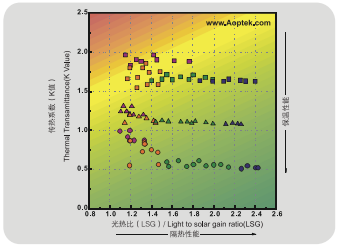
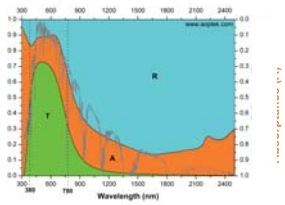
AOPTEK®
Advanced Optics

Measurement Instruments for Architectural Energy-saving Glass

Product Catalogue

V17-18





北京奥博泰科技有限公司
Beijing Aoptek Scientific Co.,Ltd.

https://en.aoptek.com

Company Profile

▪ Science ▪ Sincerity ▪ Innovation ▪ Progress

Established in 2005, as Chinese national level high-tech enterprise, Aoptek located in Beijing Fengtai Science Park. As Chinese leadership of glass measurement instrument, AOPTEK is proficient in photoelectric measuring technology, as well as relevant product manufacture, sales and technical support.

Our business covers energy-saving architectural glass, solar energy PV glass & photo-thermal industry, film optics and functional film, LED photo electricity performance and traditional optics measurement. Aoptek's products and technology would serve for production line, laboratory and project site, which can measure spectral transmittance, reflectance, haze, sheet resistivity, color difference, gas fill and other glass performance index.

Aoptek has set up Photoelectric Technology R&D Center, Lab of Optical Measurement & Image Quality Test, Ultra-weak Light Lab, Ultra-clean Assemble & Debug Room, Lab of Testing Military Products, Test Platform of Geodetic Coordinates Datum Point, Reference Direction, Orientation and Goniometry, and Test Platform of Wireless Communication. Through sustainable development of scientific research and growing input of R&D, AOPTEK has a large number of core technologies which have independent intellectual property and strong ability of technology innovation, and is in charge of Torch Project. Many projects are supported by the scientific special fund from Ministry of Science & Technology and Beijing Municipality. At the same time, many products are compiled in Beijing Independent Innovation Products Catalogue.

With the accumulation of products and technology over 20 years, we develop Filmeasure and GlasSpec series glass measuring products in lab, which have excellent performance, Filmonitor series for online measuring color, transmitted & reflected spectrum, spectral haze, sheet resistivity, etc, and Filmate and GlassMeter series portable products for measuring on-site to meet the demand in all industry. As an optical measurement expert, we offer the top design assistance and support.

Contents

- **Measurement Instruments Recommendation Lists**

Recommendable measurement instruments used on CVD coating production line 01

Recommendable measurement instruments used on Magnetron Sputtering coating production line 02

Recommendable measurement instruments used for green building and passive house 04

Recommendable measurement instruments for quality inspection organization 05

Recommendable measurement instruments for glass deep processing 08

Recommendable measurement instruments for energy-saving glass sales 11

Overall products list 12

- **Online Measurement Technology for Magnetron Sputtering Coating Production Line**

Measurement instruments allocation drawing 15

Online measurement instruments 17

Customer list 24

- **Online Measurement Technology for CVD Coating Production Line**

Measurement instruments allocation drawing 27

Online measurement instruments 29

Customer list 34

- **Laboratory Instruments & Onsite Meters**

Comprehensive target of energy efficiency 37

Spectrum color 38

Visible light transmittance 43

Haze 45

Stress analysis 47

Tin side identification 49

Abrasion 52

Thickness and film 53

Emissivity 57

Sheet resistivity 60

Gas content 64

Others 66

Table 01-*Recommendable measurement instruments used on CVD coating production line*

Recommendable measurement instruments used on CVD coating production line

Indispensable Optical Monitoring and Measurement System for Process Filmonitor6000 Series

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
A0 Area	1	Online Spectral Reflectance Measurement System at A0 Area	Filmonitor6230	ISO 9050	Measure reflective color & film properties	29
Continuous Ribbon Area	2	Online T&R Spectrophotometer for Float Glass Production Line	Filmonitor6330	ISO 9050	Integrated measurement on spectral transmittance, reflectance, absorptance, thickness etc.	30
	3	Online Spectral Reflectance Scanning Measurement System	Filmonitor6200	ISO 9050	Measure color uniformity for finished glass, Indispensable equipment for hard Low-E coating	31
	4	Online Multi-channel Non-contact Sheet Resistivity Measurement System	Filmonitor6420		Online measure sheet resistivity for Low-E and TCO coated glass	32
Post Annealing	5	Online Multi-channel Visible Transmittance Measurement System	Filmonitor6020	ISO 9050	Indispensable equipment for solar control coating	33

Indispensable Instruments for Process and Quality Control

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Spectrometer	1	Solar Spectrophotometer for Architectural Glass	GlasSpec2500	ISO 9050	Desktop, measure optical performance of IG, Spectrum range 380~2500nm	38
Spectrum Color [Desktop]	2	Rapid Spectral T&R Instrument	Filmeasure2300	ISO 9050	Desktop, measure spectral color of single pane	40
	3	Off-angle Spectral Reflectance Instrument	Filmeasure2200	ISO 9050	Desktop, measure color difference at off angle Indispensable equipment for double & triple Low-E glass	41
Spectrum color [Handheld]	4	Portable Wide-Spectrometer	GlassQ	ISO 9050	Measure color uniformity onsite; Can measure IG directly.	42
Haze	5	High Precision Hazemeter	SGH-2	ISO 3537 ASTM D1003	Measure light scattering status of coated glass	46
	6	High Precision Spectyum Haze Instrument	SpecHaze1000			47
Abrasion	7	Abrasion Tester	BTA-5000	ISO 9050 ISO 3537	Abrasion test on film layer No drilling	53
Emissivity	8	Emissometer with Scaling Digital Voltmeter	AE1		Directly emissivity measurement on film side	58
	9	Emissometer with Scaling Digital Voltmeter	AE2			59
Sheet resistivity	10	Sheet Resistivity Meter for Insulating Glass	GlassMeter600		Measure sheet resistivity & thickness of installed IG	60
	11	Handheld device for contactless measuring of sheet resistivity with high-frequency method	Stratometer G		Handheld, inductive measurement on sheet resistivity	61
	12	R-CHEK + Surface Resistivity Meter 1-19990ohms	RC3175		Handheld, 4-point	64

Table 02-*Recommendable measurement instruments used on Magnetron Sputtering coating production line*

Recommendable measurement instruments used on Magnetron Sputtering coating production line

Indispensable Optical Monitoring and Measurement System for Process Filmonitor6000 Series

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Measurement and Analysis on Process	1	Online Optical Measurement and Monitoring System ——Basic part for raw glass measurement and process analysis	Filmonitor6000		Integrated control and data transfer for distributed measurement system	17
	2	Online Automatic Tin Side Detection System	TS2600		Online monitor Tin side location of float glass	18
	3	Online Spectral Transmittance Measurement System ------ Online distributed spectral transmittance measurement system for raw glass at fixed positions	Filmonitor6110	ISO 9050	Online monitor spectrum & color of raw glass	19
	4	Online Spectral Transmittance Measurement System ------ Online distributed spectral transmittance measurement system in vacuum chamber	Filmonitor6110	ISO 9050	Monitor optical properties of specified layer	19
	5	Online Non-contact Sheet Resistivity Measurement System ------ Online distributed non-contact sheet resistivity measurement system in vacuum chamber	Filmonitor6410		Monitor quality of silver coating	20
Measurement and Analysis for Finished Glass	6	Online Optical Measurement and Monitoring System ------ Basic analysis part for finished glass at unloading table	Filmonitor6000		Integrated control and data transfer for finished glass	17
		Online Scanning Comprehensive Measurement System for Low-E Glass ------ Spectral transmittance & reflectance including color values ------ Off-angle aberration (optional) ------ Sheet resistivity((optional)	Filmonitor6300	ISO 9050	Measure finished glass's transmittance, film side reflectance, glass side reflectance, glass side off-angle reflectance, color values, sheet resistivity.	18

Indispensable Instruments for Process and Quality Control

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Comprehensive Energy Efficiency	1	Multifunctional Field-Measuring Instrument for Energy Saving Glass	GlasSmart1000	ISO9050	Field measure comprehensive energy efficiency performance of installed glass, Spectrum range 380~2500nm, Can measure triple glazing.	37
Spectrometer	2	Solar Spectrophotometer for Architectural Glass	GlasSpec2500	ISO9050	Desktop, measure optical performance of IG, Spectrum range 380~2500nm	38
	3	Spectrophotometer for Architectural IG Glass	GlasSpec1000	ISO9050	Desktop , measure optical performance of IG, Spectrum range 380~1000nm	39
Spectrum Color [Desktop]	4	Rapid Spectral T&R Instrument	Filmeasure2300	ISO9050	Desktop, measure spectral color of single pane	40
	5	Off-angle Spectral Reflectance Instrument	Filmeasure2200	ISO 9050	Desktop, measure color difference at off angle Indispensable equipment for double & triple Low-E glass	41
	6	Portable Wide-Spectrometer	GlassQ	ISO 9050	Measure color uniformity onsite; Can measure IG directly.	42

Table 02-*Recommendable measurement instruments used on Magnetron Sputtering coating production line*

Recommendable measurement instruments used on Magnetron Sputtering coating production line						
Indispensable Instruments for Process and Quality Control						
Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Haze	7	High Precision Hazemeter	SGH-2	ISO 3537 ASTM D1003	Measure light scattering status of coated glass	46
	8	High Precision Spectyum Haze Instrument	SpecHaze1000		Measure light scattering status of coated glass	47
Abrasion	9	Abrasion Tester	BTA-5000	ISO 3537	Abrasion test on film layer No drilling	53
Emissivity	10	Emissometer with Scaling Digital Voltmeter	AE1		Directly emissivity measurement on film side	58
	11	Emissometer with Scaling Digital Voltmeter	AE2		Directly emissivity measurement on film side	59
	12	Sheet Resistivity Meter for Insulating Glass	GlassMeter800		Measure sheet resistivity & thickness of installed IG	60
Sheet Resistivity	13	Handheld device for contactless measuring of sheet resistivity with high-frequency method	Stratometer G		Handheld, inductive measurement on sheet resistivity	61
	14	Device for Non-contact Measuring of Sheet Resistivity	SRM-14T		Desktop, high accuracy, inductive measurement	63
Tin Side Identification	15	Tin Side Detector	TS580		Measure tin side location onsite	51

Table 03-*Recommendable measurement instruments used for green building and passive house*

Recommendable measurement instruments used for green building and passive house						
Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Comprehensive Energy Efficiency	1	Multifunctional Field-Measuring Instrument for Energy Saving Glass	GlasSmart1000	ISO 9050	Field measure comprehensive energy efficiency performance of installed glass, Spectrum range 380~2500nm, Can measure triple glazing.	37
Spectrum Color handheld	2	Portable Wide-Spectrometer	GlassQ	ISO 9050	Measure color uniformity onsite, Can measure IG directly.	42
Stress Analysis	3	Scattered Light Polariscope	GlasStress SCALP-04		Portable, measure installed glass onsite	48
	4	Tempered Glass Detector	SG980		Identify tempered glass	49
Gas Content	5	SPARKLIKE LASER	SPARKLIKE LASER		Double & triple glazing	65
	6	SPARKLIKE HANDHELD	SPARKLIKE HANDHELD		Double glazing	66
Thickness & Film Side	7	Glass Thickness Meter & Low-E Detector	GlassMeter100		Handheld , measure thickness, identify film location	54
Sheet Resistivity	8	Sheet Resistivity Meter for Insulating Glass	GlassMeter800		Measure sheet resistivity & thickness of installed IG	60

Table 04-*Recommendable measurement instruments for quality inspection organization*

