

<b>LAUDO TÉCNICO</b>	Data: 08/12/2023	Película: Semi-profissional ardósia 20%
Elaborado por: Vittor Andrade Revisado por: Thaynnara Siqueira Aprovado por: Hernane Fernandes	<b>Lote: SA202303201</b>	

## 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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# Multiple test report

**Company name:** BLUETECH

**Department:** AUDITORIA E QUALIDADE

**SMP name:**

**test Title:** HAZE E TONALIDADE

**Light:** D65

Name	Test Mode	Haze	Total Tran	DT	DHaze	400nm	420nm	410nm	430nm
Target	ASTM	0.00	100.00	-	-	0.00	0.00	0.00	0.00
SA202303 201 - M1	ASTM	0.54	14.54	-85.46	0.54	0.00	0.00	0.00	0.00
SA202303 201 - M1	ASTM	0.61	14.48	-85.52	0.61	0.00	0.00	0.00	0.00
SA202303 201 - M1	ASTM	1.45	14.33	-85.67	1.45	0.00	0.00	0.00	0.00
SA202303 201 - M1	ASTM	0.56	14.17	-85.83	0.56	0.00	0.00	0.00	0.00
SA202303 201 - M1	ASTM	0.58	13.95	-86.05	0.58	0.00	0.00	0.00	0.00
Remark:									

Tester:

check:VITTOR A.

Data:

# 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>
■	SA202303201 - M1	D65	ASTM	0.54	14.54	-85.46	0.54	0.00	0.00	0.00	0.00
■	SA202303201 - M1	D65	ASTM	0.61	14.48	-85.52	0.61	0.00	0.00	0.00	0.00
■	SA202303201 - M1	D65	ASTM	1.45	14.33	-85.67	1.45	0.00	0.00	0.00	0.00
■	SA202303201 - M1	D65	ASTM	0.56	14.17	-85.83	0.56	0.00	0.00	0.00	0.00
■	SA202303201 - M1	D65	ASTM	0.58	13.95	-86.05	0.58	0.00	0.00	0.00	0.00

# Multiple test report

Company name: BLUETECH

Department: AUDITORIA E QUALIDADE

SMP name:

test Title: HAZE E TONALIDADE

light /angle: D65/2°

Name	Test Mode	Haze	Total Tran	DT	DHaze	400nm	420nm	410nm	430nm
Target	ASTM	0.00	100.14	-	-	99.77	101.24	101.85	100.40
SA202303 201 - M1	ASTM	0.76	15.40	-84.74	0.76	22.55	19.73	21.18	19.19
SA202303 201 - M1	ASTM	0.76	15.38	-84.76	0.76	23.18	19.82	21.33	19.24
SA202303 201 - M1	ASTM	0.80	15.16	-84.98	0.80	22.01	19.72	21.17	18.90
SA202303 201 - M1	ASTM	0.67	15.02	-85.12	0.67	22.45	19.87	21.03	18.72
SA202303 201 - M1	ASTM	0.79	14.84	-85.30	0.79	22.30	19.23	20.28	18.61
Remark:									

Tester:

check:VITTOR A.

Data:

