	0.40±0.05



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

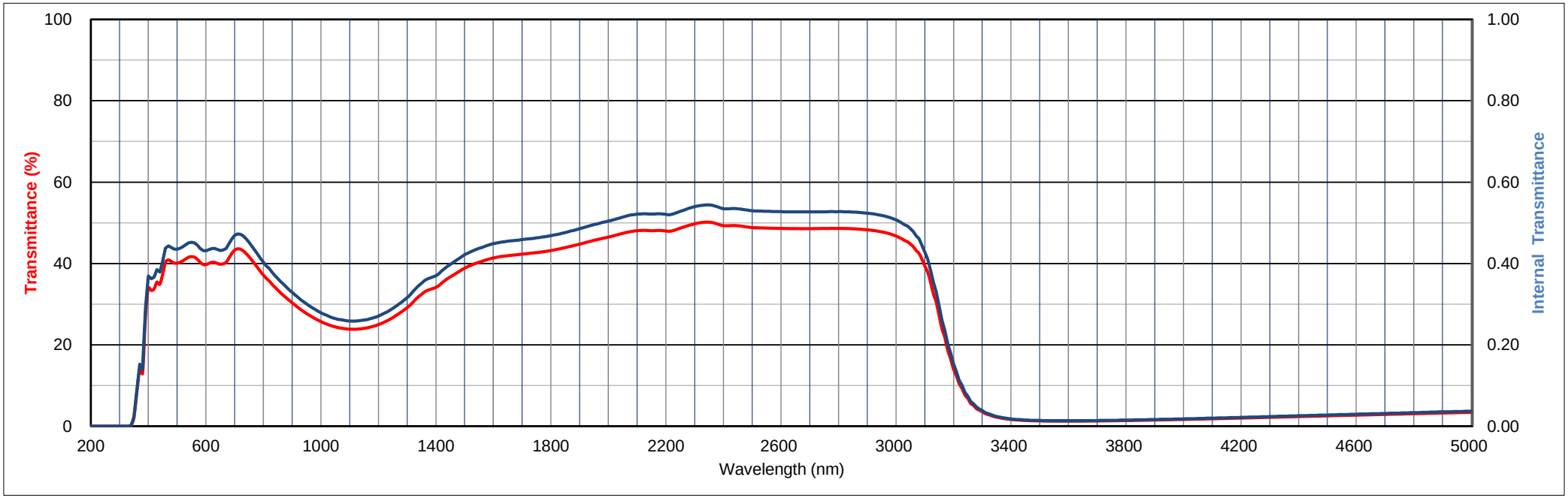
HOYA CORPORATION OPTICS SECTION

Thickness (2.73) mm

ND40

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.1	8.4	14.0	13.0	27.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	34.0	33.4	33.7	35.4	34.9	37.4	40.4	40.9	40.5	40.1	40.1	40.3	40.7	41.1	41.5	41.7	41.6	41.1	40.3	39.8
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	39.7	40.0	40.3	40.3	40.0	39.8	39.9	40.3	41.3	42.5	43.3	43.6	43.5	43.1	42.4	41.7	40.8	39.9	39.0	38.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	37.1	36.4	35.7	34.9	34.2	33.5	32.8	32.1	31.5	30.9	30.4	29.8	29.2	28.7	28.2	27.7	27.3	26.8	26.4	26.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	25.7	25.4	25.1	24.9	24.6	24.4	24.2	24.1	24.0	23.9	23.9	23.8	23.8	23.9	24.0	24.1	24.2	24.3	24.5	24.7
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	25.0	25.3	25.6	25.9	26.3	26.7	27.2	27.6	28.1	28.6	29.1	29.7	30.4	31.2	31.9	32.4	33.0	33.4	33.6	33.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	34.1	34.6	35.2	35.7	36.3	36.7	37.1	37.6	38.0	38.5	38.8	39.2	39.5	39.8	40.1	40.3	40.5	40.8	41.0	41.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	41.4	41.5	41.6	41.7	41.8	41.9	42.0	42.1	42.1	42.2	42.3	42.4	42.4	42.5	42.6	42.7	42.8	42.9	43.0	43.1
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	44.6	44.8	44.9	45.1	45.3	45.5	45.7	45.9	46.0	46.2	46.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	46.5	47.4	48.1	48.1	48.0	48.7	49.8	50.2	49.3	49.3	48.8	48.7	48.6	48.6	48.6	48.6	48.6	48.5	48.3	47.8
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	46.7	44.8	39.4	27.2	14.0	6.8	3.6	2.2	1.7	1.4	1.3	1.2	1.2	1.3	1.3	1.3	1.4	1.5	1.5	1.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.2	3.3
λnm	5000																			
T	3.4																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.5) mm

ND50

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	5.4	15.6	22.7	20.7	37.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	44.9	43.9	44.2	45.9	45.3	48.0	51.0	51.5	51.1	50.7	50.7	50.9	51.3	51.8	52.1	52.3	52.2	51.7	50.9	50.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	50.2	50.4	50.6	50.6	50.3	50.0	50.0	50.4	51.3	52.4	53.1	53.3	53.2	52.7	52.0	51.2	50.3	49.4	48.4	47.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	46.6	45.8	45.0	44.2	43.5	42.7	42.0	41.3	40.7	40.1	39.5	38.9	38.3	37.8	37.2	36.7	36.2	35.8	35.3	34.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	34.6	34.2	33.9	33.6	33.3	33.1	32.9	32.8	32.6	32.5	32.5	32.4	32.5	32.7	33.0	33.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.515	1.508	1.505	1.503	1.502	1.501	1.500
P	0.919	0.921	0.922	0.922	0.923	0.923	0.923

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

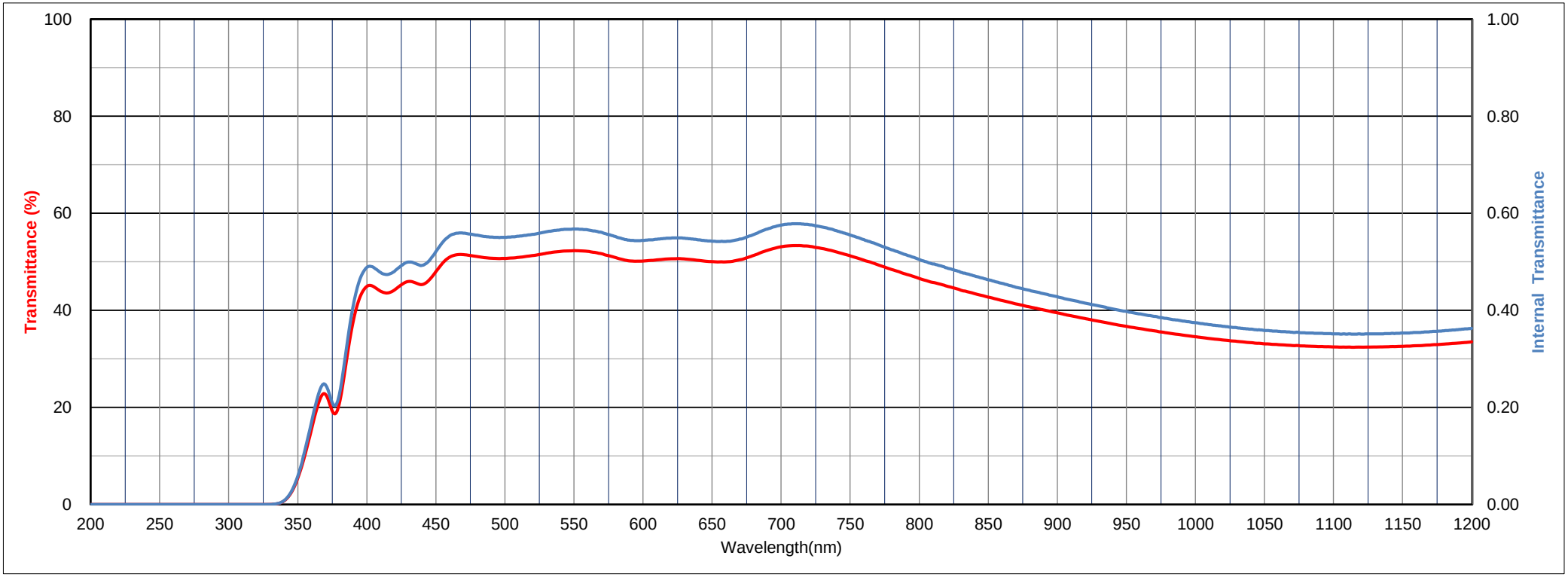
	x	y	Y	λ_d	P_e
A	0.448	0.412	51	571	3
C	0.312	0.325	51	562	3
D65	0.315	0.337	51	562	3

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	4	495	555	62	66	550	90	2.42

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
50±5	0.30±0.05



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

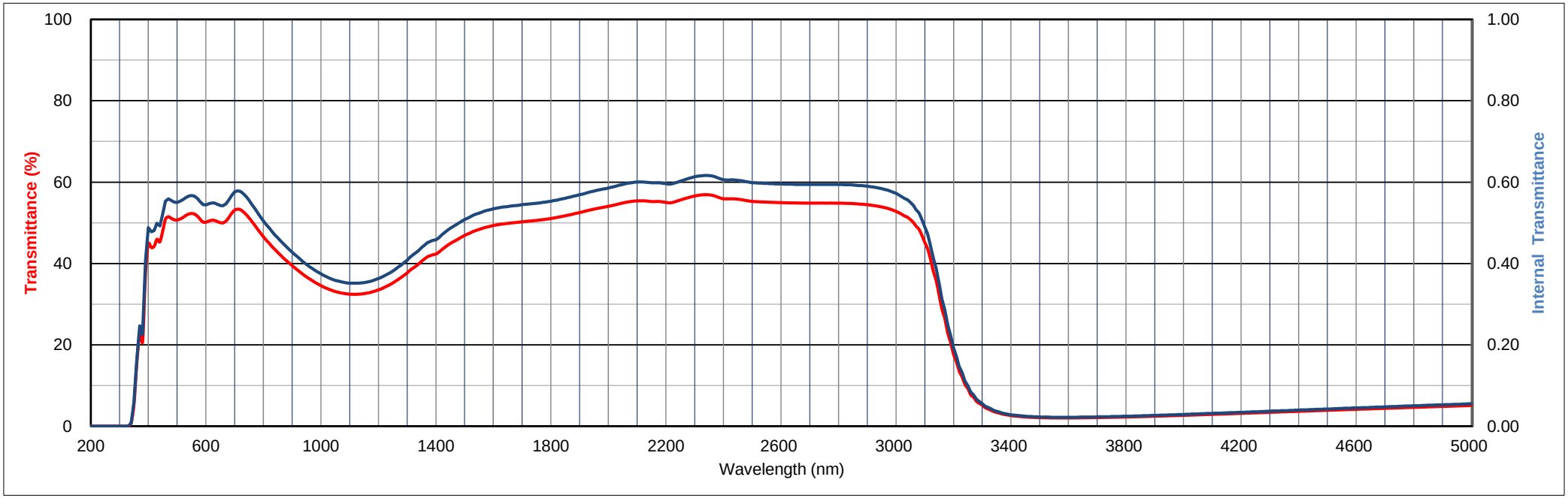
HOYA CORPORATION OPTICS SECTION

Thickness (2.5) mm

ND50

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	5.4	15.6	22.7	20.7	37.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	44.9	43.9	44.2	45.9	45.3	48.0	51.0	51.5	51.1	50.7	50.7	50.9	51.3	51.8	52.1	52.3	52.2	51.7	50.9	50.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	50.2	50.4	50.6	50.6	50.3	50.0	50.0	50.4	51.3	52.4	53.1	53.3	53.2	52.7	52.0	51.2	50.3	49.4	48.4	47.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	46.6	45.8	45.0	44.2	43.5	42.7	42.0	41.3	40.7	40.1	39.5	38.9	38.3	37.8	37.2	36.7	36.2	35.8	35.3	34.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	34.6	34.2	33.9	33.6	33.3	33.1	32.9	32.8	32.6	32.5	32.5	32.4	32.4	32.5	32.5	32.6	32.7	32.9	33.0	33.3
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	33.5	33.8	34.1	34.4	34.8	35.2	35.7	36.1	36.6	37.1	37.7	38.3	38.8	39.3	39.9	40.5	41.1	41.6	41.9	42.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	42.3	42.8	43.4	43.9	44.4	44.9	45.3	45.7	46.1	46.5	46.9	47.2	47.5	47.9	48.1	48.4	48.6	48.8	49.0	49.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	49.3	49.5	49.6	49.7	49.8	49.9	49.9	50.0	50.1	50.2	50.3	50.3	50.4	50.5	50.5	50.6	50.7	50.8	50.8	51.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	51.1	51.2	51.3	51.4	51.6	51.7	51.9	52.0	52.2	52.4	52.5	52.7	52.9	53.1	53.2	53.4	53.5	53.7	53.8	53.9
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	54.1	54.9	55.4	55.2	55.0	55.6	56.6	56.9	55.9	55.8	55.2	55.1	55.0	54.9	54.8	54.8	54.8	54.7	54.4	53.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	52.8	50.8	45.2	32.2	17.7	9.2	5.2	3.4	2.6	2.3	2.1	2.0	2.0	2.1	2.1	2.2	2.3	2.4	2.4	2.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	2.7	2.8	2.9	3.0	3.2	3.3	3.4	3.5	3.7	3.8	3.9	4.0	4.1	4.3	4.4	4.5	4.6	4.8	4.9	5.0
λnm	5000																			
T	5.1																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (1.75) mm

ND60

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	3.1	12.7	26.5	34.5	32.4	49.1
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	55.7	54.8	55.1	56.6	56.1	58.3	60.9	61.3	61.0	60.7	60.6	60.8	61.1	61.6	61.9	62.0	61.9	61.5	60.8	60.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	60.2	60.4	60.6	60.6	60.3	60.1	60.1	60.4	61.2	62.1	62.7	62.9	62.8	62.4	61.8	61.1	60.4	59.6	58.8	58.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	57.2	56.5	55.8	55.1	54.5	53.8	53.2	52.6	52.0	51.5	50.9	50.4	49.9	49.4	48.9	48.4	48.0	47.6	47.1	46.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	46.4	46.1	45.8	45.5	45.3	45.0	44.9	44.7	44.6	44.5	44.4	44.4	44.5	44.7	45.0	45.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.515	1.511	1.509	1.508	1.508	1.507	1.507
P	0.920	0.920	0.921	0.921	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

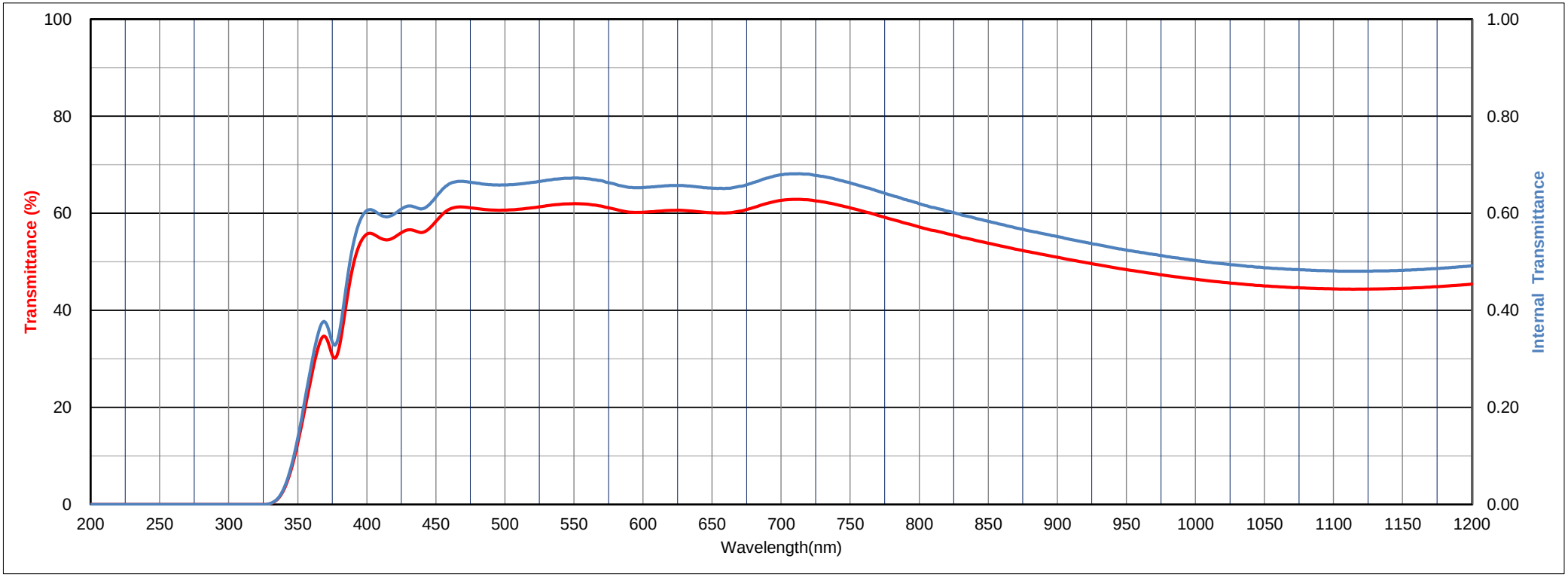
	x	y	Y	λ_d	P_e
A	0.448	0.411	61	571	2
C	0.312	0.322	61	562	2
D65	0.314	0.335	61	562	2

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
2	4	495	555	62	66	550	90	2.42

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
60±5	0.22±0.04



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HOYA

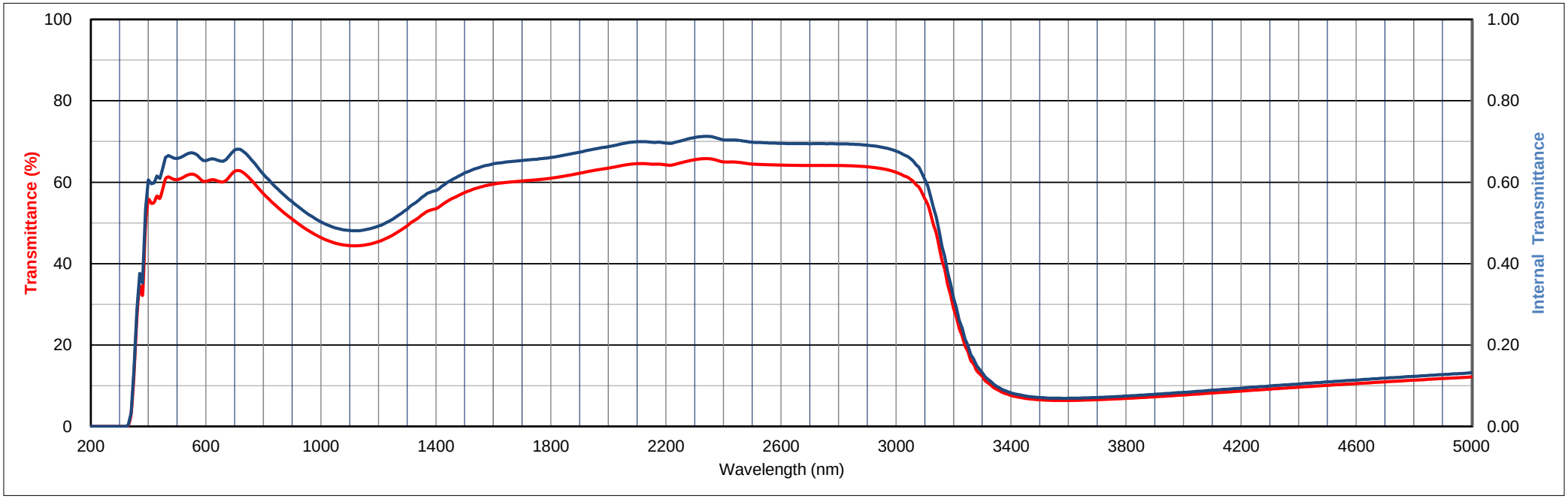
HOYA CORPORATION OPTICS SECTION

Thickness (1.75) mm

ND60

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	3.1	12.7	26.5	34.5	32.4	49.1
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	55.7	54.8	55.1	56.6	56.1	58.3	60.9	61.3	61.0	60.7	60.6	60.8	61.1	61.6	61.9	62.0	61.9	61.5	60.8	60.2
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	60.2	60.4	60.6	60.6	60.3	60.1	60.1	60.4	61.2	62.1	62.7	62.9	62.8	62.4	61.8	61.1	60.4	59.6	58.8	58.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	57.2	56.5	55.8	55.1	54.5	53.8	53.2	52.6	52.0	51.5	50.9	50.4	49.9	49.4	48.9	48.4	48.0	47.6	47.1	46.8
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	46.4	46.1	45.8	45.5	45.3	45.0	44.9	44.7	44.6	44.5	44.4	44.4	44.4	44.4	44.5	44.5	44.7	44.8	45.0	45.2
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	45.4	45.6	46.0	46.3	46.6	47.0	47.4	47.9	48.3	48.8	49.3	49.9	50.4	50.8	51.3	51.9	52.4	52.9	53.1	53.3
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	53.5	53.9	54.4	54.9	55.3	55.7	56.1	56.4	56.8	57.1	57.5	57.7	58.0	58.3	58.5	58.7	58.9	59.1	59.3	59.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	59.5	59.7	59.8	59.8	59.9	60.0	60.1	60.1	60.2	60.2	60.3	60.4	60.4	60.5	60.5	60.6	60.7	60.7	60.8	60.9
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	61.0	61.1	61.2	61.3	61.4	61.5	61.7	61.8	61.9	62.1	62.2	62.3	62.5	62.6	62.8	62.9	63.0	63.1	63.2	63.4
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	63.5	64.1	64.6	64.4	64.3	64.7	65.5	65.8	65.0	64.9	64.4	64.3	64.2	64.1	64.1	64.1	64.1	64.0	63.8	63.3
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	62.4	60.8	56.0	44.2	29.1	18.4	12.3	9.1	7.6	6.9	6.5	6.4	6.4	6.5	6.6	6.7	6.9	7.1	7.3	7.5
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	7.7	8.0	8.2	8.4	8.7	8.9	9.2	9.4	9.6	9.8	10.1	10.3	10.5	10.7	10.9	11.1	11.4	11.6	11.8	11.9
λnm	5000																			
T	12.2																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (2.9) mm

ND70

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.6	17.7	34.8	42.9	38.7	58.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	65.4	63.8	63.8	65.4	64.8	67.4	70.3	71.0	70.9	71.0	71.2	71.5	71.9	72.1	72.2	72.2	72.2	72.0	71.5	71.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	70.9	70.8	70.7	70.5	70.1	69.7	69.4	69.2	69.1	69.0	68.8	68.3	67.6	66.7	65.8	64.8	63.7	62.6	61.6	60.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	59.6	58.7	57.9	57.1	56.3	55.6	54.9	54.2	53.7	53.1	52.5	51.9	51.4	50.9	50.4	49.9	49.5	49.0	48.6	48.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	47.9	47.6	47.3	47.0	46.8	46.6	46.4	46.3	46.1	46.1	46.0	46.0	46.1	46.4	46.7	47.2				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.520	1.510	1.504	1.501	1.499	1.497	1.496
P	0.918	0.921	0.922	0.923	0.923	0.924	0.924

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

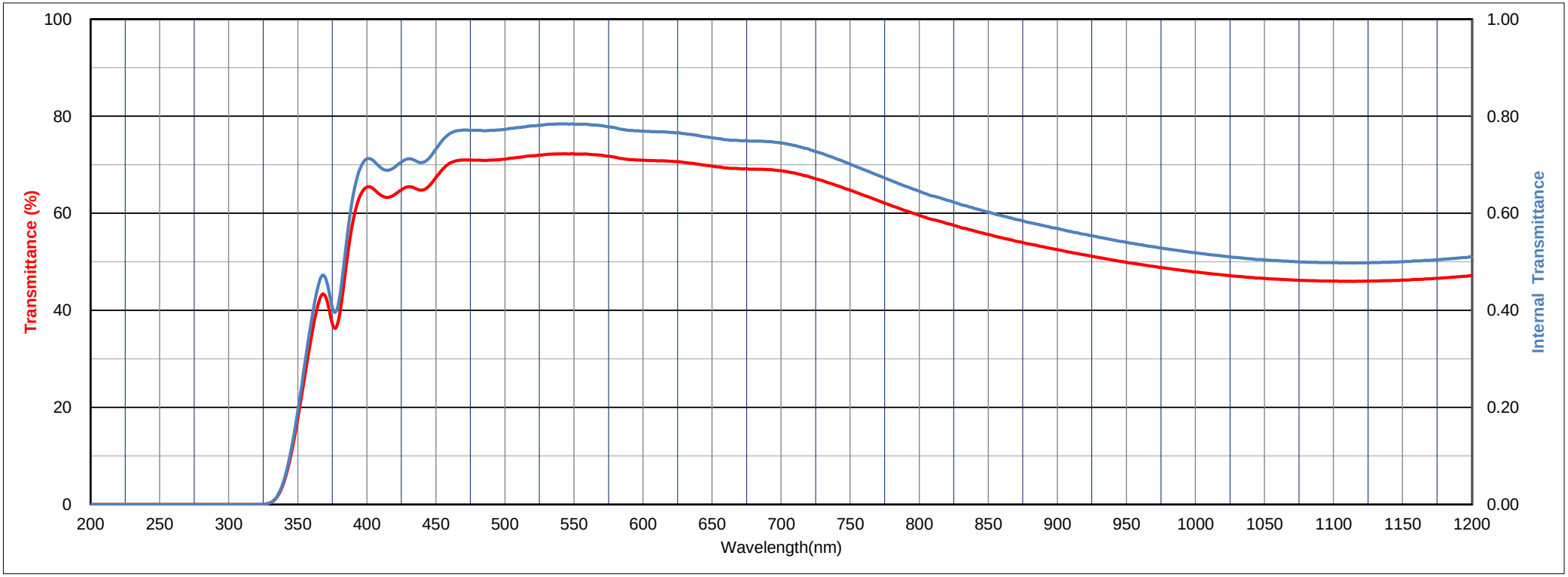
	x	y	Y	λ_d	P_e
A	0.448	0.411	71	572	3
C	0.312	0.324	72	564	3
D65	0.315	0.336	72	563	3

