

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 coefficient

λnm	400	500	600	700	800	900	1000
n	1.533	1.520	1.513	1.509	1.506	1.504	1.503
K	1.9E-05	1.9E-05	2.4E-05	2.6E-05	3.8E-05	5.3E-05	6.6E-05
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

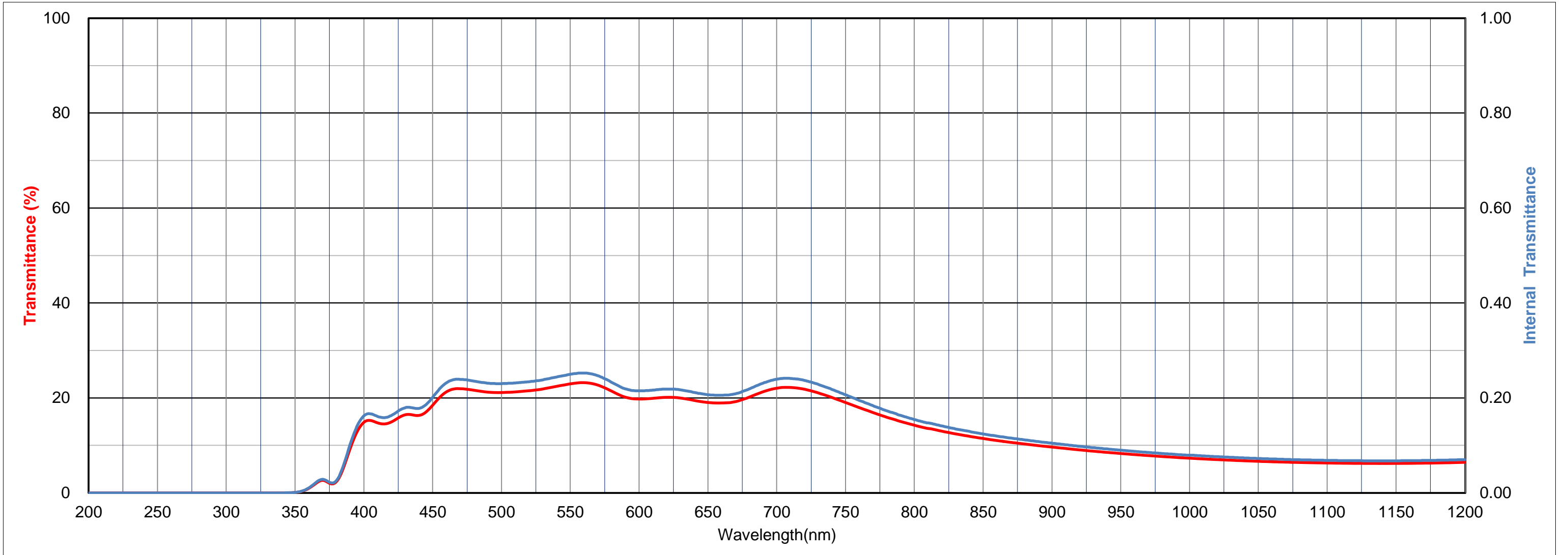
	x	y	Y	λ _d	P _e
A	0.443	0.420	21	559	6
C	0.312	0.337	22	556	6
D65	0.314	0.349	22	555	6

Properties

Chemical		Thermal				Mechanical		Others
D _w	D _A	T _g	T _s	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





HOYA CANDEO OPTRONICS CORPORATION

Thickness (3.1) 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																			