Recommendable measurement instruments for quality inspection organization

Comprehensive Measurement Instruments

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Comprehensive Energy Efficiency	1	Multifunctional Field-Measuring Instrument for Energy Saving Glass	GlasSmart1000	ISO9050	Field measure comprehensive energy efficiency performance of installed glass, Spectrum range 380~2500nm, Can measure triple glazing.	37
Spectrometer	2	Solar Spectrophotometer for Architectural Glass	GlasSpec2500	ISO9050	Desktop, measure optical performance of IG, Spectrum range 380~2500nm	38
	3	Spectrophotometer for Architectural IG Glass	GlasSpec1000	ISO9050	Desktop , measure optical performance of IG, Spectrum range 380~1000nm	39
Spectrum Color [desktop]	4	Rapid Spectral T& R Instrument	Filmeasure2300	ISO9050	Desktop, measure spectral color of single pane	40
	5	Off-angle Spectral Reflectance Instrument	Filmeasure2200	ISO9050	Desktop, measure color difference at off angle Indispensable equipment for double & triple Low-E glass	41
Spectrum Color [handheld]	6	Portable Wide-Spectrometer	GlassQ	ISO9050	Measure color uniformity onsite , Can measure IG directly.	42
Haze	7	High Precision Hazemeter	SGH-2	ISO 3537 ASTM D1003	Measure light scattering status of coated glass	46
Thickness & Film	8	High Precision Spectrum Haze Instrument	SpecHaze1000		Measure light scattering status of coated glass	47
Emissivity	9	Abrasion Tester	BTA-5000	ISO 3537	Abrasion test on film layer No drilling	53
Sheet Resistivity	10	Emissometer with Scaling Digital Voltmeter	AE1		Directly emissivity measurement on film side	58
	11	Emissometer with Scaling Digital Voltmeter	AE2		Directly emissivity measurement on film side	59
	12	Sheet Resistivity Meter for Insulating Glass	GlassMeter800		Measure sheet resistivity & thickness of installed IG	60
	13	Handheld device for contactless measuring of sheet resistivity with high-frequency method	Stratometer G		Handheld, inductive measurement on sheet resistivity	61
Stress Analysis	14	Device for Measuring the Sheet Resistivity with 4-point Measuring Method	SD-600		Desktop, high precison,4-point	62
	15	Device for Non-contact Measuring of Sheet Resistivity	SRM-14T		Desktop, high accuracy, inductive measurement	63
Thickness	16	Scattered Light Polariscope	Glasstress SCALP		Portable, measure installed glass onsite	48
	17	Glass Thickness Gauge	GlassMeter100		Handheld, measure thickness	54

Table 04-*Recommendable measurement instruments for quality inspection organization*

Recommendable measurement instruments for quality inspection organization

Architectural Safety Glass

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Stress Analysis	1	Scattered Light Polariscope	Glasstress SCALP		Portable, measure installed glass onsite	48
	2	Tempered Glass Detector	SG980		Qualitative stress measurement	49
Thickness	3	Glass Thickness Meter	GlassMeter100		Handheld, measure thickness	54
Visible Transmittance	4	Safety Glass Transmittance Instrument	SGT-3	ISO 3538	Measure visible transmittance, imaging transmittance	44
T & R	5	Rapid Spectral T& R Instrument	Fimeasure2300	ISO9050	Desktop, measure spectral color of single pane	40
Spectrometer	6	Solar Spectrophotometer for Architectural Glass	GlasSpec2500	ISO9050	Desktop, measure optical performance of IG, Spectrum range 380~2500nm	38
	7	Spectrophotometer for Architectural IG Glass	GlasSpec1000	ISO9050	Desktop, measure optical performance of IG, Spectrum range 380~1000nm	39

Automobile Glass

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Haze	1	High Precision Hazemeter	SGH-2	ISO 3537 ASTM D1003	Resolution 0.01%	46
	2	High Precision Spectrum Haze Instrument	SpecHaze1000		Resolution 0.01%	47
Abrasion	3	Abrasion Tester	BTA-5000	ISO 3537	No drilling	53
Visible Transmittance	4	Safety Glass Transmittance Instrument	SGT-3	ISO 3538	Visible light transmittance, imaging transmittance	44
T& R color, Aberration	5	Solar Spectrophotometer for Architectural Glass	GlasSpec2500		Measure optical performance of glass, Spectrum range 380~2500nm	38
	6	Rapid Spectral T& R Instrument	Fimeasure2300		Measure spectral color	40
	7	Portable Wide-Spectrometer	GlassQ	ISO9050	Measure color uniformity onsite	42
Stress Analysis	8	Scattered Light Polariscope	Glasstress SCALP-05		Quantitative stress measurement	48
	9	Tempered Glass Detector	SG980		Qualitative stress measurement	49

Table 04-*Recommendable measurement instruments for quality inspection organization*

Recommendable measurement instruments for quality inspection organization						
Insulating Glass / Vacuum Glass						
Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Comprehensive Energy Efficiency	1	Multifunctional Field-Measuring Instrument for Energy Saving Glass	GlasSmart1000	ISO 9050	Field measure comprehensive energy efficiency performance of installed glass, Spectrum range 380~2500nm, Can measure triple glazing.	37
Spectrometer	2	Solar Spectrophotometer for Architectural Glass	GlasSpec2500	ISO 9050	Desktop, measure optical performance of IG, Spectrum range 380~2500nm	38
	3	Spectrophotometer for Architectural IG Glass	Glasspec1000	ISO 9050	Desktop , measure optical performance of IG, Spectrum range 380~1000nm	39
T& R color	4	Portable Wide-Spectrometer	GlassQ	ISO 9050	Measure color uniformity onsite, Can measure IG directly.	42
Thickness & Film Side	5	Glass Thickness Gauge	GlassMeter100		Handheld, measure thickness	54
Sheet Resistivity	6	Sheet Resistivity Meter for Insulating Glass	GlassMeter600		Measure sheet resistivity & thickness of installed IG	60
Stress Analysis	7	Scattered Light Polariscope	Glasstress SCALP		Portable, measure installed glass onsite	48
	8	Tempered Glass Detector	SG980		Qualitative stress measurement	49
Gas Content	9	Gasglass Laser	SPARKLIKE LASER		Double & triple glazing	65

Table 05-*Recommendable measurement instruments for glass deep processing*

Recommendable measurement instruments for glass deep processing						
Insulating glass Processing						
Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Online Measurement	1	Online Low-E Detection System	AE5800		Non-contact, Installed online	55
	2	Online Automatic Tin Side Detection System	TS2600		Online monitor tin side location of float glass	18
Tin Side Identification	3	Tin Side Detector	TS570		Measure tin side location onsite	51
Gas Content	4	SPARKLIKE LASER	SPARKLIKE LASER		Double & triple glazing	65
	5	SPARKLIKE HANDHELD	SPARKLIKE HANDHELD		Double glazing	66
Thickness & Film Side	6	Glass Thickness Gauge	GlassMeter100		Handheld, measure thickness	54
	7	ETEKT+ Low-E Coating Detector	AE1601		Handheld	56
	8	Single Pane Low-E Coating Detector	AE3600		Handheld	56
	9	GLASS-CHEK + Glass & Air Space Thickness Meter	GC2001		Handheld	57
	10	Glass-Chek PRO Glass Thickness Meter & Low-E Detector	GC3000		Handheld	57
	11	Glass-Chek ELITE Glass Thickness Meter & Low-E Detector	GC3200		Handheld	57
Sheet Resistivity	12	Sheet Resistivity Meter for Insulating Glass	GlassMeter800		Measure sheet resistivity & thickness of installed IG.	60
Comprehensive Energy Efficiency	13	Multifunctional Field-Measuring Instrument for Energy Saving Glass	Glassmart1000	ISO 9050	Field measure comprehensive energy efficiency performance of installed glass, Spectrum range 380~2500nm, Can measure triple glazing.	37
Spectrum Color	14	Rapid Spectral T& R Instrument	Filmeasure2300	ISO 9050	Desktop, measure spectral color of single pane.	40
	15	Off-angle Spectral Reflectance Instrument	Filmeasure2200	ISO 9050	Desktop, measure color difference at off angle Indispensable equipment for double & triple Low-E glass	41
	16	Portable Wide-Spectrometer	GlassQ	ISO 9050	Measure color uniformity onsite, Can measure IG directly.	42
Spectrometer	17	Solar Spectrophotometer for Architectural Glass	GlasSpec2500	ISO 9050	Desktop, measure optical performance of IG, Spectrum range 380~2500nm.	38
	18	VIS-NIR Spectrophotometer for Architectural Glass	GlasSpec1000	ISO 9050	Desktop , measure optical performance of IG, Spectrum range 380~1000nm	39

Table 05-*Recommendable measurement instruments for glass deep processing*

Recommendable measurement instruments for glass deep processing

Insulating glass Processing

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Surface Stress	19	Scattered Light Polariscope	GlasStress SCALP		Portable, measure installed glass onsite	48
	20	Tempered Glass Detector	SG980		Qualitative stress measurement	49

Tempered Glass Processing

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Online Measurement	1	Online Automatic Tin Side Detection System	TS2600		Online monitor tin side location of float glass	18
Tin Side Identification	2	Tin Side Detector	TS580		Measure tin side location onsite	51
Surface Stress	3	Scattered Light Polariscope	GlasStress SCALP		Portable, measure installed glass onsite	48
	4	Tempered Glass Detector	SG980		Qualitative stress measurement	49
Spectrum Color	5	Rapid Spectral T& R Instrument	Filmeasure2300	ISO 9050	Desktop, measure spectral color of single pane	40
	6	Portable Wide-Spectrometer	GlassQ	ISO 9050	Measure color uniformity onsite, Can measure IG directly.	42

Low-E Tempering

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Online Measurement	1	Online Optical Measurement and Monitoring System ------ Basic analysis part for finished glass at unloading table	Filmonitor6000		Integrated control and data transfer for finished glass	17
		Online Scanning Comprehensive Measurement System for Low-E Glass ------ Spectral transmittance & reflectance including color values ------ Off-angle aberration (optional) ------ Sheet resistivity((optional)	Filmonitor6300	ISO 9050	Measure finished glass's transmittance, film side reflectance, glass side reflectance, glass side off-angle reflectance, color values, sheet resistivity.	21
	2	Online Automatic Tin Side Detection System	TS2600		Online monitor tin side location of float glass	18
	3	Online Low-E Detection System	AE5800		Non-contact, Installed online	55
Emissivity	4	Emissometer with Scaling Digital Voltmeter	AE1		Directly emissivity measurement on film side	58
	5	Emissometer with Scaling Digital Voltmeter	AE2		Directly emissivity measurement on film side	59
	6	Sheet Resistivity Meter for Insulating Glass	GlassMeter800		Measure sheet resistivity & thickness of installed IG.	60
Haze	7	High Precision Hazemeter	SGH-2	ISO 3537 ASTM D1003	Measure light scattering status of coated glass	46

Table 05-*Recommendable measurement instruments for glass deep processing*

Recommendable measurement instruments for glass deep processing

Low-E Tempering

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Abrasion	8	High Precision Spectrum Haze Instrument	SpecHaze1000		Measure light scattering status of coated glass	47
Sheet Resistivity	9	Abrasion Tester	BTA-5000	ISO 3537	Abrasion test on film layer No drilling	53
	10	Handheld device for contactless measuring of sheet resistivity with high-frequency method	Stratometer G		Handheld, inductive measurement on sheet resistivity	61
	11	Device for Non-contact Measuring of Sheet Resistivity	SRM-14T		Desktop, high accuracy, inductive measurement	63
Surface Stress	12	Scattered Light Polariscope	GlasStress SCALP		Portable, measure installed glass onsite	48
	13	Tempered Glass Detector	SG980		Qualitative stress measurement	49
Film Identification	14	Single Pane Low-E Coating Detector	AE3600		Handheld	56
Spectrum color	15	Rapid Spectral T & R Instrument	Filmeasure2300	ISO 9050	Desktop, measure spectral color of single pane	40
	16	Off-angle Spectral Reflectance Instrument	Filmeasure2200	ISO 9050	Desktop, measure color difference at off angle Indispensable equipment for double & triple Low-E glass	41
	17	Portable Wide-Spectrometer	GlassQ	ISO 9050	Measure color uniformity onsite, Can measure IG directly.	42
	18	Solar Spectrophotometer for Architectural Glass	GlasSpec2500	ISO 9050	Desktop, measure optical performance of IG, Spectrum range 380~2500nm	38

Colored Glazing Screen Printing

Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Online Measurement	1	Online Automatic Tin Side Detection System	TS2600		Online monitor tin side location of float glass	18
Tin Side Identification	2	Tin Side Detector	TS5780		Measure tin side location onsite	51
Surface Stress	3	Scattered Light Polariscope	GlasStress SCALP		Portable, measure installed glass onsite	48
	4	Tempered Glass Detector	SG980		Qualitative stress measurement	49