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	5	470	540	66	72	510	100	2.39

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
70±5	0.15±0.04



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HOYA

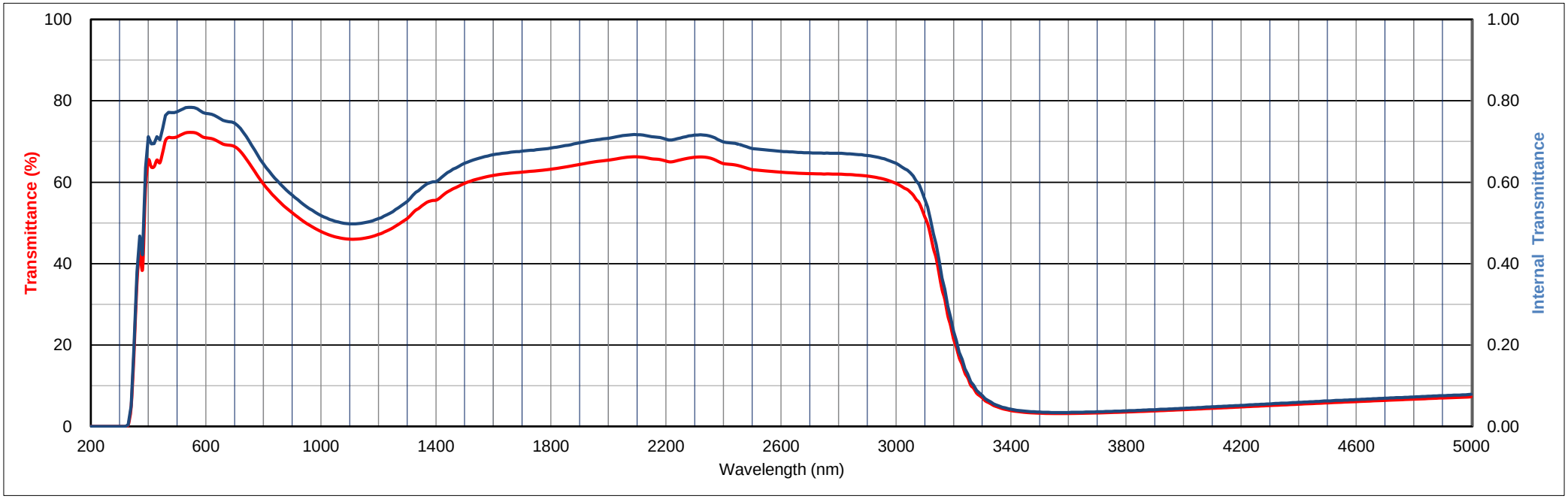
HOYA CORPORATION OPTICS SECTION

Thickness (2.9) mm

ND70

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.6	17.7	34.8	42.9	38.7	58.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	65.4	63.8	63.8	65.4	64.8	67.4	70.3	71.0	70.9	71.0	71.2	71.5	71.9	72.1	72.2	72.2	72.2	72.0	71.5	71.1
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	70.9	70.8	70.7	70.5	70.1	69.7	69.4	69.2	69.1	69.0	68.8	68.3	67.6	66.7	65.8	64.8	63.7	62.6	61.6	60.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	59.6	58.7	57.9	57.1	56.3	55.6	54.9	54.2	53.7	53.1	52.5	51.9	51.4	50.9	50.4	49.9	49.5	49.0	48.6	48.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	47.9	47.6	47.3	47.0	46.8	46.6	46.4	46.3	46.1	46.1	46.0	46.0	46.0	46.0	46.1	46.2	46.4	46.5	46.7	46.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	47.2	47.4	47.8	48.1	48.4	48.8	49.2	49.7	50.1	50.6	51.1	51.7	52.5	53.1	53.5	54.1	54.6	55.1	55.4	55.5
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	55.6	55.9	56.5	57.1	57.6	58.0	58.4	58.7	59.1	59.4	59.7	60.0	60.2	60.5	60.7	60.9	61.1	61.2	61.4	61.5
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	61.7	61.8	61.9	62.0	62.1	62.2	62.2	62.3	62.4	62.4	62.5	62.5	62.6	62.7	62.7	62.8	62.9	62.9	63.0	63.1
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	63.2	63.3	63.4	63.5	63.6	63.7	63.9	64.0	64.1	64.2	64.4	64.5	64.6	64.8	64.9	65.0	65.1	65.2	65.3	65.3
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	65.4	66.0	66.2	65.8	65.2	65.5	66.1	66.0	64.6	64.1	63.1	62.8	62.5	62.3	62.1	62.0	62.0	61.8	61.5	60.9
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	59.7	57.6	51.5	37.5	21.5	11.9	7.1	4.9	3.9	3.4	3.2	3.2	3.2	3.2	3.3	3.4	3.5	3.7	3.8	4.0
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	4.1	4.3	4.5	4.6	4.8	5.0	5.1	5.3	5.5	5.6	5.8	5.9	6.1	6.2	6.4	6.5	6.7	6.8	7.0	7.1
λnm	5000																			
T	7.3																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (1.5) mm

ND80

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.9	19.6	39.2	55.5	61.9	58.7	72.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	77.0	76.0	76.1	77.1	76.7	78.3	80.1	80.5	80.4	80.5	80.6	80.8	81.0	81.2	81.2	81.2	81.2	81.1	80.9	80.6
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	80.5	80.5	80.4	80.3	80.0	79.8	79.6	79.5	79.5	79.4	79.3	79.0	78.6	78.0	77.5	76.8	76.2	75.5	74.9	74.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	73.6	73.1	72.5	72.0	71.5	71.1	70.6	70.1	69.7	69.4	69.0	68.6	68.2	67.9	67.5	67.2	66.9	66.6	66.3	66.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	65.8	65.3	65.1	64.9	64.8	64.6	64.5	64.4	64.3	64.2	64.2	64.2	64.3	64.5	64.7	65.1				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.525	1.516	1.512	1.509	1.507	1.506	1.505
P	0.917	0.919	0.920	0.921	0.921	0.922	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

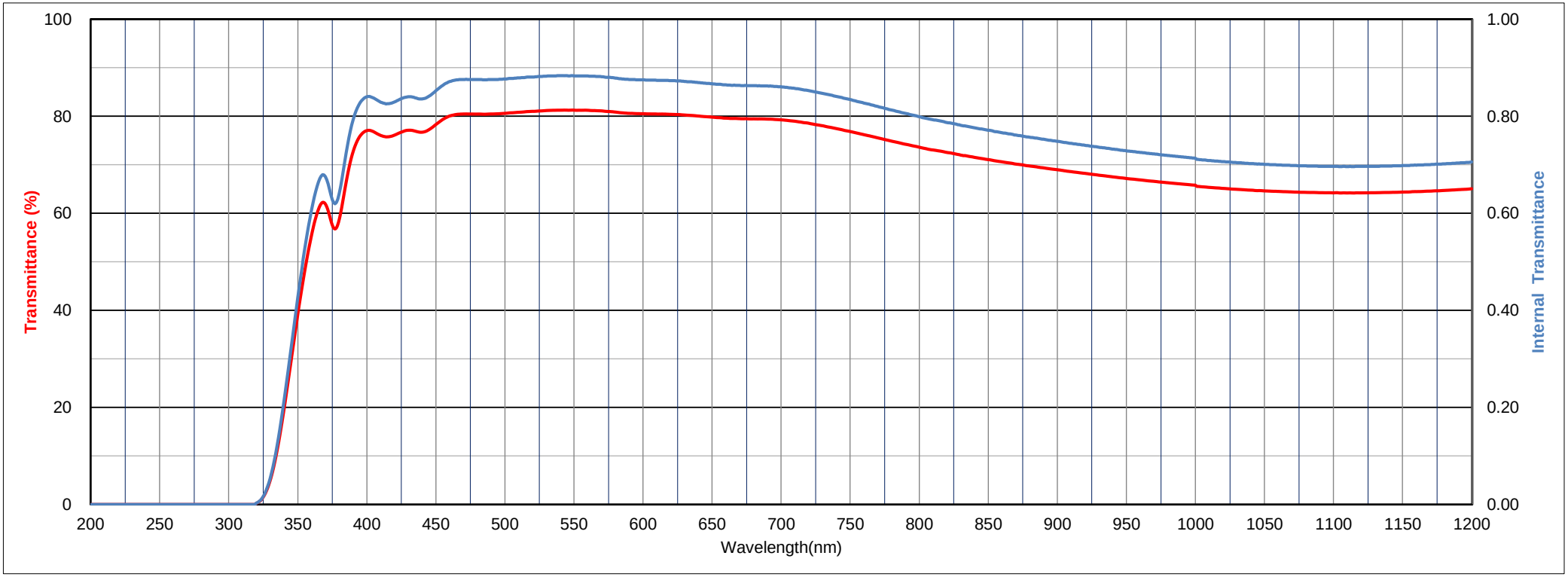
	x	y	Y	λ_d	P_e
A	0.448	0.409	81	573	2
C	0.311	0.320	81	564	1
D65	0.314	0.333	81	564	1

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	5	470	540	66	72	510	100	2.39

Tolerance of Transmittance (T)

Average Transmittance at 400nm-700nm	
Tav(%)	OD
80±5	0.1±0.03



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HOYA

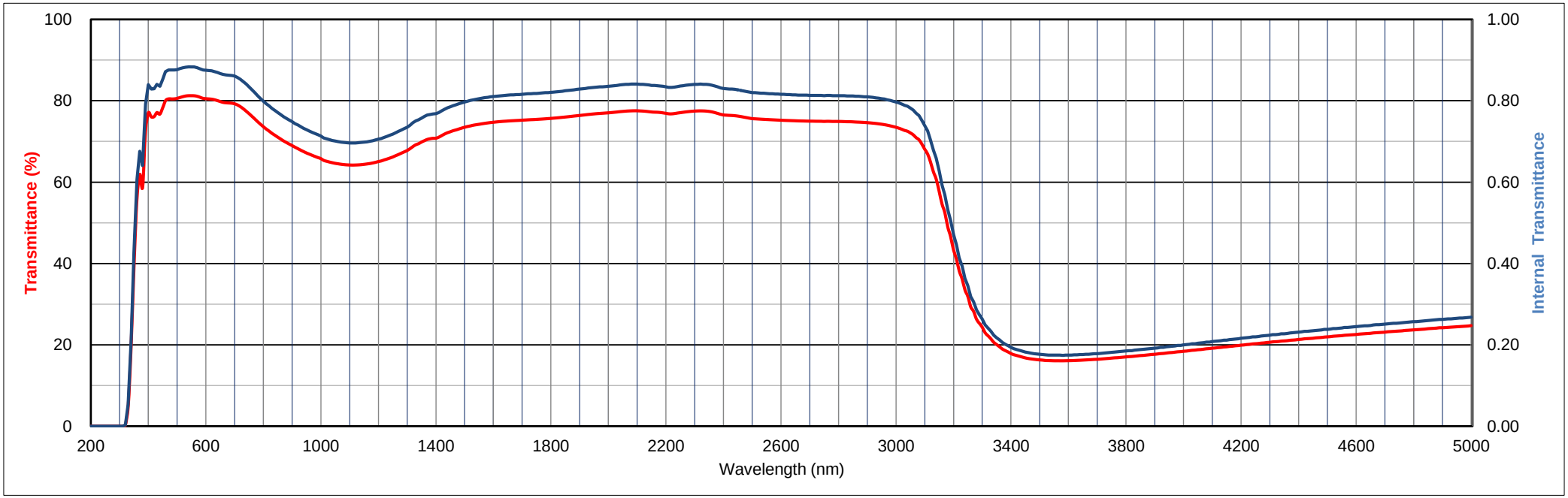
HOYA CORPORATION OPTICS SECTION

Thickness (1.5) mm

ND80

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	4.9	19.6	39.2	55.5	61.9	58.7	72.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	77.0	76.0	76.1	77.1	76.7	78.3	80.1	80.5	80.4	80.5	80.6	80.8	81.0	81.2	81.2	81.2	81.2	81.1	80.9	80.6
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	80.5	80.5	80.4	80.3	80.0	79.8	79.6	79.5	79.5	79.4	79.3	79.0	78.6	78.0	77.5	76.8	76.2	75.5	74.9	74.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	73.6	73.1	72.5	72.0	71.5	71.1	70.6	70.1	69.7	69.4	69.0	68.6	68.2	67.9	67.5	67.2	66.9	66.6	66.3	66.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	65.8	65.3	65.1	64.9	64.8	64.6	64.5	64.4	64.3	64.2	64.2	64.2	64.2	64.2	64.3	64.4	64.5	64.6	64.7	64.9
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	65.1	65.2	65.5	65.7	65.9	66.2	66.5	66.8	67.1	67.4	67.8	68.2	68.7	69.2	69.5	69.9	70.2	70.5	70.7	70.8
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	70.8	71.0	71.4	71.8	72.1	72.4	72.6	72.8	73.1	73.3	73.5	73.7	73.8	74.0	74.1	74.2	74.3	74.5	74.6	74.6
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	74.7	74.8	74.9	74.9	75.0	75.0	75.1	75.1	75.1	75.2	75.2	75.3	75.3	75.4	75.4	75.4	75.5	75.5	75.6	75.6
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	75.7	75.7	75.8	75.9	75.9	76.0	76.1	76.2	76.2	76.3	76.4	76.5	76.5	76.6	76.7	76.8	76.8	76.9	76.9	77.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	77.0	77.4	77.5	77.2	76.9	77.1	77.5	77.4	76.5	76.2	75.6	75.4	75.2	75.1	75.0	74.9	74.9	74.8	74.6	74.2
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	73.5	72.1	68.1	57.8	43.4	31.9	24.3	20.1	17.8	16.8	16.3	16.1	16.1	16.3	16.4	16.7	17.0	17.4	17.7	18.1
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	18.4	18.8	19.2	19.5	19.9	20.3	20.6	21.0	21.3	21.6	22.0	22.3	22.5	22.8	23.1	23.4	23.7	24.0	24.2	24.4
λnm	5000																			
T	24.7																			



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ニュートラルデンシティフィルター (W-ND シリーズ)

高品質で優れた光学性能を備えた世界標準の中ニュートラデンシティフィルター(W-ND フィルター)。W-ND シリーズは、従来の ND シリーズとは異なり、世界標準に適合するように設計されています。
ニュートラルデンシティフィルターは、特定の波長の光を選択的に吸収することなく光強度を制御できるため、光量の調整などさまざまな用途に使用できます。

ニュートラルデンシティフィルター一覧

	HOYA W-ND シリーズ	HOYA ND シリーズ
標準肉厚	t1.0mm*	t2.5mm*
透過率規格	波長 405nm, 546nm, 694nm の透過率	400-700nm の平均透過率
	内部透過率	外部透過率

＊W-ND/ND シリーズの光学特性は、ガラスの肉厚を調整することにより実現します。

“W-ND”シリーズ 仕様:
吸収タイプのニュートラルデンシティフィルターであるW-NDシリーズは、特定のOD値または透過率に幅広く対応することが可能です。それらは使用硝材の特性に基づき肉厚を調整することによって実現することができます。
以下の表は、OD値と参考肉厚によるW-NDフィルターシリーズの種類を表しています。

透過率(%) @546nm	OD値 @546nm	参考肉厚(mm)*	使用硝材
50	0.3	2.3	W-ND11
25	0.6	2.3	W-ND5
10	1.0	1.7	W-ND4
5	1.3	2.3	W-ND4
1	2.0	2.0	W-ND3
0.1	3.0	2.1	W-ND9
0.01	4.0	2.8	W-ND9
0.001	5.0	3.5	W-ND9

*本データは複数の溶解ポット毎のデータの平均値です。
＊W-ND/ND シリーズの光学特性は、ガラスの肉厚を調整することにより実現します。

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND9

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.001	0.004	0.006	0.014
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.021	0.025	0.028	0.031	0.032	0.035	0.039	0.039	0.038	0.037	0.036	0.036	0.036	0.037	0.038	0.038	0.037	0.037	0.036	0.037
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.038	0.040	0.041	0.043	0.045	0.048	0.051	0.056	0.063	0.071	0.078	0.084	0.089	0.093	0.097	0.100	0.102	0.104	0.106	0.108
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.109	0.108	0.110	0.110	0.110	0.110	0.109	0.109	0.107	0.106	0.104	0.104	0.103	0.102	0.101	0.100	0.100	0.099	0.099	0.099
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.099	0.099	0.100	0.100	0.101	0.102	0.103	0.104	0.105	0.106	0.108	0.111	0.116	0.121	0.127	0.133				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.539	1.527	1.521	1.517	1.514	1.513	1.512
P	0.914	0.917	0.918	0.919	0.920	0.920	0.920

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

	x	y	Y	λ_d	P_e
A	0.463	0.404	4	602	8
C	0.323	0.324	3	585	6
D65	0.326	0.336	3	585	6

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	2	490	545	-	78	415	109	2.46

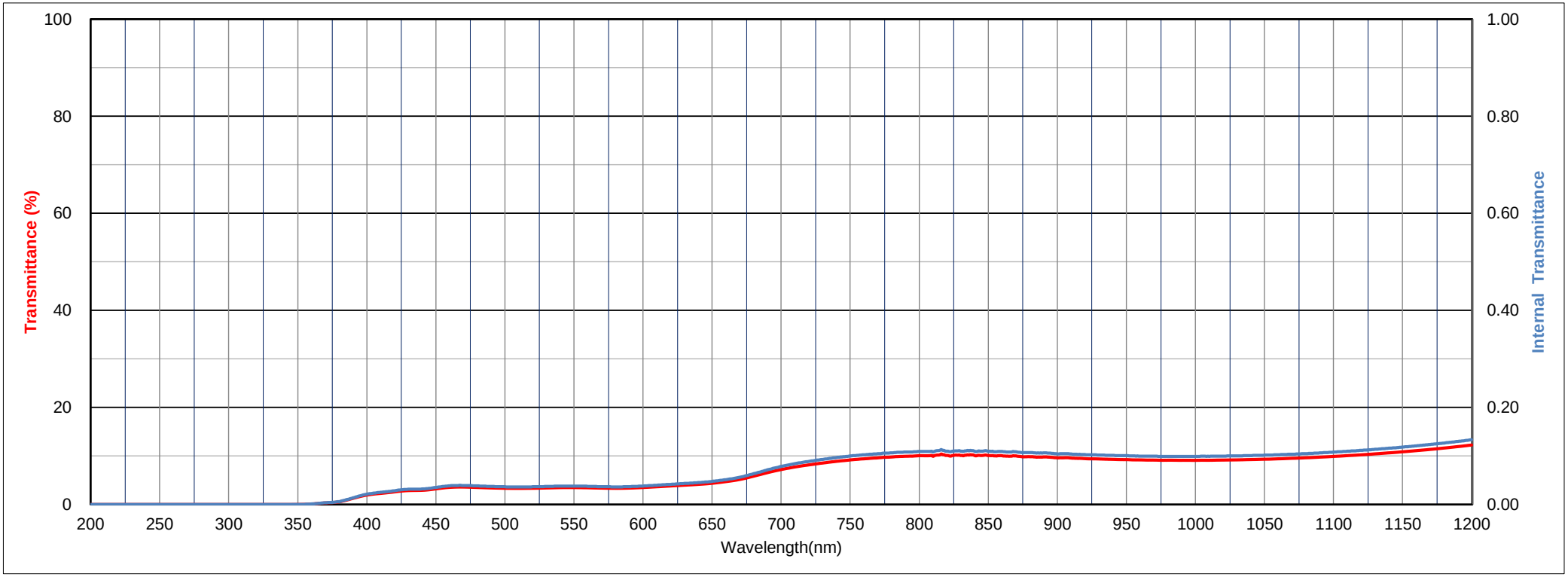
Tolerance of Transmittance (τ)

τ 405 (1)	τ 546 (2)	τ 694 (3)
0.025±0.01	0.04±0.02	0.08±0.02

(1)Internal transmittance at 405nm

(2)Internal transmittance at 546nm

(3)Internal transmittance at 694nm



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

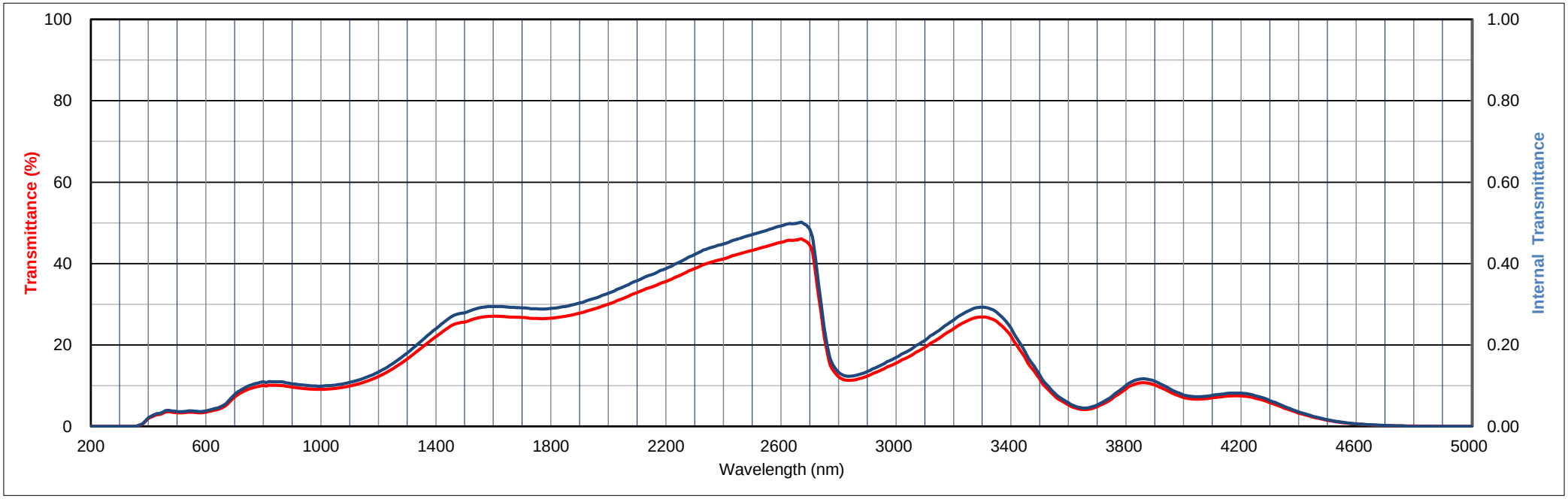
HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND9