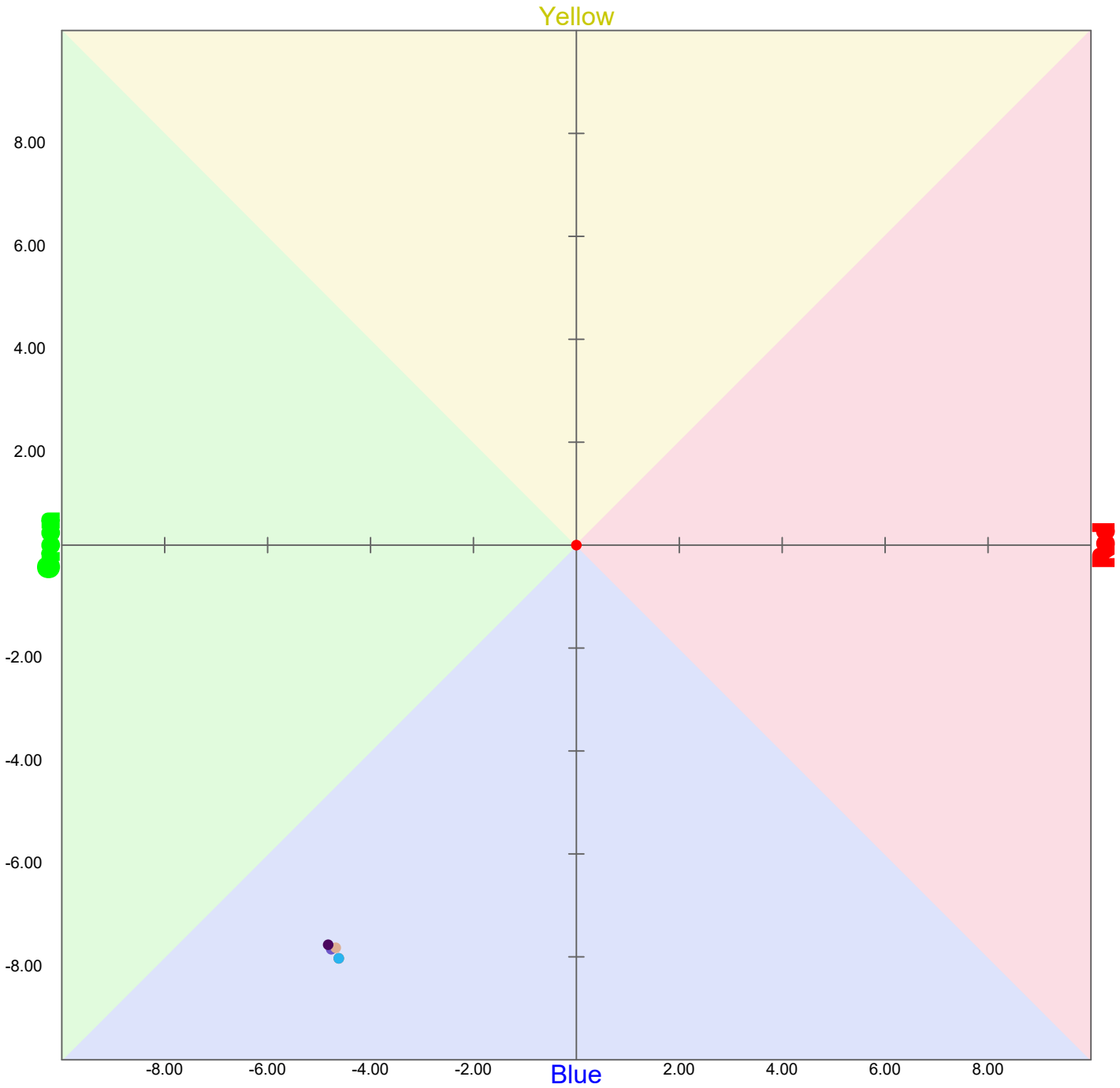
# HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE

tester: VITTOR A.

