

LAUDO TÉCNICO	Data: 30/11/2023	Película: Nanocerâmica 70%
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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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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
NN701302 201 - M1	ASTM	2.30	76.39	-23.61	2.30	0.00	0.00	0.00	0.00
NN701302 201 - M1	ASTM	2.26	76.47	-23.53	2.26	0.00	0.00	0.00	0.00
NN701302 201 - M1	ASTM	2.24	76.62	-23.38	2.24	0.00	0.00	0.00	0.00
NN701302 201 - M1	ASTM	2.23	76.51	-23.49	2.23	0.00	0.00	0.00	0.00
NN701302 201 - M1	ASTM	2.28	76.52	-23.48	2.28	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>
■ N701302201 - M1	D65	ASTM	2.30	76.39	-23.61	2.30	0.00	0.00	0.00	0.00
■ N701302201 - M1	D65	ASTM	2.26	76.47	-23.53	2.26	0.00	0.00	0.00	0.00
■ N701302201 - M1	D65	ASTM	2.24	76.62	-23.38	2.24	0.00	0.00	0.00	0.00
■ N701302201 - M1	D65	ASTM	2.23	76.51	-23.49	2.23	0.00	0.00	0.00	0.00
■ N701302201 - M1	D65	ASTM	2.28	76.52	-23.48	2.28	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	99.88	-	-	99.54	100.24	100.53	99.29
NN701302 201 - M1	ASTM	2.22	76.00	-23.88	2.22	51.17	67.80	62.36	71.17
NN701302 201 - M1	ASTM	2.32	75.99	-23.89	2.32	50.93	67.86	61.70	70.82
NN701302 201 - M1	ASTM	2.37	76.07	-23.82	2.37	50.55	67.33	61.86	70.43
NN701302 201 - M1	ASTM	2.32	76.08	-23.80	2.32	50.56	67.37	62.01	71.25
NN701302 201 - M1	ASTM	2.87	76.03	-23.85	2.87	50.57	67.42	61.76	70.70
Remark:									

Tester:

check:VITTOR A.

Data:

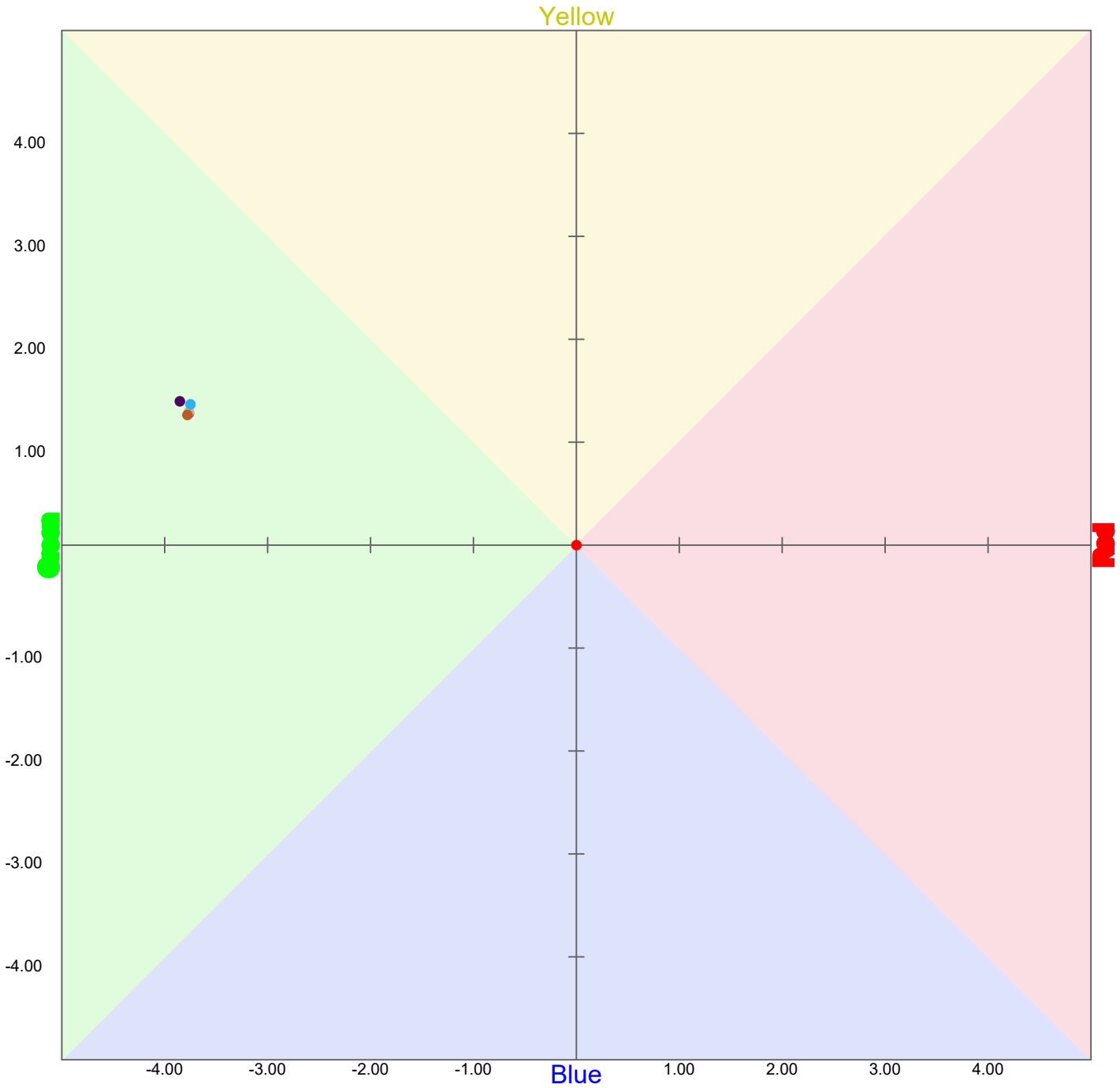
HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE

tester: VITTOR A.

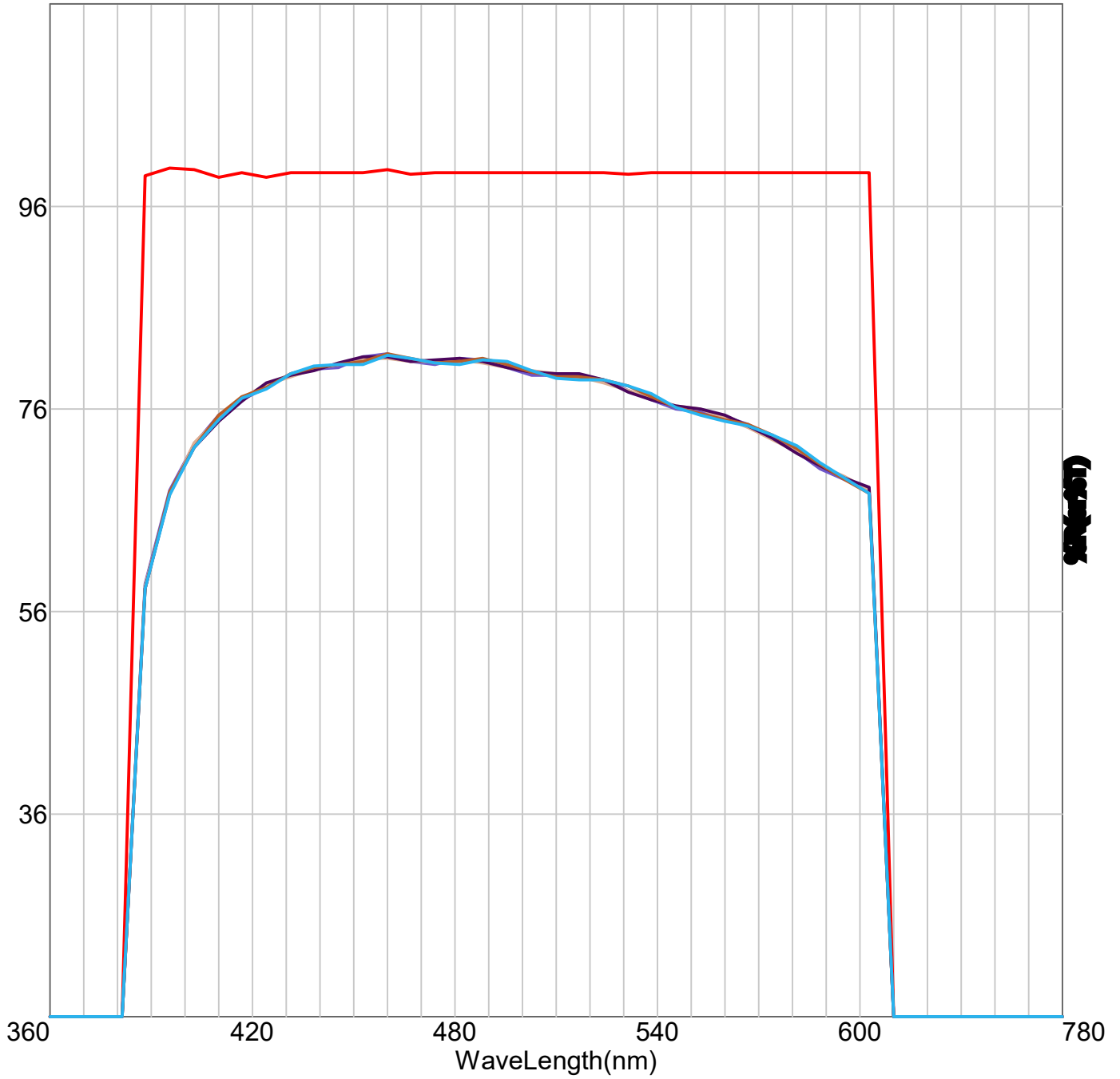


HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE tester:VITTOR A.



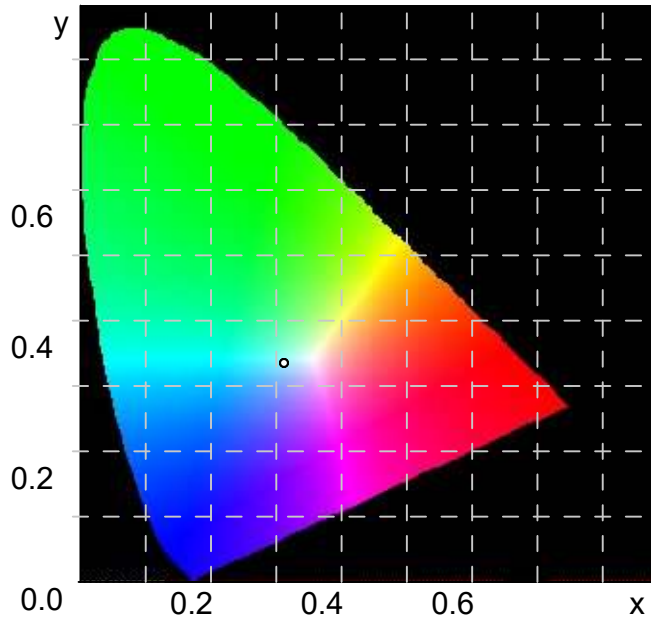
HAZE E TONALIDADE

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.