Table 06-*Recommendable measurement instruments for energy-saving glass selling*

Recommendable measurement instruments for energy-saving glass sales						
Aspect	Item	Product Name	Model	Meet Standard	Remarks	Page
Spectrum color	1	Portable Wide-Spectrometer	GlassQ	ISO 9050	Measure color uniformity onsite, Can measure IG directly.	42
Comprehensive energy efficiency	2	Multifunctional Field-Measuring Instrument for Energy Saving Glass	GlasSmart1000	ISO 9050	Field measure comprehensive energy efficiency performance of installed glass, Spectrum range 380~2500nm, Can measure triple glazing.	37
Stress Analysis	3	Tempered Glass Detector	SG980		Qualitative stress measurement	49
	4	Scattered Light Polariscope	GlasStress SCALP		Portable, measure installed glass onsite	48
Tin Side Identification	5	Tin Side Detector	TS580		Measure tin side location onsite	51
Thickness & Film Side	6	Glass Thickness Gauge	GlassMeter100		Handheld, measure thickness	54
Sheet Resistivity	7	Emissometer with Scaling Digital Voltmeter	AE1		Directly emissivity measurement on film side	58
	8	Emissometer with Scaling Digital Voltmeter	AE2		Directly emissivity measurement on film side	59
	9	Sheet Resistivity Meter for Insulating Glass	GlassMeter800		Measure sheet resistivity & thickness of installed IG	60
Others	10	Solar Spectrum Transmission Meter	SS2450		UV%, Visible%, Solar%	67
	11	Window Energy Profiler "In-Frame" Window Tester	WP4500		SHGC, UV%, Visible%, Infrared% (700nm+)	67
	12	Window Energy Meter	WE2500		SHGC, UV%, Visible%	67
	13	"Spectrum Detective" Energy Transmission Meter	SD2400		UV%, Visible%, Infrared% (700nm+)	67
	14	Solar Transmission & BTU/Watt Power Meter	SP2065		Solar%, BTU,	67
	15	UV Transmission Meter	UV1265		UV%	67
	16	UV Demo Lamp	UV1390		365nm	67

Table 07-*Products Catalogue*

Products Catalogue				
Aspect	Item	Model	Product Name	Page
Online measurement for magnetron sputtering coated glass	1	Filmonitor6000	Online Optical Measurement and Monitoring System ------ Basic part for raw glass measurement and process analysis	17
	2	TS2600	Online Automatic Tin Side Detection System	18
	3	Filmonitor6110	Online Spectral Transmittance Measurement System ------ Online distributed spectral transmittance measurement system for raw glass at fixed positions	19
	4	Filmonitor6110	Online Spectral Transmittance Measurement System ------ Online distributed spectral transmittance measurement system in vacuum chamber	19
	5	Filmonitor6410	Online Non-contact Sheet Resistivity Measurement System ------ Online distributed non-contact sheet resistivity measurement system in vacuum chamber	20
	6	Filmonitor6000	Online Optical Measurement and Monitoring System ------ Basic analysis part for finished glass at unloading exit	17
		Filmonitor6300	Online Scanning Comprehensive Measurement System for Low-E Glass ------ Spectral transmittance & reflectance including color values ------ Off-angle aberration (optional) ------ Sheet resistivity((optional)	21
Online measurement for CVD coating glass	1	Filmonitor6230	Online Spectral Reflectance Measurement System at A0 Area	29
	2	Filmonitor6330	Online T&R Spectrophotometer for Float Glass Production Line	30
	3	Filmonitor6200	Online Spectral Reflectance Scanning Measurement System	31
	4	Filmonitor6420	Online Multi-channel Non-contact Sheet Resistivity Measurement System	32
	5	Filmonitor6020	Online Multi-channel Visible Transmittance Measurement System	33
Comprehensive energy efficiency	1	GlasSmart1000	Multifunctional Field-Measuring Instrument for Energy Saving Glass	37
Spectrum color	1	GlasSpec2500	Solar Spectrophotometer for Architectural Glass	38
	2	GlasSpec1000	Spectrophotometer for Architectural IG Glass	39
	3	Filmeasure2300	Rapid Spectral T&R Instrument	40
	4	Filmeasure2200	Off-angle Spectral Reflectance Instrument	41
	5	GlassQ	Portable Wide-Spectrometer	42
	6	Filmeasurer1000	Spectral Transmittance Instrument	43
Visible light transmittance	1	SGT-3	Safety Glass Transmittance Instrument	44
	2	GTR-2	Visible Transmittance and Reflectance Instrument	45
Haze	1	SGH-2	High Precision Hazemeter	46
	2	SpecHaze1000	High Precision Spectrum Haze Instrument	47
Abrasion	1	GlasStress SCALP	Scattered Light Polariscope	48
	2	SG980	Tempered Glass Detector	49
Stress analysis	1	TS2600	Online Automatic Tin Side Detection System	50
	2	TS580	Tin Side Detector	51
	3	TS1600	Online Tin Side Detector	52
Tin side identification	1	BTA-5000	Abrasion Tester	53

Table 07-*Products Catalogue*

Products Catalogue				
Aspect	Item	Model	Product Name	Page
Thickness and film	1	GlassMeter100	Glass Thickness Gauge	54
	2	AE5800	Online Low-E Detection System	55
	3	AE1601	ETEKT+ Low E Coating Detector	56
	4	AE3600	Single Pane Low-E Coating Detector	56
	5	GC3200	Glass-Chek ELITE Glass Thickness Meter & Low-E Detector	57
	6	GC3000	Glass-Chek PRO Glass Thickness Meter & Low-E Detector	57
	7	GC2001	GLASS-CHEK + Glass & Air Space Thickness Meter	57
Emissivity	1	AE1	Emissometer with Scaling Digital Voltmeter	58
	2	AE2	Emissometer with Scaling Digital Voltmeter	59
	3	GlassMeter800	Sheet Resistivity Meter for Insulating Glass	60
Sheet Resistivity	1	Stratometer G	Handheld device for contactless measuring of sheet resistivity with high-frequency method	61
	2	SD-800	Device for Measuring the Sheet Resistivity with 4-point Measuring Method	62
	3	SRM-14T	Device for Non-contact Measuring of Sheet Resistivity	63
	4	RC3175	R-CHEK + Surface Resistivity Meter	64
	5	RC2175	R-CHEK + Surface Resistivity Meter	64
Gas Content	1	SPARKLIKE LASER	Gasglass Laser	65
	2	SPARKLIKE HANDHELD	Gasglass V2	66
Others	1	SS2450	Solar Spectrum Transmission Meter	67
	2	WP4500	Window Energy Profiler "In-Frame" Window Tester	67
	3	WE2500	Window Energy Meter	67
	4	SD2400	"Spectrum Detective" Energy Transmission Meter	67
	5	SP2065	Solar Transmission & BTU/Watt Power Meter	67
	6	UV1265	UV Transmission Meter	67
	7	UV1390	UV Demo Lamp	67
Components	1	FT-KF25-10	Vacuum Feedthrough	67
	1	————		—
	2	————		—

Online Measurement Technology for Magnetron Sputtering Coating Production Line

Since 1992, as coated glass manufacturers beared customers' complaints and claims on glass quality and color difference a lot, Aoptek devoted to vacuum online measurement technology for magnetron sputtering Low-E coating production line.

In 1994, the global first commercialized set of ***Multi-channel Transmittance Measurement System*** developed by Aoptek was introduced into the market successfully. In 1996 the global first commercialized ***Online Optical Scanning Color Measurement System*** developed was launched. With technology developing & accumulating for many years, Aoptek's measurement technology gradually towards to the top, online measuring systems evolved from simple to complex, from single function to multiple functions, with products' humanized design and convenient operation, more and more companies cooperate with Aoptek, such as CSG, North Glass, China Glass, Xinyi Glass etc.. So far, more than 200 sets of online measurement systems have been installed on coating production lines. In China, Including imported Low-E coating production line, the market share of Aoptek's online measurement has over 70%. Marketing share of system installed in domestic high-end Low-E coating production line near 100%.

Based on extensive measurement experience on vacuum magnetron sputtering coating, we proposed comprehensive online optical measurement methods: From films simulation of the pre-production to monitoring dummy-coating, from film optimizing after dummy-coating to the quality monitoring during production process, from measurement on raw glass at loading table to the tracking measurement of spectral transmittance in vacuum chamber until overall optical measurement for finished glass. Aoptek work on these to economize time, labor power and material resources During the production of Low-E glass, Aoptek can supply online measurement systems, laboratory instruments and onsite portable meters.

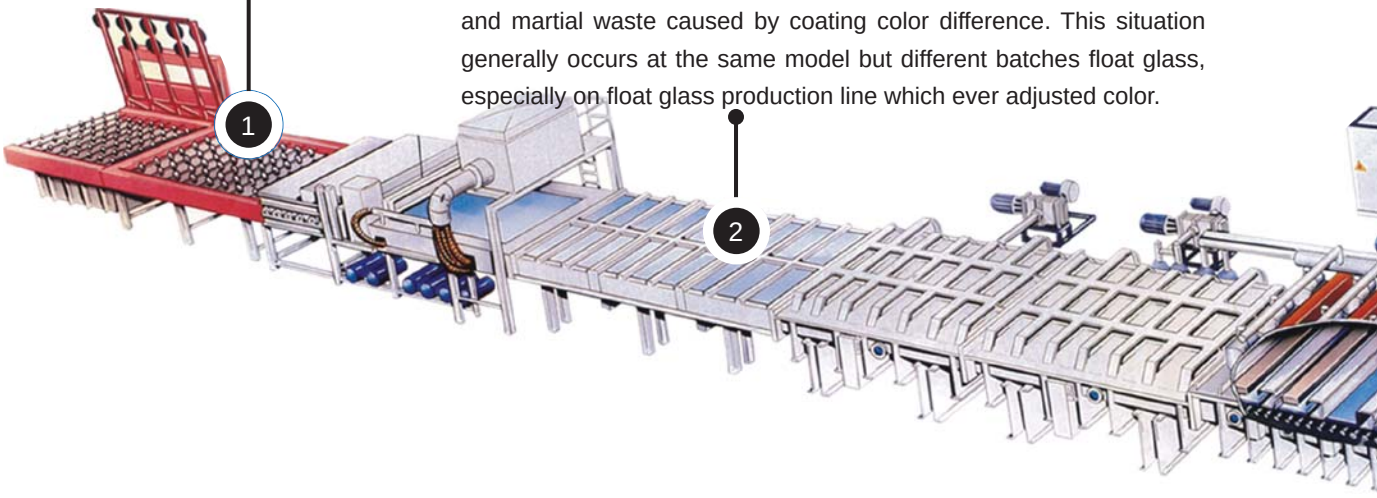
As glass manufacturers set up new magnetron sputtering coated glass production lines, the table 02 ***Recommendable instruments used on Magnetron Sputtering coating production line*** would be reference; it can help to choose applicable measurement instruments. Any question and demands please call + 86 10 5112 2588 or send email to sales@aoptek.com.

Online Automatic Tin Side Detection System / TS2600

TS2600 is installed at loading table of Low-E coated glass production line， it could fast and efficiently identify the tin side of the float glass. With output interface, it could alarm in real time if tin side be placed error, then interact with transfer platform to clear these glass, so that avoid the color difference of finished glass.

Online Spectral Transmittance Measurement System for Raw glass / Filmonitor6110

This system is installed in clean room after washing machine, to inspect quality and uniformity of float glass. Float glass uniformity would bring about color difference after coating， this system can help to pick out unqualified raw glass before coating in case economic loss and martial waste caused by coating color difference. This situation generally occurs at the same model but different batches float glass, especially on float glass production line which ever adjusted color.