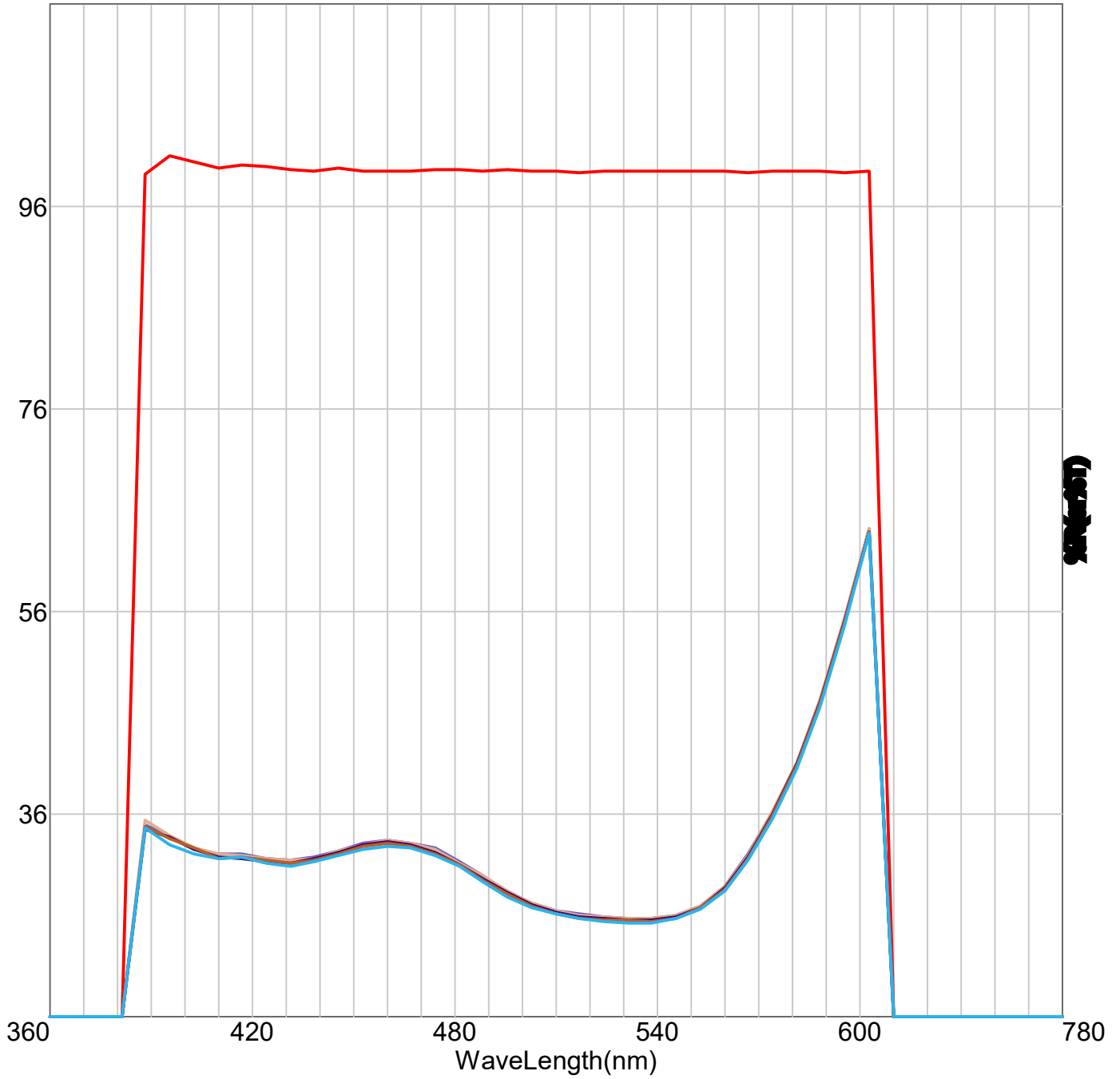


# HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE tester:VITTOR A.



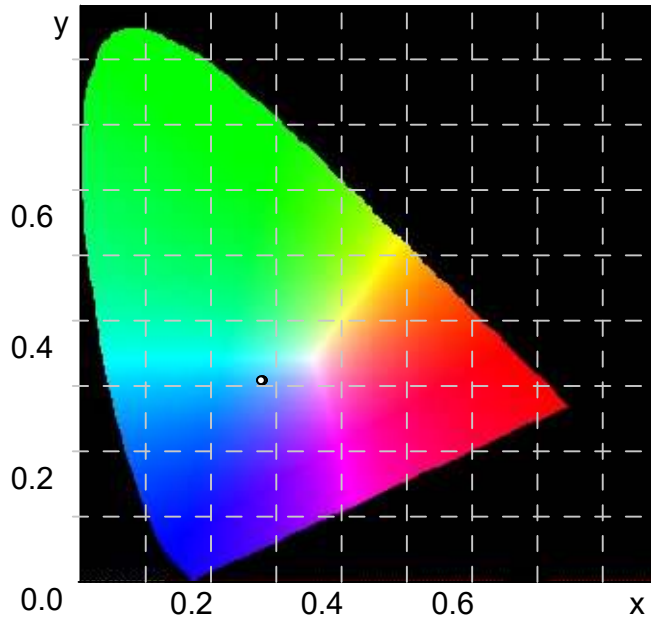
# HAZE E TONALIDADE

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.