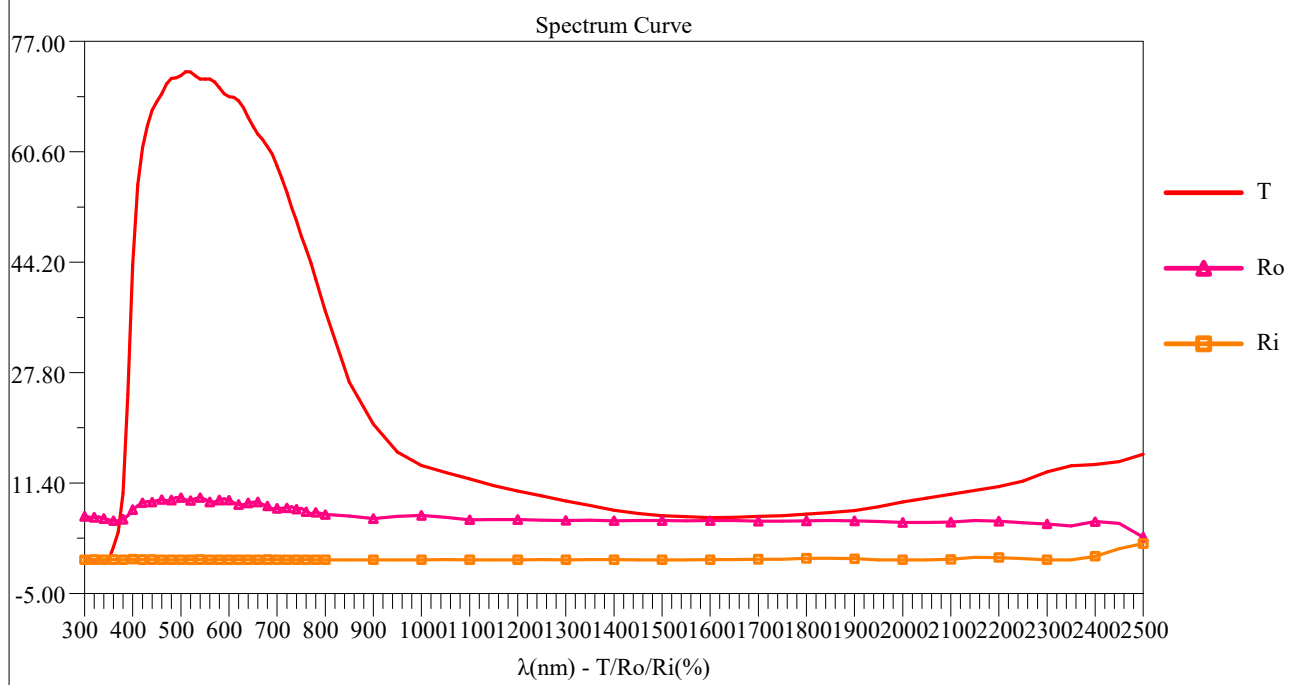
	<u>Standard</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■	Target	D65/2°	ASTM	0.00	99.88	-	-	99.54	100.24	100.53	99.88
	<u>Sample</u>	<u>Light</u>	<u>Standard</u>	<u>Haze</u>	<u>Total Tran</u>	<u>DT</u>	<u>DHaze</u>	<u>400nm</u>	<u>420nm</u>	<u>410nm</u>	<u>430nm</u>
■	N701302201 - M1	D65/2°	ASTM	2.22	76.00	-23.88	2.22	51.17	67.80	62.36	71.80
■	N701302201 - M1	D65/2°	ASTM	2.32	75.99	-23.89	2.32	50.93	67.86	61.70	70.80
■	N701302201 - M1	D65/2°	ASTM	2.37	76.07	-23.82	2.37	50.55	67.33	61.86	70.80
■	N701302201 - M1	D65/2°	ASTM	2.32	76.08	-23.80	2.32	50.56	67.37	62.01	71.80
■	N701302201 - M1	D65/2°	ASTM	2.87	76.03	-23.85	2.87	50.57	67.42	61.76	70.80

GlasSpec2500 Optical and Thermal Parameters Measuring Instrument Test Report

Instrument: GlasSpec2500 Thermal standard: JGJ/T 151 Date: 2023-10-23 Test No.: _____
 CIE: D65/2° Optical standard: GB/T 2680 Time: 09:53:24 Environment: _____

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

No.	Content	Results
1	UV transmittance τ_{uv}	0.023
2	Visible light transmittance τ_v	0.706
3	Visible light reflectance ρ_v	0.088
4	Inside visible light reflectance $\rho_{v,i}$	0.000
5	Solar direct transmittance τ_e	0.414
6	Solar direct reflectance ρ_e	0.073
7	Inside solar direct reflectance $\rho_{e,i}$	0.000
8	Solar direct absorptance a_e	0.512
9	Solar infrared direct transmittance τ_{IR}	0.162
10	Solar infrared direct reflectance ρ_{IR}	0.061
11	Total solar energy transmittance g	0.544
12	Shading coefficient SC	0.625
13	Total solar infrared heat transmittance g_{IR}	0.359
14	Visible light to total solar energy transmittance LSG	1.30
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: 0.414
	Solar direct reflectance	pe: 0.073
	Solar direct absorptance	ae: 0.512
VIS	Visible light transmittance	tv: 0.706
	Visible light reflectance	pv: 0.088
NIR	Solar infrared direct transmittance	tIR: 0.162
	Solar infrared direct reflectance	pIR: 0.061
Thermal	Total solar energy transmittance	g: 0.544
	Shading coefficient	SC: 0.625
	Total solar infrared heat transmittance	gIR: 0.359
	Light to solar gain	LSG: 1.30
	Thermal transmittance	K: 5.39 W/(m ² ·K)