Online Spectral Transmittance Measurement System in Vacuum Chamber Filmonitor6110

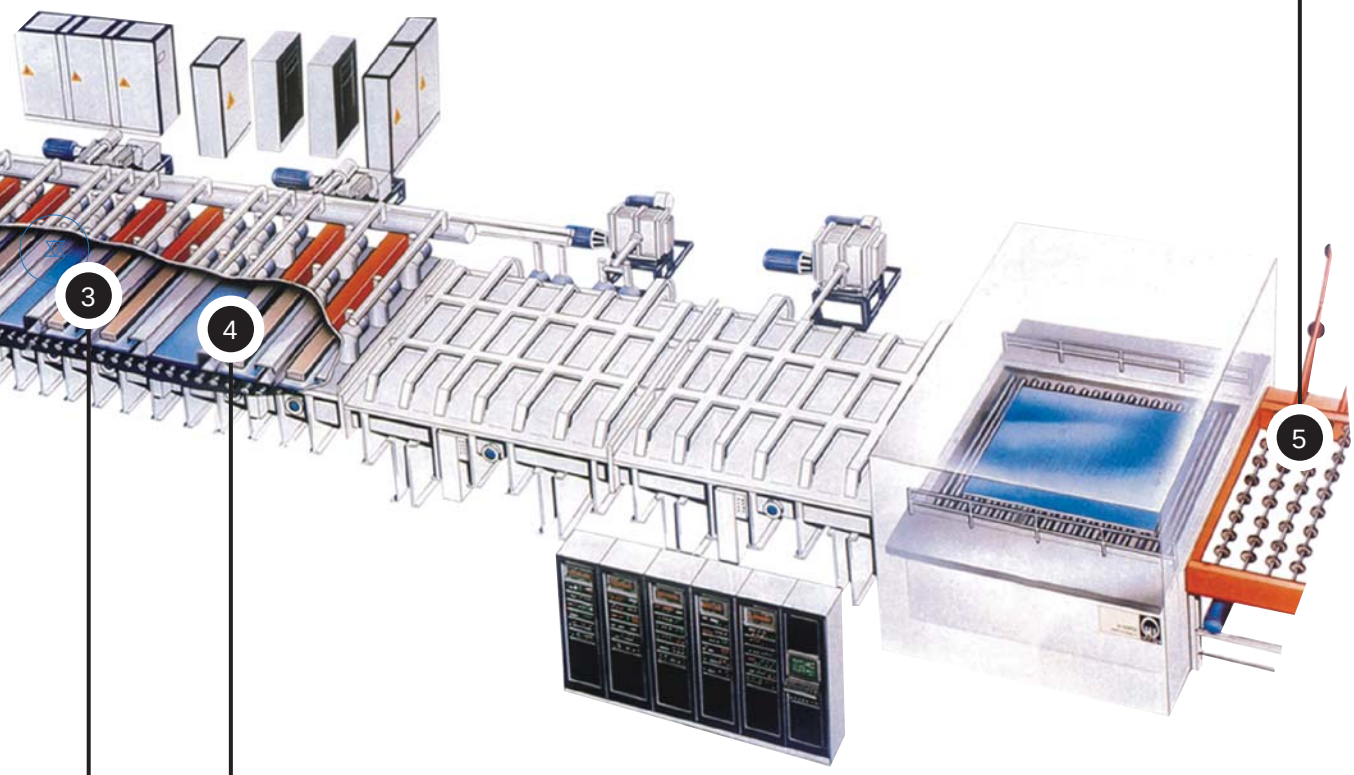
This system is installed in vacuum chamber where key films be coating, which is significant for Low-E coating monitoring，especially for complex dual and triple Low-E glass. If there is craft deviation on single layer， it is hard and time-consuming to find reasons without measuring on each layer of film, Filmonitor 6110 could measure spectrum on each layer of films so as to strictly control over the color and performance of Low-E glass. To get high quality coating, the system monitors spectrum curve of each layer of film, compare them with the target curve and find difference, thereby to guide technicians to adjust craft and assistant them to develop new products, realize overall quality management. It is called “eyes in vacuum chamber” by customers.

Online Spectral T&R Scanning Measurement System Filmonitor6300

This system is applied in magnetron sputtering Low-E coating line,which can measure film side reflective color difference, glass side reflective color difference, glass side reflective color at special angle(45°/ 60°etc.), glass side transmission color difference and sheet resistivity in scanning mode online, thus to comprehensively measure and judge the quality of coated glass.

Online Multi-channel Non-contact Sheet Resistivity Measurement System / Filmonitor6420

This system adopts multi-probes to measure the sheet resistivity of coated glass at some fixed points, which can show the sheet resistivity distribution of single glass. Its feature is fast measuring speed, which is suitable for the conditions with high transferring rate and unable to pause.

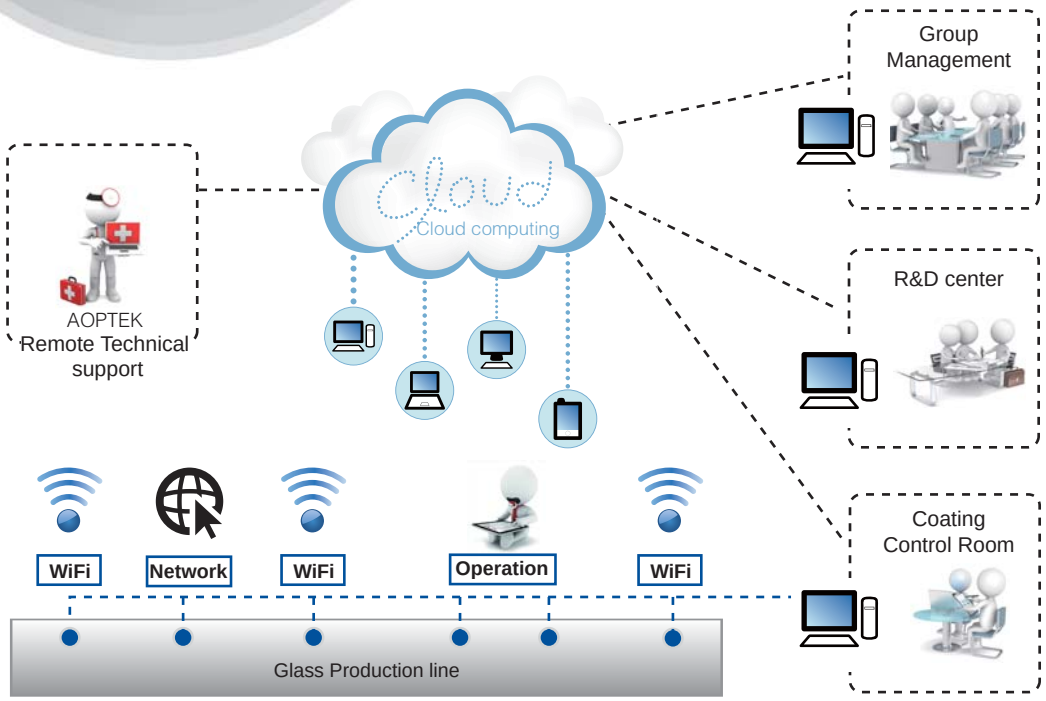


Online Non-contact Sheet Resistivity Measurement System / Filmonitor6410

Silver layer is the most critical functional film for Low-E coated glass, it determines the infrared reflection performance, as well as heat-shielding performance of finished glass. Because of silver target's expensive costs, the coating not only affects the quality of products, at the same time relates to the manufacturing costs. This system installed in the vacuum chamber to monitor silver coating during magnetron sputtering, it also can monitor density, thickness, uniformity of silver layer according to the value change of sheet resistance after coating. Customers could accurately control silver coating via measurement on sheet resistivity and optical index, thus to ensure quality and save manufacture costs.

Online Optical Measurement & Monitoring System
Filmonitor6000

Basic part for raw glass measurement and process analysis;
Basic analysis part for finished glass at unloading table.



With the development of Internet technology, Aoptek's online measurement system has adopted network data transfer completely, Filmonitor6000 online optical detection and monitoring system use distributed network structure, connecting with various functional equipment at different positions of production line, such as tin side online automatic tin side detector, spectrum measuring instruments for raw glass, spectrum measurement system in vacuum chamber, sheet resistivity measurement instruments, etc. Traditional analog signal processing & transmission is extended to digital data processing and transmission, users can choose collectivize cloud data management functions in the future.

So far, Filmonitor6000 not only realized data transfer, but also effect distributed network management including integrated control, modulus conversion, data packaging, integrated data transfer. Each part of signal data processing is relatively independent, as well as complement to each other, with excellent extensibility, Filmonitor6000 can transmit large amount of network spectrum data on 16 control points, after extension up to 256 control points' spectrum data transfer is available, great extensibility is significant for system upgrade in further. Distributed measurement data could be transmit to master computer in control room, which including online automatic tin side identification, spectral color identification for raw glass, inspection on coating process in vacuum chamber, sheet resistivity measurement, all kinds of signal on the whole line can be extensible transmitted. When customer chooses Filmonitor6110 and Filmonitor6410, as basic part for distributed measurement system Filmonitor6000 is the required part to work together.

There are differences on operation mode between basic part for finished glass analysis on unloading table with basic part for distributed raw glass detection and process analysis. Measurement on finished glass include film surface vertical reflectance, glass surface vertical and special angle reference & color difference, transmittance and scanning sheet resistivity, control and data integration use concurrent data processing technology. If customer choose Filmonitor6300, basic part for finished glass analysis Filmonitor6000 is required.

Online Automatic Tin Side Detection System

TS2600

Online indentify tin side automatically without eyeballing.

Indentify automatically
Automatic alarm
Non-contact measurement

Scan QR code to get soft copy.

It is an intelligent and automatic tin side detector for float glass installed on production line, mainly applied in the deep processing of glass, such as tempering, coating, screen-printing, colored glazing and other glass further processing production line. It is able to recognize the tin side of float glass rapidly and effectively, and provide alarm indication signal. With external extend signal interface; it can work with PLC to get information about tin side identification. This detector is innovative with independent intellectual property right and patent.

PCT Global Paten: 【Russia】RU 2497103 C2 【Korea】210-1303261【U·S·A】US 8,729,504 B2
Patent for utility models: ZL201020182123.9

Parameters

Item	parameter
Operation Environment	Install on production line, automatically identify tin side
Input Power Supply	AC 100～240V
Detection Distance	Lower head to glass surface: 1～1.5mm, Upper to lower head: 100mm
Measurable Thickness	1mm～19mm
Interface	RS485，PLC relay interface

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Spectral Transmittance Measurement System

Filmonitor6110

Measure spectral transmittance for raw glass and distributed spectral transmittance in vacuum chamber;
Notes: This product cannot work without Filmonitor6000 basic analysis part.

- **Filmonitor6000 for Raw glass**

This system is installed in clean room after washing, to inspect quality and uniformity of float glass. Float glass uniformity would bring about color difference after coating; this system can help to pick out unqualified raw glass before coating in case economic loss and martial waste caused by coating color difference. This situation generally occurs at the same model but different batches float glass, especially on float glass production line which ever adjusted color.

- **Filmonitor6000 in Vacuum Chamber**

This system is installed in vacuum chamber where key films be coating, which is significant for Low-E coating monitoring, especially for complex dual and triple Low-E glass. If there is craft deviation on single layer, it is hard and time-consuming to find reasons without measuring on each layer of film, Filmonitor 6110 could measure spectrum on each layer of films so as to strictly control over the color and performance of Low-E glass. To get high quality coating, the system monitors spectrum curve of each layer of film, compare them with the target curve and find difference, thereby to guide technicians to adjust craft and assistant them to develop new products, realize overall quality management. It is called “eyes in vacuum chamber” by customers.

Parameters

Item	Parameter	Item	Parameter
Geometric Conditions	8/d T	Spectrum Range	380～1000nm
Measuring Mode	Measurement on fixed points	Wavelength Interval	5nm
Light Source	Halogen lamp	Wavelength Accuracy	Better than 0.3nm
Glass Thickness Range	2-19mm	Wavelength Repeatability	Better than 0.1nm
Measurement Speed	<200ms for one time spectrum data collection, measurement interval ≥1s		
Short-term Stability	Measure one point on same piece of glass for 30 times, fluctuation of L *,a *,b *＜0.1 RMS		
Long-term Drifting	After reboot device or replace light source, measure one point on same piece of glass, fluctuation of L *,a *,b *＜0.1RMS		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Non-contact Sheet Resistivity Measurement System

Filmonitor6410

Custom-made specified instrument to monitor coating in vacuum chamber;
Notes: This product cannot work without Filmonitor6000 basic analysis part.