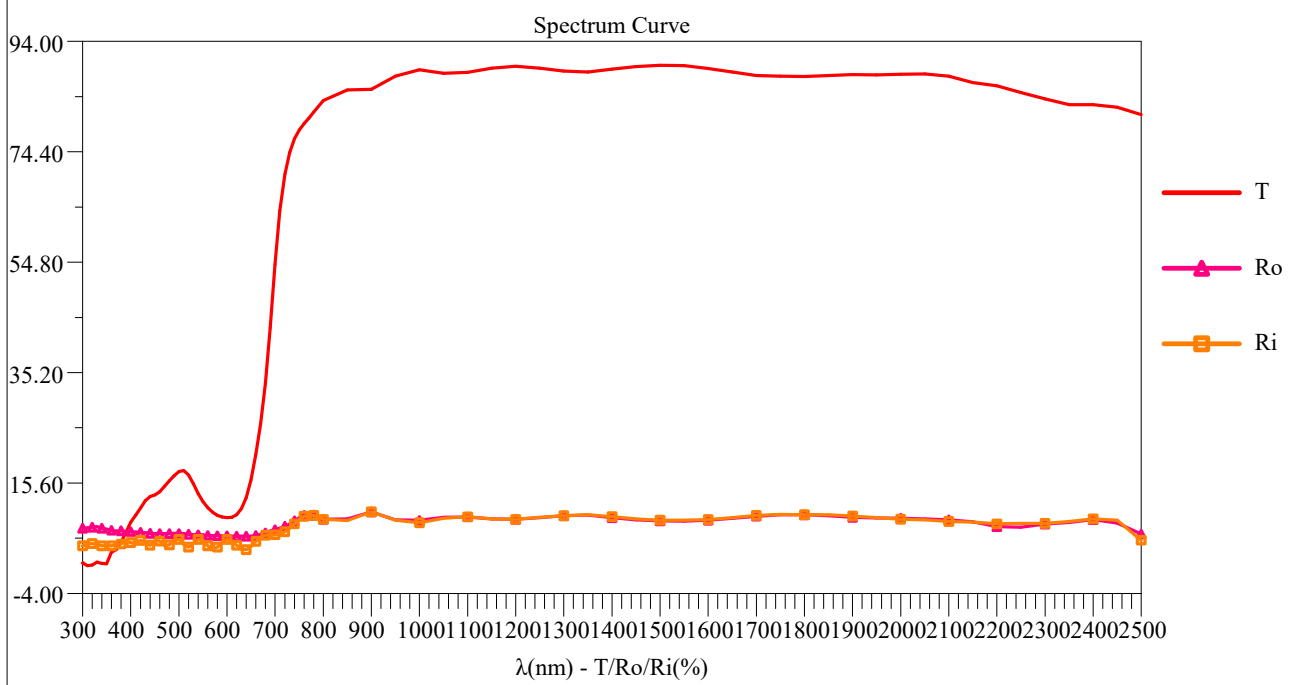
	<u>Standard</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■	Target	D65/2°	ASTM	0.00	100.14	-	-	99.77	101.24	101.85	100.00
	<u>Sample</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■	SA202303201 - M1	D65/2°	ASTM	0.76	15.40	-84.74	0.76	22.55	19.73	21.18	19.00
■	SA202303201 - M1	D65/2°	ASTM	0.76	15.38	-84.76	0.76	23.18	19.82	21.33	19.00
■	SA202303201 - M1	D65/2°	ASTM	0.80	15.16	-84.98	0.80	22.01	19.72	21.17	18.00
■	SA202303201 - M1	D65/2°	ASTM	0.67	15.02	-85.12	0.67	22.45	19.87	21.03	18.00
■	SA202303201 - M1	D65/2°	ASTM	0.79	14.84	-85.30	0.79	22.30	19.23	20.28	18.00

# GlasSpec2500 Optical and Thermal Parameters Measuring Instrument Test Report

Instrument: GlasSpec2500      Thermal standard: JGJ/T 151      Date: 2023-09-22      Test No.: \_\_\_\_\_  
 CIE: D65/2°      Optical standard: GB/T 2680      Time: 15:16:02      Environment: \_\_\_\_\_

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

No.	Content	Results
1	UV transmittance $\tau_{uv}$	0.026
2	Visible light transmittance $\tau_v$	0.129
3	Visible light reflectance $\rho_v$	0.064
4	Inside visible light reflectance $\rho_{v,i}$	0.048
5	Solar direct transmittance $\tau_e$	0.511
6	Solar direct reflectance $\rho_e$	0.079
7	Inside solar direct reflectance $\rho_{e,i}$	0.071
8	Solar direct absorptance $a_e$	0.410
9	Solar infrared direct transmittance $\tau_{IR}$	0.873
10	Solar infrared direct reflectance $\rho_{IR}$	0.093
11	Total solar energy transmittance $g$	0.614
12	Shading coefficient $SC$	0.705
13	Total solar infrared heat transmittance $g_{IR}$	0.881
14	Visible light to total solar energy transmittance $LSG$	0.21
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: \_\_\_\_\_

>> SA202303201 - M1 [Total]

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

Solar	Solar direct transmittance	te: 0.511
	Solar direct reflectance	pe: 0.079
	Solar direct absorptance	ae: 0.410
VIS	Visible light transmittance	tv: 0.129
	Visible light reflectance	pv: 0.064
NIR	Solar infrared direct transmittance	tIR: 0.873
	Solar infrared direct reflectance	pIR: 0.093
Thermal	Total solar energy transmittance	g: 0.614
	Shading coefficient	SC: 0.705
	Total solar infrared heat transmittance	gIR: 0.881
	Light to solar gain	LSG: 0.21
Thermal transmittance $W/(m^2 \cdot K)$		K: 5.39