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.001	0.004	0.006	0.014
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.021	0.025	0.028	0.031	0.032	0.035	0.039	0.039	0.038	0.037	0.036	0.036	0.036	0.037	0.038	0.038	0.037	0.037	0.036	0.037
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.038	0.040	0.041	0.043	0.045	0.048	0.051	0.056	0.063	0.071	0.078	0.084	0.089	0.093	0.097	0.100	0.102	0.104	0.106	0.108
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.109	0.108	0.110	0.110	0.110	0.110	0.109	0.109	0.107	0.106	0.104	0.104	0.103	0.102	0.101	0.100	0.100	0.099	0.099	0.099
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.099	0.099	0.100	0.100	0.101	0.102	0.103	0.104	0.105	0.106	0.108	0.110	0.111	0.114	0.116	0.118	0.121	0.124	0.127	0.130
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.133	0.137	0.141	0.145	0.150	0.154	0.159	0.164	0.169	0.175	0.180	0.186	0.192	0.198	0.204	0.210	0.216	0.222	0.228	0.234
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.240	0.246	0.251	0.257	0.262	0.268	0.272	0.275	0.277	0.278	0.279	0.281	0.284	0.287	0.289	0.291	0.292	0.293	0.294	0.295
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.295	0.295	0.295	0.294	0.294	0.293	0.292	0.292	0.292	0.292	0.291	0.291	0.290	0.289	0.289	0.289	0.288	0.288	0.289	0.289
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.290	0.290	0.291	0.292	0.294	0.295	0.296	0.298	0.299	0.301	0.303	0.305	0.307	0.310	0.312	0.314	0.316	0.319	0.322	0.325
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.327	0.342	0.358	0.373	0.388	0.404	0.422	0.438	0.448	0.460	0.471	0.482	0.492	0.499	0.485	0.243	0.133	0.124	0.134	0.151
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.169	0.188	0.211	0.236	0.261	0.283	0.293	0.281	0.242	0.183	0.127	0.083	0.058	0.045	0.053	0.073	0.100	0.116	0.111	0.093
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.077	0.073	0.076	0.081	0.081	0.075	0.063	0.049	0.035	0.025	0.016	0.010	0.006	0.004	0.002	0.001	0.001	0.001	0.001	0.001
λnm	5000																			
τ	<1E-05																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND3

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.002	0.008	0.019	0.027	0.050
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.068	0.075	0.081	0.087	0.087	0.093	0.100	0.100	0.097	0.094	0.093	0.092	0.092	0.094	0.096	0.096	0.094	0.092	0.090	0.091
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.093	0.096	0.099	0.102	0.104	0.108	0.114	0.122	0.135	0.149	0.160	0.168	0.175	0.179	0.184	0.187	0.189	0.191	0.192	0.192
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.193	0.191	0.193	0.191	0.190	0.187	0.185	0.182	0.180	0.178	0.176	0.174	0.171	0.169	0.167	0.166	0.164	0.163	0.162	0.162
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.161	0.161	0.161	0.161	0.161	0.162	0.162	0.163	0.164	0.166	0.167	0.171	0.175	0.181	0.187	0.195				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.537	1.523	1.516	1.512	1.509	1.507	1.506
P	0.914	0.918	0.919	0.920	0.921	0.921	0.922

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

	x	y	Y	λ_d	P_e
A	0.454	0.404	9	638	3
C	0.315	0.318	9	593	2
D65	0.317	0.330	9	593	2

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	2	485	545	-	75	416	114	2.44

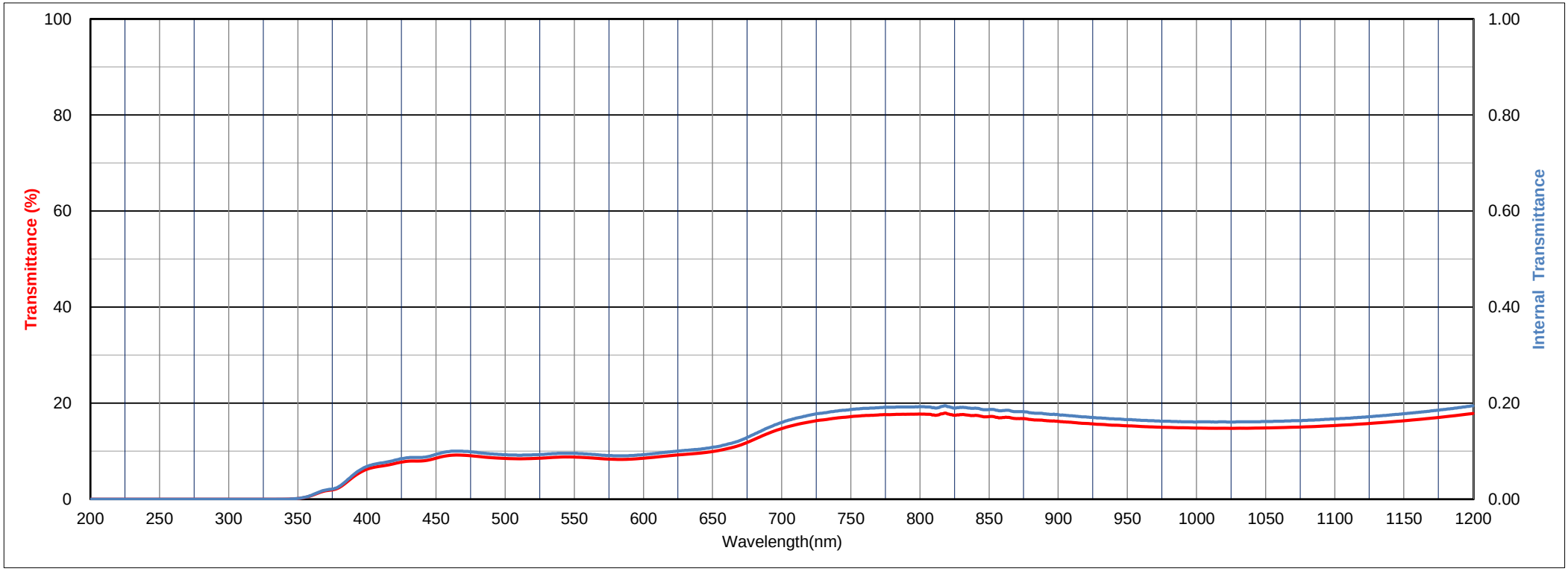
Tolerance of Transmittance (τ)

τ 405 (1)	τ 546 (2)	τ 694 (3)
0.06±0.02	0.10±0.02	0.17±0.03

(1)Internal transmittance at 405nm

(2)Internal transmittance at 546nm

(3)Internal transmittance at 694nm



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HOYA

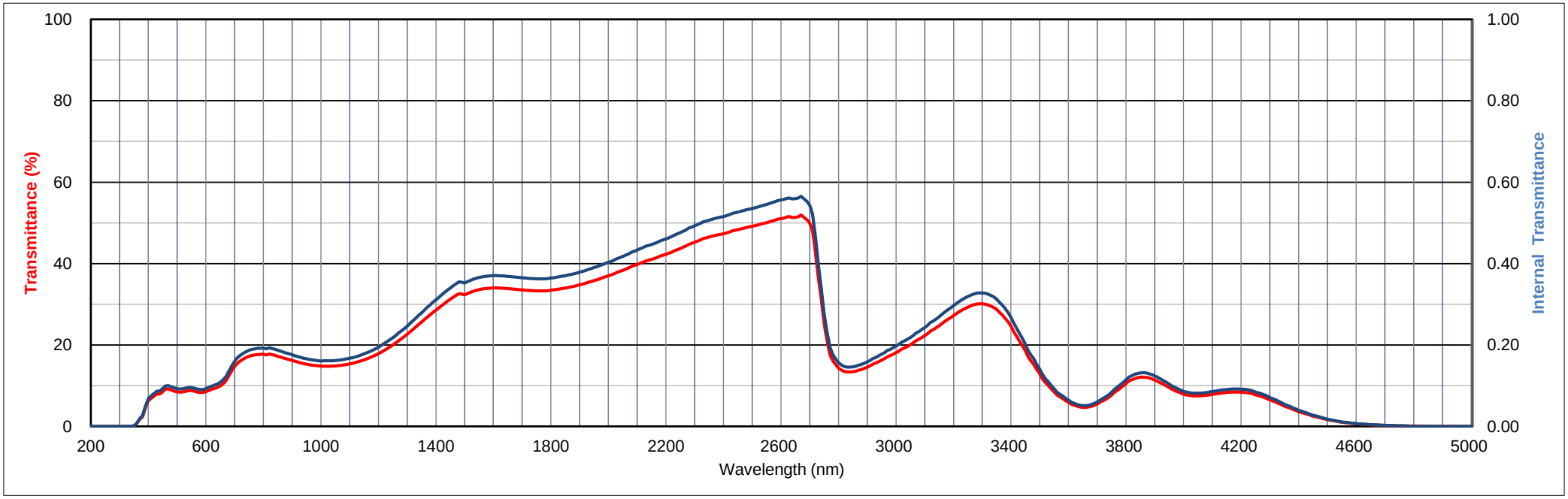
HOYA CORPORATION OPTICS SECTION

Thickness （1.00） mm

W-ND3

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.002	0.008	0.019	0.027	0.050
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.068	0.075	0.081	0.087	0.087	0.093	0.100	0.100	0.097	0.094	0.093	0.092	0.092	0.094	0.096	0.096	0.094	0.092	0.090	0.091
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.093	0.096	0.099	0.102	0.104	0.108	0.114	0.122	0.135	0.149	0.160	0.168	0.175	0.179	0.184	0.187	0.189	0.191	0.192	0.192
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.193	0.191	0.193	0.191	0.190	0.187	0.185	0.182	0.180	0.178	0.176	0.174	0.171	0.169	0.167	0.166	0.164	0.163	0.162	0.162
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.161	0.161	0.161	0.161	0.161	0.162	0.162	0.163	0.164	0.166	0.167	0.169	0.171	0.173	0.175	0.178	0.181	0.184	0.187	0.191
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.195	0.199	0.203	0.208	0.213	0.218	0.223	0.229	0.234	0.240	0.246	0.253	0.259	0.266	0.273	0.279	0.286	0.292	0.299	0.305
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.311	0.317	0.323	0.329	0.335	0.340	0.345	0.350	0.355	0.354	0.353	0.356	0.359	0.362	0.364	0.366	0.367	0.369	0.370	0.370
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.370	0.370	0.370	0.370	0.369	0.369	0.368	0.367	0.367	0.366	0.365	0.365	0.364	0.363	0.363	0.363	0.363	0.363	0.363	0.363
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.365	0.365	0.367	0.368	0.369	0.370	0.372	0.373	0.375	0.377	0.379	0.381	0.383	0.386	0.388	0.390	0.392	0.395	0.398	0.400
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.403	0.418	0.433	0.447	0.461	0.476	0.493	0.507	0.515	0.526	0.535	0.545	0.556	0.560	0.543	0.277	0.156	0.146	0.159	0.177
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.197	0.218	0.243	0.269	0.296	0.319	0.328	0.313	0.268	0.202	0.141	0.092	0.065	0.051	0.060	0.084	0.115	0.132	0.124	0.104
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.086	0.081	0.086	0.091	0.091	0.084	0.071	0.054	0.039	0.027	0.018	0.011	0.007	0.004	0.002	0.001	0.001	0.001	0.001	0.001
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND4

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.008	0.038	0.093	0.139	0.157	0.228
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.267	0.275	0.282	0.291	0.290	0.300	0.310	0.307	0.300	0.293	0.287	0.285	0.287	0.291	0.295	0.294	0.289	0.282	0.275	0.274
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.276	0.281	0.284	0.287	0.288	0.291	0.300	0.312	0.334	0.356	0.371	0.381	0.386	0.388	0.389	0.388	0.385	0.382	0.378	0.373
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.369	0.364	0.359	0.354	0.349	0.343	0.337	0.333	0.327	0.322	0.316	0.311	0.306	0.302	0.298	0.294	0.290	0.287	0.284	0.282
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.279	0.279	0.277	0.276	0.275	0.275	0.274	0.274	0.274	0.275	0.276	0.278	0.282	0.287	0.293	0.301				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.529	1.515	1.508	1.504	1.501	1.499	1.498
P	0.916	0.919	0.921	0.922	0.923	0.923	0.924

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

	x	y	Y	λ_d	P_e
A	0.445	0.405	26	483	1
C	0.306	0.312	26	479	2
D65	0.308	0.325	26	480	2

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	2	490	555	-	70	417	111	2.42

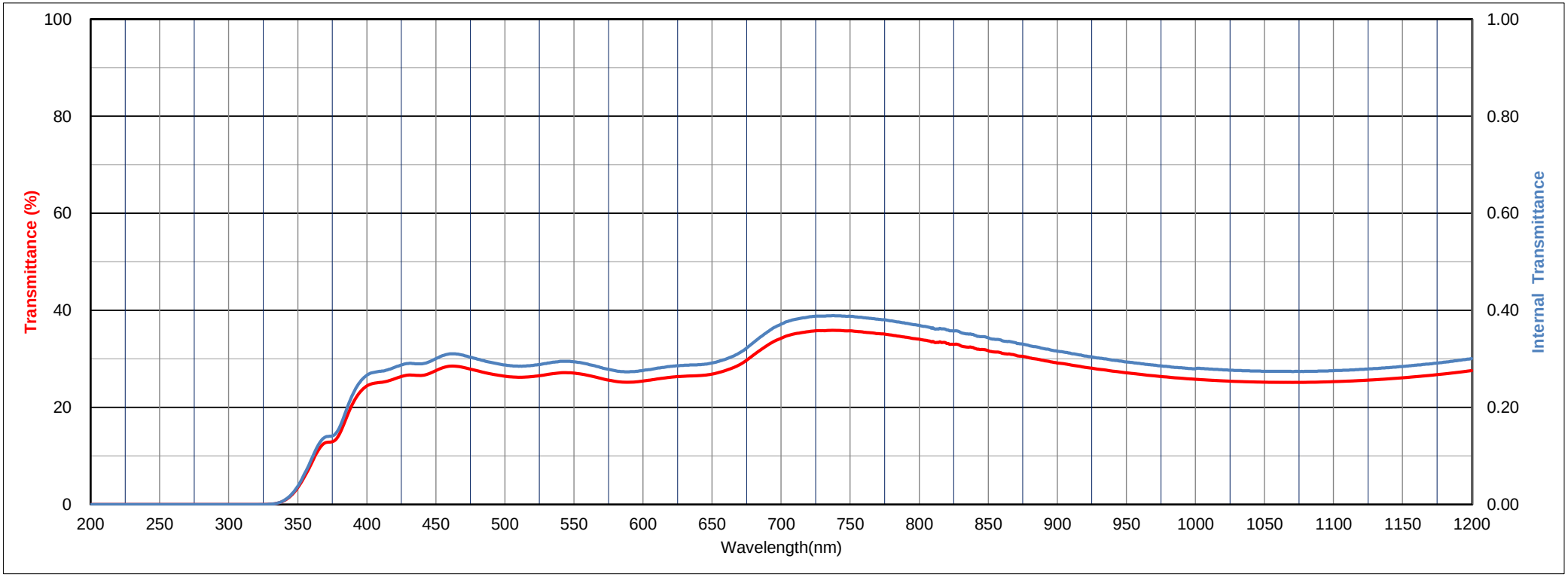
Tolerance of Transmittance (τ)

τ 405 (1)	τ 546 (2)	τ 694 (3)
0.27±0.03	0.31±0.03	0.39±0.04

(1)Internal transmittance at 405nm

(2)Internal transmittance at 546nm

(3)Internal transmittance at 694nm



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HOYA

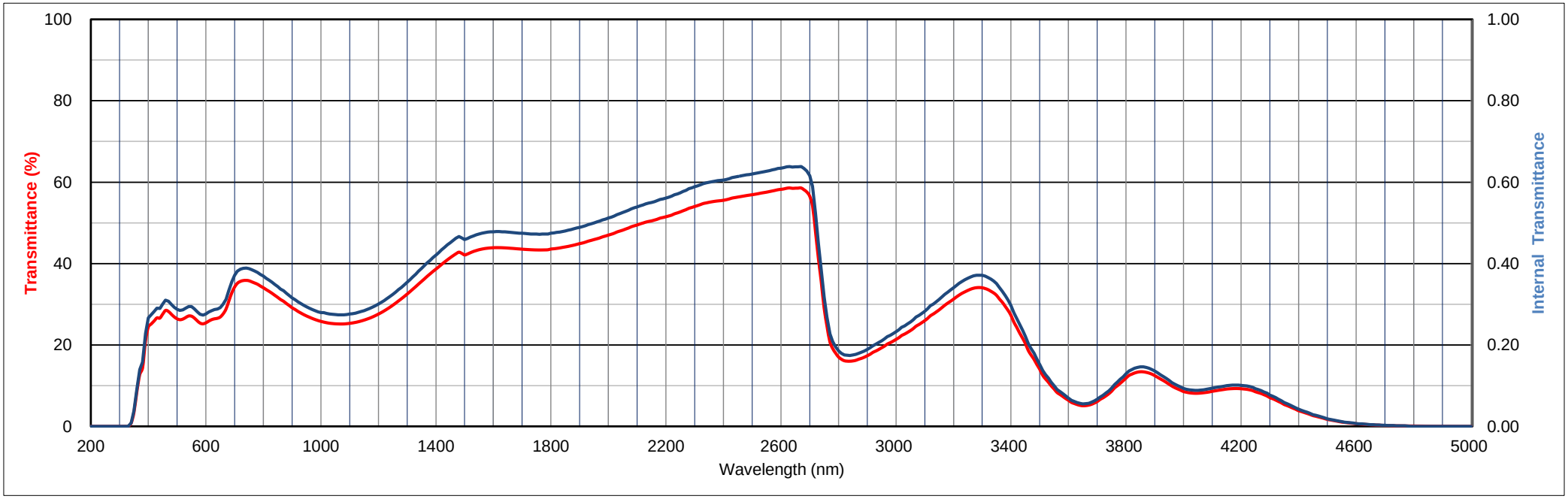
HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND4

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.008	0.038	0.093	0.139	0.157	0.228
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.267	0.275	0.282	0.291	0.290	0.300	0.310	0.307	0.300	0.293	0.287	0.285	0.287	0.291	0.295	0.294	0.289	0.282	0.275	0.274
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.276	0.281	0.284	0.287	0.288	0.291	0.300	0.312	0.334	0.356	0.371	0.381	0.386	0.388	0.389	0.388	0.385	0.382	0.378	0.373
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.369	0.364	0.359	0.354	0.349	0.343	0.337	0.333	0.327	0.322	0.316	0.311	0.306	0.302	0.298	0.294	0.290	0.287	0.284	0.282
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.279	0.279	0.277	0.276	0.275	0.275	0.274	0.274	0.274	0.275	0.276	0.277	0.278	0.280	0.282	0.284	0.287	0.290	0.293	0.297
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.301	0.305	0.309	0.314	0.319	0.324	0.330	0.336	0.342	0.348	0.354	0.361	0.368	0.374	0.381	0.388	0.395	0.402	0.408	0.415
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.421	0.427	0.434	0.440	0.446	0.452	0.457	0.462	0.466	0.463	0.459	0.461	0.465	0.468	0.471	0.473	0.475	0.476	0.477	0.478
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.478	0.478	0.478	0.478	0.478	0.477	0.477	0.476	0.476	0.475	0.474	0.474	0.473	0.473	0.473	0.472	0.472	0.472	0.472	0.473
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.475	0.475	0.476	0.478	0.479	0.480	0.482	0.483	0.485	0.487	0.489	0.491	0.493	0.496	0.498	0.500	0.502	0.505	0.507	0.510
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.512	0.525	0.539	0.550	0.561	0.574	0.589	0.600	0.605	0.614	0.620	0.627	0.635	0.638	0.616	0.317	0.186	0.175	0.189	0.210
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.233	0.256	0.283	0.312	0.341	0.364	0.371	0.351	0.297	0.222	0.153	0.100	0.070	0.055	0.066	0.094	0.129	0.146	0.136	0.113
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.093	0.089	0.094	0.100	0.101	0.093	0.077	0.059	0.042	0.029	0.019	0.011	0.007	0.004	0.002	0.001	0.001	0.001	0.001	0.001
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND5

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.015	0.080	0.200	0.330	0.395	0.404	0.514
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.558	0.558	0.562	0.571	0.569	0.582	0.595	0.594	0.588	0.582	0.579	0.577	0.580	0.584	0.588	0.587	0.583	0.575	0.568	0.567
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.568	0.571	0.573	0.574	0.574	0.575	0.580	0.591	0.607	0.623	0.634	0.640	0.640	0.639	0.637	0.632	0.627	0.621	0.615	0.609
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.604	0.597	0.591	0.583	0.575	0.569	0.563	0.556	0.550	0.544	0.538	0.531	0.525	0.520	0.515	0.511	0.506	0.502	0.499	0.495
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.492	0.493	0.491	0.489	0.487	0.486	0.485	0.484	0.484	0.484	0.484	0.486	0.489	0.493	0.498	0.505				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.527	1.513	1.506	1.502	1.499	1.497	1.495
P	0.917	0.920	0.922	0.923	0.923	0.924	0.924

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

	x	y	Y	λ_d	P_e
A	0.446	0.408	53	500	0
C	0.309	0.317	53	494	0
D65	0.311	0.329	53	495	0

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	2	490	560	-	68	416	124	2.42

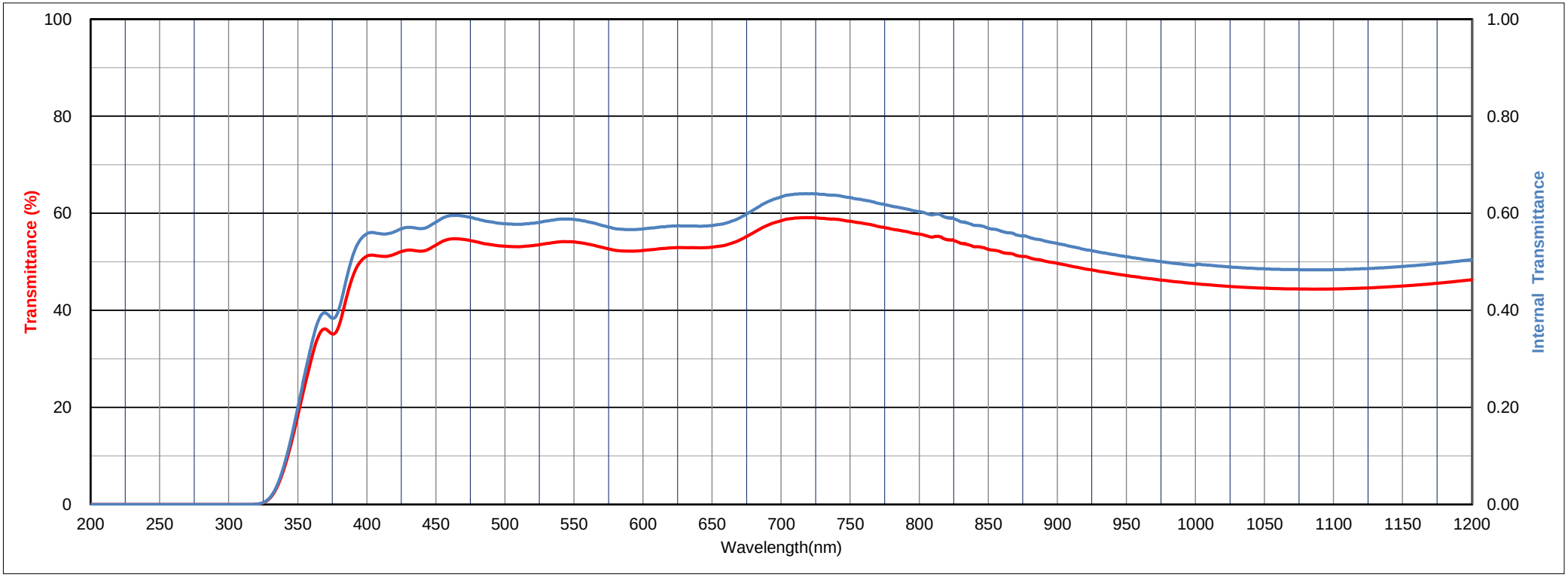
Tolerance of Transmittance (τ)

τ 405 (1)	τ 546 (2)	τ 694 (3)
0.56±0.03	0.57±0.03	0.62±0.03

(1)Internal transmittance at 405nm

(2)Internal transmittance at 546nm

(3)Internal transmittance at 694nm



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HOYA

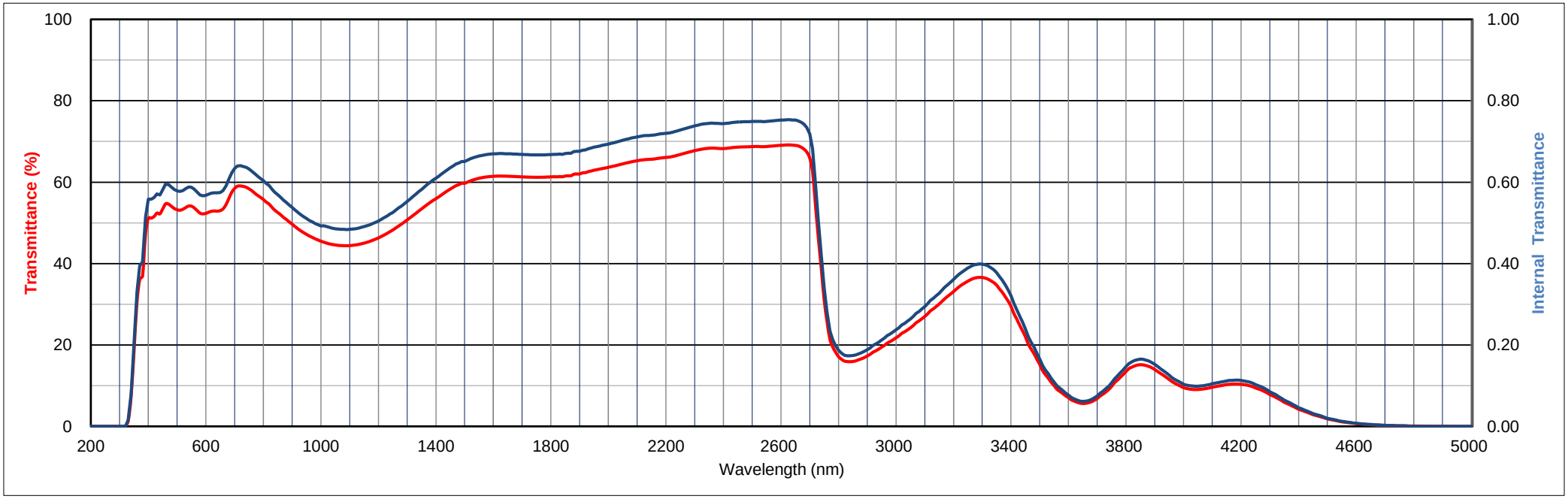
HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND5

