

LAUDO TÉCNICO	Data: 08/12/2023	Película: Nanocarbono 20%
Elaborado por: Vittor Andrade Revisado por: Thaynnara Siqueira Aprovado por: Hernane Fernandes	Lote: CBP205403203	

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: CONTROLE E QUALIDADE

SMP name:

test Title: TESTE HAZE E TONAL. 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
CBP20540 3203 - M1	ASTM	2.08	20.05	-79.95	2.08	0.00	0.00	0.00	0.00
CBP20540 3203 - M1	ASTM	2.06	20.23	-79.77	2.06	0.00	0.00	0.00	0.00
CBP20540 3203 - M1	ASTM	2.11	20.17	-79.83	2.11	0.00	0.00	0.00	0.00
CBP20540 3203 - M1	ASTM	2.08	20.05	-79.95	2.08	0.00	0.00	0.00	0.00
CBP20540 3203 - M1	ASTM	2.11	20.17	-79.83	2.11	0.00	0.00	0.00	0.00
Remark:									

Tester:

check:VITTOR A.

Data:

TESTE HAZE E TONAL.Default 1024.st5

corp: BLUETECH

Department: CONTROLE 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>
●BP205403203 - M1	D65	ASTM	2.08	20.05	-79.95	2.08	0.00	0.00	0.00	0.00
●BP205403203 - M1	D65	ASTM	2.06	20.23	-79.77	2.06	0.00	0.00	0.00	0.00
●BP205403203 - M1	D65	ASTM	2.11	20.17	-79.83	2.11	0.00	0.00	0.00	0.00
●BP205403203 - M1	D65	ASTM	2.08	20.05	-79.95	2.08	0.00	0.00	0.00	0.00
●BP205403203 - M1	D65	ASTM	2.11	20.17	-79.83	2.11	0.00	0.00	0.00	0.00

Multiple test report

Company name: BLUETECH

Department: CONTROLE E QUALIDADE

SMP name:

test Title: TESTE HAZE E TONAL. light /angle: D65/2°

Name	Test Mode	Haze	Total Tran	DT	DHaze	400nm	420nm	410nm	430nm
Target	ASTM	0.00	100.00	-	-	100.17	99.56	100.82	99.98
CBP20540 3203 - M1	ASTM	2.06	20.47	-79.53	2.06	25.36	22.69	23.87	21.19
CBP20540 3203 - M1	ASTM	2.16	20.36	-79.64	2.16	23.77	21.46	23.65	20.94
CBP20540 3203 - M1	ASTM	2.11	20.27	-79.73	2.11	24.90	21.42	23.44	20.39
CBP20540 3203 - M1	ASTM	2.04	20.33	-79.67	2.04	24.75	22.05	23.41	21.00
CBP20540 3203 - M1	ASTM	2.25	20.34	-79.66	2.25	24.06	21.52	23.73	20.70
Remark:									

Tester:

check:VITTOR A.

Data:

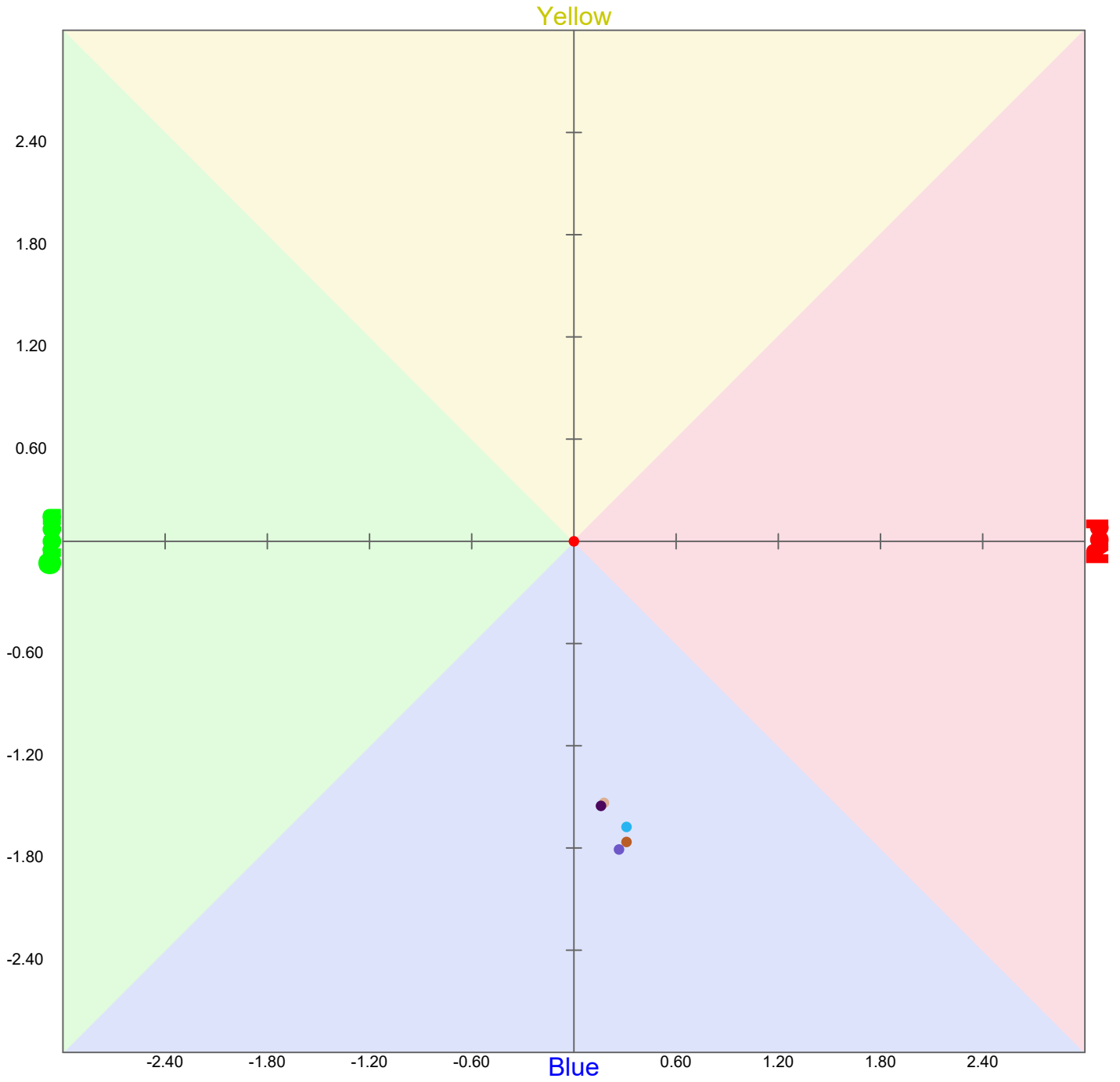
TESTE HAZE E TONAL.

Default 1024.st5

corp: BLUETECH

Department: CONTROLE E QUALIDADE

tester:VITTOR A.

