

LAUDO TÉCNICO	Data: 30/11/2023	Película: Segurança PS2 Clear
Elaborado por: Vittor Andrade Revisado por: Thaynnara Siqueira Aprovado por: Hernane Fernandes	Lote: C29913021	

Introdução

O presente relatório tem por objetivo apresentar o resultado dos testes feitos com as películas Bluetech Window Films®, bem como a análise e efetiva comprovação de suas características, sendo exemplos de avaliação o haze (embaçamento), percentual de luz visível transmitida, retenção de raios e infravermelhos ultravioleta, durabilidade, resistência (impactos mecânicos), entre outros.

Normas técnicas

Todos os testes conduzidos pelo Departamento de Auditoria e Qualidade da Bluetech Window Films® são orientados segundo normas técnicas estabelecidas pela American Society for Testing and Materials (ASTM), Normas Nacionais da República Popular da China (GB) e pela The industry standard of the People's Republic of China (JGJ) seguindo rigorosos padrões de qualidade, a fim de constatar os atributos físicos de todas as películas comercializadas pela marca. Desta forma, as normas utilizadas nas aferições das amostras são:

- TH-100: Norma ASTM D1003;
- CS-700: Norma ASTM D1003/D1044;
- GlasSpec-2500: Norma térmica JGJ/T151 e Norma ótica GB/T2680;
- Q-SUN XE-1: Norma ASTM D3424 - 01.

Maquinário

Para avaliação detalhada das películas, o laboratório de controle e qualidade da Bluetech Window Films® conta com os seguintes equipamentos:

- CHN Spec modelo TH-100;
- CHN Spec modelo CS-700;
- GlasSpec-2500;
- Microscópio - Trinocular ótica finita acromático 1600x Mod. NO216T4 com Monitor. Lentes Plan 10/0.25, 4/0.10, 40/0.65, 100/1.25.
- Q-SUN modelo XE-1.

Índice

Aferições haze TH-100	3
Tabela haze e transmitância TH-100	4
Aferições haze CS-700	5
Gráfico de Colorimetria	6
Curva espectral de luz visível	7
Diagrama de cromaticidade	8
Tabela haze e transmitância CS-700	9
Padrões óticos e térmicos	10
Gráfico do espectro solar	11
Análise no microscópio (disposição da cola na película)	12

HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE tester:VITTOR A.

	<u>Standard</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■	Target	D65	ASTM	0.00	100.00	-	-	0.00	0.00	0.00	0.00
	<u>Sample</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■	C29913021 - M1	D65	ASTM	1.40	92.29	-7.71	1.40	0.00	0.00	0.00	0.00
■	C29913021 - M1	D65	ASTM	1.37	92.29	-7.71	1.37	0.00	0.00	0.00	0.00
■	C29913021 - M1	D65	ASTM	1.36	92.30	-7.70	1.36	0.00	0.00	0.00	0.00
■	C29913021 - M1	D65	ASTM	1.41	92.30	-7.70	1.41	0.00	0.00	0.00	0.00
■	C29913021 - M1	D65	ASTM	1.39	92.30	-7.70	1.39	0.00	0.00	0.00	0.00