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.015	0.080	0.200	0.330	0.395	0.404	0.514
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.558	0.558	0.562	0.571	0.569	0.582	0.595	0.594	0.588	0.582	0.579	0.577	0.580	0.584	0.588	0.587	0.583	0.575	0.568	0.567
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.568	0.571	0.573	0.574	0.574	0.575	0.580	0.591	0.607	0.623	0.634	0.640	0.640	0.639	0.637	0.632	0.627	0.621	0.615	0.609
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.604	0.597	0.591	0.583	0.575	0.569	0.563	0.556	0.550	0.544	0.538	0.531	0.525	0.520	0.515	0.511	0.506	0.502	0.499	0.495
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.492	0.493	0.491	0.489	0.487	0.486	0.485	0.484	0.484	0.484	0.484	0.485	0.486	0.487	0.489	0.491	0.493	0.495	0.498	0.501
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.505	0.508	0.512	0.517	0.521	0.526	0.531	0.536	0.541	0.547	0.553	0.559	0.564	0.570	0.576	0.582	0.588	0.594	0.600	0.605
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.610	0.615	0.620	0.625	0.631	0.635	0.640	0.645	0.647	0.651	0.651	0.654	0.657	0.660	0.662	0.664	0.666	0.667	0.668	0.669
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.670	0.670	0.670	0.670	0.670	0.670	0.669	0.669	0.669	0.668	0.668	0.668	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.668
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.668	0.669	0.668	0.669	0.668	0.670	0.671	0.671	0.675	0.676	0.676	0.679	0.679	0.682	0.684	0.686	0.687	0.689	0.691	0.692
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.694	0.703	0.711	0.715	0.720	0.728	0.738	0.745	0.744	0.748	0.749	0.749	0.752	0.752	0.719	0.341	0.187	0.174	0.188	0.212
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.237	0.264	0.294	0.327	0.361	0.389	0.399	0.378	0.321	0.240	0.166	0.109	0.077	0.061	0.075	0.107	0.147	0.165	0.152	0.126
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.104	0.099	0.105	0.112	0.113	0.103	0.085	0.064	0.046	0.031	0.020	0.012	0.008	0.004	0.003	0.001	0.001	0.001	0.001	0.001
λnm	5000																			
τ	<1E-05																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND11

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.010	0.085	0.246	0.431	0.565	0.624	0.608	0.713
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.750	0.744	0.746	0.755	0.751	0.763	0.773	0.771	0.766	0.760	0.757	0.755	0.756	0.759	0.761	0.761	0.759	0.752	0.745	0.741
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.740	0.743	0.747	0.747	0.744	0.744	0.746	0.752	0.763	0.775	0.784	0.791	0.796	0.799	0.795	0.792	0.786	0.778	0.772	0.765
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.758	0.750	0.742	0.735	0.726	0.720	0.711	0.707	0.703	0.693	0.688	0.681	0.674	0.666	0.662	0.657	0.650	0.647	0.641	0.637
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
τ	0.634	0.634	0.631	0.628	0.626	0.624	0.621	0.619	0.618	0.617	0.617	0.616	0.618	0.620	0.623	0.627				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.524	1.511	1.504	1.500	1.498	1.496	1.495
P	0.917	0.920	0.922	0.923	0.924	0.924	0.924

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

	x	y	Y	λ_d	P_e
A	0.446	0.408	69	496	0
C	0.308	0.316	69	487	1
D65	0.311	0.329	69	488	1

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	2	485	565	-	66	423	110	2.40

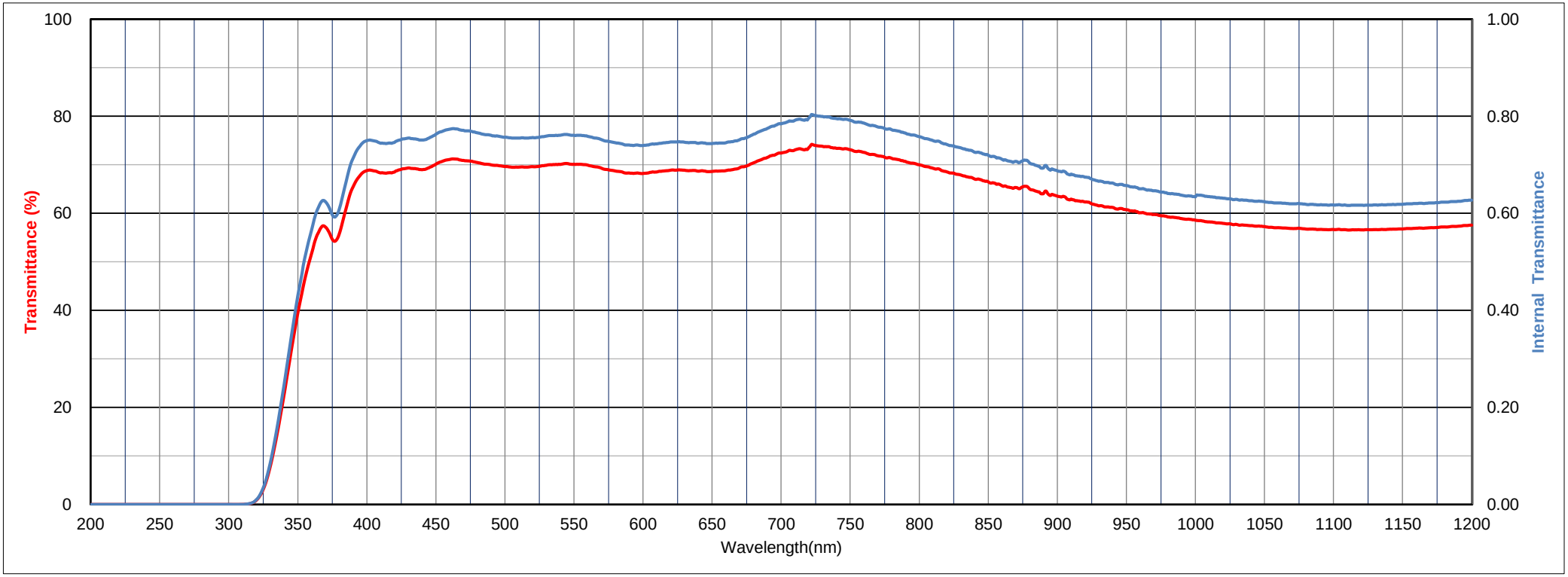
Tolerance of Transmittance (τ)

τ 405 (1)	τ 546 (2)	τ 694 (3)
0.76±0.02	0.77±0.02	0.79±0.02

(1)Internal transmittance at 405nm

(2)Internal transmittance at 546nm

(3)Internal transmittance at 694nm



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HOYA

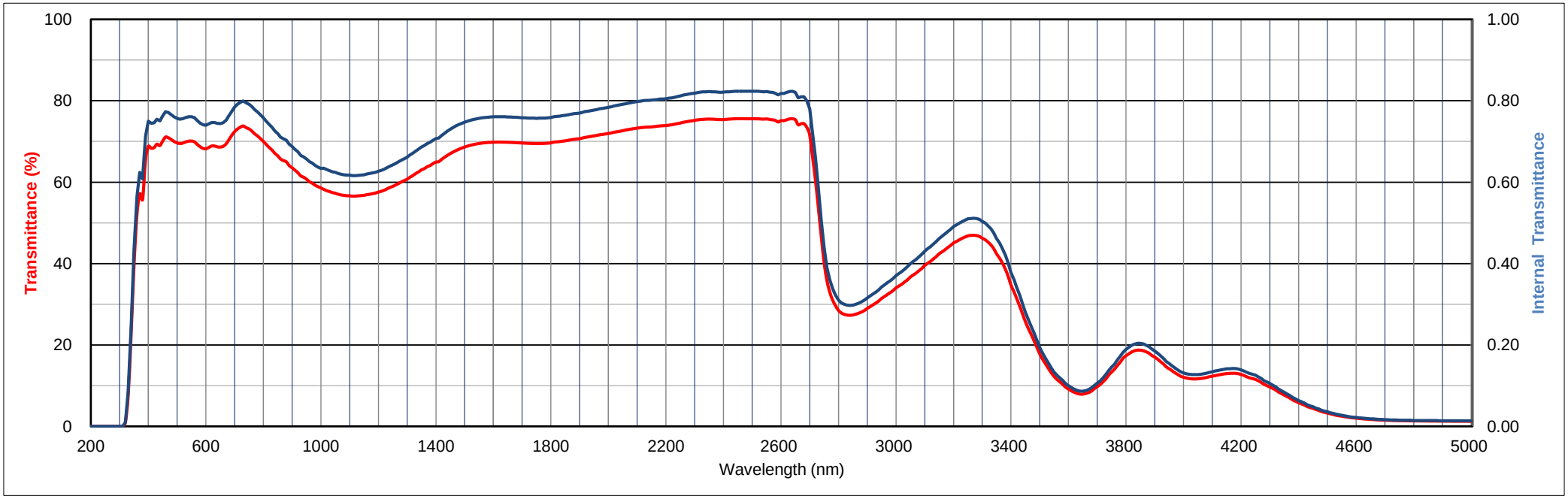
HOYA CORPORATION OPTICS SECTION

Thickness (1.00) mm

W-ND11

Internal Transmittance (τ)

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
τ	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	<1E-05	0.001	0.010	0.085	0.246	0.431	0.565	0.624	0.608	0.713
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
τ	0.750	0.744	0.746	0.755	0.751	0.763	0.773	0.771	0.766	0.760	0.757	0.755	0.756	0.759	0.761	0.761	0.759	0.752	0.745	0.741
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
τ	0.740	0.743	0.747	0.747	0.744	0.744	0.746	0.752	0.763	0.775	0.784	0.791	0.796	0.799	0.795	0.792	0.786	0.778	0.772	0.765
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
τ	0.758	0.750	0.742	0.735	0.726	0.720	0.711	0.707	0.703	0.693	0.688	0.681	0.674	0.666	0.662	0.657	0.650	0.647	0.641	0.637
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
τ	0.634	0.634	0.631	0.628	0.626	0.624	0.621	0.619	0.618	0.617	0.617	0.616	0.616	0.617	0.618	0.618	0.620	0.621	0.623	0.624
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
τ	0.627	0.629	0.632	0.636	0.639	0.642	0.646	0.650	0.654	0.658	0.662	0.667	0.671	0.677	0.681	0.687	0.690	0.695	0.698	0.703
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
τ	0.707	0.709	0.715	0.720	0.725	0.730	0.734	0.738	0.742	0.745	0.748	0.750	0.752	0.754	0.756	0.757	0.758	0.759	0.760	0.760
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
τ	0.761	0.761	0.761	0.761	0.761	0.760	0.760	0.760	0.759	0.759	0.758	0.758	0.758	0.757	0.757	0.757	0.757	0.757	0.758	0.758
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
τ	0.759	0.761	0.761	0.762	0.763	0.764	0.766	0.767	0.768	0.769	0.770	0.772	0.774	0.775	0.776	0.777	0.779	0.780	0.781	0.783
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
τ	0.784	0.791	0.798	0.801	0.805	0.812	0.819	0.822	0.821	0.823	0.823	0.823	0.818	0.821	0.780	0.439	0.310	0.298	0.316	0.342
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
τ	0.370	0.400	0.431	0.462	0.491	0.510	0.504	0.461	0.378	0.281	0.194	0.133	0.100	0.086	0.106	0.145	0.189	0.204	0.185	0.154
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
τ	0.132	0.127	0.134	0.141	0.139	0.126	0.105	0.084	0.063	0.048	0.036	0.027	0.022	0.019	0.017	0.015	0.015	0.014	0.014	0.014
λnm	5000																			
τ	0.0																			



All data is mean values of various melts.

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熱線吸収フィルター

可視域の透過率が高く、熱線（赤外線）を吸収する。いくぶん青みを帯びたフィルターガラスで、HA-5, HA-15は珪酸塩ガラス、HA-30,HA-50は燐酸塩ガラスです。特に後者は、光源から照射される熱線をよく吸収するので、スライドプロジェクターや各種照明器具などに使用した場合に著しい効果があります。

備考 急熱、急冷によるフィルターガラスの破損を防止するため、熱強化法による強化ガラスを提供することもできます。

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

HA5

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	1.34E-04	0.02	0.60	5.16	18.49	37.74	54.04	66.07	75.02	78.72	79.91	77.95
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	74.02	71.98	70.18	71.15	72.72	73.07	71.88	73.23	74.44	75.53	75.33	74.76	73.41	72.83	73.58	75.34	75.52	74.69	73.21	70.88
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	67.89	64.16	59.72	54.82	49.64	44.26	38.85	34.00	28.78	23.77	19.20	15.17	11.83	9.04	6.75	4.91	3.47	2.39	1.60	1.06
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.68	0.45	0.28	0.17	0.10	0.06	0.03	0.02	0.01	0.01	3.39E-03	1.87E-03	1.02E-03	5.68E-04	3.14E-04	1.78E-04	1.04E-04	6.01E-05	3.50E-05	2.10E-05
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	1.29E-05	8.01E-06	5.13E-06	3.37E-06	2.28E-06	1.58E-06	1.12E-06	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.539	1.529	1.525	1.522	1.520	1.519	1.518
P	0.914	0.916	0.917	0.918	0.918	0.919	0.919

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

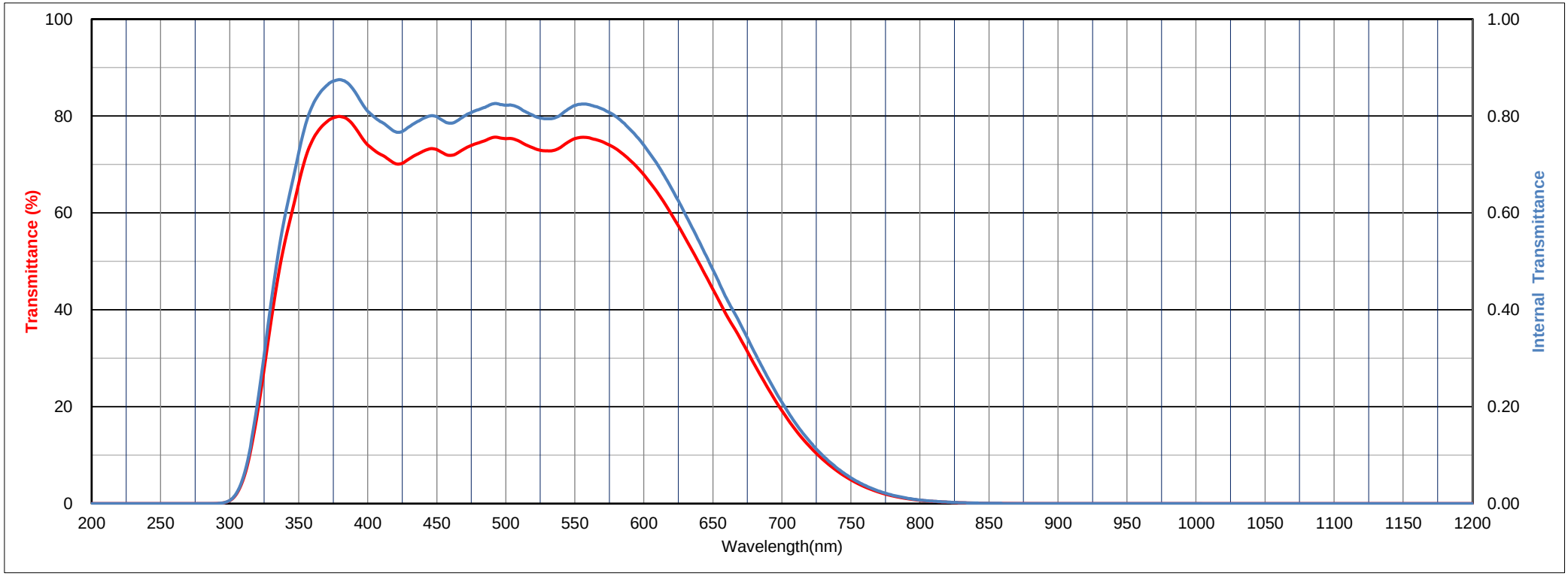
	x	y	Y	λ_d	P_e
A	0.424	0.419	69	504	5
C	0.295	0.320	71	494	5
D65	0.298	0.333	71	495	5

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	-	595	-	-	64	517	-	2.63

Tolerance of Transmittance (T)

Transmittance at 750nm	Transmittance at 1000nm	Average Transmittance at 400nm-700nm
T750(%)	T1000(%)	Tav(%)
<6	<1	63±5



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The content of this catalog is accurate as of October ,2020

HOYA

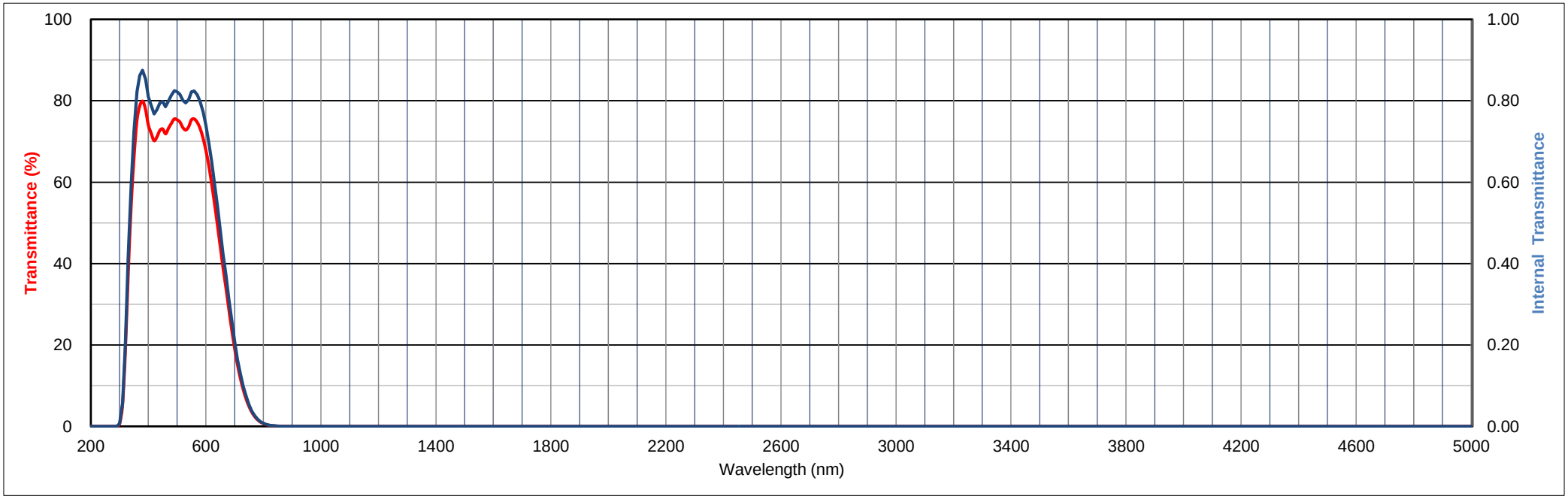
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

HA5

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	1.3E-04	0.02	0.60	5.16	18.49	37.74	54.04	66.07	75.02	78.72	79.91	77.95
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	74.02	71.98	70.18	71.15	72.72	73.07	71.88	73.23	74.44	75.53	75.33	74.76	73.41	72.83	73.58	75.34	75.52	74.69	73.21	70.88
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	67.89	64.16	59.72	54.82	49.64	44.26	38.85	34.00	28.78	23.77	19.20	15.17	11.83	9.04	6.75	4.91	3.47	2.39	1.60	1.06
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.68	0.45	0.28	0.17	0.10	0.06	0.03	0.02	0.01	0.01	3.4E-03	1.9E-03	1.0E-03	5.7E-04	3.1E-04	1.8E-04	1.0E-04	6.0E-05	3.5E-05	2.1E-05
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	1.3E-05	8.0E-06	5.1E-06	3.4E-06	2.3E-06	1.6E-06	1.1E-06	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	<1E-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	5000																			
T	0.00																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

HA15

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	4.32E-05	0.01	0.20	2.31	11.86	30.59	50.81	65.17	74.39	80.53	83.05	83.78	82.40
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	79.69	78.02	77.11	78.05	79.31	79.59	78.63	79.44	80.26	80.90	80.59	80.02	78.93	78.35	78.78	79.84	79.86	79.15	78.00	76.35
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	74.23	71.61	68.36	64.65	60.65	56.38	51.81	47.56	42.67	37.73	32.88	28.20	24.00	20.16	16.70	13.62	10.89	8.57	6.63	5.07
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	3.80	2.84	2.12	1.52	1.08	0.76	0.53	0.37	0.26	0.18	0.12	0.08	0.06	0.04	0.03	0.02	0.01	0.01	0.01	4.51E-03
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	3.28E-03	2.46E-03	1.86E-03	1.43E-03	1.12E-03	8.91E-04	7.22E-04	5.96E-04	5.05E-04	4.33E-04	3.75E-04	2.99E-04	2.53E-04	2.26E-04	2.12E-04	2.06E-04				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.538	1.529	1.524	1.521	1.519	1.518	1.517
P	0.914	0.916	0.917	0.918	0.919	0.919	0.919

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

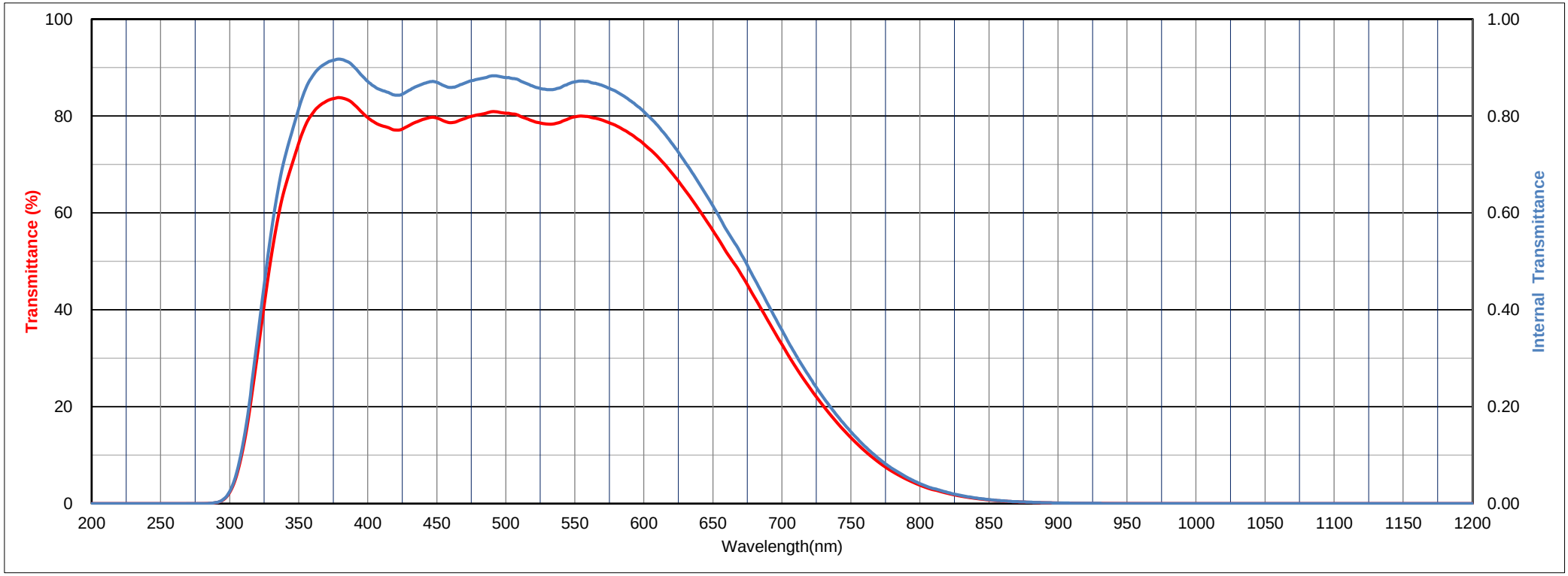
	x	y	Y	λ_d	P_e
A	0.431	0.414	75	502	4
C	0.298	0.317	77	492	4
D65	0.301	0.330	77	492	4

