

LAUDO TÉCNICO	Data: 22/11/2023	Película: Window Blue Segurança 20%
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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.

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HAZE E TONALIDADE

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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>
	WBS204212204 - M1	D65	ASTM	2.28	15.45	-84.55	2.28	0.00	0.00	0.00	0.00
	WBS204212204 - M1	D65	ASTM	2.29	15.39	-84.61	2.29	0.00	0.00	0.00	0.00
	WBS204212204 - M1	D65	ASTM	2.42	15.40	-84.60	2.42	0.00	0.00	0.00	0.00
	WBS204212204 - M1	D65	ASTM	2.25	15.28	-84.72	2.25	0.00	0.00	0.00	0.00
	WBS204212204 - M1	D65	ASTM	2.25	15.27	-84.73	2.25	0.00	0.00	0.00	0.00

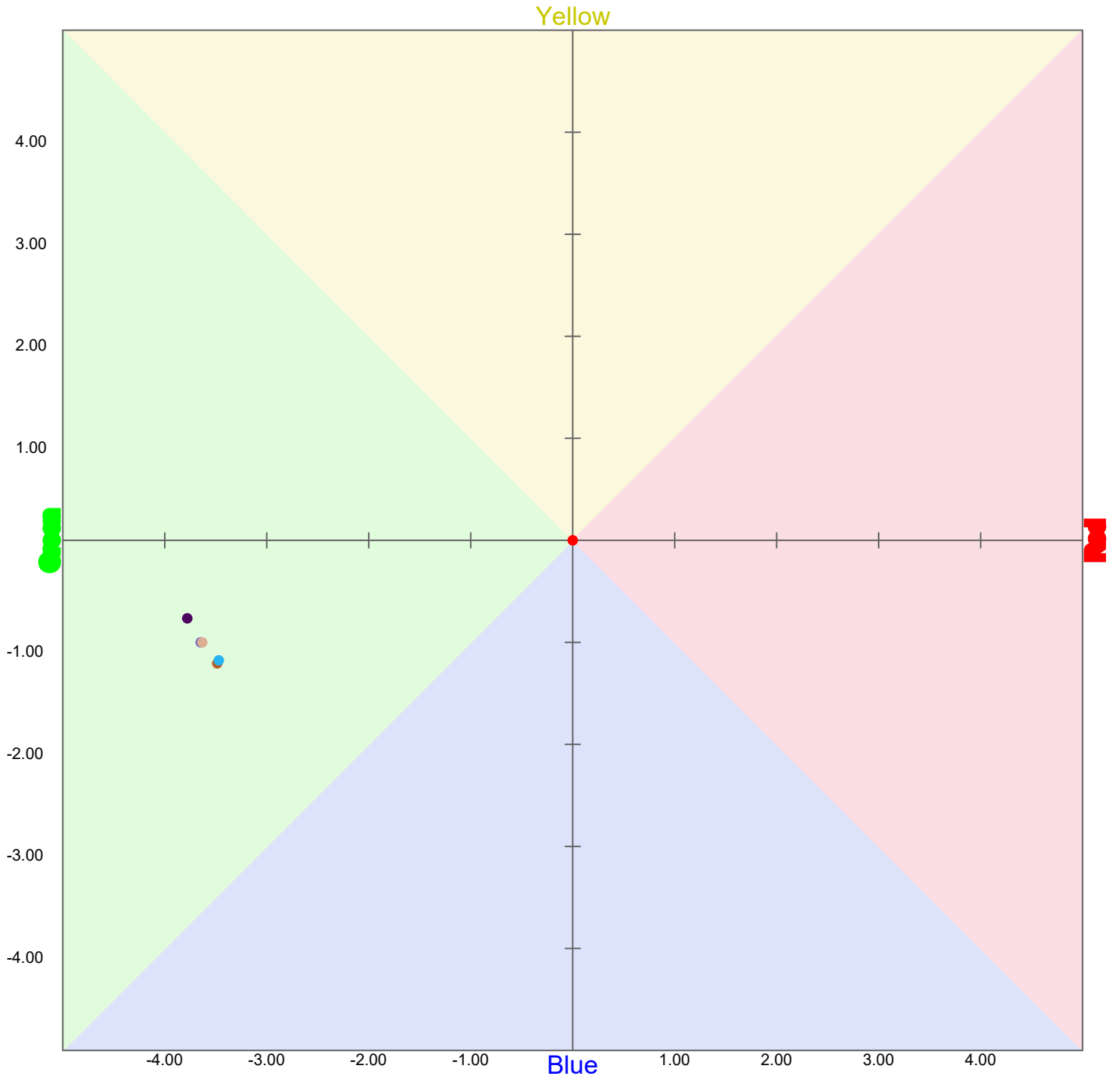
HAZE E TONALIDADE

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corp: BLUETECH

Department: AUDITORIA E QUALIDADE

tester: VITTOR A.