Silver layer is the most critical functional film for Low-E coated glass, it determines the infrared reflection performance, as well as heat-shielding performance of finished glass. Because of silver target's expensive costs, the coating not only affects the quality of products, at the same time relates to the manufacturing costs.

This system is installed in the vacuum chamber to monitor silver coating during magnetron sputtering. Generally, it is installed in the front or back of silver coating position. 3 probes could be set on triple Low-E glass production line, it can monitor density, thickness, uniformity of silver layer according to the value change of sheet resistance after coating. Customers could accurately control silver coating via measurement on sheet resistivity and optical index, thus to ensure quality and save manufacture costs.

Parameters

Item	Parameters
Measurement Mode	Measurement on fixed points
Measurable Range	0.5-20Ω/□
Measuring Speed	100ms
Glass Thickness Range	2-19mm
Measurement area	120 × 120mm
Accuracy	0.1Ω/□
Repeatability	1%

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Scanning Comprehensive Measurement System for Low-E Glass

Filmonitor6300

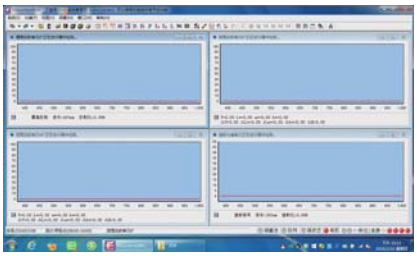
Measure comprehensive performance of finished coated glass online;
Notes: This product cannot work without Filmonitor6000 basic analysis part.

This equipment is installed at unloading table to measure and evaluate color and aberration of finished glass roundly in scanning mode. As double and triple silver Low-E coating film are more complex, it is apt to appear color difference at various angle because of multi-film interference effect, on this case new requirements on measurement of this part are puts forward. For instance, when human look at one piece of glass， there is no color difference at vertical small angle(less than 10°)， but the color difference appears obviously at 45°or 60°thereby instrument monitoring color difference at 45°or 60°should be added on measurement system for finished glass, thus to control film's color difference at front & oblique angle and satisfy the requirement of color inspection . So far, disputes and claims related to color difference at off angle has been happened, as essential measurement project, color difference measurement at off angle has been recognized by masses of factories.

In the process of production commissioning, it is more difficult to control transversal coating uniformity of large panel glass, in addition to color requirements on finished glasses in each position of Low-E production line, the uniformity of low emissivity requires more attention. This makes measurement on sheet resistance homogeneity in large panel be more important. So online sheet resistance measurement has become to be a standard configuration for Low-E coating production line.

Features:

- Network connection, flexible configuration;
- Auto dynamic calibration, drift-free for long run;
- Dedicated calibration box, avoiding the sputtering contamination;
- Self-developed software, suitable for the customer in glass industry;
- Open control interface to facilitate the interaction with control system;
- Self-checking function, accident alarm and record;
  Independent functions to facilitate maintaining or upgrading computer.



Parameters

Transmittance & Reflectance Measurement		
Item	Parameter	
Geometric Condition	8/d Transmittance(T) 8/d Film side Reflectance(R_F) 8/d Glass side Reflectance(R_G) 45/d & 60/d glass side reffection	
MeasuringMode	Scanning mode	
Light Source	Halogen lamp	
Glass Thickness Range	2～19mm	
Spectrum Range	380nm～1000nm	
Wavelength Interval	1nm	
Wavelength Accuracy	Better than 0.3nm	
Wavelength Repeatability	Better than 0.1nm	
Measuring Speed	<200ms for one point measurement per time	Measure 24 points on 2.54m production line, measuring speed less than 20s; Measure 33 points on 3.3m production line, measuring speed less than 25s.
Short-term Stability	Measure one point on same piece of glass for 30 continuing times, fluctuation of L *, a *, b * ＜0.1RMS.	
Long-term Drifting	After reboot device or replace light source, measure one point on same piece of glass, fluctuation of L *, a *, b * ＜0.1RMS	

Sheet Resistivity	
Item	Parameter
Measuring Mode	Scanning mode
Measurement Range	0.5～20Ω/□
Measuring Speed	100ms
Glass Thickness Range	2～19mm
Measurement Area	120mm×120mm
Measurement Accuracy	0.1Ω/□
Repeatability	1%

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

North China

● ● Two Lines ● ● ● Three Lines

Beijing

Beijing Fuhaiyuntong Technology Co.,Ltd.

Beijing Guanhua Dongtai Glass Technology Co.,Ltd. ● ●

Beijing Wuhua Tianbao Coating Technology Co.,Ltd. ● ●

Tianjin

Tianjin CSG Architectural Glass Co.,Ltd. ● ● ●

Tianjin Yaopi Glass Co.,Ltd.

Tianjin North Glass Technology Co.,Ltd.

Shandong

Qingdao Glorious Future Energy Saving Glass Co., Ltd.

Shandong linyi Qingyuan Group

Shandong Blue Glass Technology Co.,Ltd.

Hebei

ENN Solar Energy Co.,Ltd.

Shijiazhuang Yingxin Glass Group Co., Ltd.

Hebei jingrui Glass Co.,Ltd.

Hebei Huijing Glass Technology Co.,Ltd.

Hebei Zichuang Glass Technology Co.,Ltd.

Hebei Geng Chang Glass Co.,Ltd.

Shahe Sihuan Glass Co.,Ltd.

Handan Aode Decoration Engineering Co.,Ltd.

Huanghua Rongda Glass Co.,Ltd.

Huanghua Haihua Glass Co.,Ltd.

Hebei Xinmei Glass Technology Co.,Ltd.

Qinhuangdao Yaoyou Engineering Glass Co.,Ltd.

Qinhuangdao Huaguang Technology Glass Co.,Ltd.

Hebei Yongtuo Energy-saving Glass Co.,Ltd.

Hebei Runda Energy-saving Materials Co. Ltd.

South China

Guangdong

Dongguan CSG Solar Glass Co.,Ltd. ● ●

Xinyi Automobile Glass (Donguan) Co.,Ltd.

Foshan Zhongnanluosen Glass Co.,Ltd.

Huizhou longlass PolyLow-E Glass Co., Ltd.

Guangdong South Bright Glass Co.,Ltd.

Jiangmen Yaopi Glass Co.,Ltd.

Guangdong Kibing Energy-sacing Glass Co.,Ltd.

Fujian

Fuyao Group(Fujian)Co.,Ltd.

Xinfuxing Glass Co.,Ltd.

Southwest China

Sichuan

Sichuan CSG Energy Conservation Glass Co.,Ltd. ● ● ●

CNBS (Neijiang)Glass Hi-tech Co.,Ltd.

Mianyang Zhongbang Energy-saving Glass Co.,Ltd.

Chongqing

Chongqing Yuhu Glass Co.,Ltd. ● ●

Chongqing WHTB Coating Techndogy Co.,Ltd.

Customer List

East China

Shanghai

Shanghai Yaohua Pilkington Glass Group Co.,Ltd. ● ● ●

Shanghai North Glass Technology Co., Ltd.,

Fuyao Group (Shanghai) Automotive Glass Co.,Ltd.

Shanghai Taishenglong Glass Co.,Ltd.

Shanghai Xingsha Glass Co., Ltd.

Zhejiang

Zhejiang Drory
Energy-saving Glass Manufacturing Co.,Ltd.

Zhejiang Donya Engineering Glass Co.,Ltd.

Zhejiang Daming Glass Co.,Ltd.

Flat Solar Glass Group Co.,Ltd.

Lianhai International Co.,Ltd.

Jiangsu

Wujiang CSG Glass Co.,Ltd. ● ● ●

Suzhou Huadong Coating Glass Co.,Ltd.

Dongtai (Kunshan) Vacuum Coating Engineering Co., Ltd.

Jiangyin Muxiang
Energy-saving Decoration Engineering Co.,Ltd.

Jiangsu Aolan Architecture Glass Co.,Ltd.

Jiangsu Tiancheng Coating Glass Co.,Ltd.

Zhangjiagang Xinyu Special Glass Co., Ltd.

Suzhou Youbetter Medical Apparatus Co.,Ltd.Jiangsu

Yaohua Special Glass Co.,Ltd.

Jiangsu Farun Group

Nanjing Suyang Glass Co.,Ltd.

Central China

Henan

Luoyang North Glass Technology (Group) Co.,Ltd.

Zhengzhou Hainachuan Group

Zhengzhou Fuyao Glass Co., Ltd.

Anhui

Hefei Guanghe Glass Co.,Ltd.

HuBei

Xianning CSG Glass Co.,Ltd. ● ●

Wuhan Changli Glass Co.,Ltd. ● ●

Hubei Minghong Glass Co.,Ltd.

Northeast China

Heilongjiang

Heilongjiang Jianzhong Special Glass Co.,Ltd.

Northwest China

Gansu

Lanzhou Lantian Glass Co.,Ltd.

Customer Map

Online Measurement Technology for CVD Coating Production Line

The CVD coating is the global most widely used method in coated glass production line so far. In general, one or more coating reactors were inserted in the area with suitable temperature which according to the techniques in the tin bath of float glass production line. The mixed gas, which is diffused at a proper proportion, is sent into reactors. The gas will be blowout through it and carry out chemical reaction with the glass surface. Then, reactants deposit on the glass and become to be solid film. So that is the coating process. Compared with the Low-E glass produced with magnetron sputtering method, it has the irreplaceable advantage on bending and single pane process. In domestic, this method has been adopted by China Glass Group, Kibing Glass Group, SYP Glass, AVIC Sanxin Glass Group etc.

With feature of rapid production rate without interruption, if the production design is failed, or other procedures such as change color be deviated, products' quality will be fluctuated, which will cause a great loss for manufacturers. All of this makes quality control very important.

With the experience accumulated for many years, Aoptek committed to research and develop measurement instruments for float glass since 1988. According to the features of float glass production line, Aoptek developed a series of online optical performance measurement system, many core technologies of which are pioneered and reach the world's top. With long-term working on production line, our technicians are clear about the habit of glass manufacturers, so that we can develop the data analysis system suitable for them. With stability and reliability features, this system is essential to guide production craft, monitor and manage quality. By far, more than 40 float glass coating production lines have been equipped with online measurement systems in home and abroad, accounts for more than 90% of all CVD coating production lines in domestic.

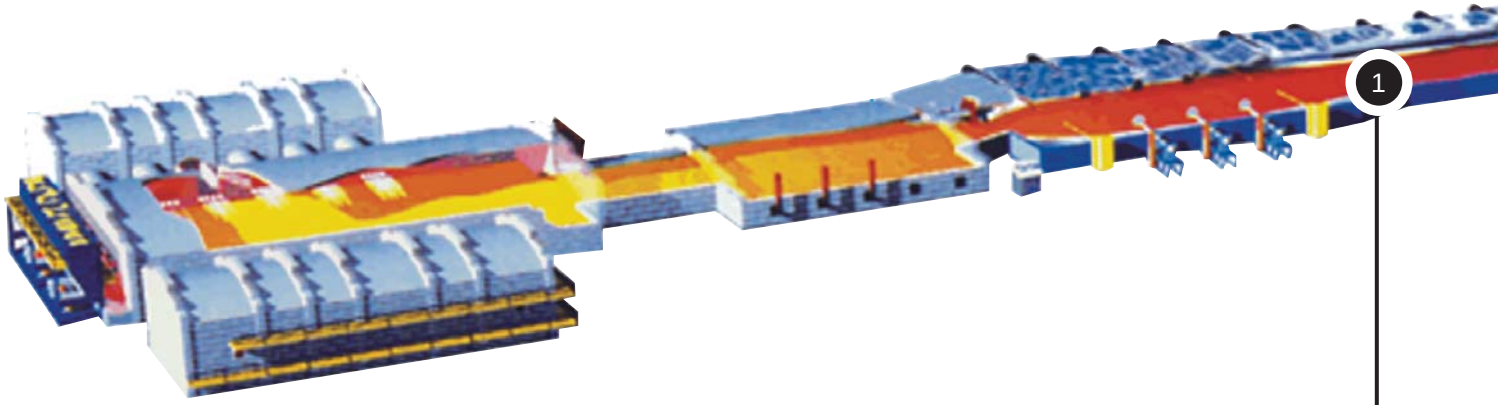
As glass manufacturers set up new CVD coated glass production lines, the table 01 ***Recommendable instruments used on CVD coating production line*** would be reference; it can help to choose applicable measurement instruments. Any question and demands please call + 86 10 5112 2588 or send email to sales@aoptek.com.