>> Measurement control information

Normal	
T: 0.03:40	R: 0.01:58

D65/2° Batch BLUETECH

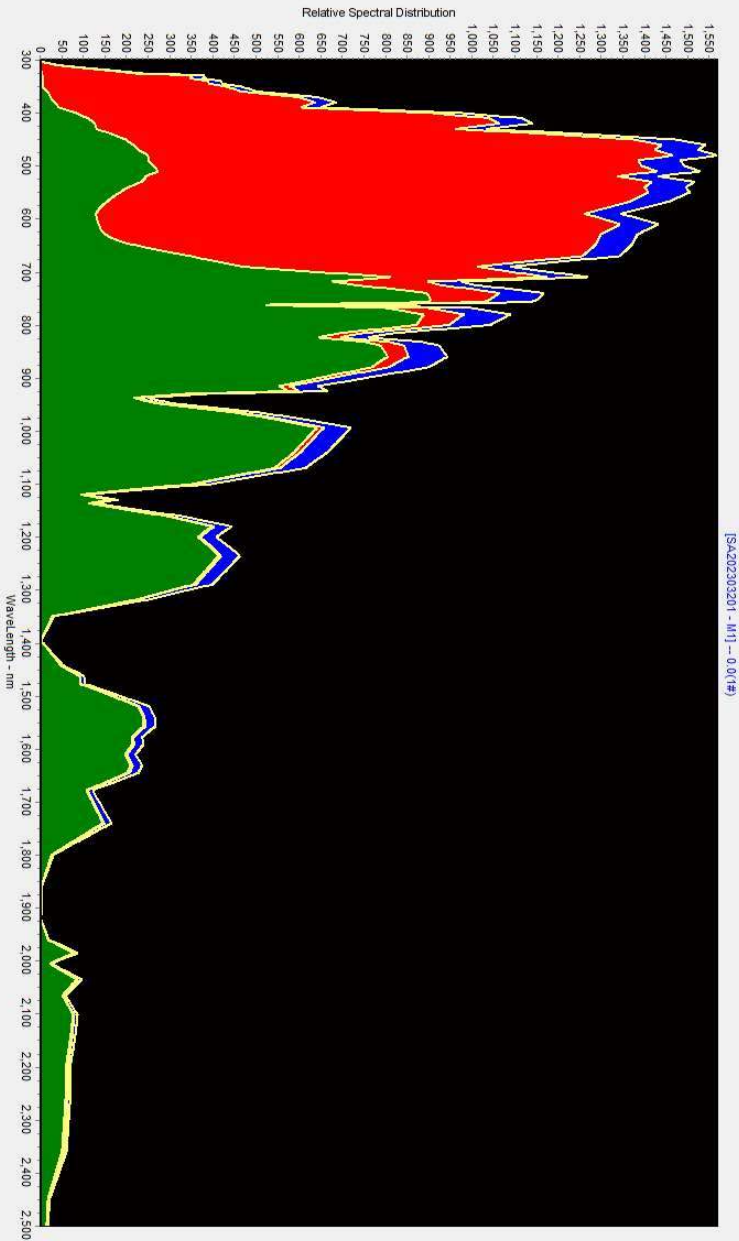
T-R-A Graph at AM1.5

Status: Normal

File: SA202303201 - M1 Structure: D(0) (#) Current Data: Total

File Path: Testbed\bin\T-R-A

ITC 3 - Spectro - connected



>> Glass Structure File: [SA202303201 - M1] Structure: D(0) (#) Current Data: Total

JG/T 151  
GB/T 2680

Outdoor Indoor

Name:  Automatic

SA202303201 - M1

Wizard

0 Internal Link

Overlay Spectrum

No.	Name	T	Ro	Ri
0	Current Measuring	Red	Red	Red
1	SA05230321 - M1	Yellow	Yellow	Yellow
2	SA052303201 - M1	Green	Green	Green
3	SA202303201 - M1	Blue	Blue	Blue

SA202303201 - SAMPLE - LENTE PLAN 10/0.25



SA202303201 - SAMPLE - LENTE PLAN 4/0.10



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**Assinatura do responsável**

*Vittor Andrade*

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**Vittor Andrade**  
Auditor de Qualidade