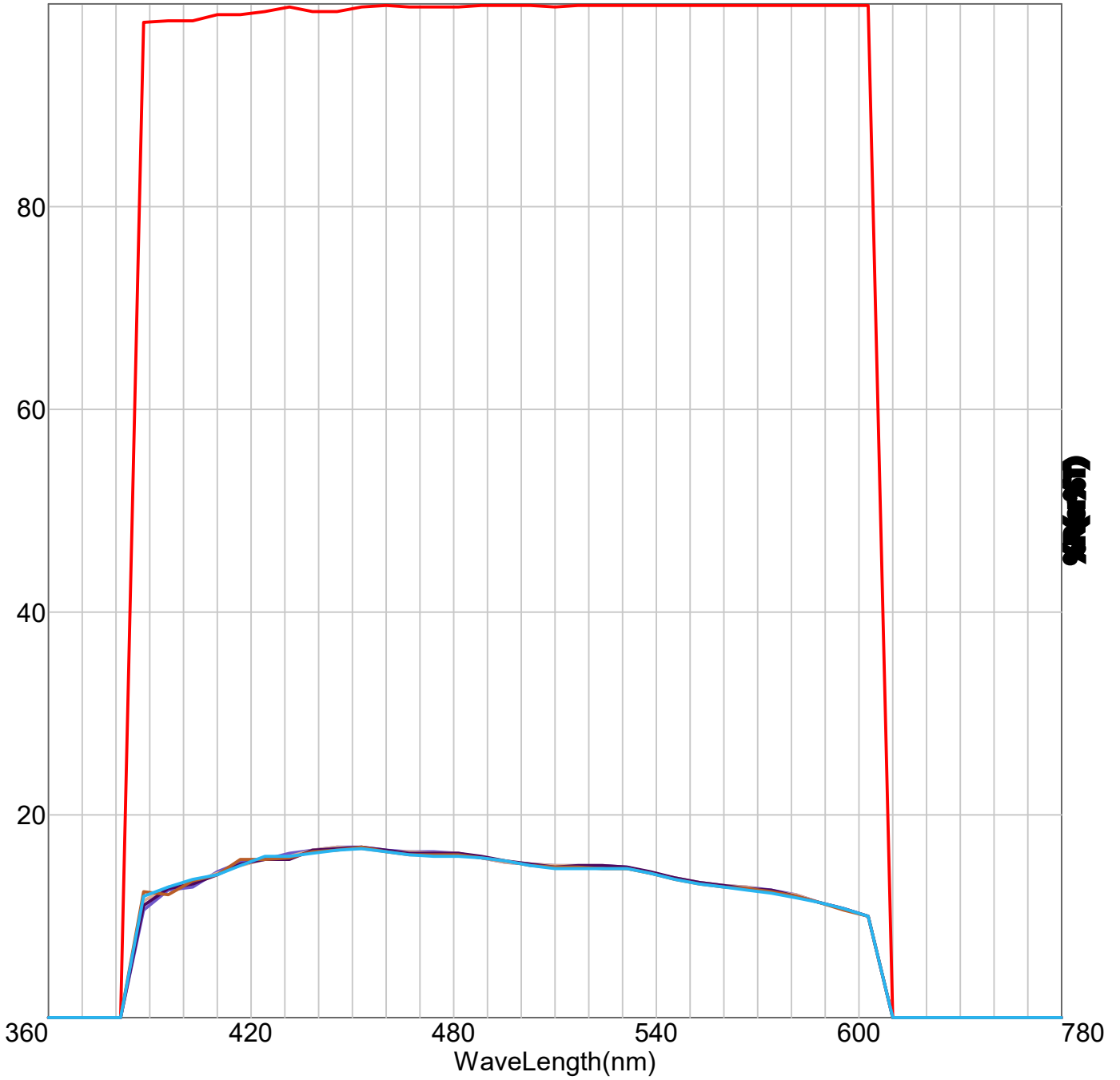


HAZE E TONALIDADE

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corp: BLUETECH

Department: AUDITORIA E QUALIDADE tester:VITTOR A.