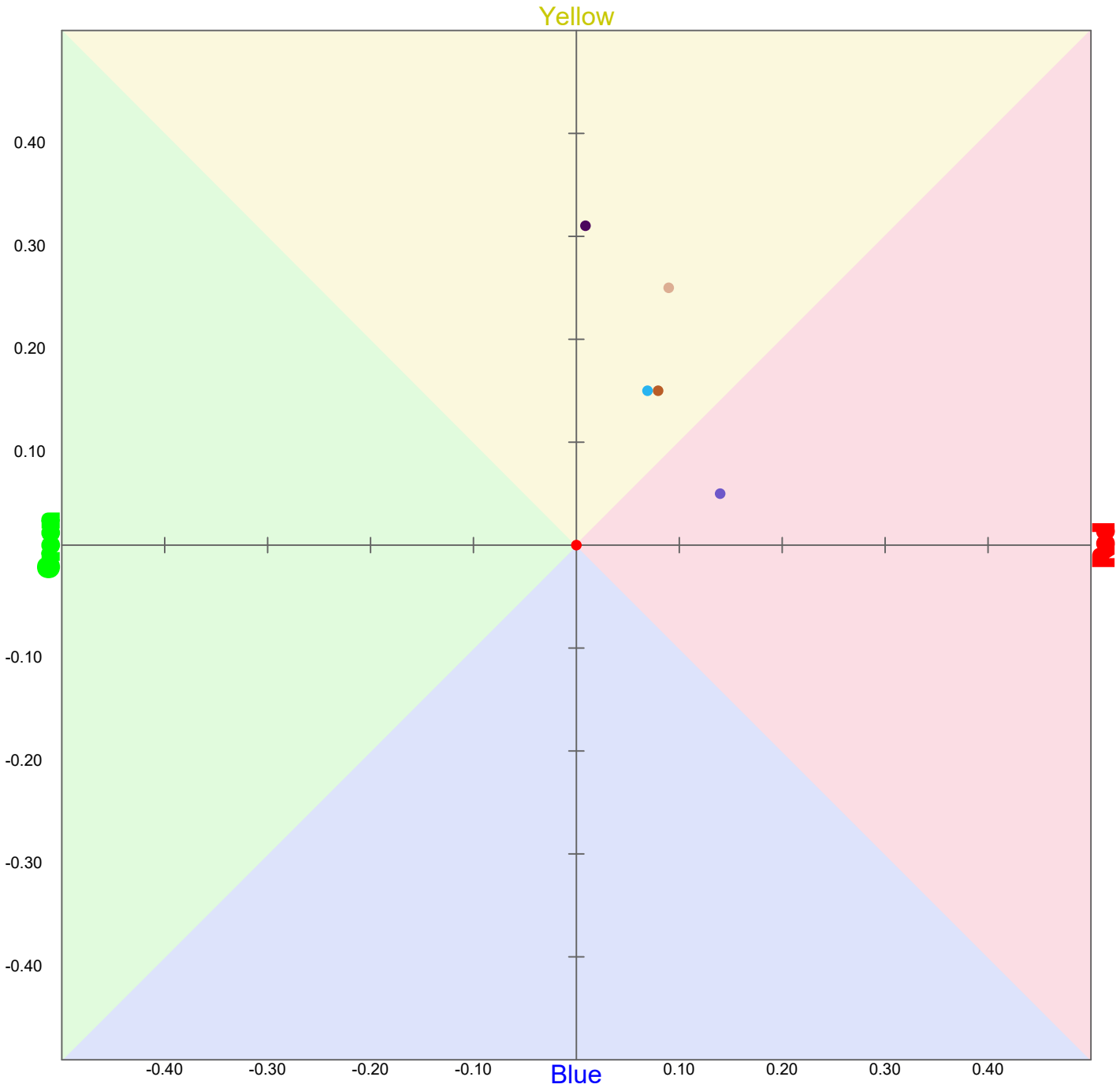
HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE

tester: VITTOR A.