Online T&R Spectrophotometer for Float Glass Production Line Filmonitor6330

It is an online automatic spectrometer installed at the location of continuous ribbon area after emergency drop area, which to measure spectral transmission and reflection including color, thickness etc. so that monitor color change of float glass and coated glass, thus to detect problems in advance.

Coating Stripes Defect Scanning Measurement System / Filmonitor6010

This system is installed at the location between glass cross cutting and drop area to detect coating stripes defects, coating mist defects, color difference defects etc. data on each piece of glass could be record and checked. This system has the alarm function to manually or automatically control the defect products to recycle spot in coating detection room according to the customer's demands.

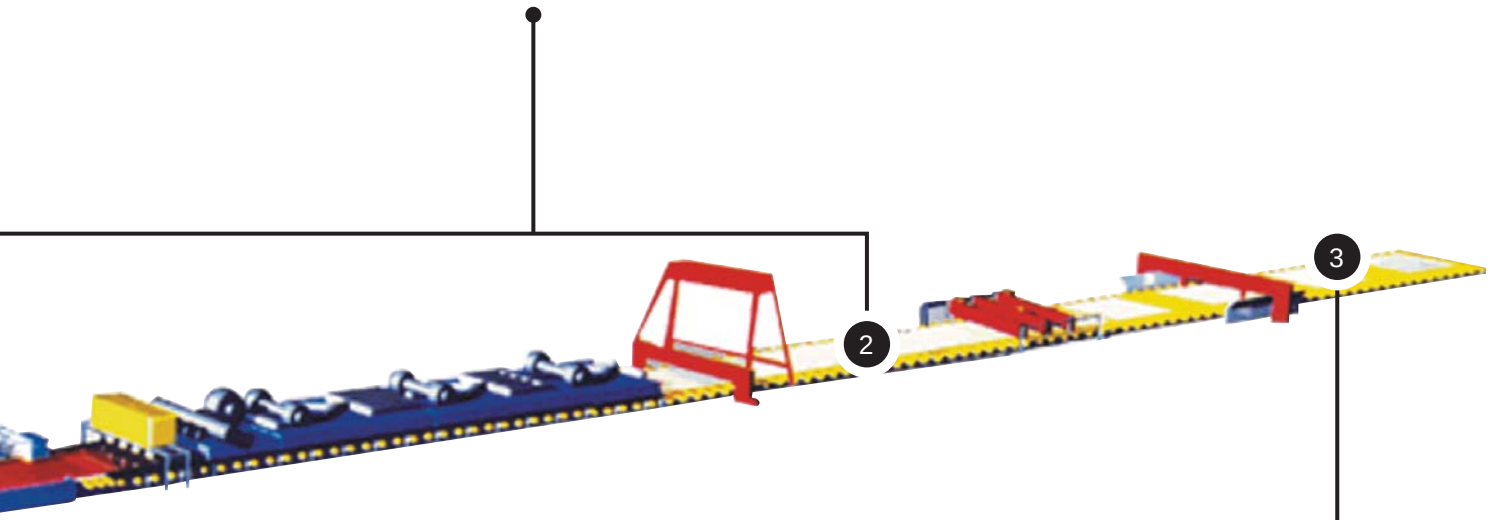


Online Spectral Reflectance Measurement System at A0 Area Filmonitor6230

The instrument is installed at hot end A0 area on float glass production line, which locates at end of the tin bath, rapidly measure spectral reflectance, and calculates parameters such as color, the color difference of glass in A0 area. It can get real-time film properties of TCO coating, low-e coating at least 30 minutes ahead of time, by monitoring on coating conditions, it is convenient for crafts discover coating problems in advance then to adjust process parameters, according to save costs and improve yield.

Online Spectral Reflectance Scanning Measurement System Filmonitor6200

The instrument is installed at hot end A0 area on float glass production line, which locates at end of the tin bath, rapidly measure spectral reflectance, and calculates parameters such as color, the color difference of glass at A0 area. It can get real-time film properties of TCO coating, Low-E coating at least 30 minutes ahead of time, by monitoring on coating conditions, it is convenient for crafts discover coating problems in advance then to adjust process parameters, accordingly to save costs and improve yield.



Online Multi-Channel Non-contact Sheet Resistivity Measurement System Filmonitor6420

This system is installed at the location between glass cutting and emergency drop area, which adopts multi-probes to measure sheet resistivity of coating glass at fixed positions and shows distribution. With advantage of fast measuring speed，it can work excellently in high glass conveying speed.

Online Multi-channel Visible Transmittance Measurement System Filmonitor6020

This system is installed at the location between glass cutting and emergency drop area. When glass passing through the system, Filmonitor6020 can measure visible transmittance for up to 100 points in longitudinal direction, and calculate the average value, difference in one piece, difference between pieces and other parameters. At the same time, work together with stepper indicator, it can classify products as high quality, qualified, unqualified, reject, moreover mark the corresponding level and label the unqualified products via working with marker.

Online Spectral Reflectance Measurement System at A0 Area

Filmonitor6230

Specified custom-made instrument installed at A0 area to measure spectral reflectance, color and film properties of high-temperature glass.

The instrument is installed at A area on float glass production line, which locates at end of the tin bath, rapidly measure spectral reflectance, and calculates parameters such as color, color difference of glass in A area. It can get real-time film properties of TCO coating and Low-E coating at least 30 minutes ahead of time, by monitoring on coating conditions, it is convenient for crafts discover coating problems in advance then to adjust process parameters, according to save costs and improve yield. As this system is installed at hot end of float glass production line, it has to carry out installation and commissioning during production line design period or cold repair.

Parameters

Item	Parameter	Item	Parameter
Geometric Conditions	8/d R_F	Spectrum Range	380～1000nm
Measuring Mode	Fixed points measurement or scanning	Wavelength Interval	1nm
Light Source	Halogen lamp	Wavelength Accuracy	Better than 0.3nm
Glass Temperature	500～560℃	Wavelength Repeatability	Better than 0.1nm
Glass Thickness Range	2-19mm		
Measuring Speed	≤2s for a measurement of one point		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online T&R Spectrophotometer for Float Glass Production Line

Filmonitor6330

Online automatic spectrometer.

This system is an automatic spectrophotometer installed at continuous ribbon area of float glass production line to measure spectral transmission and reflection including color, thickness etc. in real-time. It is consist of onsite units and remote control units. The onsite units includes measuring probe, auto-calibrate part, light source, spectrometer, onsite controller and network parts, etc..The remote control units includes network, computer, measuring software and so on.

This system can measure spectral transmission and reflection curve, spectral absorption curve of float glass, and show key parameters such as visible transmittance, reflectance color coordinate and glass thickness. At the same time, it can display real-time spectrum curve, chromaticity diagram, history tendency curve of parameters. When customer change color or process, if the measured spectrum curve coincident with spectrum curve of standard glass, it means the color alteration crafts meets the requirement. With this system, there is no need to cut small samples and tedious laboratory measurement. It can also monitor the change of color difference and set advance notice and tolerance range. The system can assistance users to control uniformity and homogeneity of glass via measuring these key data, which is necessary quality monitoring equipment for low iron glass, super white glass and high white glass, the color film glass.

Parameters

Item	Parameter	Item	Parameter
Geometric Conditions	8/d T&R	Spectrum Range	380～1000nm
Measuring Mode	Measurement on fixed points	Wavelength Interval	1nm
Light Source	Halogen lamp	Wavelength Accuracy	Better than 0.3nm
Glass Thickness Range	2-19mm	Wavelength Repeatability	Better than 0.1nm
Measurement Speed	<200ms for one time spectrum data collection		
Short-term Stability	Measure one point on same piece of glass for 30 times，fluctuation of L *,a *,b *＜0.1 RMS		
Long-term Drifting	After reboot device or replace light source, measure one point on same piece of glass，fluctuation of L *,a *,b *＜0.1RMS		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Spectrum Reflectance Scanning Measurement System

Filmonitor6200

It is used to measure color uniformity of coated glass clear surface and film surface;
Indispensable instrument for online Low-E coating with high quality.

This system is applied to measure color uniformity of coated glass clear surface and film surface on production line, which be installed in the continuous ribbon area post annealing, to measure transversal spectral reflectance in scanning mode including color transversal distribution. As online Low-E coating films are complex and thick, there are different color performance at different viewing angle, it is inevitable to appear color difference at off angle for finished product, so for Low-E coated glass it is not only necessary to monitor color at vertical angle, but also need to monitor color at off angle. Filmonitor6200 is the essential measurement system for Low-E coated glass manufacture.

This instrument is consist of measuring unit, onsite control box, master computer, onsite network and specified software. Installed with specified controlling software，the master computer is connected with control box through network. Under the control of computer， the probe can measure transversal spectral reflectance at any position in scanning mode, as well as transversal color difference at multi-points, longitudinal uniformity of glass. The software has functional modules of self-checking, calibration, measurement, data processing, display, print, and data saving etc. Pre-preserved marked interface and corresponding software make mark function available at any time.

Parameters

Item	Parameter	Item	Parameter
Geometric Conditions	8/d R and 45/d R	Spectrum Range	380～1000nm
Measuring Mode	Scanning mode	Wavelength Interval	5nm
Light Source	Halogen lamp	Wavelength Accuracy	Better than 0.3nm
Glass Thickness Range	2-19mm	Wavelength Repeatability	Better than 0.1nm
Measurement Speed	Less than1s for one time spectrum data collection, measurement interval <1s		
Short-term Stability	Measure one point on same piece of glass for 30 times，fluctuation of L *,a *,b *＜0.1 RMS		
Long-term Drifting	After reboot device or replace light source, measure one point on same piece of glass，fluctuation of L *,a *,b *＜0.1RMS		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Multi-Channel Non-contact Sheet Resistivity Measurement System

Filmonitor6420

Rapidly measure multi-channel sheet resistivity for Low-E continuous coating.

This system is installed at location after cross and longitudinal cutting measure the sheet resistivity for Low-E production coating line in real time. Since the float glass coating line is fast and continuous, it is essential to choose multi-channel sheet resistivity measurement method with high measuring speed. To facilitate the calibration, the instrument must be installed at drop area. In general, measure on multi-points in transversal and longitudinal direction after the cutting place, to guide manufacture craft, monitor and manage quality. Filmonitor6420 is the required measurement system for Low-E coated glass manufacture.

This system is online multi-probe measurement system. According to the width of glass, it was equipped with 11 to 13 probes in general. Compared with single-probe scanning system, it has faster measuring speed, intensive measurement points, rich function, which is convenient and practical for operation.

Parameters

Item	Parameter
Measurement Mode	Measurement on fixed points
Measurable Range	0.5-20Ω/□
Measuring Speed	100ms
Glass Thickness Range	2-19mm
Measurement Area	120 × 120mm
Accuracy	0.1Ω/□
Repeatability	1%

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Multi-channel Visible Transmittance Measurement System

Filmonitor6020

Measure multi-channel visible transmittance of coated glass in real time.

This system is installed at location after cross and longitudinal cutting, which is used to online measure visible light transmittance for continuous coating production line in real time. It is mainly used for flat glass and coated glass, which could measure transversal and longitudinal visible light transmittance at multi-points of finished glass, monitor and manage quality. As essential equipment for float solar control coated glass, it has been applied in more than 30 production lines in domestic.

This system is online multi-probe measurement system for visible light transmittance, which is consist of measuring unit, control unit, host computer, remote management computer and so on.. According to the width of glass, it was equipped with 11 to 16 probes in general. Compared with single-probe scanning system, it has faster measuring speed, favorable price, rich function, which is convenient and practical for operation.

