

LAUDO TÉCNICO	Data: 24/11/2023	Película: Window blue Arquitetura 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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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
WA20150 322 - M1	ASTM	1.92	19.59	-80.41	1.92	0.00	0.00	0.00	0.00
WA20150 322 - M1	ASTM	1.91	19.68	-80.32	1.91	0.00	0.00	0.00	0.00
WA20150 322 - M1	ASTM	1.90	19.77	-80.23	1.90	0.00	0.00	0.00	0.00
WA20150 322 - M1	ASTM	2.00	19.77	-80.23	2.00	0.00	0.00	0.00	0.00
WA20150 322 - M1	ASTM	2.05	19.74	-80.26	2.05	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>
■	WA20150322 - M1	D65	ASTM	1.92	19.59	-80.41	1.92	0.00	0.00	0.00	0.00
■	WA20150322 - M1	D65	ASTM	1.91	19.68	-80.32	1.91	0.00	0.00	0.00	0.00
■	WA20150322 - M1	D65	ASTM	1.90	19.77	-80.23	1.90	0.00	0.00	0.00	0.00
■	WA20150322 - M1	D65	ASTM	2.00	19.77	-80.23	2.00	0.00	0.00	0.00	0.00
■	WA20150322 - M1	D65	ASTM	2.05	19.74	-80.26	2.05	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	99.82	-	-	98.53	99.54	98.52	99.71
WA20150 322 - M1	ASTM	2.12	19.45	-80.38	2.12	14.12	16.47	15.67	17.22
WA20150 322 - M1	ASTM	2.11	19.50	-80.32	2.11	13.69	16.60	15.22	17.26
WA20150 322 - M1	ASTM	2.07	19.58	-80.24	2.07	13.75	16.82	15.82	17.11
WA20150 322 - M1	ASTM	2.11	19.61	-80.22	2.11	13.52	16.78	15.52	17.15
WA20150 322 - M1	ASTM	2.01	19.59	-80.23	2.01	13.52	16.28	15.59	17.32
Remark:									

Tester:

check:VITTOR A.

Data:

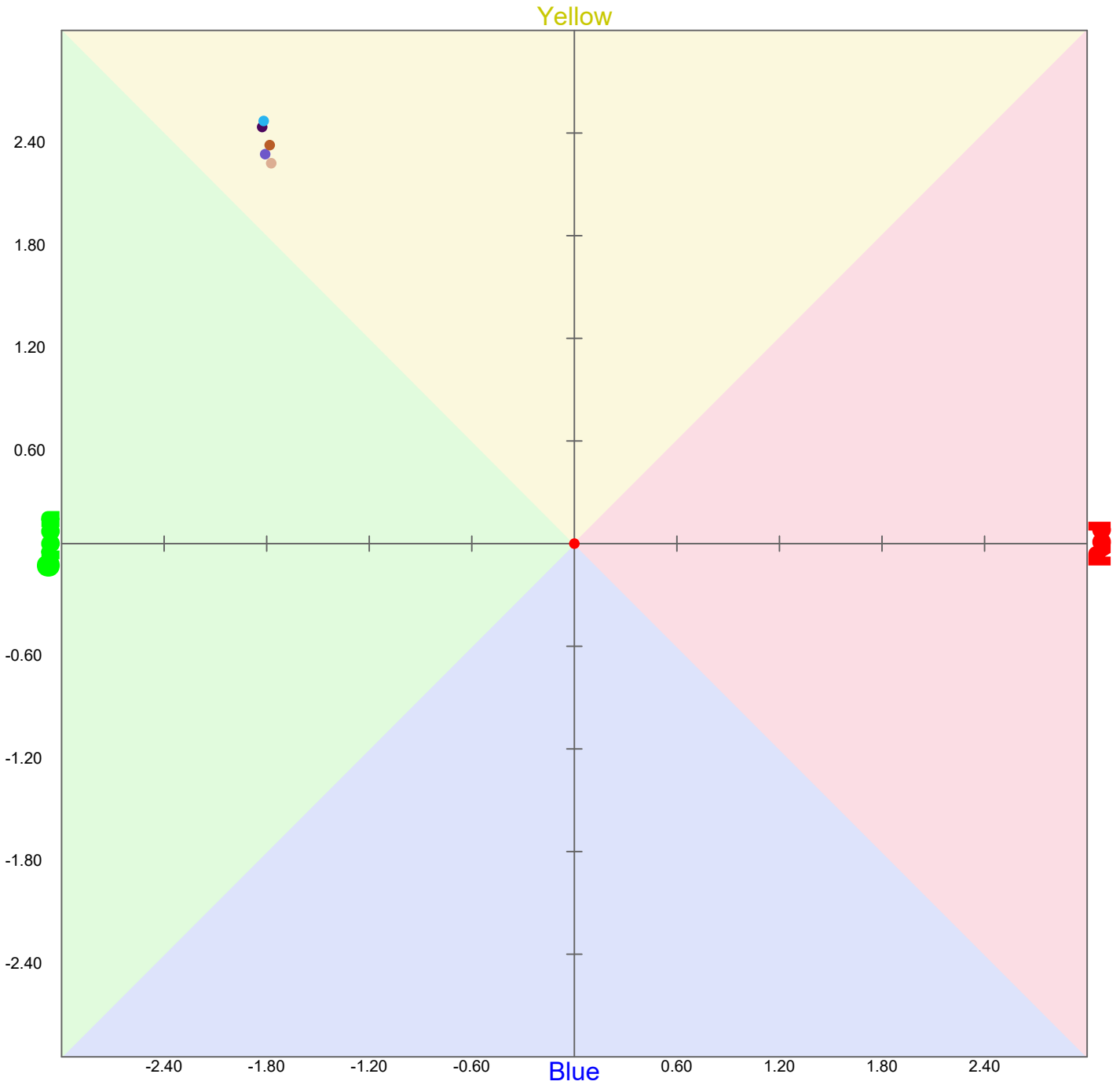
HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE