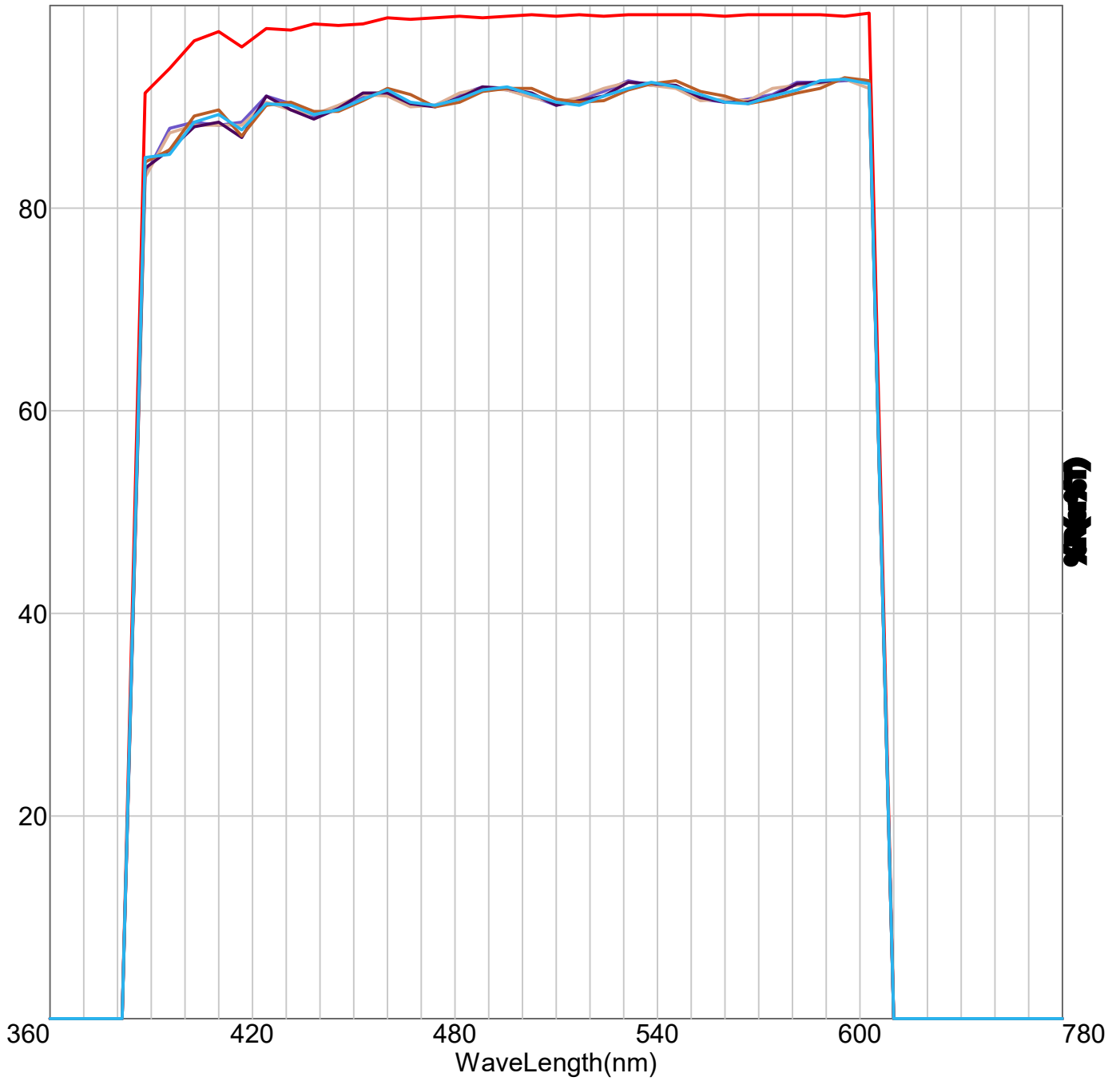


HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE tester:VITTOR A.



100
80
60
40
20

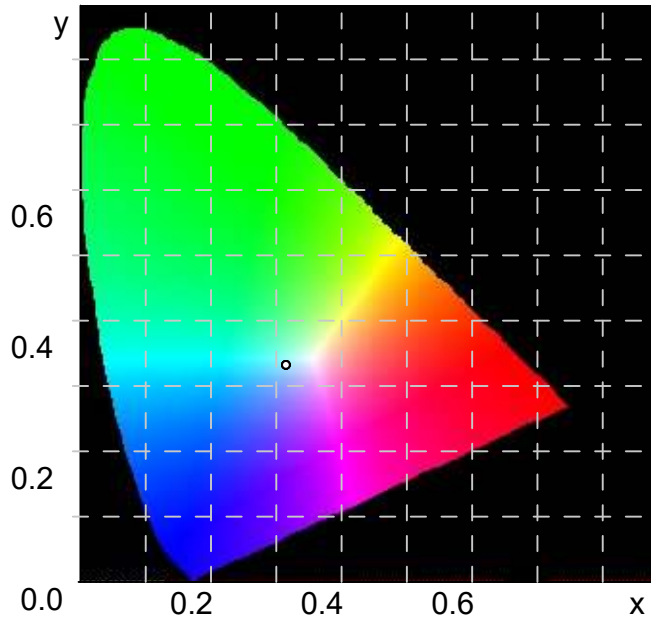
HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE

tester: VITTOR A.



HAZE E TONALIDADEDefault 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE tester:VITTOR A.