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	-	597	-	-	65	502	-	2.64

Tolerance of Transmittance (T)

Wavelength for Max Transmittance	Transmittance at 750nm	Average Transmittance at 400nm-700nm
λTmax(nm)	T750(%)	Tav(%)
380±5	<15	70±5



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HOYA

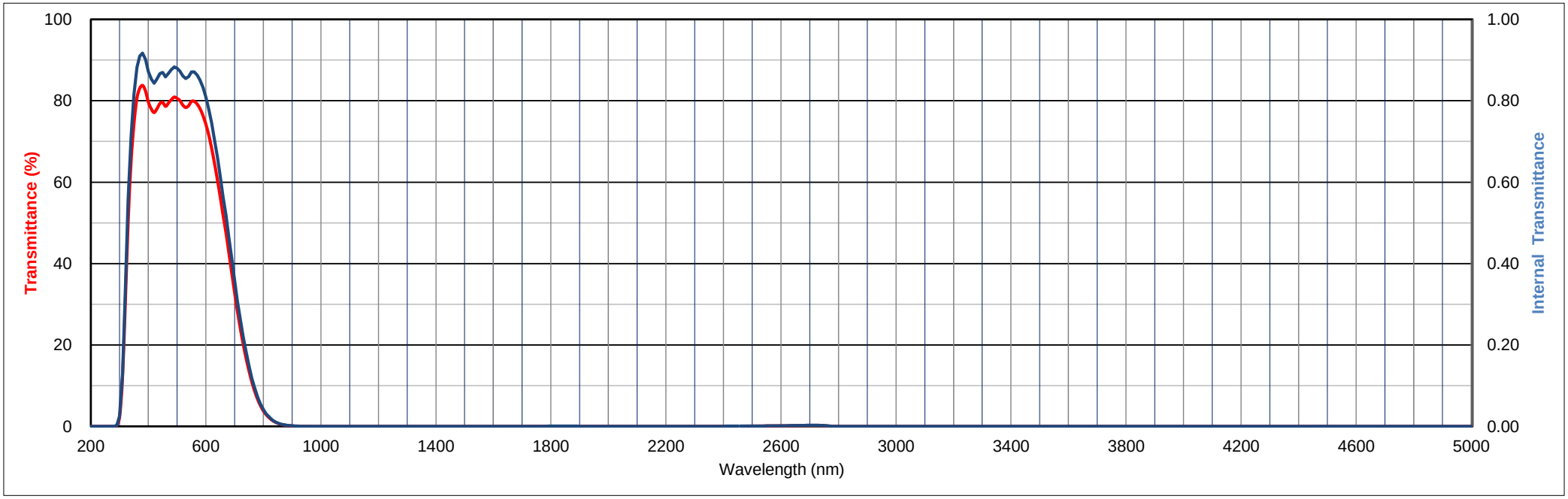
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

HA15

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	4.3E-05	0.01	0.20	2.31	11.86	30.59	50.81	65.17	74.39	80.53	83.05	83.78	82.40
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	79.69	78.02	77.11	78.05	79.31	79.59	78.63	79.44	80.26	80.90	80.59	80.02	78.93	78.35	78.78	79.84	79.86	79.15	78.00	76.35
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	74.23	71.61	68.36	64.65	60.65	56.38	51.81	47.56	42.67	37.73	32.88	28.20	24.00	20.16	16.70	13.62	10.89	8.57	6.63	5.07
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	3.80	2.84	2.12	1.52	1.08	0.76	0.53	0.37	0.26	0.18	0.12	0.08	0.06	0.04	0.03	0.02	0.01	0.01	0.01	0.00
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	3.3E-03	2.5E-03	1.9E-03	1.4E-03	1.1E-03	8.9E-04	7.2E-04	6.0E-04	5.0E-04	4.3E-04	3.8E-04	3.3E-04	3.0E-04	2.7E-04	2.5E-04	2.4E-04	2.3E-04	2.2E-04	2.1E-04	2.1E-04
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	2.1E-04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.05	0.08	0.10	0.14	0.19	0.24	0.18	0.01	0.00	0.00	0.00
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
λnm	5000																			
T	0.00																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

HA30

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	3.35E-04	0.05	1.30	9.24	28.21	50.81	67.65	77.92	83.91	86.23	87.11	86.49
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	84.91	83.92	83.41	84.01	84.78	84.97	84.47	85.03	85.55	86.00	85.83	85.57	84.98	84.71	85.01	85.65	85.77	85.46	84.81	83.87
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	82.57	80.92	78.88	76.44	73.73	70.68	67.28	64.04	60.11	55.98	51.68	47.26	43.02	38.84	34.77	30.83	27.01	23.44	20.14	17.18
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	14.48	12.20	10.26	8.45	6.93	5.60	4.50	3.64	2.93	2.33	1.86	1.48	1.18	0.94	0.75	0.61	0.49	0.40	0.33	0.27
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	0.23	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08	0.08	0.07	0.06	0.05	0.05	0.05	0.05				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.533	1.524	1.519	1.516	1.514	1.513	1.512
P	0.915	0.917	0.919	0.919	0.920	0.920	0.920

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

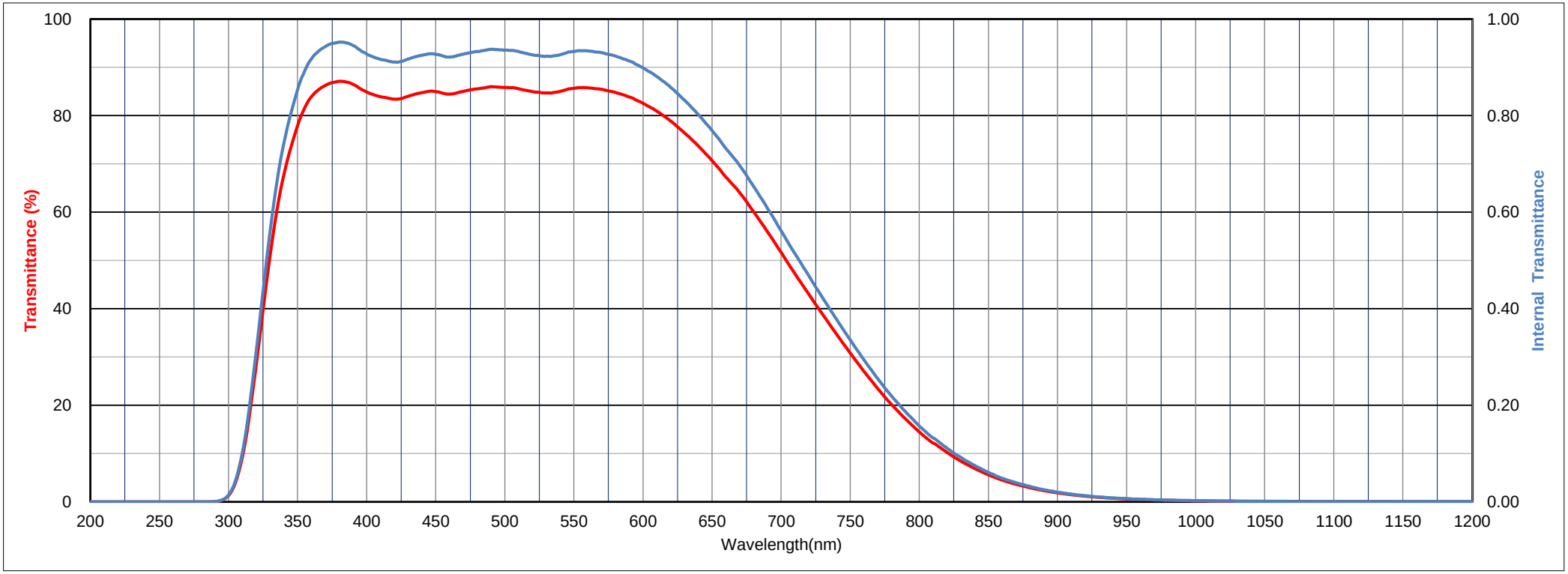
	x	y	Y	λ_d	P_e
A	0.438	0.412	83	503	2
C	0.304	0.317	84	493	2
D65	0.307	0.330	84	494	2

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	-	565	620	-	66	-	-	2.61

Tolerance of Transmittance (T)

Transmittance at 750nm	Transmittance at 1000nm	Average Transmittance at 400nm-700nm
T750(%)	T1000(%)	Tav(%)
<35	<1	80±5



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HOYA

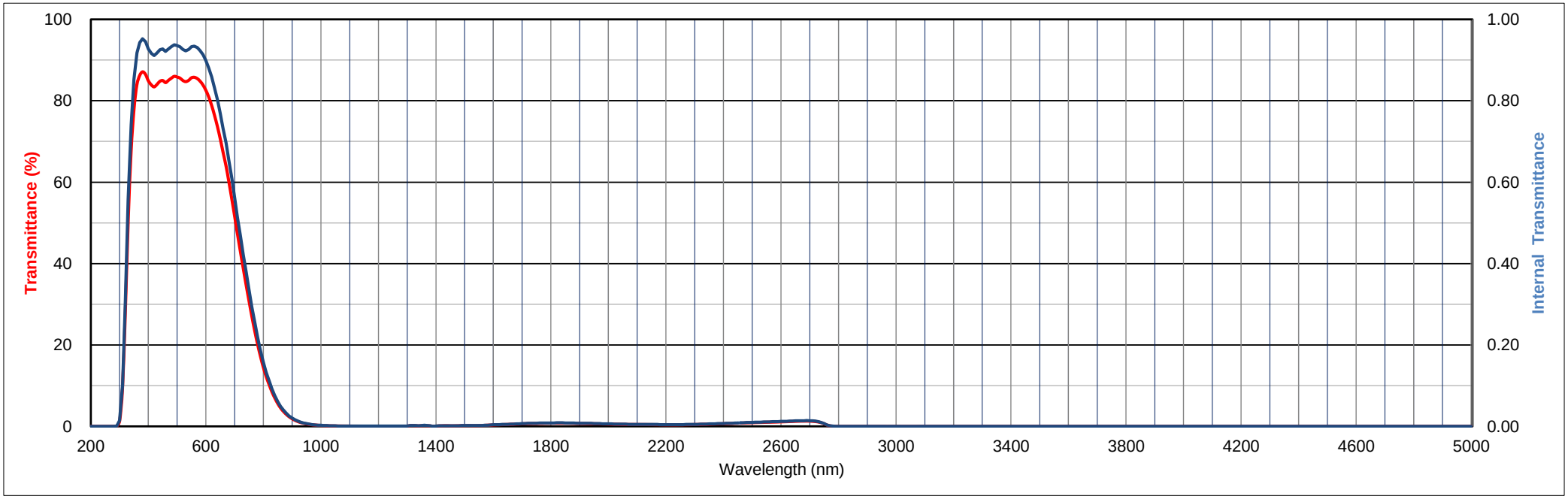
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

HA30

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	3.4E-04	0.05	1.30	9.24	28.21	50.81	67.65	77.92	83.91	86.23	87.11	86.49
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	84.91	83.92	83.41	84.01	84.78	84.97	84.47	85.03	85.55	86.00	85.83	85.57	84.98	84.71	85.01	85.65	85.77	85.46	84.81	83.87
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	82.57	80.92	78.88	76.44	73.73	70.68	67.28	64.04	60.11	55.98	51.68	47.26	43.02	38.84	34.77	30.83	27.01	23.44	20.14	17.18
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	14.48	12.20	10.26	8.45	6.93	5.60	4.50	3.64	2.93	2.33	1.86	1.48	1.18	0.94	0.75	0.61	0.49	0.40	0.33	0.27
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	0.23	0.19	0.16	0.14	0.12	0.10	0.09	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.18	0.22	0.17	0.13	0.17	0.23	0.17	0.12	0.01
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	0.06	0.11	0.13	0.16	0.16	0.13	0.13	0.14	0.16	0.19	0.19	0.21	0.20	0.18	0.18	0.20	0.21	0.25	0.29	0.32
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	0.36	0.39	0.41	0.43	0.45	0.47	0.51	0.53	0.57	0.59	0.63	0.66	0.68	0.69	0.71	0.71	0.73	0.73	0.76	0.76
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	0.78	0.79	0.79	0.79	0.79	0.78	0.77	0.76	0.74	0.72	0.71	0.70	0.69	0.67	0.66	0.65	0.64	0.62	0.60	0.59
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	0.57	0.49	0.46	0.44	0.39	0.40	0.46	0.55	0.66	0.78	0.91	1.01	1.12	1.24	1.28	0.64	0.00	0.00	0.01	0.00
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00
λnm	5000																			
T	0.00																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

HA50

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	3.09E-03	0.32	2.91	11.77	29.03	49.56	66.40	77.11	82.72	85.84	87.94	88.59	88.69	87.92
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	86.60	85.85	85.19	85.46	85.98	86.05	85.66	86.11	86.55	86.82	86.70	86.45	85.95	85.63	85.82	86.24	86.21	85.90	85.33	84.52
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	83.49	82.17	80.49	78.56	76.40	73.95	71.17	68.49	65.19	61.70	57.97	54.11	50.29	46.48	42.71	38.90	35.16	31.52	28.05	24.83
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	21.79	19.12	16.78	14.43	12.43	10.60	8.97	7.61	6.47	5.46	4.59	3.86	3.26	2.75	2.32	1.98	1.70	1.45	1.26	1.09
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	0.95	0.83	0.74	0.66	0.59	0.53	0.49	0.45	0.42	0.39	0.37	0.33	0.31	0.29	0.28	0.28				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.528	1.519	1.515	1.512	1.510	1.509	1.508
P	0.916	0.919	0.920	0.920	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

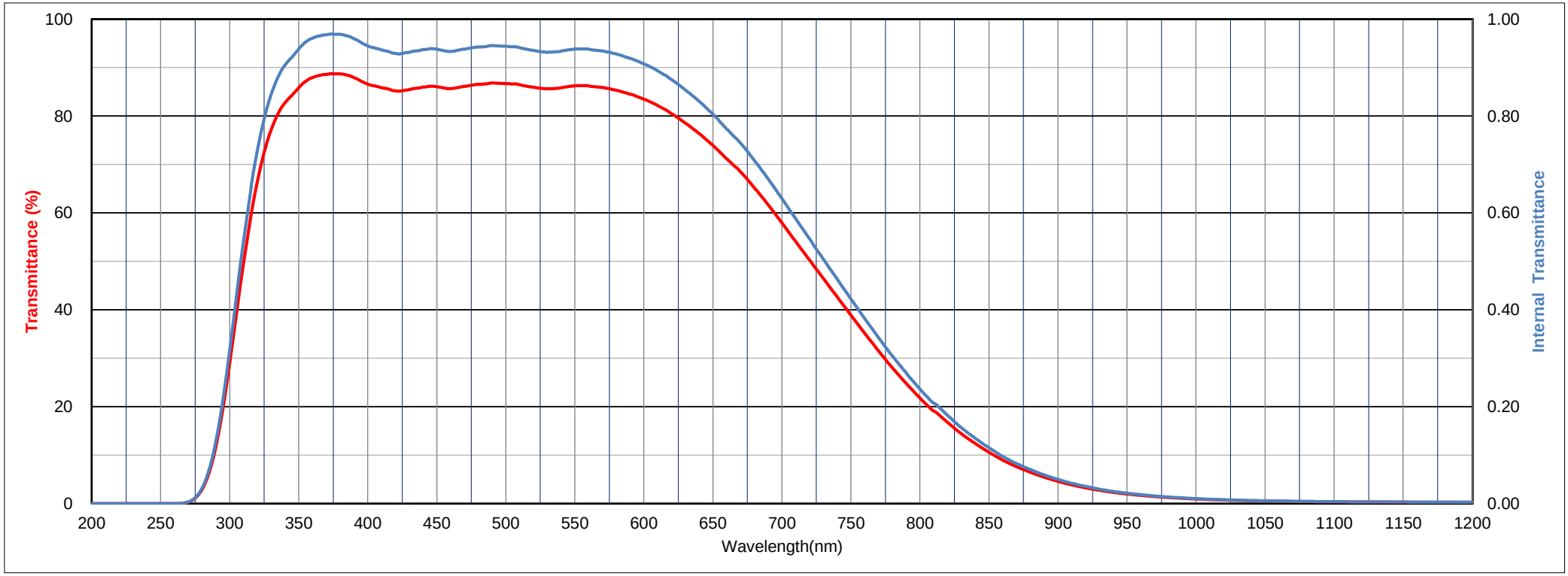
	x	y	Y	λ_d	P_e
A	0.440	0.411	84	502	2
C	0.305	0.316	85	491	2
D65	0.307	0.329	85	493	2

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	-	560	615	-	66	-	-	2.60

Tolerance of Transmittance (T)

Transmittance at 750nm	Transmittance at 1000nm	Average Transmittance at 400nm-700nm
T750(%)	T1000(%)	Tav(%)
<55	<3	80±5



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HOYA

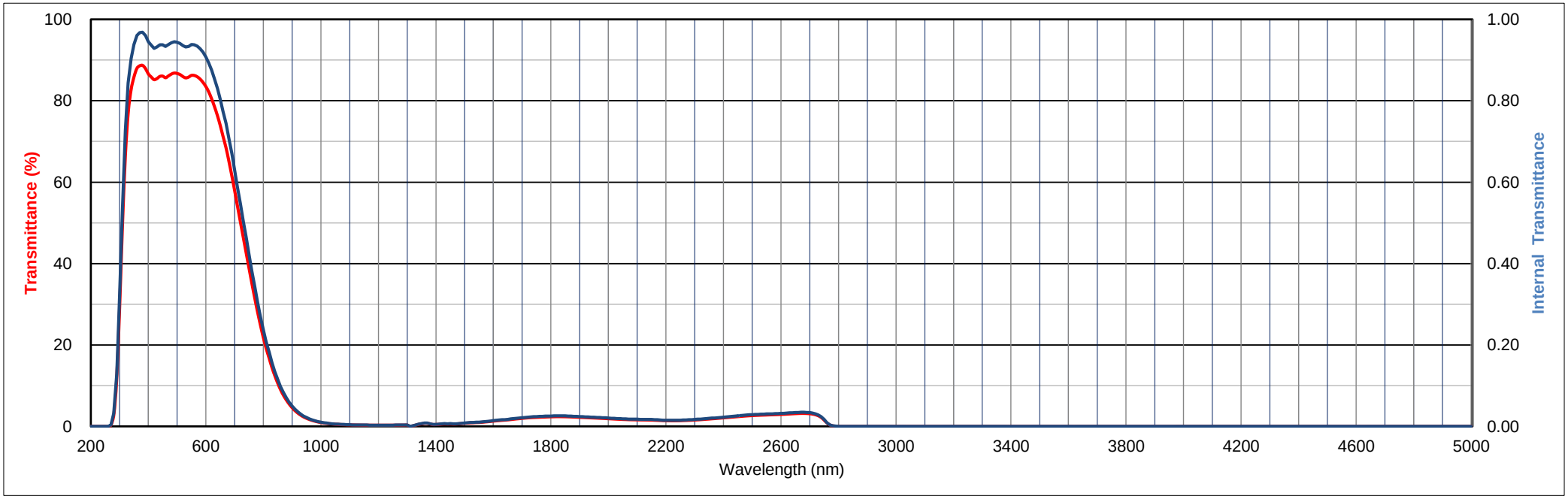
HOYA CORPORATION OPTICS SECTION

Thickness 3.00 mm

HA50

Transmittance (T) **units: %**

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	<1E-6	0.00	0.32	2.91	11.77	29.03	49.56	66.40	77.11	82.72	85.84	87.94	88.59	88.69	87.92
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	86.60	85.85	85.19	85.46	85.98	86.05	85.66	86.11	86.55	86.82	86.70	86.45	85.95	85.63	85.82	86.24	86.21	85.90	85.33	84.52
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	83.49	82.17	80.49	78.56	76.40	73.95	71.17	68.49	65.19	61.70	57.97	54.11	50.29	46.48	42.71	38.90	35.16	31.52	28.05	24.83
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	21.79	19.12	16.78	14.43	12.43	10.60	8.97	7.61	6.47	5.46	4.59	3.86	3.26	2.75	2.32	1.98	1.70	1.45	1.26	1.09
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	0.95	0.83	0.74	0.66	0.59	0.53	0.49	0.45	0.42	0.39	0.37	0.35	0.33	0.32	0.31	0.30	0.29	0.29	0.28	0.28
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	0.28	0.28	0.28	0.28	0.28	0.29	0.29	0.30	0.30	0.31	0.31	0.00	0.13	0.31	0.49	0.62	0.75	0.75	0.60	0.44
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	0.45	0.50	0.56	0.60	0.58	0.60	0.57	0.58	0.64	0.71	0.77	0.82	0.87	0.90	0.94	0.96	1.00	1.09	1.14	1.22
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	1.29	1.36	1.42	1.49	1.54	1.60	1.68	1.75	1.84	1.90	1.97	2.04	2.09	2.14	2.18	2.21	2.24	2.27	2.30	2.33
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	2.35	2.37	2.39	2.39	2.38	2.37	2.35	2.32	2.29	2.25	2.22	2.19	2.16	2.12	2.09	2.06	2.03	1.99	1.96	1.93
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	1.88	1.71	1.60	1.54	1.40	1.40	1.56	1.81	2.09	2.39	2.65	2.80	2.93	3.13	3.11	1.54	0.01	0.00	0.00	0.00
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
λnm	5000																			
T	0.00																			



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紫外透過・可視吸収フィルター

紫外域を透過し、可視域を吸収し、わずかに近赤外域を透過する暗黒色のフィルターガラスです。
ガラスタイプの数字は、最高透過率になる波長を表しています。主として紫外線のみを取り出す時に用い、水銀灯の代表的スペクトル線である253.7nmや365nmの波長を選択的に透過させることに利用します。

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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

U330

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.4	17.6	52.1	72.4	80.2	84.9	87.0	87.7	87.9	88.1	87.9	87.5	86.9	85.2	79.8	65.4	38.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	12.8	3.1	0.9	0.4	0.3	0.4	0.5	0.5	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.1	1.1	5.4	15.5	30.2	42.0	48.0	49.6	47.5	43.7	39.5	35.6	32.2	29.3	27.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	25.4	24.2	23.4	22.8	22.5	22.3	22.4	22.5	22.8	23.2	23.7	24.3	25.0	25.8	26.7	27.6	28.6	29.5	30.4	31.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	32.1	32.7	33.2	33.5	33.6	33.4	33.1	32.5	31.7	30.7	29.5	26.8	23.7	20.8	17.9	15.4				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.567	1.557	1.552	1.549	1.547	1.545	1.544
P	0.907	0.909	0.911	0.911	0.912	0.912	0.912

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

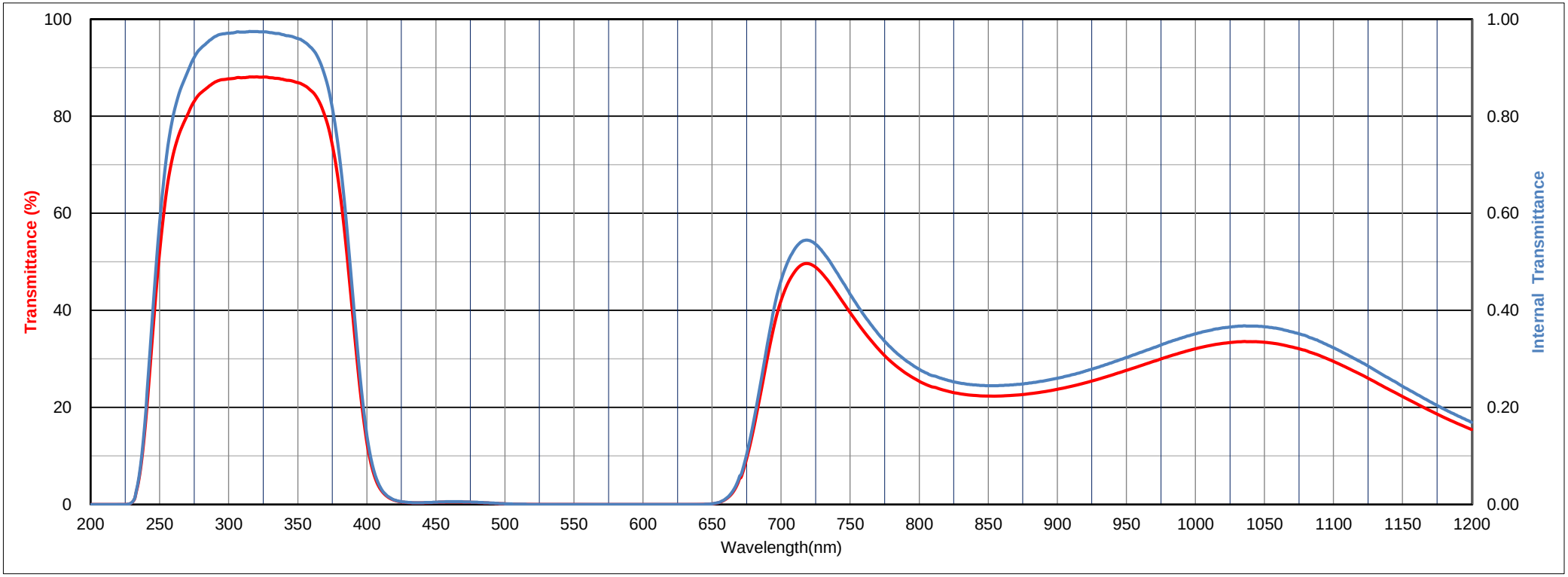
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	5	470	505	82	93	420	230	2.78