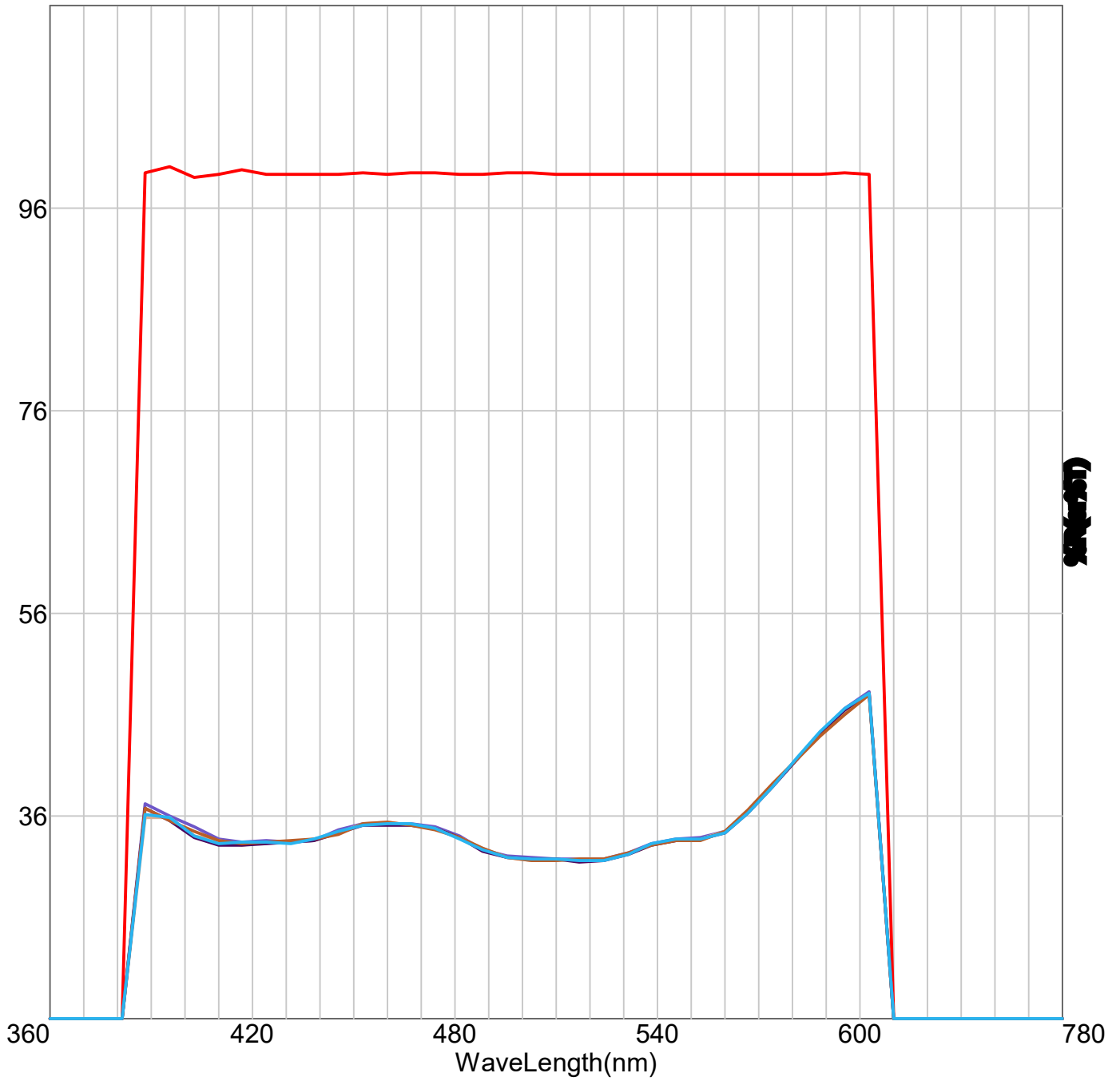


TESTE HAZE E TONAL.

Default 1024.st5

corp: BLUETECH

Department: CONTROLE E QUALIDADE tester:VITTOR A.



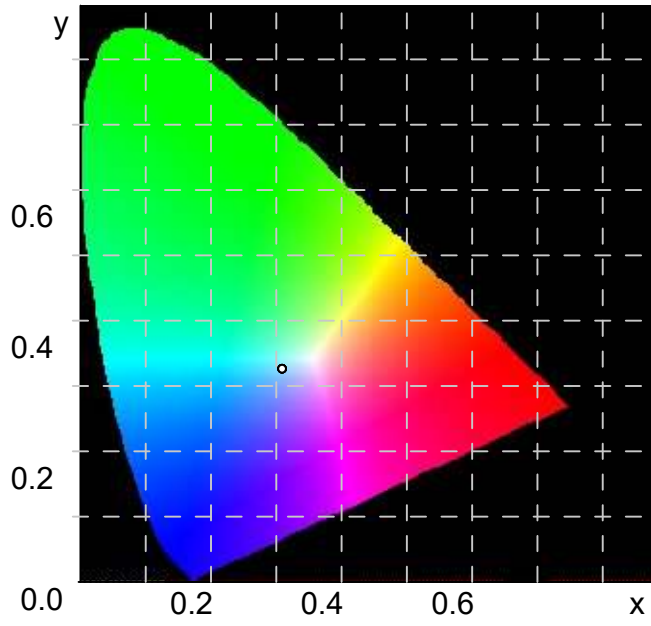
TESTE HAZE E TONAL.

Default 1024.st5

corp: BLUETECH

Department: CONTROLE E QUALIDADE

tester:VITTOR A.



TESTE HAZE E TONAL.Default 1024.st5

corp: BLUETECH

Department: CONTROLE E QUALIDADE tester:VITTOR A.