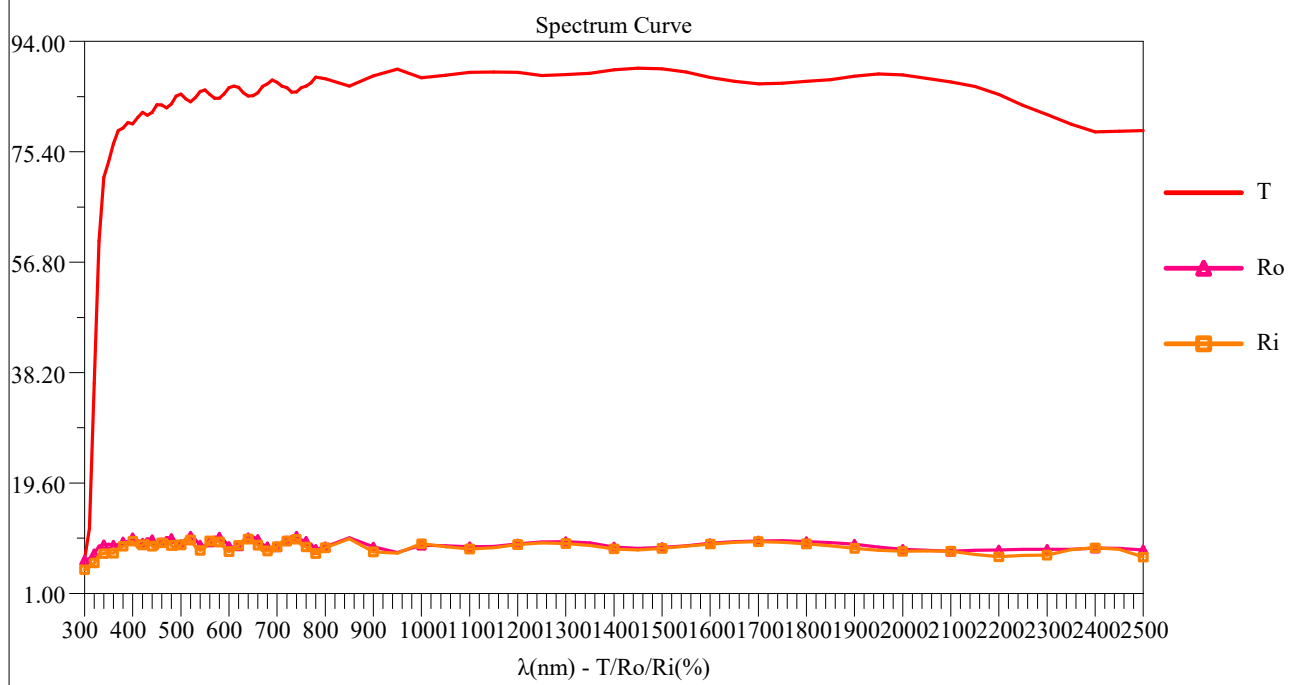
	<u>Standard</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■	Target	D65/2°	ASTM	0.00	98.79	-	-	91.26	96.37	93.65	97.16
	<u>Sample</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■	C29913021 - M1	D65/2°	ASTM	1.57	91.07	-7.71	1.57	83.10	88.37	87.74	88.11
■	C29913021 - M1	D65/2°	ASTM	1.77	91.07	-7.72	1.77	82.97	88.11	87.36	88.11
■	C29913021 - M1	D65/2°	ASTM	1.47	91.03	-7.75	1.47	83.82	88.02	85.65	88.11
■	C29913021 - M1	D65/2°	ASTM	1.86	91.04	-7.75	1.86	84.44	89.09	85.73	89.11
■	C29913021 - M1	D65/2°	ASTM	1.89	90.99	-7.80	1.89	84.95	88.45	85.16	89.11

GlasSpec2500 Optical and Thermal Parameters Measuring Instrument Test Report

Instrument: GlasSpec2500 Thermal standard: JGJ/T 151 Date: 2023-10-19 Test No.: _____
 CIE: D65/2° Optical standard: GB/T 2680 Time: 11:29:06 Environment: _____

Structure: 0.0(1#Low-E, 0.880)

No.	Content	Results
1	UV transmittance τ_{uv}	0.709
2	Visible light transmittance τ_v	0.850
3	Visible light reflectance ρ_v	0.097
4	Inside visible light reflectance $\rho_{v,i}$	0.092
5	Solar direct transmittance τ_e	0.856
6	Solar direct reflectance ρ_e	0.095
7	Inside solar direct reflectance $\rho_{e,i}$	0.091
8	Solar direct absorptance a_e	0.049
9	Solar infrared direct transmittance τ_{IR}	0.877
10	Solar infrared direct reflectance ρ_{IR}	0.092
11	Total solar energy transmittance g	0.868
12	Shading coefficient SC	0.998
13	Total solar infrared heat transmittance g_{IR}	0.884
14	Visible light to total solar energy transmittance LSG	0.98
15	Thermal transmittance $K(W/(m^2 \cdot K))$	5.39



Notes:

1. K is calculated according to the winter condition of JGJ/T 151
2. g/g_{IR} is calculated according to the summer condition of JGJ/T 151
3. The optical parameters are calculated according to standard GB/T 2680, $SC = g/0.87$
4. The spectral curve is plotted at spectral intervals in standard GB/T 2680