Tolerance of Transmittance (T)

Maximum Transmittance	Transmittance at 254nm	Transmittance at 405nm
Tmax(%)	T254(%)	T405(%)
85±5	>40	<15



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HOYA

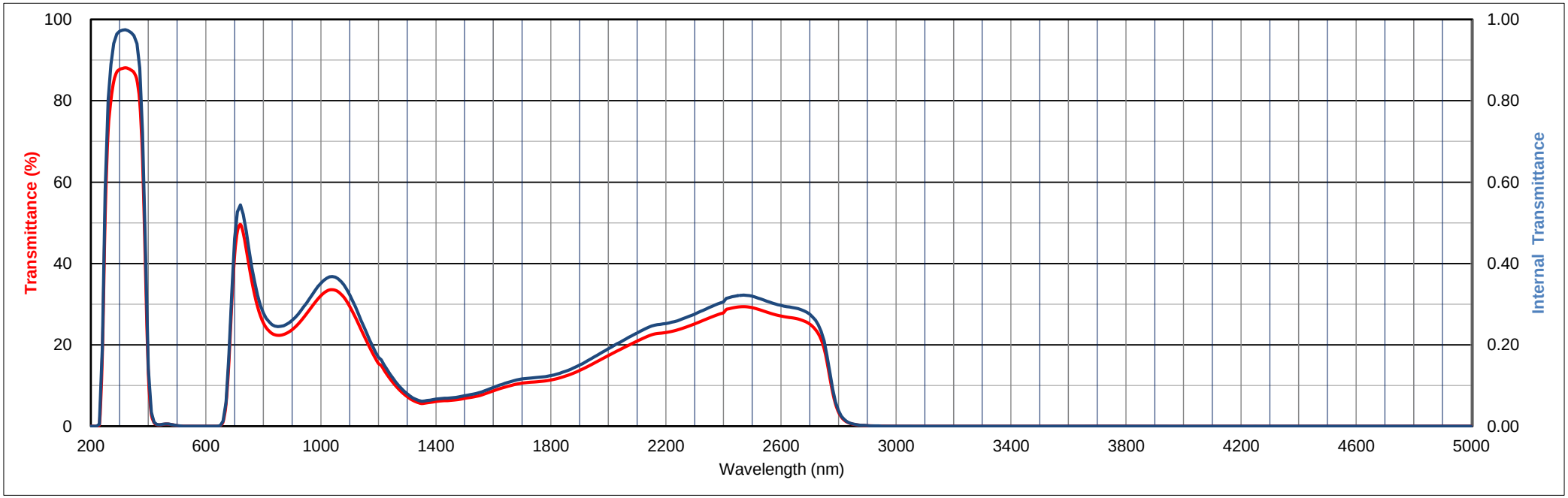
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

U330

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.4	17.6	52.1	72.4	80.2	84.9	87.0	87.7	87.9	88.1	87.9	87.5	86.9	85.2	79.8	65.4	38.4
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	12.8	3.1	0.9	0.4	0.3	0.4	0.5	0.5	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.1	1.1	5.4	15.5	30.2	42.0	48.0	49.6	47.5	43.7	39.5	35.6	32.2	29.3	27.1
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	25.4	24.2	23.4	22.8	22.5	22.3	22.4	22.5	22.8	23.2	23.7	24.3	25.0	25.8	26.7	27.6	28.6	29.5	30.4	31.3
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	32.1	32.7	33.2	33.5	33.6	33.4	33.1	32.5	31.7	30.7	29.5	28.1	26.8	25.3	23.7	22.2	20.8	19.3	17.9	16.6
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	15.4	14.9	13.8	12.7	11.7	10.8	9.9	9.2	8.5	7.8	7.3	6.8	6.4	6.0	5.8	5.6	5.6	5.8	5.9	6.0
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	6.1	6.2	6.2	6.3	6.3	6.3	6.4	6.5	6.6	6.7	6.8	7.0	7.1	7.2	7.3	7.5	7.7	8.0	8.2	8.4
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	8.7	8.9	9.2	9.4	9.6	9.8	10.0	10.2	10.3	10.5	10.6	10.7	10.8	10.8	10.9	10.9	11.0	11.1	11.1	11.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	11.4	11.5	11.7	11.9	12.1	12.3	12.5	12.8	13.1	13.4	13.7	14.0	14.4	14.7	15.1	15.5	15.9	16.2	16.6	17.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	17.4	19.2	20.9	22.5	23.0	23.9	25.2	26.6	27.9	29.3	29.1	28.1	27.1	26.5	25.1	19.1	3.5	0.5	0.1	0.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness	2.50	mm

U340

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.2	7.8	30.7	54.3	67.5	73.4	75.9	76.7	75.9	72.3	63.0	39.7	9.4	0.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.6	2.1	2.1	1.4	0.7	0.3	0.1	0.1	0.0	0.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.587	1.576	1.571	1.568	1.565	1.563	1.562
P	0.902	0.905	0.906	0.907	0.907	0.908	0.908

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

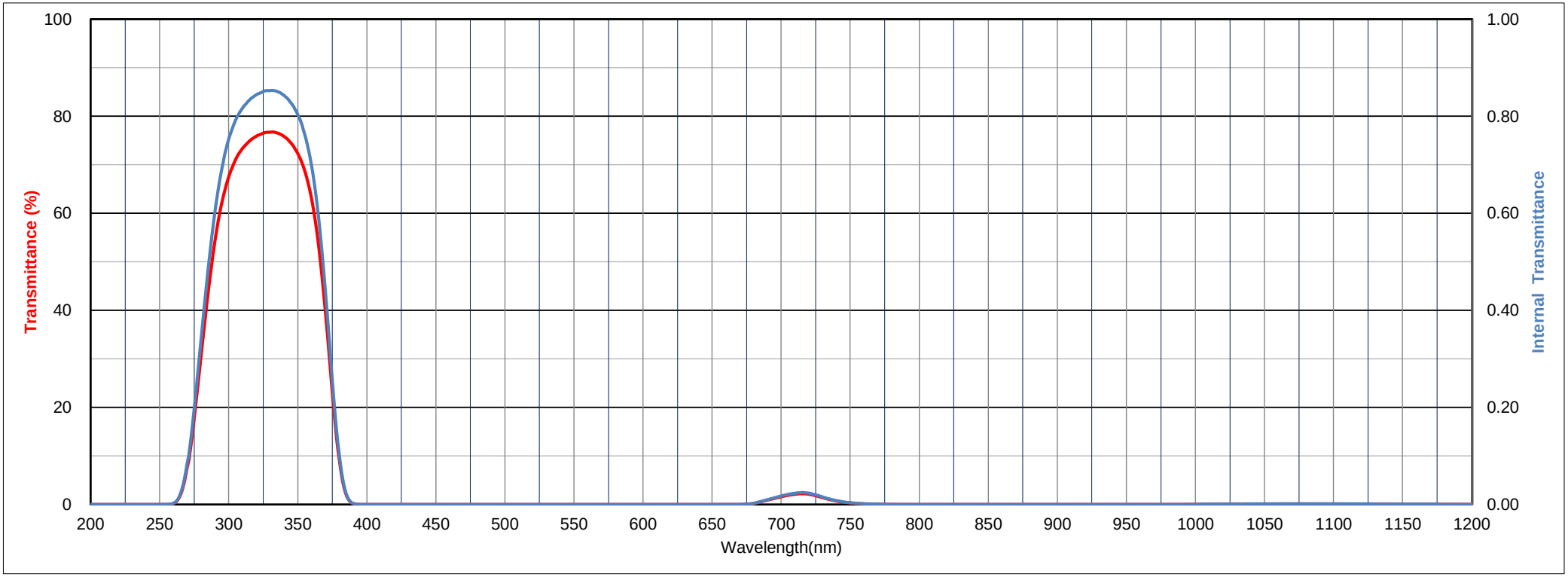
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	4	530	565	85	96	430	250	2.92

Tolerance of Transmittance (T)

Maximum Transmittance	Transmittance at 254nm	Transmittance at 405nm
Tmax(%)	T254(%)	T405(%)
75±5	<1	<0.1



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

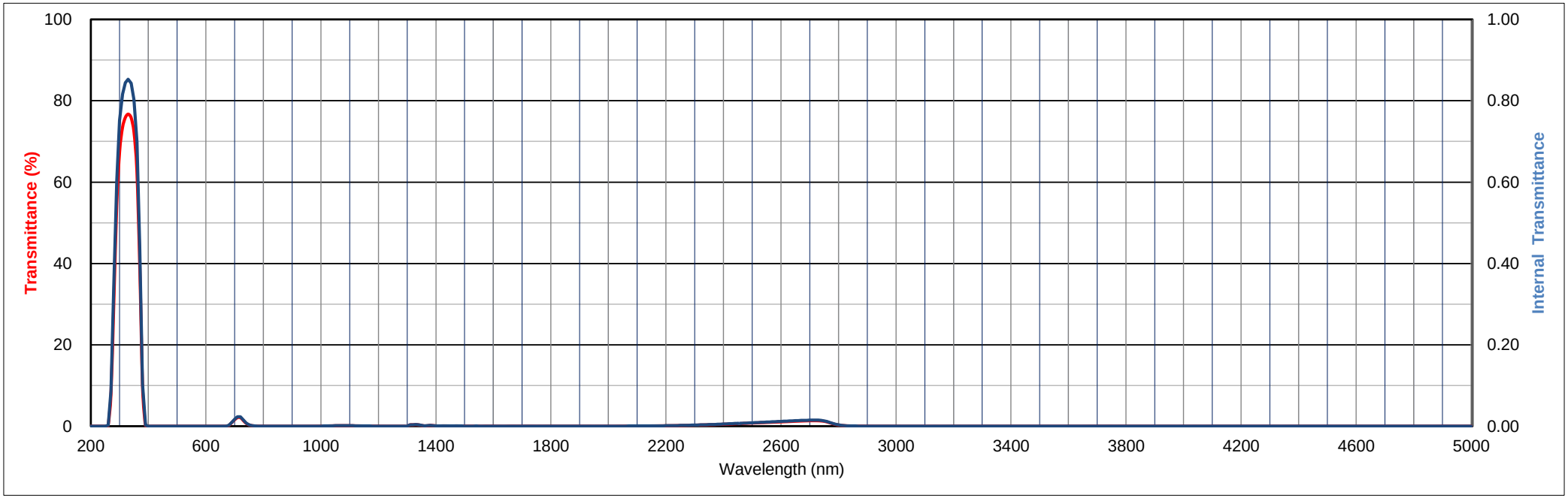
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

U340

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.2	7.8	30.7	54.3	67.5	73.4	75.9	76.7	75.9	72.3	63.0	39.7	9.4	0.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.6	2.1	2.1	1.4	0.7	0.3	0.1	0.1	0.0	0.0
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.4	0.3	0.2	0.1	0.1	0.2	0.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9	1.1	1.2	1.3	1.2	0.3	0.1	0.0	0.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

U360

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	24.9	47.9	62.2	69.2	72.1	71.0	62.3	38.0	8.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.2	5.5	7.7	9.6	9.1	6.7	4.0	2.6	1.9
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.3	0.9	0.6	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.552	1.542	1.537	1.534	1.532	1.531	1.531
P	0.911	0.913	0.914	0.915	0.915	0.916	0.916

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

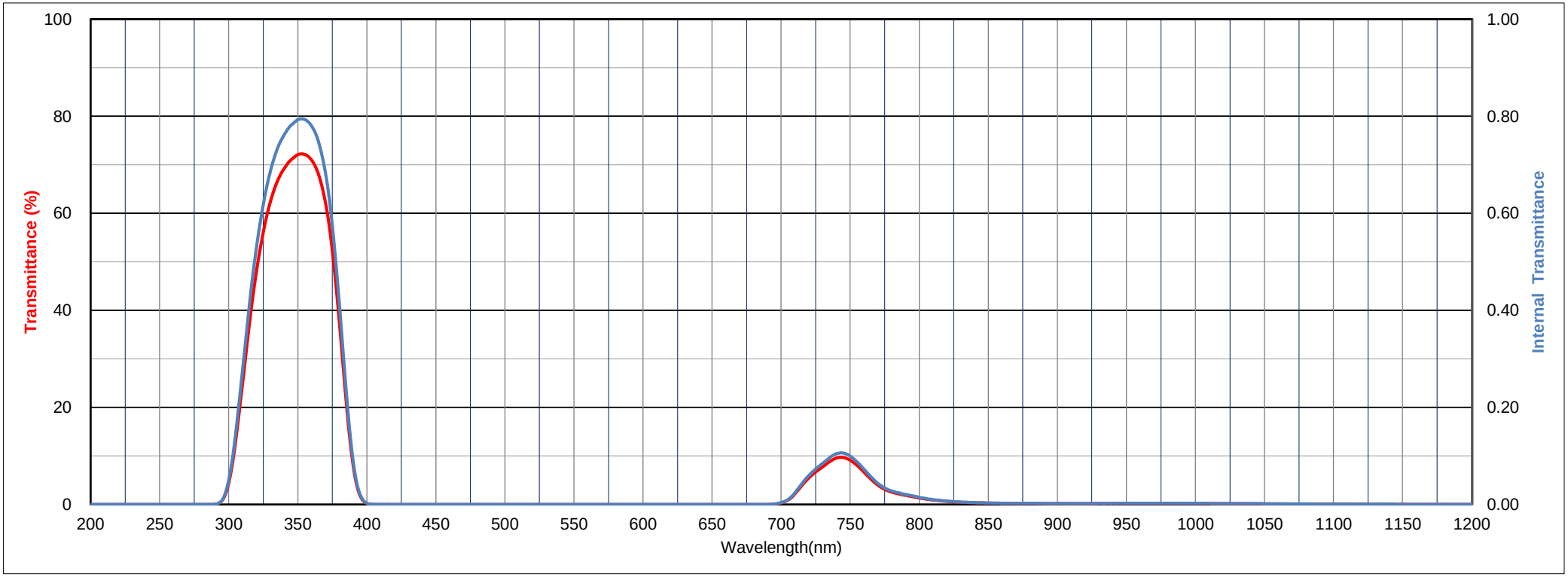
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
3	2	520	560	100	111	560	140	2.74

Tolerance of Transmittance (T)

Maximum Transmittance	Transmittance at 254nm	Transmittance at 405nm
Tmax(%)	T254(%)	T405(%)
70±5	<0.01	<1



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HOYA

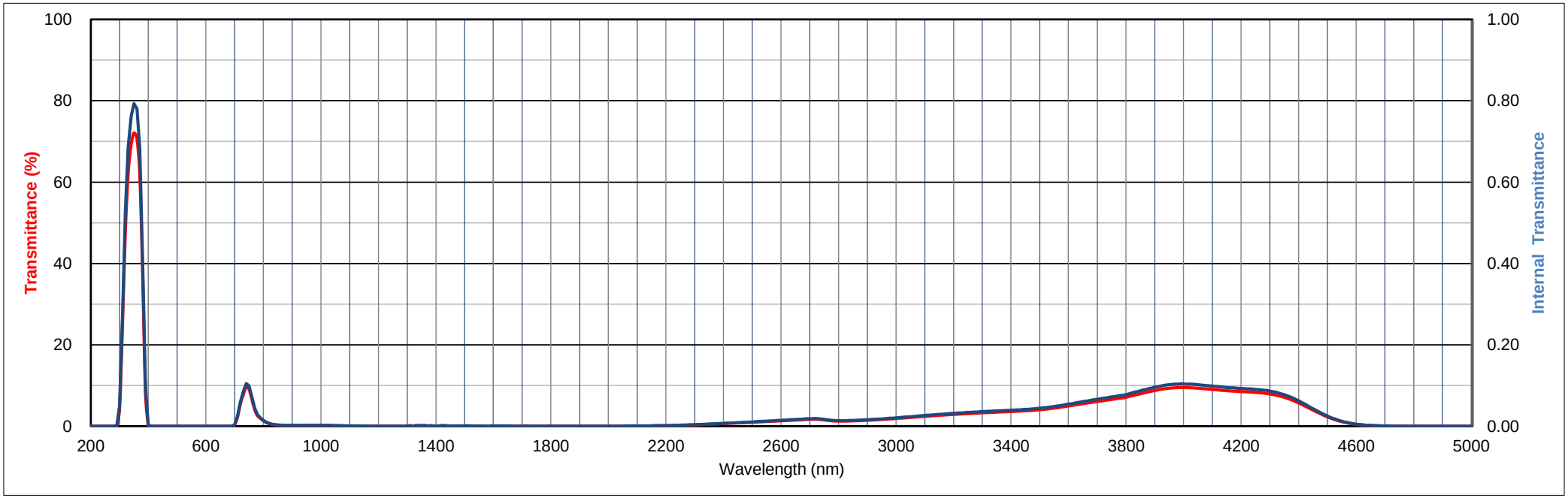
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

U360

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	24.9	47.9	62.2	69.2	72.1	71.0	62.3	38.0	8.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.2	5.5	7.7	9.6	9.1	6.7	4.0	2.6	1.9
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	1.3	0.9	0.6	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.1	0.2	0.0	0.1	0.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.5	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.5	1.3	1.3	1.5	1.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	1.9	2.2	2.4	2.7	2.9	3.1	3.3	3.5	3.6	3.8	4.0	4.4	5.0	5.5	6.1	6.6	7.1	8.0	8.8	9.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	9.5	9.3	9.0	8.7	8.5	8.3	7.9	7.1	5.7	4.0	2.3	1.1	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UL254S

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	4.0	34.4	65.1	78.2	82.7	86.2	88.0	88.6	88.8	88.9	88.7	88.4	88.0	87.0	84.1	75.4	56.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	30.3	12.5	5.4	2.9	2.3	2.1	1.8	1.2	0.7	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.1	0.9	5.1	17.5	35.2	50.1	58.5	61.7	61.2	58.7	55.5	52.2	49.2	46.4	44.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	42.3	40.7	39.5	38.6	37.9	37.4	37.0	36.8	36.6	36.6	36.7	36.8	37.1	37.4	37.8	38.2	38.7	39.1	39.6	40.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	40.4	40.7	40.8	40.8	40.6	40.2	39.6	38.8	37.8	36.7	35.3	32.3	29.0	25.7	22.5	19.6				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.566	1.556	1.551	1.548	1.546	1.544	1.543
K	1.4E-05	9.9E-05	2.2E-04	9.5E-06	1.5E-05	2.0E-05	1.9E-05
P	0.907	0.910	0.911	0.912	0.912	0.912	0.913

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

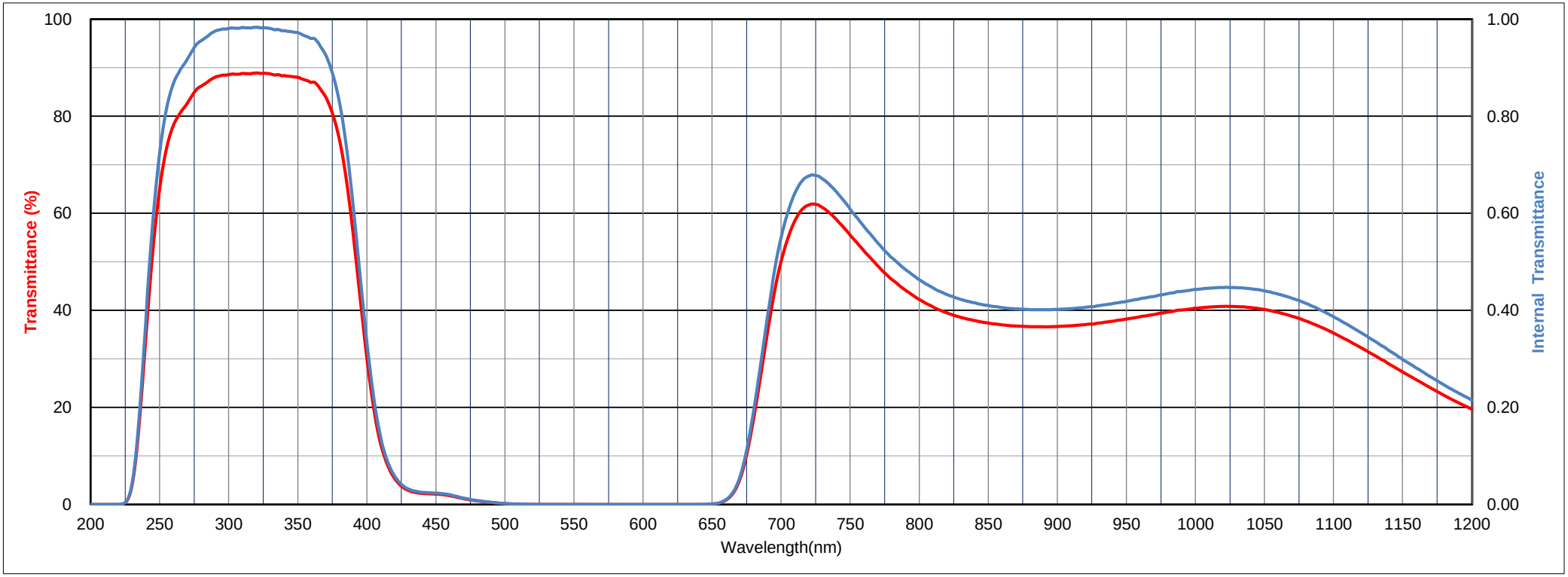
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	3	450	500	93	65	380	220	2.89

Tolerance of Transmittance (T)

Transmittance at 254nm	Transmittance at 310nm	Transmittance at 365nm
T254(%)	T310(%)	T365(%)
≥70	≥85	≥83



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HOYA

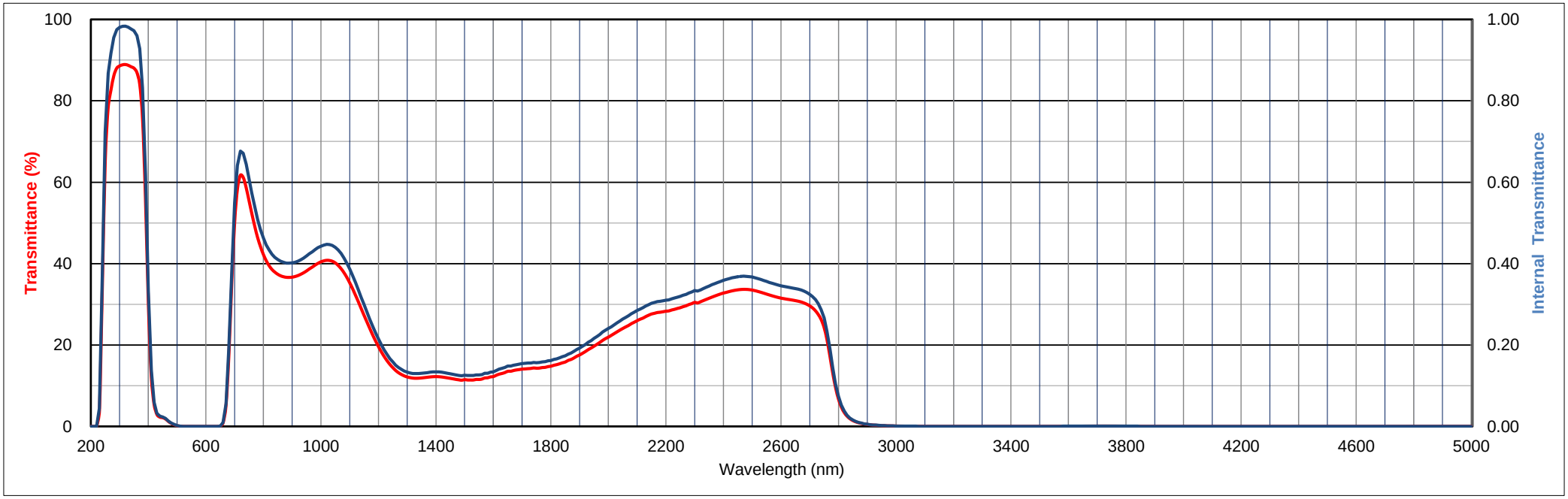
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

UL254S

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	4.0	34.4	65.1	78.2	82.7	86.2	88.0	88.6	88.8	88.9	88.7	88.4	88.0	87.0	84.1	75.4	56.0
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	30.3	12.5	5.4	2.9	2.3	2.1	1.8	1.2	0.7	0.4	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.1	0.9	5.1	17.5	35.2	50.1	58.5	61.7	61.2	58.7	55.5	52.2	49.2	46.4	44.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	42.3	40.7	39.5	38.6	37.9	37.4	37.0	36.8	36.6	36.6	36.7	36.8	37.1	37.4	37.8	38.2	38.7	39.1	39.6	40.1
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	40.4	40.7	40.8	40.8	40.6	40.2	39.6	38.8	37.8	36.7	35.3	33.9	32.3	30.7	29.0	27.3	25.7	24.1	22.5	21.0
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	19.6	18.3	17.2	16.1	15.2	14.5	13.7	13.2	12.8	12.4	12.2	12.0	11.9	11.8	11.9	11.9	12.0	12.1	12.2	12.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	12.2	12.2	12.1	12.0	11.9	11.8	11.7	11.6	11.4	11.3	11.5	11.4	11.4	11.4	11.5	11.5	11.6	11.9	11.9	12.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	12.2	12.6	12.8	13.0	13.2	13.5	13.6	13.7	13.9	14.0	14.1	14.1	14.2	14.2	14.4	14.3	14.3	14.5	14.5	14.7
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	14.8	15.0	15.2	15.4	15.6	15.8	16.2	16.5	16.8	17.2	17.6	18.0	18.4	18.9	19.3	19.7	20.2	20.6	21.1	21.6
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	21.9	24.1	26.0	27.6	28.3	29.2	30.5	31.5	32.8	33.6	33.5	32.5	31.5	30.9	29.6	24.3	6.7	1.4	0.5	0.2
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



All data is mean values of various melts.