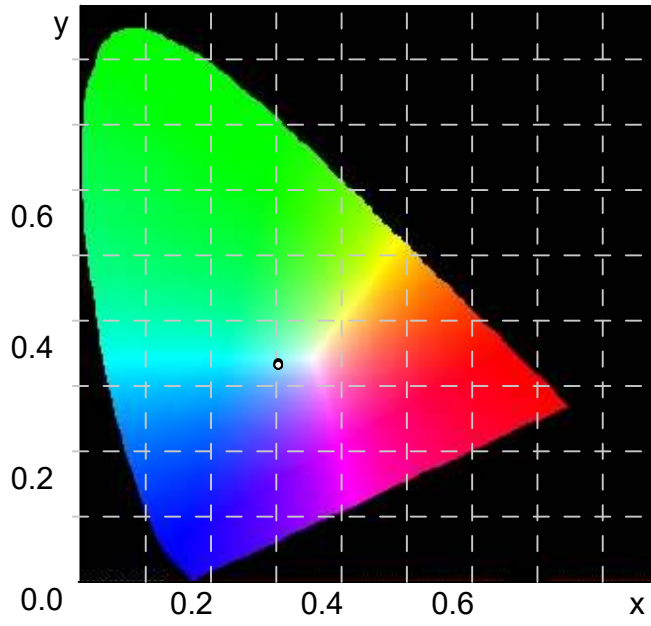
HAZE E TONALIDADE

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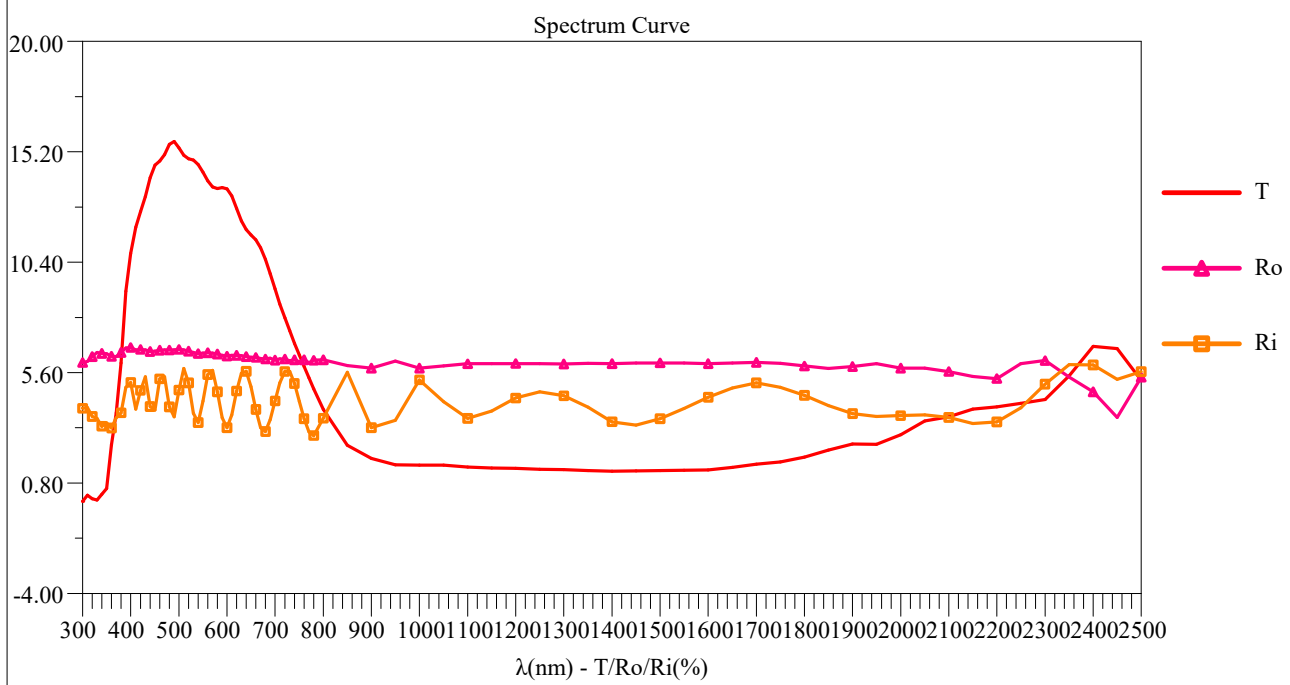
<u>Standard</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■ Target	D65/2°	ASTM	0.00	99.70	-	-	98.04	98.33	98.19	98.00
<u>Sample</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
WBS204212204 - M1D65/2°		ASTM	2.32	15.28	-84.42	2.32	10.48	12.84	12.51	14.00
WBS204212204 - M1D65/2°		ASTM	2.37	15.24	-84.46	2.37	11.37	13.29	12.87	14.00
WBS204212204 - M1D65/2°		ASTM	2.62	15.25	-84.45	2.62	11.00	13.14	12.66	13.00
WBS204212204 - M1D65/2°		ASTM	2.38	15.13	-84.57	2.38	12.31	13.40	12.07	13.00
WBS204212204 - M1D65/2°		ASTM	2.35	15.09	-84.61	2.35	11.84	13.53	12.74	14.00