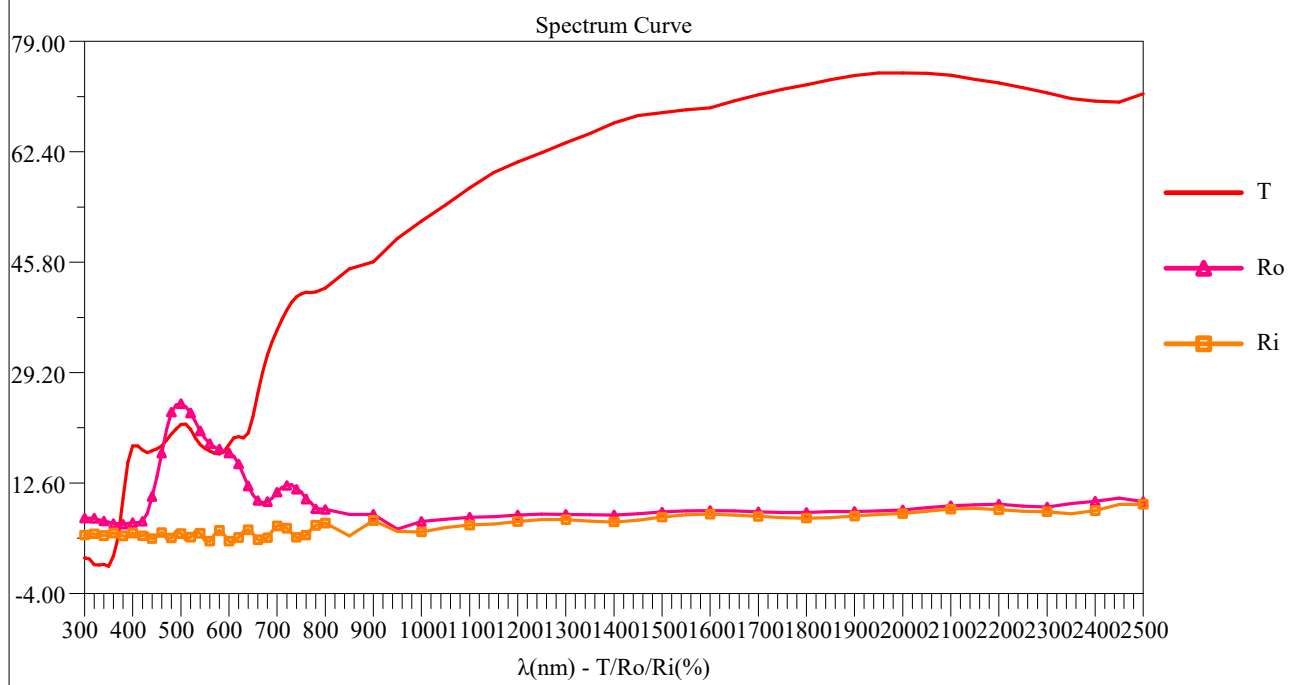
<u>Standard</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■ Target	D65/2°	ASTM	0.00	100.00	-	-	100.17	99.56	100.82	99.56
<u>Sample</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
●BP205403203 - M1D65/2°		ASTM	2.06	20.47	-79.53	2.06	25.36	22.69	23.87	21.42
●BP205403203 - M1D65/2°		ASTM	2.16	20.36	-79.64	2.16	23.77	21.46	23.65	20.82
●BP205403203 - M1D65/2°		ASTM	2.11	20.27	-79.73	2.11	24.90	21.42	23.44	20.82
●BP205403203 - M1D65/2°		ASTM	2.04	20.33	-79.67	2.04	24.75	22.05	23.41	21.42
●BP205403203 - M1D65/2°		ASTM	2.25	20.34	-79.66	2.25	24.06	21.52	23.73	20.82

GlasSpec2500 Optical and Thermal Parameters Measuring Instrument Test Report

Instrument: GlasSpec2500 Thermal standard: JGJ/T 151 Date: 2023-08-21 Test No.: _____
 CIE: D65/2° Optical standard: GB/T 2680 Time: 09:11:11 Environment: _____

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

No.	Content	Results
1	UV transmittance τ_{uv}	0.025
2	Visible light transmittance τ_v	0.188
3	Visible light reflectance ρ_v	0.193
4	Inside visible light reflectance $\rho_{v,i}$	0.046
5	Solar direct transmittance τ_e	0.369
6	Solar direct reflectance ρ_e	0.117
7	Inside solar direct reflectance $\rho_{e,i}$	0.055
8	Solar direct absorptance a_e	0.514
9	Solar infrared direct transmittance τ_{IR}	0.561
10	Solar infrared direct reflectance ρ_{IR}	0.079
11	Total solar energy transmittance g	0.498
12	Shading coefficient SC	0.573
13	Total solar infrared heat transmittance g_{IR}	0.652
14	Visible light to total solar energy transmittance LSG	0.38
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	Solar direct transmittance	te: 0.369
	Solar direct reflectance	pe: 0.117
VIS	Solar direct absorptance	ae: 0.514
	Visible light transmittance	tv: 0.188
NIR	Visible light reflectance	pv: 0.193
	Solar infrared direct transmittance	tIR: 0.561
Thermal	Solar infrared direct reflectance	pIR: 0.079
	Total solar energy transmittance	g: 0.498
	Shading coefficient	SC: 0.573
	Total solar infrared heat transmittance	gIR: 0.652