The content of this catalog is accurate as of October ,2020

HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 3.25 mm

UL365S

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8	16.1	37.3	56.6	69.6	76.8	80.1	78.6	68.3	41.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	10.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.5	10.7	21.3	31.1	39.9	40.8	33.6	26.1	24.3	23.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	20.9	17.8	15.1	12.9	11.2	9.9	9.0	8.3	7.8	7.4	7.1	6.8	6.6	6.4	6.2	6.0	5.8	5.6	5.3	5.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	4.7	4.3	3.9	3.5	3.2	2.8	2.5	2.2	1.9	1.7	1.5	1.2	1.0	0.9	0.7	0.7				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.550	1.539	1.532	1.529	1.526	1.525	1.524
P	0.911	0.914	0.915	0.916	0.917	0.917	0.917

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

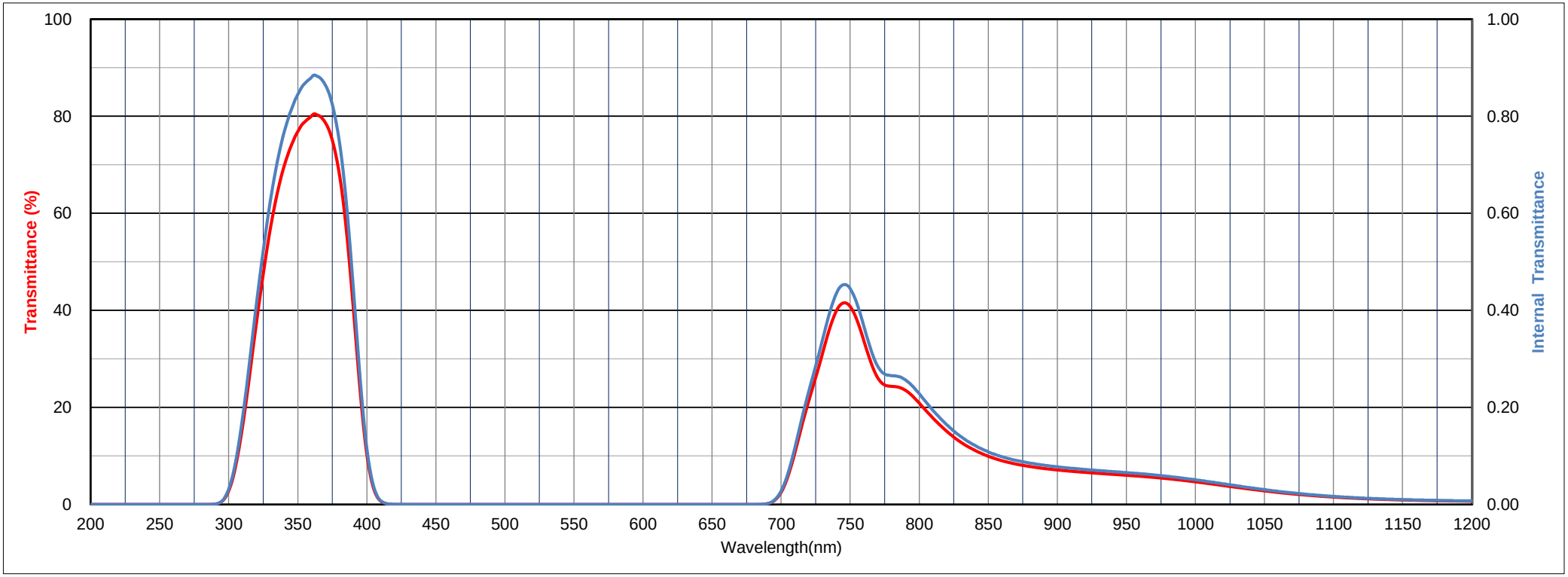
	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	527	687	88	-	490	100	2.61

Tolerance of Transmittance (T)

Maximum Transmittance	Transmittance at 254nm	Transmittance at 405nm
Tmax(%)	T254(%)	T405(%)
≧73%	≦7%	≦3%



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HOYA

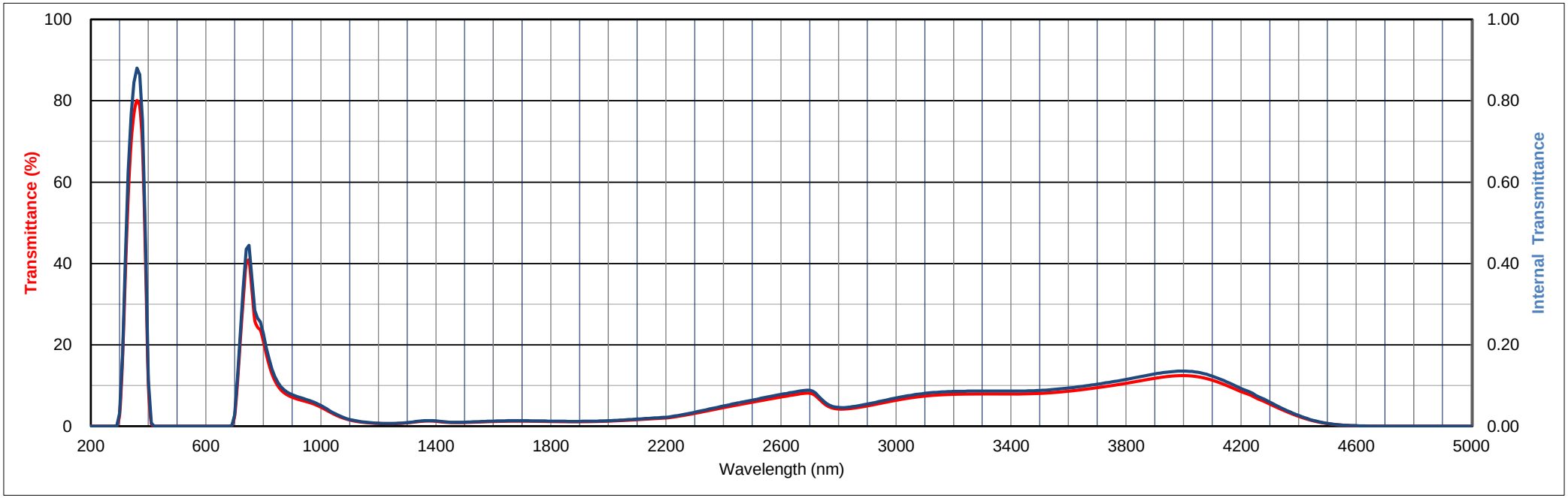
HOYA CORPORATION OPTICS SECTION

Thickness 3.25 mm

UL365S

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8	16.1	37.3	56.6	69.6	76.8	80.1	78.6	68.3	41.2
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	10.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.5	10.7	21.3	31.1	39.9	40.8	33.6	26.1	24.3	23.5
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	20.9	17.8	15.1	12.9	11.2	9.9	9.0	8.3	7.8	7.4	7.1	6.8	6.6	6.4	6.2	6.0	5.8	5.6	5.3	5.0
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	4.7	4.3	3.9	3.5	3.2	2.8	2.5	2.2	1.9	1.7	1.5	1.4	1.2	1.1	1.0	0.9	0.9	0.8	0.7	0.7
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.2	1.2	1.3	1.3	1.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	1.2	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	1.2	1.4	1.6	1.8	2.0	2.5	3.1	3.8	4.6	5.2	5.9	6.5	7.2	7.8	8.1	5.5	4.2	4.4	5.0	5.7
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	6.4	7.0	7.4	7.7	7.8	7.9	7.9	7.9	7.9	8.0	8.1	8.3	8.6	9.0	9.5	10.0	10.5	11.2	11.8	12.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	12.4	12.1	11.3	10.0	8.5	7.0	5.4	3.8	2.4	1.3	0.6	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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波長校正フィルター

V10およびV11はネオジムを、HY1はホルミウムを含有し、特定波長を著しく吸収するフィルターです。
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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

V10

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.5	62.3	75.9	82.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	85.9	87.3	86.1	63.2	47.5	56.2	59.5	49.4	44.1	75.3	74.2	51.8	52.2	24.4	65.9	84.5	81.3	5.2	3.0	1.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	24.2	56.7	86.8	84.6	88.7	89.6	89.5	84.7	77.3	77.7	88.0	89.3	86.5	67.3	5.6	8.7	43.6	69.5	67.8	32.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	9.0	3.5	38.8	67.2	83.7	85.7	71.0	49.1	30.5	57.8	74.3	83.7	86.9	89.8	90.4	90.3	90.0	89.8	89.6	88.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	88.9	89.2	89.7	90.2	90.5	90.8	91.1	91.2	91.3	91.3	91.4	91.5	91.5	91.6	91.5	91.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.551	1.538	1.530	1.526	1.523	1.522	1.520
P	0.911	0.914	0.916	0.917	0.918	0.918	0.918

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

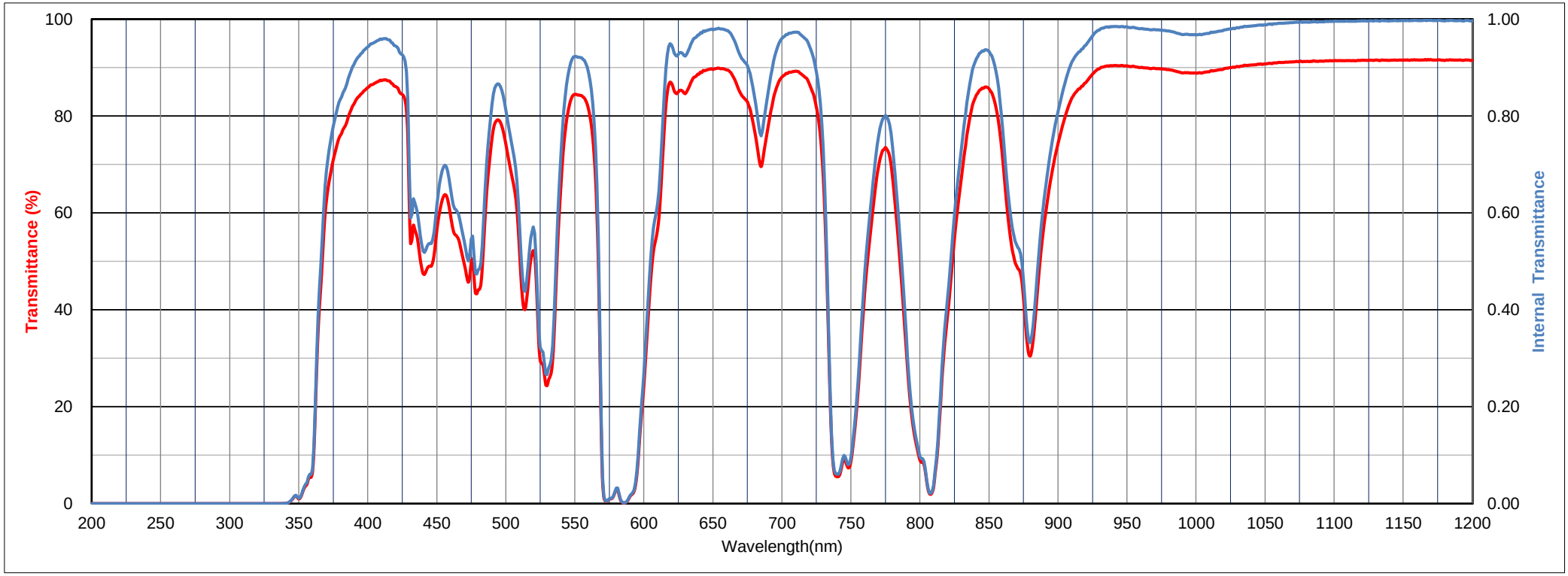
	x	y	Y	λ_d	P_e
A	0.453	0.383	48	-565	10
C	0.295	0.292	49	467	9
D65	0.297	0.304	49	466	9

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	1	500	545	103	117	520	130	2.87

Tolerance of Transmittance (T)

Transmittance at 550nm	Wavelength for Min. Transmittance
T550(%)	λ Tmin(nm)
>80	586±1



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HOYA

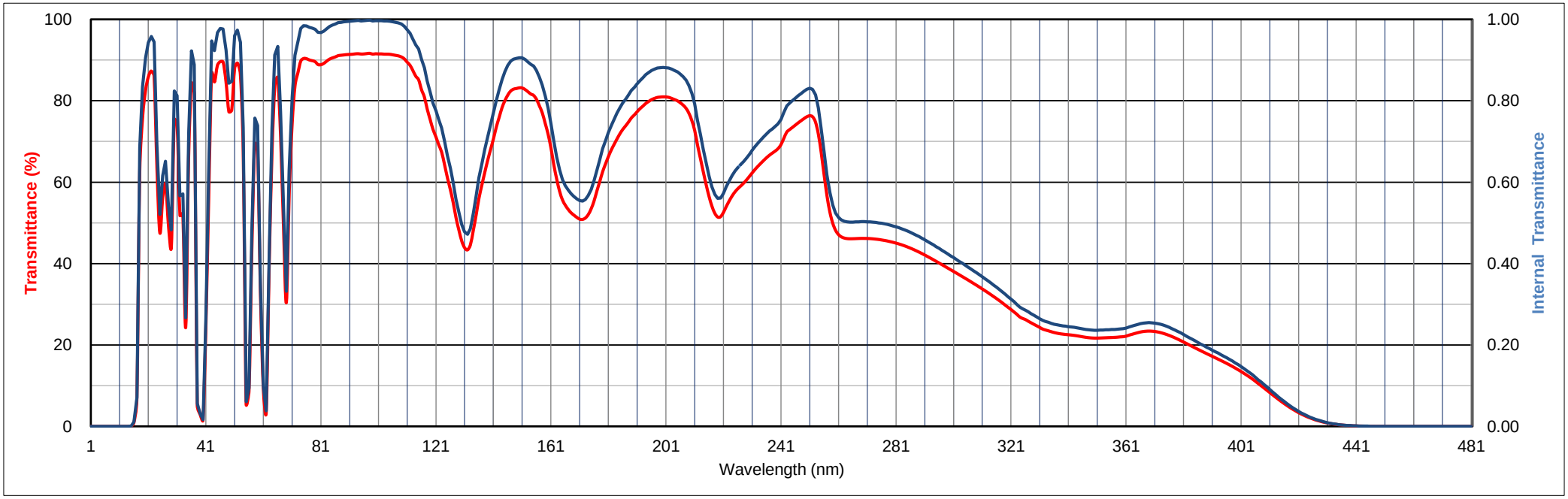
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

V10

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	6.5	62.3	75.9	82.5
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	85.9	87.3	86.1	63.2	47.5	56.2	59.5	49.4	44.1	75.3	74.2	51.8	52.2	24.4	65.9	84.5	81.3	5.2	3.0	1.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	24.2	56.7	86.8	84.6	88.7	89.6	89.5	84.7	77.3	77.7	88.0	89.3	86.5	67.3	5.6	8.7	43.6	69.5	67.8	32.2
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	9.0	3.5	38.8	67.2	83.7	85.7	71.0	49.1	30.5	57.8	74.3	83.7	86.9	89.8	90.4	90.3	90.0	89.8	89.6	88.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	88.9	89.2	89.7	90.2	90.5	90.8	91.1	91.2	91.3	91.3	91.4	91.4	91.5	91.6	91.5	91.5	91.6	91.7	91.5	91.5
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	91.5	91.5	91.5	91.5	91.4	91.3	91.2	91.0	90.8	90.3	89.5	88.7	87.4	86.0	85.1	82.7	80.9	77.9	75.4	72.9
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	71.2	69.1	67.4	64.3	61.1	58.2	55.0	51.3	48.2	45.5	43.9	43.4	44.6	48.1	52.0	56.1	59.3	62.4	65.3	68.0
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	70.6	73.5	75.9	78.3	80.0	81.4	82.4	82.9	83.0	83.2	83.2	82.8	82.2	81.7	81.3	80.3	78.7	77.0	74.5	71.8
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	68.5	64.3	60.8	57.8	55.7	54.3	53.3	52.5	51.9	51.3	50.9	50.9	51.2	52.1	53.5	55.4	57.9	60.2	62.6	64.5
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	66.3	73.0	77.3	80.3	80.9	79.5	72.7	56.5	52.6	58.4	62.3	66.0	69.2	74.0	76.3	61.8	47.1	46.1	46.2	45.8
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	45.0	43.8	42.1	40.1	38.1	36.0	33.8	31.4	28.7	26.3	24.3	23.1	22.5	22.0	21.7	21.8	22.2	23.2	23.3	22.3
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	20.7	18.9	17.2	15.5	13.5	11.1	8.3	5.6	3.4	1.8	0.8	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness	2.00	mm

V11

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.0	10.8	24.8	33.9	37.5	42.4	44.9	64.7	17.1	21.0	89.2	89.4	90.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	90.4	90.4	88.9	66.7	88.8	87.7	79.8	75.1	76.7	87.5	77.8	54.4	54.8	28.2	70.8	86.3	83.4	4.1	3.6	2.6
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	29.9	59.3	88.4	86.8	90.0	90.8	90.6	86.2	79.2	80.5	89.2	90.2	87.5	63.3	9.9	13.9	48.3	72.5	70.4	35.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	13.4	7.3	43.9	70.3	85.4	86.5	72.6	56.2	36.9	60.4	75.9	84.7	88.0	90.7	91.6	91.8	91.8	91.9	91.9	91.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	92.0	92.0	92.0	92.1	92.1	92.1	92.1	92.1	92.1	92.2	92.1	92.2	92.2	92.3	92.3	92.3				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.559	1.547	1.541	1.537	1.534	1.533	1.532
P	0.909	0.912	0.913	0.914	0.915	0.915	0.916

Classes of Bubbles and Inclusions

Bubble Class
3

Tolerance of Transmittance (T)

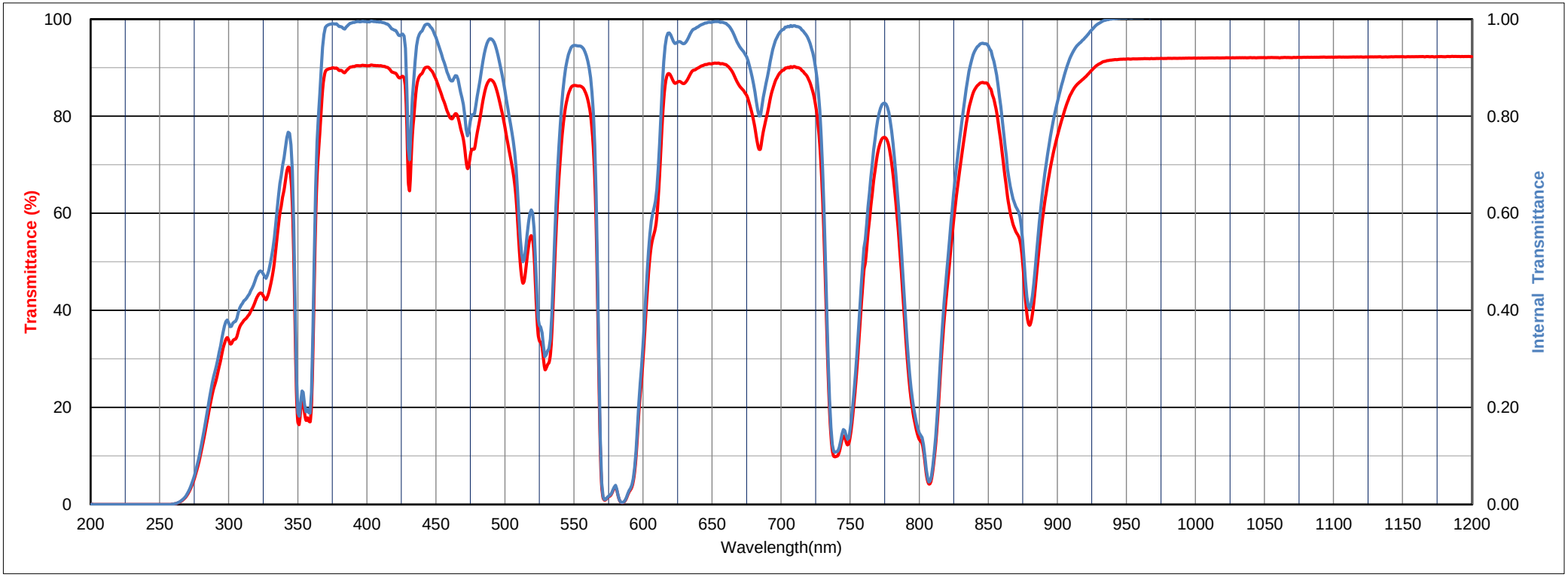
Transmittance at 586nm
T586(%)
< 1%

Color Specification

	x	y	Y	λ_d	P_e
A	-	-	-	-	-
C	-	-	-	-	-
D65	-	-	-	-	-

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
1	1	596	657	-	88	555	110	2.83