GlasSpec2500 Optical and Thermal Parameters Measuring Instrument Test Report

Instrument: GlasSpec2500 Thermal standard: JGJ/T 151 Date: 2023-08-14 Test No.: _____
 CIE: D65/2° Optical standard: GB/T 2680 Time: 11:40:21 Environment: _____

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

No.	Content	Results
1	UV transmittance τ_{uv}	0.021
2	Visible light transmittance τ_v	0.141
3	Visible light reflectance ρ_v	0.064
4	Inside visible light reflectance $\rho_{v,i}$	0.045
5	Solar direct transmittance τ_e	0.076
6	Solar direct reflectance ρ_e	0.062
7	Inside solar direct reflectance $\rho_{e,i}$	0.044
8	Solar direct absorptance a_e	0.862
9	Solar infrared direct transmittance τ_{IR}	0.021
10	Solar infrared direct reflectance ρ_{IR}	0.060
11	Total solar energy transmittance g	0.295
12	Shading coefficient SC	0.340
13	Total solar infrared heat transmittance g_{IR}	0.256
14	Visible light to total solar energy transmittance LSG	0.48
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: _____

>> WBS204212204 - M1 [Total]

>> T-R-A Graph at AM1.5

Solar	Solar direct transmittance	te: 0.076
	Solar direct reflectance	pe: 0.062
	Solar direct absorptance	ae: 0.862
VIS	Visible light transmittance	tv: 0.141
	Visible light reflectance	pv: 0.064
NIR	Solar infrared direct transmittance	tIR: 0.021
	Solar infrared direct reflectance	pIR: 0.060
Thermal	Total solar energy transmittance	g: 0.295
	Shading coefficient	SC: 0.340
	Total solar infrared heat transmittance	gIR: 0.256
	Light to solar gain	LSG: 0.48
Thermal transmittance $W/(m^2 \cdot K)$		K: 5.39