tester: VITTOR A.

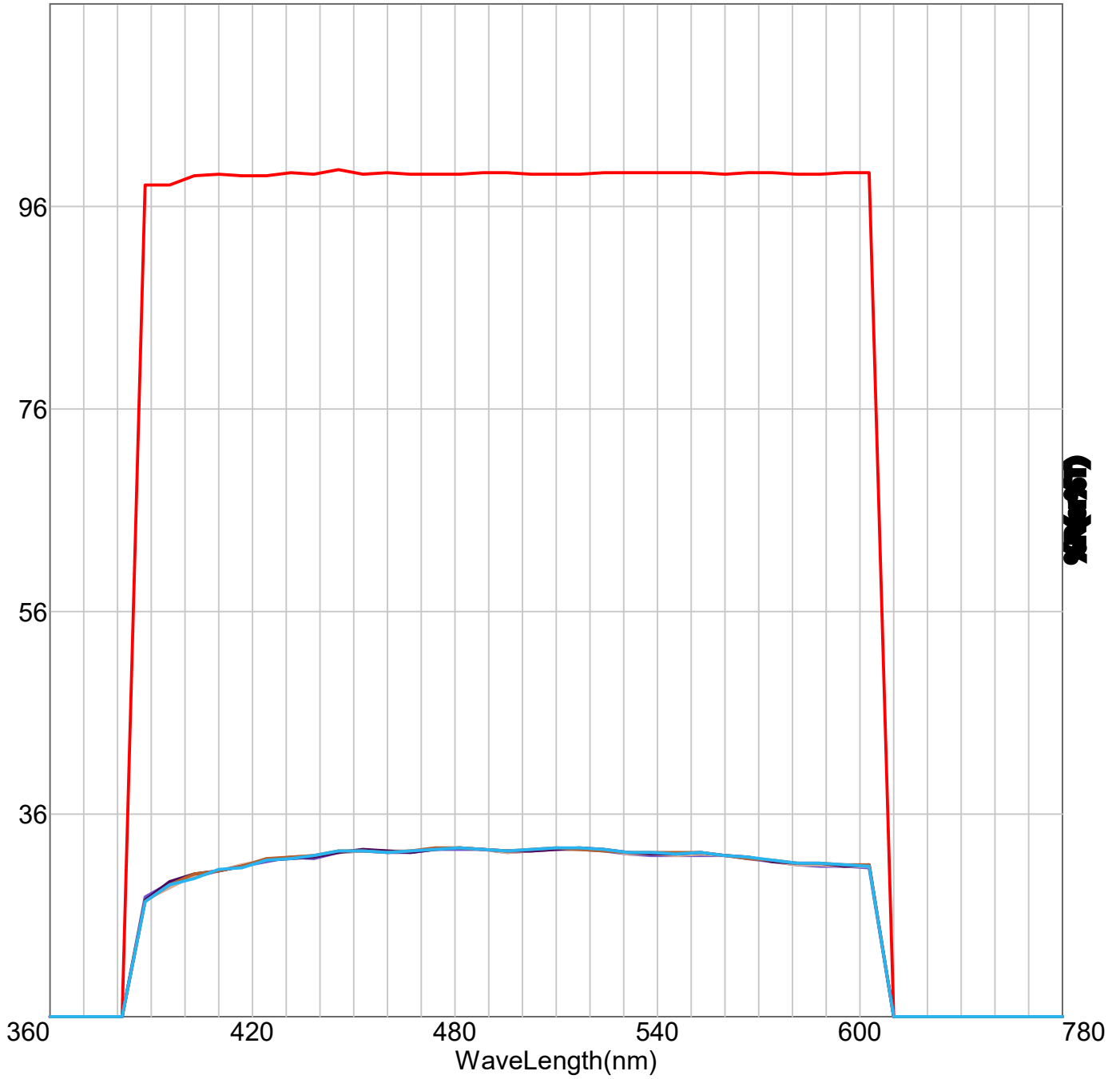


HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE tester:VITTOR A.



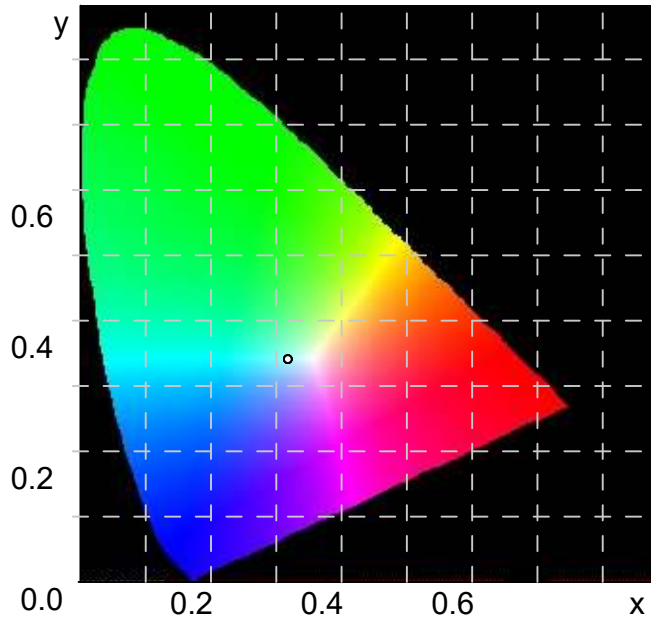
HAZE E TONALIDADE

Default 1024.st5

corp: BLUETECH

Department: AUDITORIA E QUALIDADE

tester: VITTOR A.