Tester: _____

Verification: _____

Solar direct transmittance **te: 0.856**

Solar direct reflectance **pe: 0.095**

Solar direct absorptance **ae: 0.049**

Visible light transmittance **tv: 0.850**

Visible light reflectance **pv: 0.097**

Solar infrared direct transmittance **tIR: 0.877**

Solar infrared direct reflectance **pIR: 0.092**

Total solar energy transmittance **g: 0.868**

Shading coefficient **SC: 0.998**

Total solar infrared heat transmittance **gIR: 0.884**

Light to solar gain **LSG: 0.98**

Thermal transmittance **K: 5.39**
W/(m²K)

>> Measurement control information

Normal
T: 0.05:34 R: 0.02:55

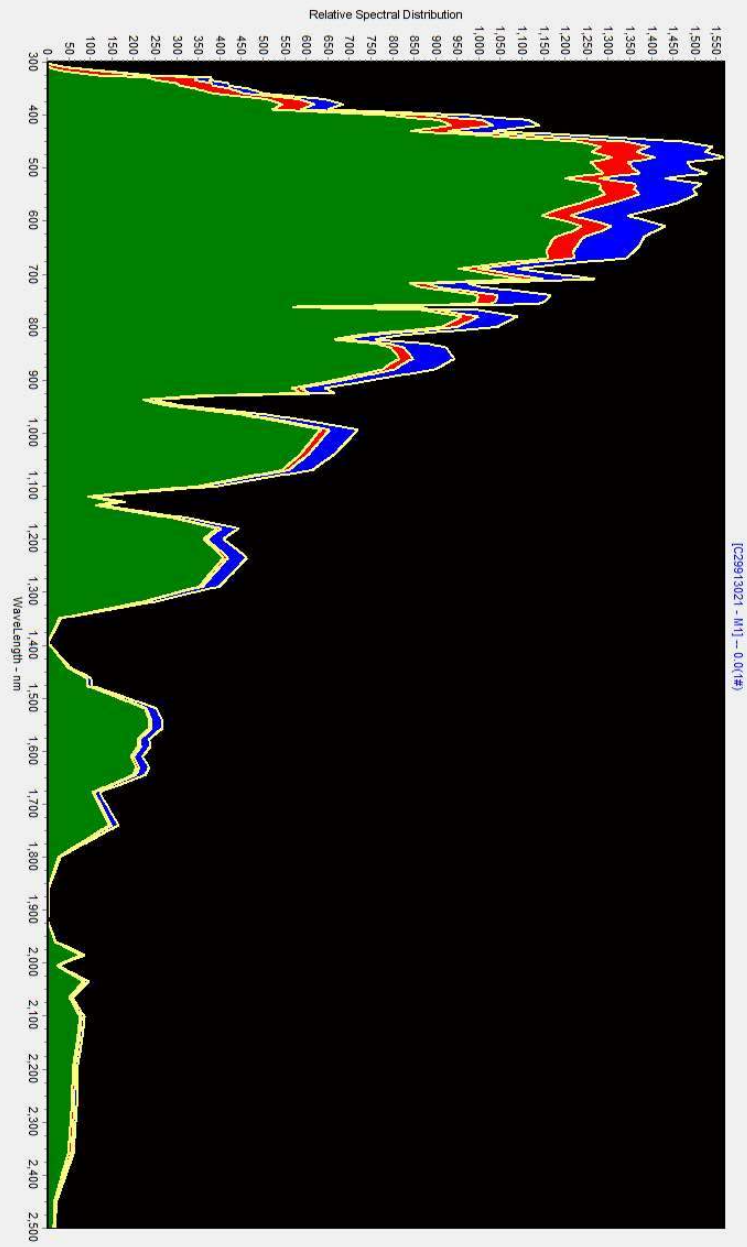
D65/2° Batch BLUETECH

T-R-A Graph at AM1.5 Status: Normal

>> Glass Structure File[C29913021 - M1] Structure:0.00(°) Current Date: Total

JG/T 151 GB/T 2680

Outdoor Indoor



Legend:
Reflectance (Blue)
Absorptance (Red)
Transmittance (Green)

Overlay Spectrum

No.	Name	T	Ro	Ri
0	Current Measuring	Red	Red	Red
1	Blue Performance - M1	Blue	Blue	Blue
2	SY051212201 - M1	Yellow	Yellow	Yellow
3	C499150322 - M1	Green	Green	Green
4	C29913021 - M1	Black	Black	Black

Name: C29913021 | M1 Automatic

Wizard

0 Internal Link

C29913021 - SAMPLE - LENTE PLAN 10/0.25



C29913021 - SAMPLE - LENTE PLAN 4/0.10



Assinatura do responsável

Vittor Andrade

Vittor Andrade
Auditor de Qualidade