Parameters

Item	Parameter	Item	Parameter
Geometric Conditions	8/d T	Measurable Channels	11-16 probes
Measuring Mode	Measurement on multi-channel fixed points	Measurement Interval	Settable in software
Light Source	Halogen lamp	Homogeneity of Channels	Better than 0.3%
Glass Thickness Range	2-19mm	Repeatability	Better than 0.3%
Measuring Speed	<50ms for one time measurement on one point		
Measurement Accuracy	1%		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Customer List

Glass group	Company	Place	Number
Chinese Glass Group	Weihai Blue Star New Technology Glass Co.,Ltd.	Weihai Production Line1	1
		Weihai Production Line2	1
		Weihai Production Line3	1
		Weihai Production Line4	1
	Shanxi Blue Star Glass Co.,Ltd.	Xianyang Production Line1	1
		Xianyang Production Line2	1
	Wuhai Blue Star Glass Co.,Ltd.	Wuhai Production Line1	1
		Wuhai Production Line2	1
	China Glass Lan Xing (Linyi) Glass Co.,Ltd.	Linyi Production Line1	1
		Linyi Production Line2	1
	Dongtai China Glass Special Glass Co.,Ltd.	Dongtai Production Line1	1
		Dongtai Production Line2	1
	Jiansu SHD New Materials Co.,Ltd.	Suqian Production Line1	1
		Suqian Production Line2	1
		Suqian Production Line3	1
Shahehaisheng	Shahe City Haisheng CO.,Ltd.	Coated glass Production Line1	1
		Coated Glass Production Line2	1
Tangshan Lanxin	Tangshan City Lanxin Glass Co.,Ltd.	Tangshan Production Line1	1
		Tangshan Production Line2	1

Customer List

Glass Group	Company	Place	Number
Kibing Group	Zhangzhou Kibing Glass Co.,Ltd. (Zhangzhou KB)	Dongshan Production Line1	1
		Dongshan Production Line2	1
		Dongshan Production Line5	1
	Zhuzhou Liling Kibing Glass Co.,Ltd. (Liling KB)	Liling Production Line1	1
		Liling Production Line4	1
	Changxing Kibing Glass Co.,Ltd. (Changxing KB)	Liling Production Line1	1
CSG Group	Wujiang CSG Glass Co., Ltd.	Coated Glass Production Line1	1
JinJing Glass Group	Shandong Jinjing Co.,Ltd.	Zibo Production Line1	1
		Zibo Production Line2	1
	Tengzhou Jinjing Glass Co.,Ltd.	Tengzhou Production Line2	1
	Beijing JinJing Wisdom Co.,Ltd.	Beijing Production Line1	1
Yaohua Glass	Qinhuangdao Yaohua Glass Industrial Park Co.,Ltd.	North Park Production Line1	1
		North Park Production Line2	1

Overseas

Country	Company	Place	Number
Indonesia	PT.MULIA GLASS	Jakarta/Production Line1	1
Bengal	NASIR GLASS INDUSTRIES LTD.	Dhaka/Gazipur Line1	1
Kazakhstan	STEWART ENGINEERS		1

Laboratory and Field Instruments

Aoptek specialized in developing, manufacturing and selling glass measurement instruments. We have high social responsibility for science and precise optical measurement industry, moreover, take practicability be working principle, on this case we have developed a number of effective optical testing instruments for the glass manufactures, quality inspection institutions. Aoptek takes factory operation environment and onsite environment into account, thus to make sure instruments can be directly used in the factory, construction sites without special operation environment requirements. With characteristic of rapid measuring speed and excellent data processing capacity, Aoptek's instruments are suitable for continuous batch operation in the factory and quality inspection institutions, all measurement results could be get in a few minutes or even in seconds.

- Many ***FIRST***

Aoptek developed the Chinese first safety glass transmittance instrument, the first falling-ball impact tester, the first shot-bag impact tester, the first high-precision haze meter, the first international standardized abrasion tester. In addition, Aoptek is the main author of international SEMI standard *Specification for Anti-Reflective-Coated Glass, Used in Crystalline Silicon Photovoltaic Modules* at optical measurement part, as well as several national standards' drafter and editor, which made great contribution to Chinese glass standard test and authentication.

- Products in ***SERIES***

For more than 20 years design and development, our products have become series, which including precision laboratory spectral instruments Filmeasure & GlasSpec series for glass manufacture and quality inspection institutions. GlasSmart series for green building and passive house field measurement, GlassMeter and GlassQ portable onsite series. The instruments apply to measure automotive glass, float glass, Low-E glass, and solar glass etc.

- Continuing ***ADVANCE***

Besides existing measurement items, according to glass industry needs, Aoptek continuing bring up new concepts, new technology to lead healthy development of the glass industry. We constantly develop new products for metrology institute, certification organization and

Multifunctional Field-Measuring Instrument for Energy Saving Glass

GlasSmart1000

Field-measuring instrument for green building, passive house, Energy-saving construction.

Meet Standard: *ISO 9050 Glass in building; determination of light transmittance, solar direct transmittance, total solar energy transmittance and ultraviolet transmittance, and related glazing factors ;*
JGJ/T 151 Calculation specification for thermal performance of windows,doors and glass curtain-walls.

Are your glass energy-saving?

Scan QR code to get soft copy.

GlasSmart1000 is global first portable comprehensive energy-saving measurement system in field, which measure optical and thermal parameters for glazing in building such as curtain walls, doors and windows, thus to test and evaluate optical performance of onsite energy saving glass. GlasSmart1000 could provide accurate and reliable indexes evaluation for owners, designers, construction units, supervision units and quality inspection institutions.

Functions:

Spectru transmittanceT(λ), Spectra Reflectance ρ(λ),
Visible Transmittance (T_V), visible reflectance (R_V),
Transmission and reflection color coordinate L *, a *, b *, color difference,
Solar direct transmittance(τe), reflectance(ρ e), absorptance(a e),
Solar total transmittance (g),
Shading coefficient (SC), solar heat gain coefficient (SHGC),
Thermal transmittance of glazing K (U_g), LSG, g_{IR} ,
Low-E location,E value glass thickness and spacer width.

Parameters

Item	parameter
Wavelength Range	380nm ～ 2500nm
Single Measurement Time	10 seconds
Measurable Glass	single pane, IG, glass curtain wall, door & window energy-saving glass
Interface	Wi-Fi
Light Source	Halogen lamp
Rechargeable lithium battery	Host 14.8V/5Ah , Transmission Head 14.8V/3Ah a Charge can be used for 3 hours

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

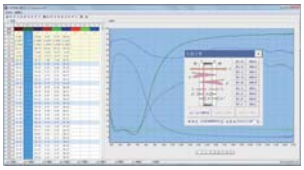
Solar Spectrophotometer for Architectural Glass
GlasSpec2500

Specified Visible and NIR spectral measurement instrument for architectural glass.
Meet Standard: *ISO 9050 Glass in building; determination of light transmittance, solar direct transmittance, total solar energy transmittance and ultraviolet transmittance, and related glazing factors.*

Wide spectrum measurement 380 ~ 2500nm

Fast and directly measure IG

Without separating



Scan QR code
to get soft copy.

GlasSpec2500 is specially designed for glass visible and NIR spectrum measurement for glass manufactures and quality inspection institutions. The instrument not only can measure the optical parameters of single pane, but also can directly measure IG Without separating. It can measure the overall solar direct spectrum transmittance and reflectance. With special software function, we can directly obtain optical performance of energy-saving glass.

Functions:

Spectrum transmittanceT(λ),Glass reflectance(Rg), Film side reflectance(Rf);
Transmission and reflection color coordinates, color difference;
Solar direct transmittance(τe), reflectance(ρe), absorptance.

Parameters

Item	parameter	Item	parameter
Geometric Conditions	8/d CIE1964	Wavelength Range	380nm～2500nm
Light Source	Halogen Lamp		Customized 300nm～2500nm
Interface Mode	Ethernet	Measurement Range	0～100%
Dimensions	500mm×500mm×690mm	Spectrum Half Width	3～5nm
Power Requiremen	AC100V～240V 3A		
Measurable Thickness	50mm for normal IG, Max thickness: 6+12A+6+12A+6		
Measurable Size	50mm×50mm，Max: 220mm from the edge		
Weight	45Kg		
Measuring Speed	Less than 10s for full spectrum measurement		
Repeatability	△E*＜0.1		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

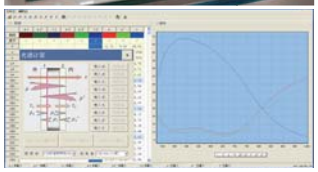
Spectrophotometer for Architectural IG Glass
GlasSpec1000

Specified instruments to measure Visible and NIR spectrum for IG
Meet Standard: *ISO 9050 Glass in building; determination of light transmittance, solar direct transmittance, total solar energy transmittance and ultraviolet transmittance, and related glazing factors*

Nondestructive measurement directly measure IG

Fast measurement & reading
Bright condition measurement

Large pane can be measured



Scan QR code
to get soft copy.

GlasSpec1000 is a rapid measurement instrument specially designed for glass industry. The instrument not only can measure the optical parameters of single pane, but also can directly measure IG to meet the needs of manufacturers and quality inspection institutions. GlasSpec1000 can measure the overall solar direct spectral transmittance and spectral reflectance without destroying IG structure. With special software function, we can directly obtain optical performance of energy-saving glass.

Functions:

Spectrum transmittanceT(λ)reflectanceR(λ)

Transmission and reflection color coordinates(Yxy、L* a* b*), color difference(ΔE).

Parameters

Item	parameter	Item	parameter
Geometric Conditions	8/d T&R	Wavelength Range	380nm～1000nm
Light Source	Ethernet	Measurement Range	0～100%
Nterface Mode	400mm×500mm×690mm	Spectrum Half Width	3～5nm
Dimensions	200W	Wavelength Accuracy	0.3nm
Maximum Power	AC100V～240V 3A	SpectrumMeasurement Interval	1nm
Power Requirement	400mm×410mm	Spectrum Storage Interval	5nm
Measuring Table Size		Repeatability	△E*＜0.1
Measurable Thickness	50mm for normal IG, Max thickness: 6+12A+6+12A+6		
Measurable Size	50mm×50mm，Max: 220mm from the edge		
Measuring Speed	Less than 1s for full spectrum measurement		
Weight	45Kg		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

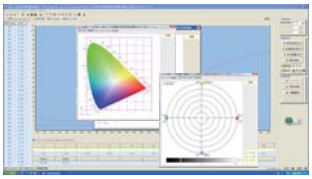
Rapid Spectral T&R Instrument
Filmeasure2300

Special for glass spectrum rapid measurement.
Meet Standard: *ISO 9050 Glass in building; determination of light transmittance, solar direct transmittance, total solar energy transmittance and ultraviolet transmittance, and related glazing factors.*

Bright condition measurement

Large sample can be measured

Network connection



Scan QR code
to get soft copy.

The instrument is used to measure spectral direct transmittance and secular reflectance of flat materials and products, such as architectural glass, display glass, electronic glass and other functional glass. Scattered light is exclusive.

Application:

Flat glass, tinted glass,
Low-E film, solar control coated glass,
ITO glass, touch screen glass, intelligent glass,
Transparent film material,
Other transparent or translucent flat material without scattering.

Functions:

T(λ)、R(λ)、Yxy、L* a* b* 、ΔE.

Parameters

Item	parameter	Item	parameter
Geometric Conditions	8/d T&R	Wavelength Accuracy	380nm～1000nm
Light Source	Ethernet	Reflectance Range	0～100%
Interface Mode	350mm×300mm×750mm	Spectrum Half Width	3～5nm
Dimensions	200W	Wavelength Accuracy	0.3nm
Maximum Power	AC100V～240V 3A	Spectrum Measurement Interval	1nm
Power Requirements		Spectrum Storage Interval	5nm
Measurable Size	length × width ≤300mm×300mm (or from the edge 150mm)		
Measuring Speed	Less than 1s for full spectrum measurement		
Repeatability	△ E* < 0.1 (standard deviation)		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Off-angle Spectral Reflectance Instrument
Filmeasure2200

Indispensable instrument for double and triple silver Low-E coated glass manufacturers.
Meet Standard: *ISO 9050 Glass in building; determination of light transmittance, solar direct transmittance, total solar energy transmittance and ultraviolet transmittance, and related glazing factors.*

Fast spectrum measurement

Measurement at 45° or 60° angle

Scan QR code
to get soft copy.

With increasingly high performance requirements for coated glass, it would occur different color on double silver and tri-silver coated glass at different angles. When observing the same glass at deflection angle, you will find obvious color changes and brightness changes, meanwhile color coordinates L*, a*, b* would shift. The kind of reflective color difference happened when visual line drift off vertical line above 10 degrees, on this occasion we call it off-angle aberration. Measurement of off-angle color difference has been gradually applied in the double silver and tri-silver Low-E coated glass. Measuring effect is obvious, which plays an important role for guiding coating production, so the 45 degree and 60 degree color difference measurement is indispensable for quality control.