HAZE E TONALIDADEDefault 1024.st5

corp: BLUETECH

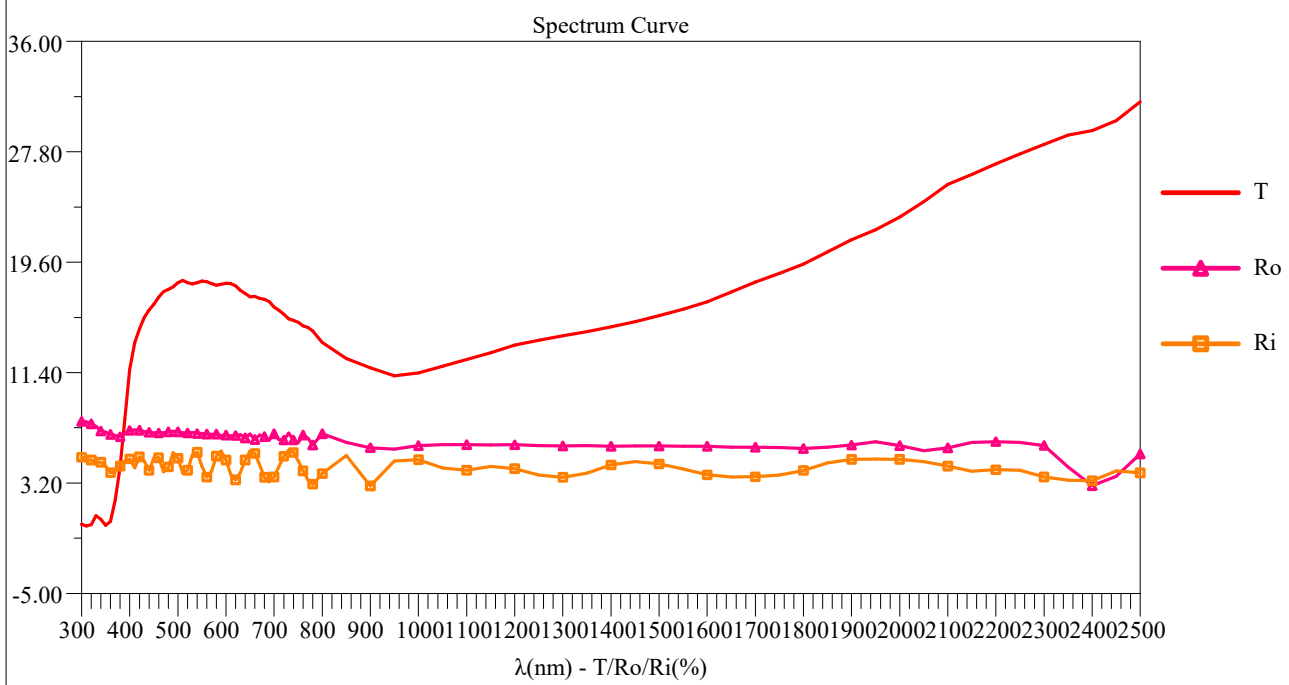
Department: AUDITORIA E QUALIDADE tester:VITTOR A.

<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	99.82	-	-	98.53	99.54	98.52	99.52
<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>
■ WA20150322 - M1	D65/2°	ASTM	2.12	19.45	-80.38	2.12	14.12	16.47	15.67	17.12
■ WA20150322 - M1	D65/2°	ASTM	2.11	19.50	-80.32	2.11	13.69	16.60	15.22	17.11
■ WA20150322 - M1	D65/2°	ASTM	2.07	19.58	-80.24	2.07	13.75	16.82	15.82	17.07
■ WA20150322 - M1	D65/2°	ASTM	2.11	19.61	-80.22	2.11	13.52	16.78	15.52	17.11
■ WA20150322 - M1	D65/2°	ASTM	2.01	19.59	-80.23	2.01	13.52	16.28	15.59	17.01

GlasSpec2500 Optical and Thermal Parameters Measuring Instrument Test Report

Instrument: GlasSpec2500 Thermal standard: JGJ/T 151 Date: 2023-09-13 Test No.: _____
 CIE: D65/2° Optical standard: GB/T 2680 Time: 15:30:28 Environment: _____
 Structure: 0.0(1#Low-E, 0.880)

No.	Content	Results
1	UV transmittance τ_{uv}	0.011
2	Visible light transmittance τ_v	0.180
3	Visible light reflectance ρ_v	0.068
4	Inside visible light reflectance $\rho_{v,i}$	0.046
5	Solar direct transmittance τ_e	0.152
6	Solar direct reflectance ρ_e	0.065
7	Inside solar direct reflectance $\rho_{e,i}$	0.044
8	Solar direct absorptance a_e	0.783
9	Solar infrared direct transmittance τ_{IR}	0.144
10	Solar infrared direct reflectance ρ_{IR}	0.061
11	Total solar energy transmittance g	0.351
12	Shading coefficient SC	0.403
13	Total solar infrared heat transmittance g_{IR}	0.346
14	Visible light to total solar energy transmittance LSG	0.51
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: _____

WA20150322 - M1 [Total]