Light to solar gain	LSG: 0.38
Thermal transmittance $W/(m^2 \cdot K)$	K: 5.39

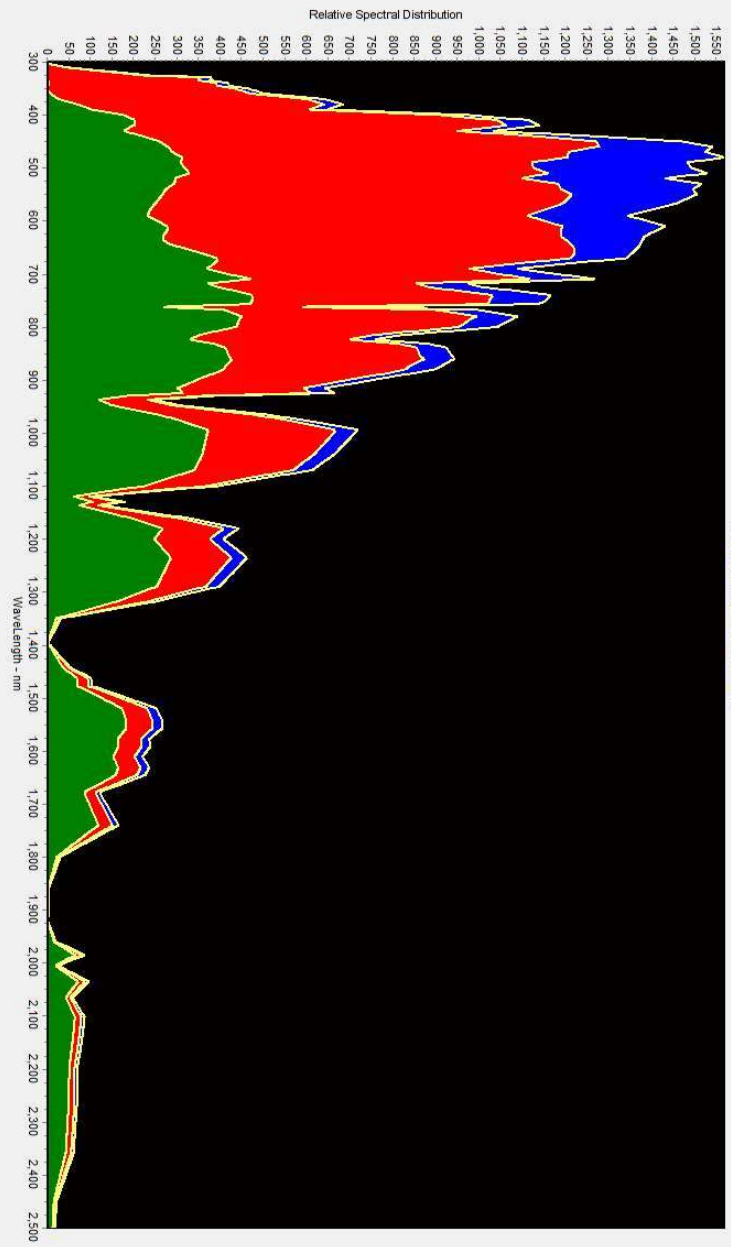
>> Measurement control information

Normal

T: 0.04:45 R: 0.02:14

D65/2° Batch BLUETECH

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



>> Glass Structure File[CBP205-403203 - M1 - P6] Structure:0(1#) Current Data: Total

JG/T 151 GB/T 2680

Outdoor Indoor

Overlay Spectrum

No.	Name	T	Ro	Ri
0	Current Measuring	Red	Yellow	Blue
1	CBP055-403203 - M2	Red	Yellow	Blue
2	CBP055-403203 - M2 - P2	Red	Yellow	Blue
3	CBP055-403203 - M2 - P3	Red	Yellow	Blue
4	CBP055-403203 - M2 - P4	Red	Yellow	Blue
5	CBP205-403203 - M1	Red	Yellow	Blue
6	CBP205-403203 - M1 - P2	Red	Yellow	Blue
7	CBP205-403203 - M1 - P3	Red	Yellow	Blue
8	CBP205-403203 - M1 - P4	Red	Yellow	Blue
9	CBP205-403203 - M1 - P5	Red	Yellow	Blue
10	CBP205-403203 - M1 - P6	Red	Yellow	Blue

Name: Automatic

CBP205-403203 - M1 - P6

Wizard

0 Internal Link

CBP205403203 - SAMPLE - LENTE PLAN 10/0.25



CBP205403203 - SAMPLE - LENTE PLAN 4/0.10



Assinatura do responsável

Vittor Andrade

Vittor Andrade
Auditor de Qualidade