>> Measurement control information

Normal	
T	0.03:10
R	0.01:05

D65/2° Batch BLUETECH

T-R-A Graph at AM1.5

Status: Normal

IGJ/T 151

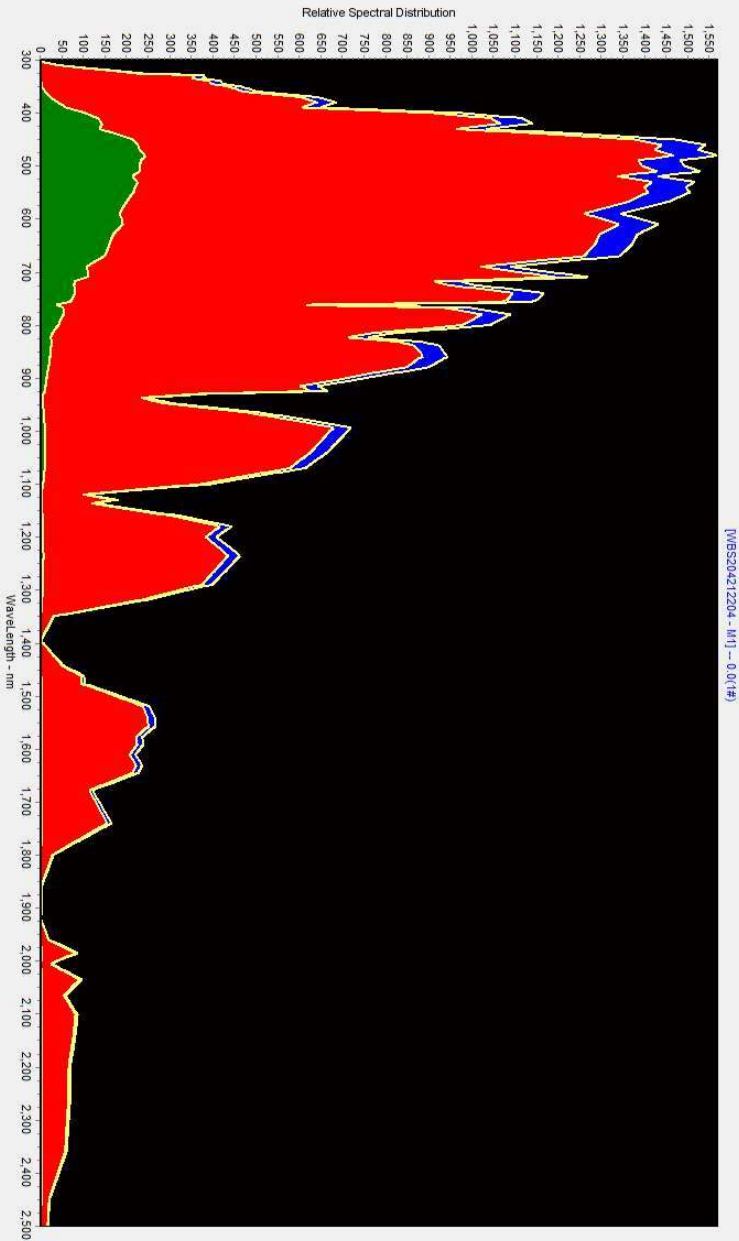
GB/T 2680

Outdoor Indoor

Wizard

Internal

Link



>> Glass Structure File: [WBS204212204 - M1] Structure: 0.0(1#) Current Date: Total

Name: T Automatic

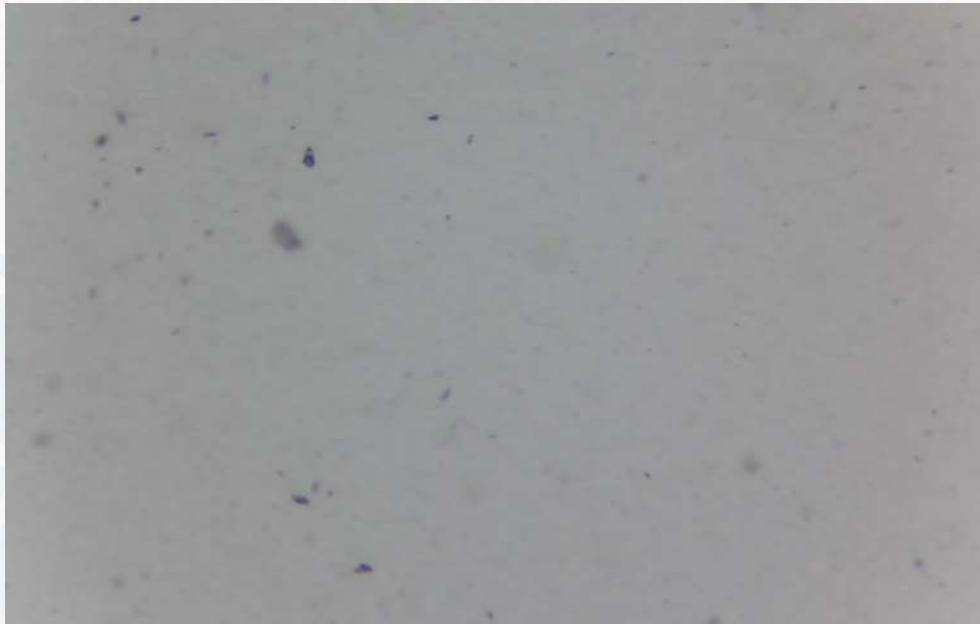
[WBS204212204 - M1]

Wizard

Overlay Spectrum

No.	Name	T	Ro	Ri
0	Current Measuring	Red	Red	Red
1	WBS204212204 - M2	Yellow	Yellow	Yellow
2	WBS204212204 - M3	Green	Green	Green
3	WBS204212204 - M1	Blue	Blue	Blue

WBS204212204 - SAMPLE - LENTE PLAN 10/0.25



WBS204212204 - SAMPLE - LENTE PLAN 4/0.10



Assinatura do responsável

Vittor Andrade

Vittor Andrade
Auditor de Qualidade