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

Solar	Solar direct transmittance te: 0.152
	Solar direct reflectance pe: 0.065
	Solar direct absorptance ae: 0.783
VIS	Visible light transmittance tv: 0.180
	Visible light reflectance pv: 0.068
NIR	Solar infrared direct transmittance tIR: 0.144
	Solar infrared direct reflectance pIR: 0.061
Thermal	Total solar energy transmittance g: 0.351
	Shading coefficient SC: 0.403
	Total solar infrared heat transmittance gIR: 0.346
	Light to solar gain LSG: 0.51
	Thermal transmittance $W/(m^2K)$ K: 5.39

>> Measurement control information

T	0.07/40	R	0.05/45
Normal			

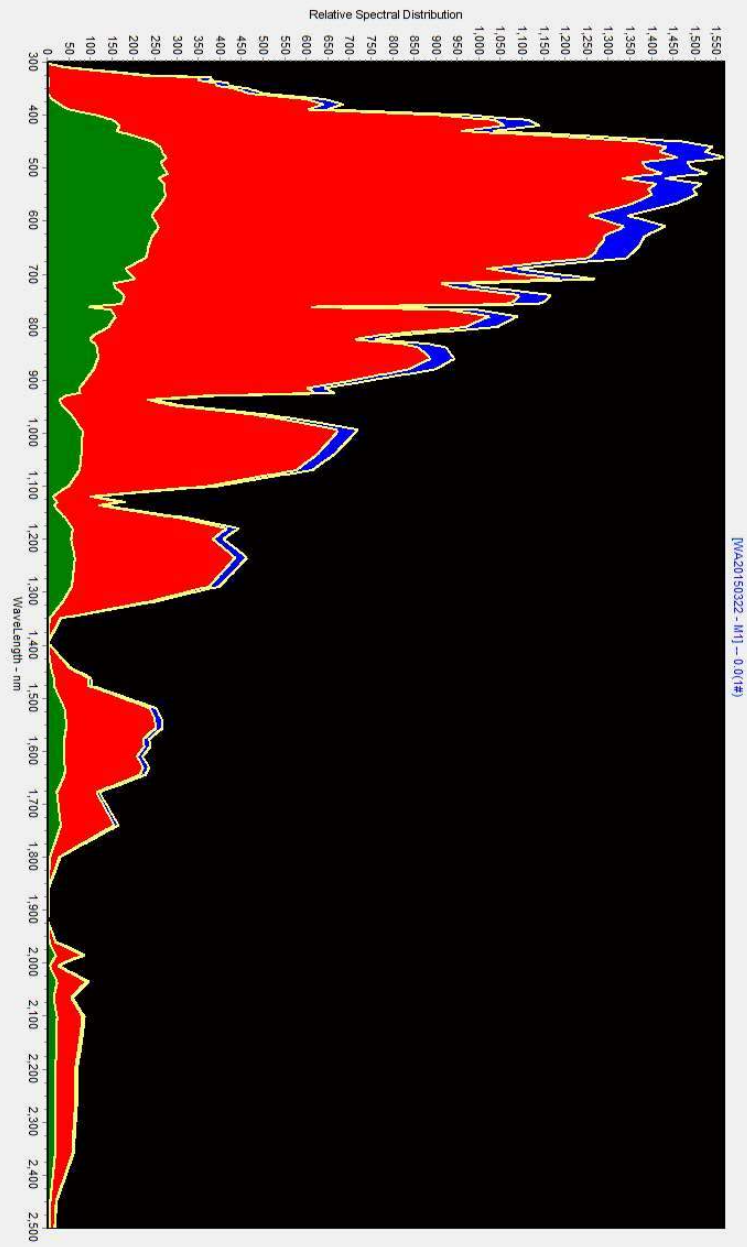
D65/2° Batch BLUETECH

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

Current Data Total

Outdoor Indoor

Wizard



Overlay Spectrum

No.	Name	T	Ro	Ri
0	Current Measuring	Red	Yellow	Blue
1	WA20150322 - M1	Red	Yellow	Blue
2	WA20150322 - M1	Magenta	Cyan	Green

Name: WA20150322 - M1

Automatic

Link

WA20150322 - SAMPLE - LENTE PLAN 10/0.25



WA20150322 - SAMPLE - LENTE PLAN 4/0.10



Assinatura do responsável

Vittor Andrade

Vittor Andrade
Auditor de Qualidade