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HOYA

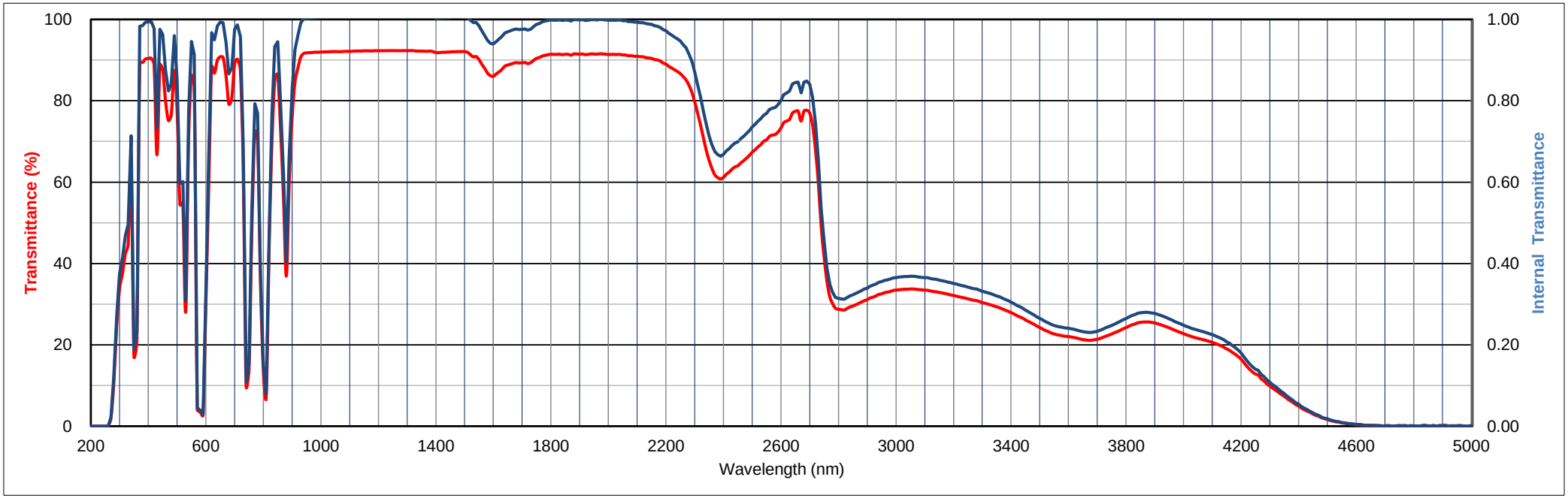
HOYA CORPORATION OPTICS SECTION

Thickness 2.00 mm

V11

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.0	10.8	24.8	33.9	37.5	42.4	44.9	64.7	17.1	21.0	89.2	89.4	90.3
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	90.4	90.4	88.9	66.7	88.8	87.7	79.8	75.1	76.7	87.5	77.8	54.4	54.8	28.2	70.8	86.3	83.4	4.1	3.6	2.6
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	29.9	59.3	88.4	86.8	90.0	90.8	90.6	86.2	79.2	80.5	89.2	90.2	87.5	63.3	9.9	13.9	48.3	72.5	70.4	35.4
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	13.4	7.3	43.9	70.3	85.4	86.5	72.6	56.2	36.9	60.4	75.9	84.7	88.0	90.7	91.6	91.8	91.8	91.9	91.9	91.9
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	92.0	92.0	92.0	92.1	92.1	92.1	92.1	92.1	92.1	92.2	92.1	92.2	92.2	92.2	92.2	92.3	92.3	92.3	92.3	92.3
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.3	92.2	92.2	92.2	92.2	92.2	92.2	92.1
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	91.8	91.8	91.9	91.9	92.0	92.0	92.1	92.1	92.1	92.1	92.1	91.9	91.4	90.8	90.9	90.1	89.0	87.9	86.8	86.2
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	86.0	86.6	87.1	87.7	88.5	88.8	89.0	89.2	89.4	89.3	89.3	89.4	89.1	89.4	89.9	90.4	90.7	91.0	91.2	91.3
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	91.4	91.4	91.4	91.5	91.3	91.4	91.4	91.2	91.5	91.5	91.4	91.5	91.3	91.4	91.5	91.5	91.5	91.5	91.5	91.5
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	91.4	91.3	90.9	90.4	89.0	86.7	79.8	65.4	61.2	64.0	67.4	70.4	73.3	77.4	77.0	41.6	28.7	29.5	31.1	32.5
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	33.5	33.7	33.4	32.9	32.1	31.3	30.4	29.3	27.9	26.2	24.3	22.7	22.0	21.3	21.4	22.7	24.2	25.5	25.4	24.2
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	22.7	21.6	20.6	19.0	16.5	12.8	9.9	7.4	5.0	3.0	1.7	0.8	0.4	0.2	0.0	0.1	0.1	0.0	0.1	0.1
λnm	5000																			
T	0.1																			



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HOYA

HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

HY1

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	1.7	11.5	23.9	44.8	71.2	81.0	85.5	86.1	84.7	84.6	36.3	83.2	87.6	87.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	89.2	88.0	71.4	87.5	78.2	38.1	17.1	81.7	85.8	81.8	89.4	89.2	89.2	85.0	68.9	83.6	89.5	89.7	89.7	89.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	89.5	89.5	89.0	85.5	75.1	78.4	83.8	88.7	89.5	89.8	89.8	89.8	89.7	89.7	89.6	89.7	89.6	89.5	89.5	89.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	89.7	89.7	89.8	90.0	89.8	89.9	89.7	89.7	89.0	89.3	89.7	89.5	89.6	90.2	90.2	90.3	90.4	90.4	90.4	90.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1120	1140	1160	1180	1200				
T	90.5	90.5	90.5	90.6	90.6	90.5	90.6	90.6	90.6	90.5	90.4	88.9	86.2	88.1	87.8	87.5				

Refractive Index/Absorption coefficient/Reflection coefficent

λnm	400	500	600	700	800	900	1000
n	1.517	1.511	1.509	1.508	1.508	1.507	1.507
P	0.919	0.920	0.921	0.921	0.921	0.921	0.921

Classes of Bubbles and Inclusions

Bubble Class
3

Color Specification

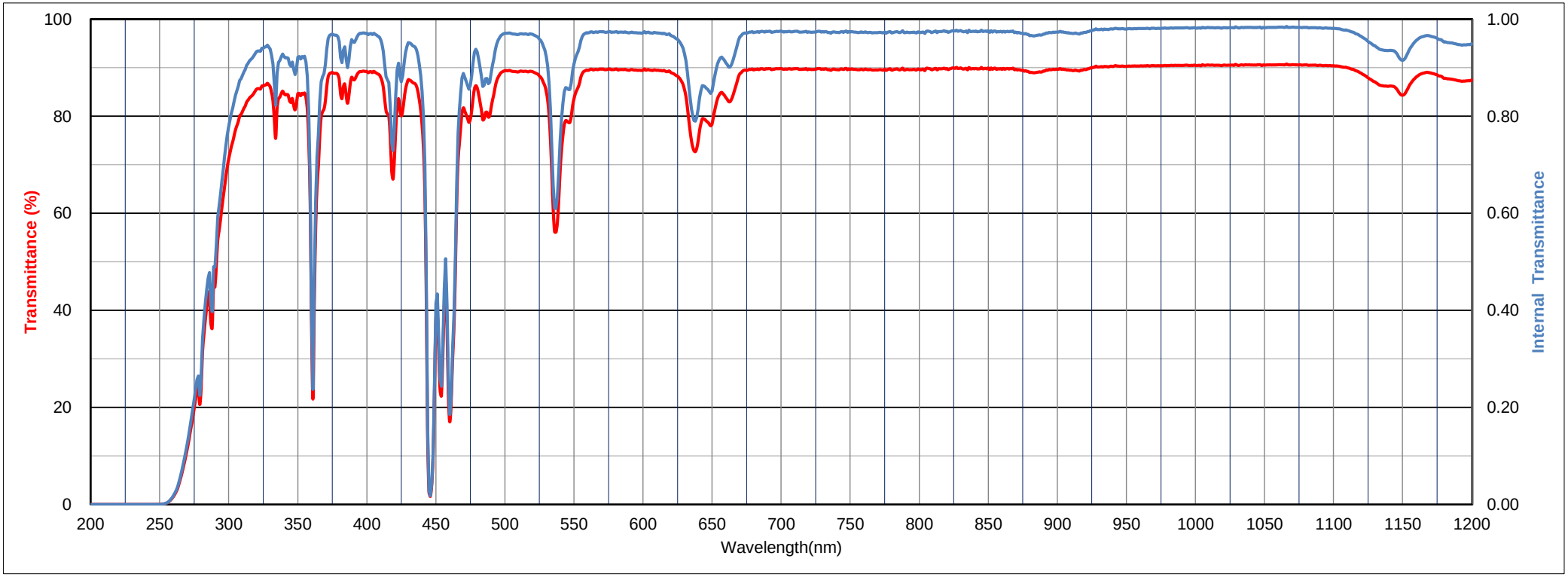
	x	y	Y	λ_d	P_e
A	0.465	0.425	86	581	24
C	0.337	0.360	85	572	19
D65	0.340	0.373	85	571	20

Properties

Chemical		Thermal				Mechanical		Others
D_W	D_A	Tg	Ts	α -30/70	α 100/300	H_K	F_A	d
4	1	590	640	102	116	520	130	3.19

Tolerance of Transmittance (T)

Transmittance at 435nm	Wavelength for Min. Transmittance
T435(%)	λ Tmin(nm)
>80	454±1



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HOYA

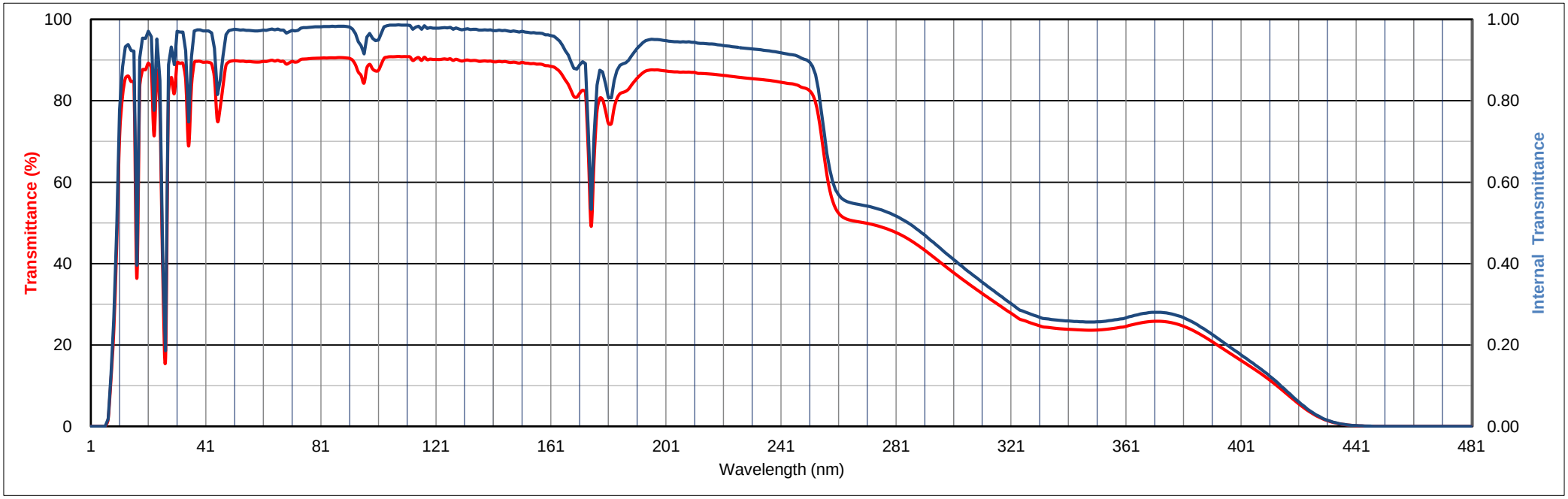
HOYA CORPORATION OPTICS SECTION

Thickness 2.50 mm

HY1

Transmittance (T) units: %

λnm	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390
T	0.0	0.0	0.0	0.0	0.0	0.0	1.7	11.5	23.9	44.8	71.2	81.0	85.5	86.1	84.7	84.6	36.3	83.2	87.6	87.6
λnm	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590
T	89.2	88.0	71.4	87.5	78.2	38.1	17.1	81.7	85.8	81.8	89.4	89.2	89.2	85.0	68.9	83.6	89.5	89.7	89.7	89.5
λnm	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790
T	89.5	89.5	89.0	85.5	75.1	78.4	83.8	88.7	89.5	89.8	89.8	89.8	89.7	89.7	89.6	89.7	89.6	89.5	89.5	89.6
λnm	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990
T	89.7	89.7	89.8	90.0	89.8	89.9	89.7	89.7	89.0	89.3	89.7	89.5	89.6	90.2	90.2	90.3	90.4	90.4	90.4	90.5
λnm	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
T	90.5	90.5	90.5	90.6	90.6	90.5	90.6	90.6	90.6	90.5	90.4	90.0	88.9	87.1	86.2	84.3	88.1	89.0	87.8	87.3
λnm	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
T	87.5	89.0	90.5	90.7	90.8	90.8	90.8	90.9	90.8	90.9	90.8	90.8	89.9	90.4	90.6	89.9	90.7	90.1	90.3	90.2
λnm	1400	1410	1420	1430	1440	1450	1460	1470	1480	1490	1500	1510	1520	1530	1540	1550	1560	1570	1580	1590
T	90.2	90.1	90.2	90.3	90.2	90.3	89.9	90.2	90.0	89.8	89.9	90.0	89.9	89.9	89.9	89.7	89.7	89.8	89.7	89.8
λnm	1600	1610	1620	1630	1640	1650	1660	1670	1680	1690	1700	1710	1720	1730	1740	1750	1760	1770	1780	1790
T	89.6	89.6	89.7	89.6	89.7	89.5	89.4	89.5	89.4	89.2	89.5	89.3	89.2	89.1	89.2	89.0	89.0	88.9	88.7	88.6
λnm	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
T	88.4	88.3	87.8	87.2	86.2	85.1	84.1	82.5	81.0	80.9	81.8	82.6	82.2	67.4	49.1	65.4	77.3	80.6	80.2	77.5
λnm	2000	2050	2100	2150	2200	2250	2300	2350	2400	2450	2500	2550	2600	2650	2700	2750	2800	2850	2900	2950
T	74.4	82.1	85.6	87.6	87.3	87.0	87.0	86.6	86.2	85.8	85.4	85.1	84.5	84.0	82.4	66.6	52.4	50.5	49.9	49.0
λnm	3000	3050	3100	3150	3200	3250	3300	3350	3400	3450	3500	3550	3600	3650	3700	3750	3800	3850	3900	3950
T	47.6	45.7	43.3	40.5	37.8	35.2	32.6	30.2	27.8	25.9	24.7	24.1	23.9	23.7	23.7	24.0	24.6	25.4	25.8	25.6
λnm	4000	4050	4100	4150	4200	4250	4300	4350	4400	4450	4500	4550	4600	4650	4700	4750	4800	4850	4900	4950
T	24.6	22.9	20.8	18.5	16.2	13.9	11.4	8.5	5.6	3.1	1.4	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
λnm	5000																			
T	0.0																			



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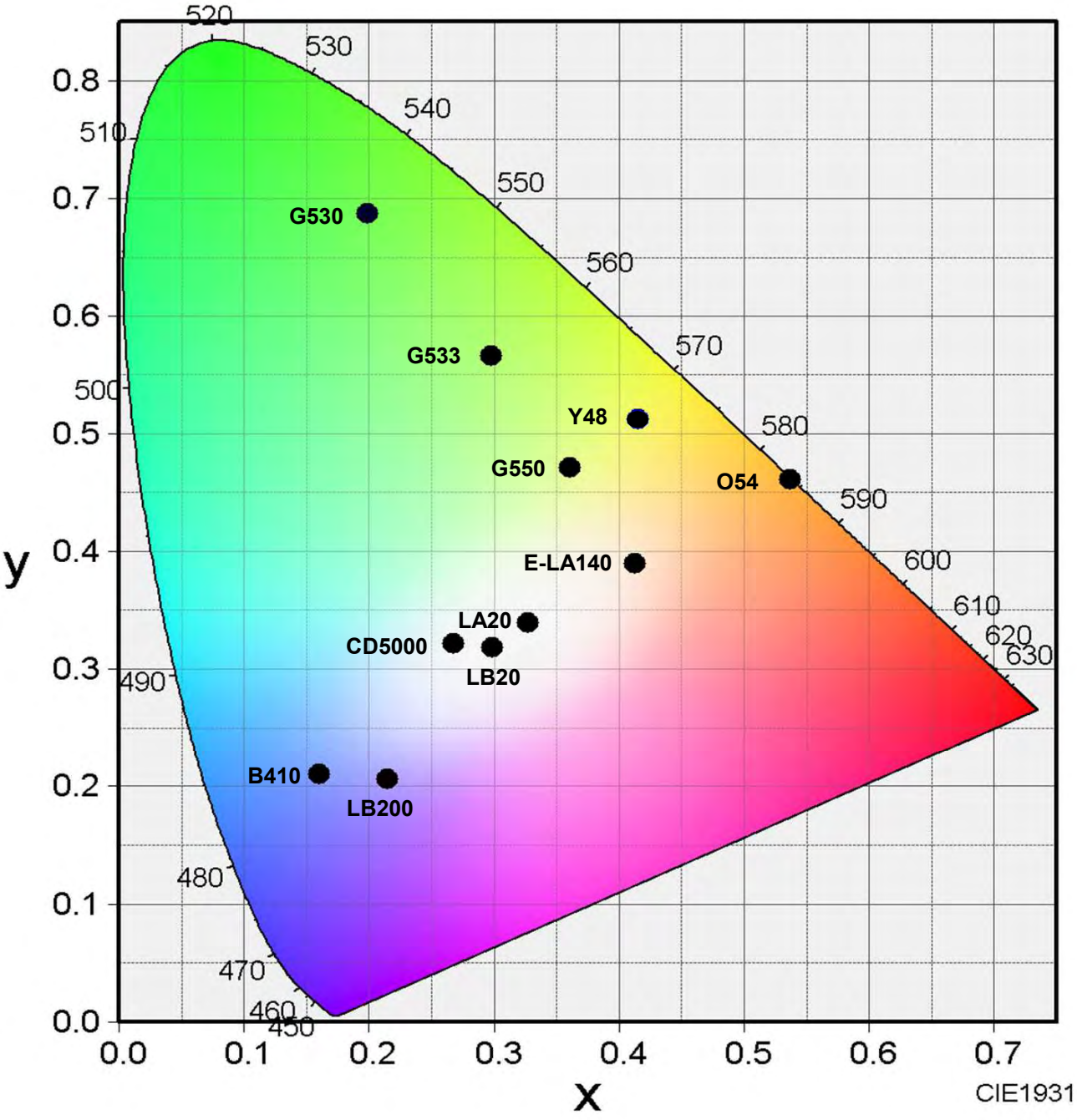
標準の光D65



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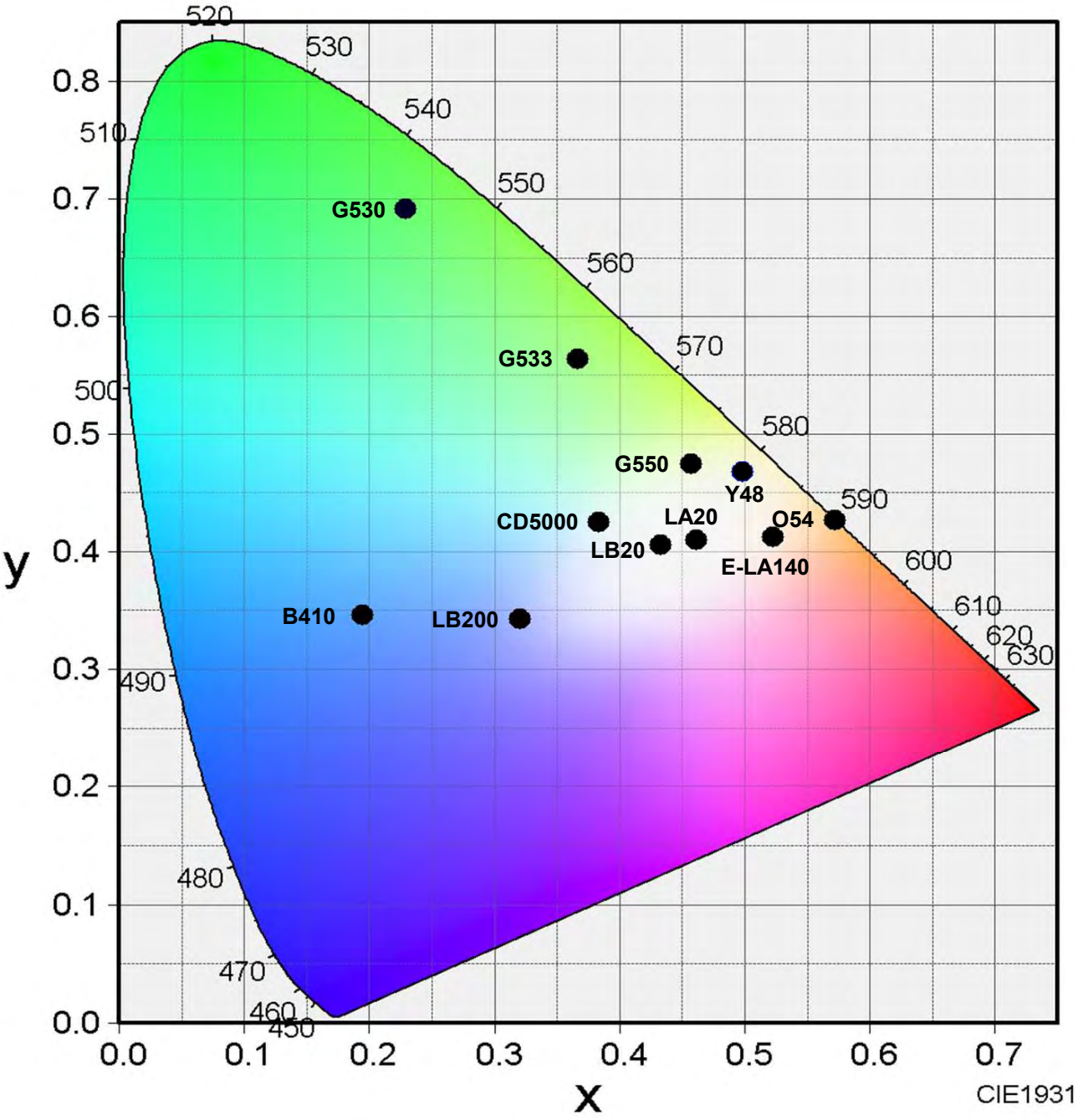
標準の光Ａ



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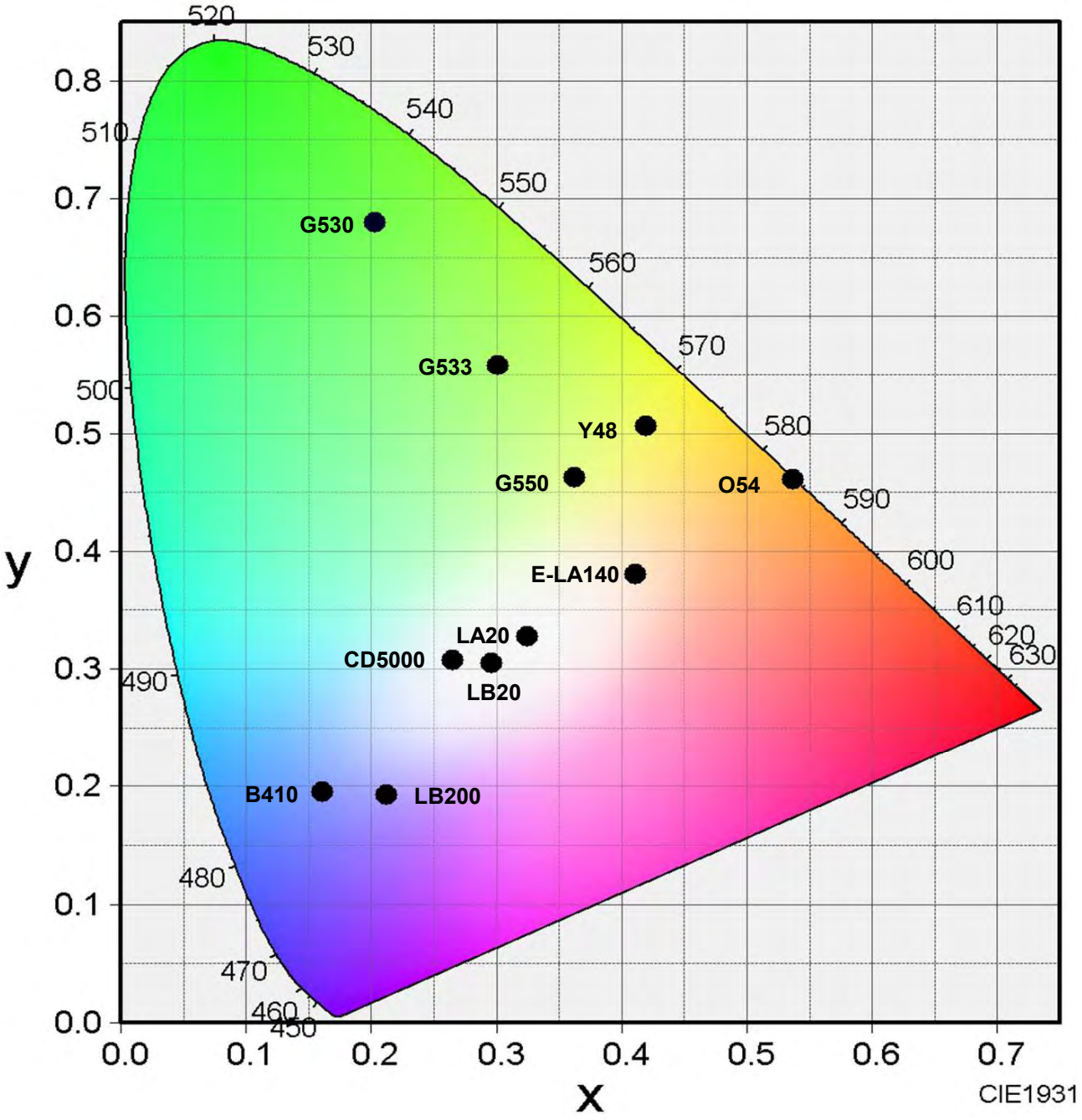
補助標準の光C



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改定

2014 年 4 月　初版発行
2015 年 7 月　改定版発行
　　G530, G533 及び HY1 のデータシートを更新
2019 年 4 月　改訂版発行
　　近赤外吸収フィルターの硝種変更
　　Ｗ－ＮＤシリーズの追加
2020 年 10月　UVフィルターを追加しました。
　　UL254Sを追加しました。
　　V11を追加しました。

カタログデータの特性は、事前予告なく変更になる場合があります。