>> Measurement control information

Normal

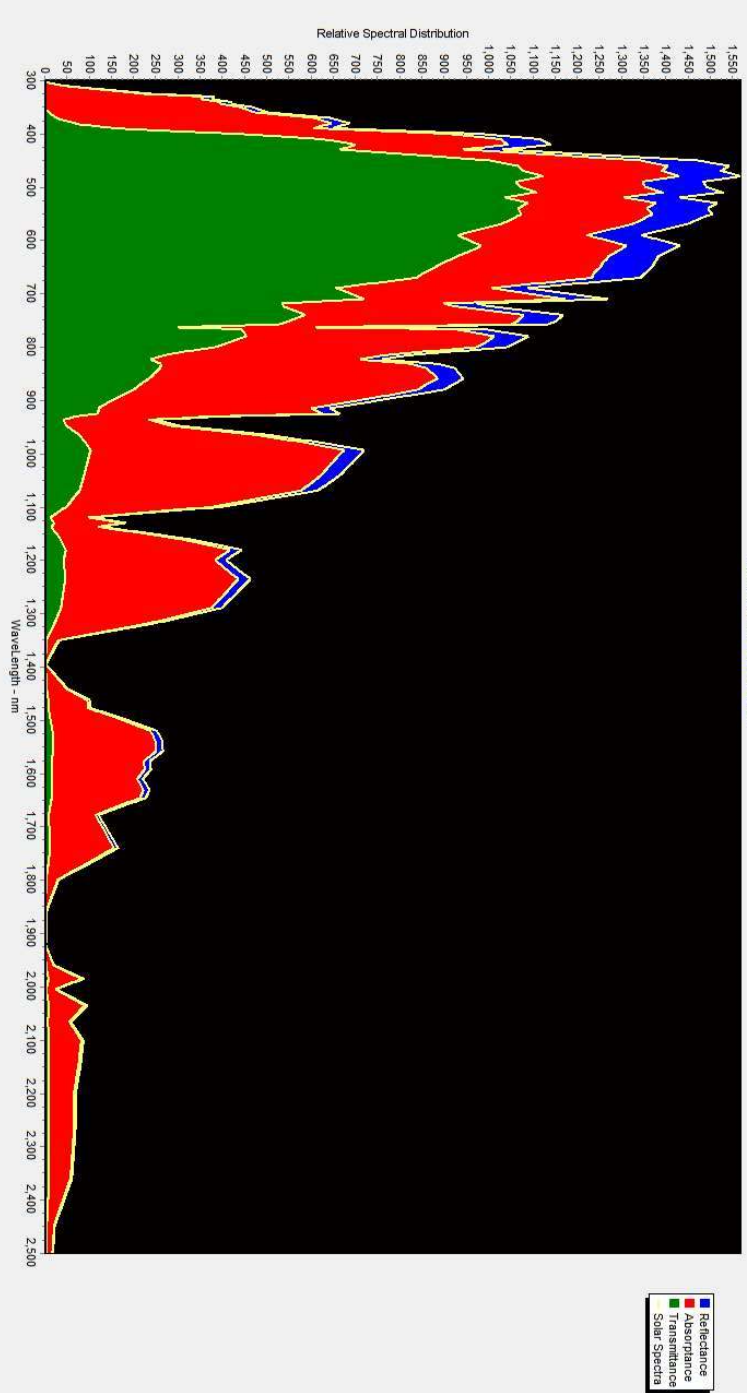
T 0:03:56 R 0:02:06

>> Glass Structure File [NNZ701302201 - M1] Structure: 0.0(1#) Current Data: Total

JG/T 151
GB/T 2680

Outdoor Indoor

Name: NNZ701302201-M1
Wizard
Internal Link



No.	Name	T	Ro	Ri
0	Current Measuring	Red	Yellow	Orange
1	C4501.302201 - M1	Red	Yellow	Orange
2	NT5002700202 - M1	Purple	Green	Cyan
3	NNZ7001501203 - M1	Brown	Green	Blue
4	C4991.3212201 - M1	Purple	Blue	Black
5	NNZ701302201 - M1	Green	Grey	Black

NN701302201 - SAMPLE - LENTE PLAN 10/0.25



NN701302201 - SAMPLE - LENTE PLAN 4/0.10



Assinatura do responsável

Vittor Andrade

Vittor Andrade
Auditor de Qualidade