Functions:

R(λ)、Yxy、L* a* b* 、ΔE.

Parameters

Item	parameter	Item	parameter
Geometric Conditions	45/d R or 60/d R, CIE1964	Wavelength Accuracy	380nm～1000nm
Light Source	Halogen lamp	Reflectance Range	0～100%
Interface Mode	Ethernet	Spectrum Measurement Interval	1nm
Dimensions	550mm×610mm×516mm	Spectrum Storage Interval	5nm
Maximum Power	200W	Power Requirements	AC100V～240V 3A
Measurable Size	length × width ≤300mm×300mm		
Measuring Speed	Less than 1s for full spectrum measurement		
Repeatability	△ E* < 0.1 (standard deviation)		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

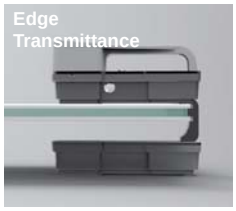
Portable Wide-Spectrometer
GlassQ

Measure color uniformity, **transmittance**, **reflectance**, **spectral color for small sample, large pane**, **IG.**
Meet Standard: *ISO 9050 Glass in building; determination of light transmittance, solar direct transmittance, total solar energy transmittance and ultraviolet transmittance, and related glazing factors.*

Wide spectrum range

More choice

Transmittance measurable
IG measurable
Separable measurement



Scan QR code
to get soft copy.

GlassQ is the first specified portable instrument to measure spectral transmittance and reflectance including color difference of glass curtain wall, glass doors and windows. GlassQ is used to measure installed glass onsite for manufactures, supervision units, owners, as well as quality control of production process and onsite measurement for energy saving glass deep processing manufacturers.

Functions:

Spectral transmittance, reflectance and absorption of 380～1000nm,
Visible reflectance, Yxy, CIE L *, a *, b *, color difference,
Visible transmittance, Yxy, CIE L *, a *, b *, color difference,
Special function for glass industry, such as color uniformity.

Parameters

Item	GlassQ 1000	GlassQ 2000	GlassQ 3000
Spectrum Reflectance and Color Difference	√	√	√
Spectrum Transmission and Color Difference	×	×	√
Low-E Location Identification	×	√	√
IG layer Analysis and Calculation	×	×	√
Wavelength Range	380nm～780nm	380nm～1000nm	380nm～1000nm
Measurement Interval	5nm	1nm	1nm
Light Source	Halogen lamp		
Geometric Conditions	d/8		
Accuracy	0.3%		
Measuring Speed	＜1s		
Rechargeable lithium battery	Transmission Pant:7.4V,2200mAh,Host:7.4V, 5000mAh,37Wh, a Charge can be used for 2.5 hours		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Spectral Transmittance Instrument
Filmeasurer1000

Suitable for transparent thin film materials, such as EVA.

Small spot

Fast measurement

Compact instrument

No moving parts

Scan QR code
to get soft copy.

The instrument is used to measure the spectral transmittance of various functional glass and thin films in the photoelectric display industry. Such as mobile phone touch screen, display glass, electronic glass, printed glass with IR ink, mobile phone protective film, car film, diffusion plate, diffusion film, AR, AF, AG, optical filter and polarizing materials.

Measuring Objects: ITO glass, touch screen glass, smart glass and film products. lens, IR ink, mobile phone protective film. Mobile phone AR, AF, AG glass. Diffusion plate, automotive film, diffusion film. Flat glass, colored glass, optical filter. Low-E film, solar control coated glass. Transparent thin film materials. Other transparent translucent glass, PMMA, PET, PC and other transparent materials (with or without scattering materials).

Functions: T(λ)、Yxy、L a b 、ΔE, Transmittance at specified wavelength (e.g. 550nm, 850nm, 940nm), IR transmittance.

Parameters

Item	Parametrs	Item	Parametrs
Geometric Conditions	d/0	Spectral Range	380nm～1000nm
Light Source	halogen lamp	Measurement Range	0～100%
Measuring Speed	1s/time	Spectral half width	3～5nm
Interface Mode	ethernet	Wavelength Accuracy	0.3nm
Instrument Dimensions	200mm×240mm×315mm	Wavelength Interval	1nm
Maximum Power	100W	Measuring Spot Size	Ø0.5
Power Requirement	AC100V～240V 1A	Measurable Minimum Size	⩾Ø6
Repeatability	△E* < 0.1RMS (standard deviation)		
Measurable Maximum Size	any size, maximum 100mm from edge		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Safety Glass Transmittance Instrument
SGT-3

The first dedicated instrument to measure visible transmittance of safety glass.
Meet Standard: *ISO3538 Road vehicles - Safety glazing materials - Test methods for optical properties.*

Domestic

Automatic data collection
Built-in printer

Leading sales quantity

Scan QR code
to get soft copy.

The SGT-3 is upgraded from the old model series SGT. SGT series are first initiated by Aoptek to measure visible transmittance of automobile glass. It not only measure small sample, but also measure the actual automotive glass, which are suitable for glass production enterprises and research institutes. The instrument is also used to measure visible light Imaging transmittance for other safety glass, laminated glass and dimming glass.

Functions:

visible transmittance.

Parameters

Item	parameter
Light Source	CIE standard illuminant A, color temperature 2856 + 50K
Repeatability	0.2%
Accuracy	1%
Receiver	CIE1964 V(λ)
Sample Size	Standard sample 80mm × 80mm, length<2.5m for finished glass
Dimensions	1240mm × 750mm × 820mm
Power Supply	AC220V 50Hz 3A
Power	100W

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Visible Transmittance and Reflectance Instrument
GTR-2

Suitable for factory to measure visible transmittance and reflectance (under standard illuminant A).
Meet Standard: *ISO 9050-2003 Glass in building; determination of light transmittance, solar direct transmittance, total solar energy transmittance and ultraviolet transmittance, and related glazing factors.*

Appropriative economic instrument

One click
to get visible transmittance and reflectance

Scan QR code
to get soft copy.

This instrument is used to measure visible reflectance and transmittance for flat materials and products, such as flat float glass, colored glass, and coated glass. Scattered light cannot be measured. This instrument is not necessarily equipped with computer, which is economic and easily-used. External serial printer makes data recorded easily. The instrument is not spectrum instruments, for high precision measurement of spectral transmittance and reflectance ratio and color, customer can choose Filmeasure2300 Rapid Spectral T&R Instrument and GlasSpec1000 VIS-NIR Spectrophotometer for Architectural Glass.

Functions:

Visible transmittance, Visible reflectance.

Parameters

Item	parameter
Light Source	CIE standard illuminant A, color temperature 2856 + 50K
Repeatability	0.3%
Accuracy	1%
Receiver	CIE1964 V(λ)
Sample Size	Less than 260mm ×200mm
Dimensions	280mm×210mm×520mm
Power Supply	AC100V～240V 3A
Maximum Power	200W
Geometric Conditions	8/d T&R

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

High Precision Hazemeter
SGH-2

Intelligent instrument to measure haze in high precision.
Meet Standard: *ASTM D1003 Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics.*
ISO 3537 Road Vehicles. Safety Glazing Materials. Mechanical Tests Third Edition.

High precision

High stability

The best choice for low haze value measurement
The only upright hazemeter in market

Scan QR code
to get soft copy.

The instrument is an intelligent haze meter, applied in haze and visible transmittance measurement of automotive glass, architectural glass, display glass and other materials, EVA, plastic film etc. It has good accuracy and high speed, which is calibrated by the National Institute of Metrology and calibration certificate is attached.

Functions:

visible light haze H_V , visible transmittance T_V , scattered light transmittance T_d .

Parameters

Item	Parameter
Receiver	CIE1964 V(λ)
Measurable Range	0～30%
Resolution	0.01%
Light Source	CIE standard illuminant A, color temperature 2856 + 50K
Dimensions	400mm × 330mm × 540mm
Accuracy and Repeatability	Range / Accuracy / Repeatability 0～2% / 0.3% / 0.1% 2～10% / 0.5% / 0.1% 10～30% / 2% / 0.1%
Light Spot	7±1mm
Maximum Measurable Size	200mm × 200mm
Power Requirements	AC100V ～ 240V 3A
Power	100W

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

High Precision Spectrum Haze Instrument

SpecHaze1000

IIntelligent high precision haze measuring instrument

Meet Standard:*ASTM D1003 Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics ;*
ISO 3537 Road Vehicles-Safety Glazing Materials-Mechanical Tests.

Completely meet

International standards

Spectrum haze instrument

Scan QR code
to get soft copy.

This instrument is used to measure the spectral haze of transparent and translucent objects, which comply with the latest international and domestic haze standards. The haze at different wavelengths can be easily and quickly obtained. Measured spectral range is from 380nm to 1000nm. It is calibrated by the Chinese National Institute of metrology, with their standard sample.

Parameters

Item	Parameters
Measuring Geometric Conditions	meet the standard of haze
Measuring Mode	fixed point measurement
Light Source	halogen lamp
Glass Thickness Range	2-5mm
Spectral Range	380-1000nm
Wavelength Interval	1nm
Wavelength Accuracy	better than 0.3nm
Wavelength Repeatability	better than 0.1nm
Measurement Speed	＜5s for one measurement of each point
Short-term Stability	measure one point on same piece of glass for 30 times， fluctuation of L *,a *,b *＜0.15 RMS
Long-term Drifting	after reboot device or replace light source, measure one point on same piece of glass， fluctuation ofL *,a *,b *＜0.15RMS
Resolution	0.01%

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Scattered Light Polariscope
Model# SCALP

A portable instrument for fast measuring glass stress in field.

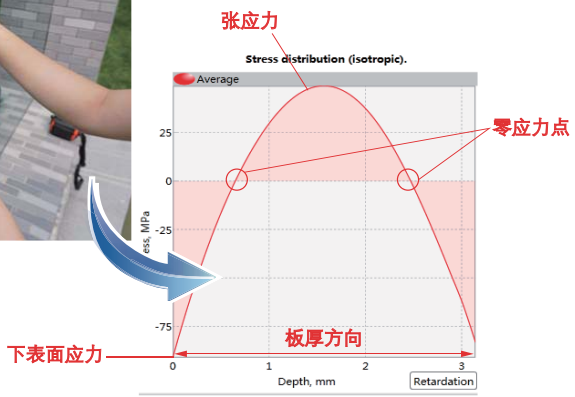
Dynamic polarized laser beam technology

Field measurement

Installed glass measurement

With a tablet

Simple operation



Scan QR code
to get soft copy.

SCALP uses the scattered light method to determine through the thickness stress distribution (residual and loading stress) in annealed, heat-strengthened and fully tempered flat glass products. All functional components of SCALP (polarized diode laser, optical modulator, CMOS camera and all related optics) are built into a robust aluminium case. Connecting with computer can realize field measurement.

Measuring objects:

Annealed glass,
Heat reinforced glass,
Tempered glass.

Parameters

Item	SCALP-05	
Thickness Range	1～5mm	
Stress Range	＞ 1.0Mpa	
Dimensions	56mm × 27.5mm × 76mm	
Weight	＜ 250g	
Power Supply & Interface	5V，500mA， USB 2.0	
Measurable Glass	Architectural Glass	Automobile Glass, Patterned Glass
Measurable Side	Air side, Tin side, Patterned side	
Restrictions	Can not directly measure from Low-E side, antireflection side and screen printing side.	
	No direct sunlight to the laser window when measuring	

* Please visit **www.glasstress.com** for more details.

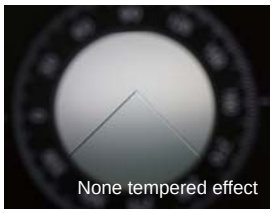
Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

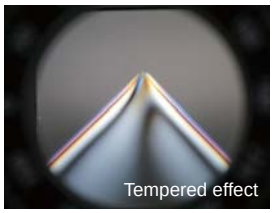
Tempered Glass Detector
SG980

SG980 is paten product used to verify the glass is tempered or not.

Measurable of single and large pane curtain wall

Compact structure, easy to carry
Built-in rechargeable lithium battery





Scan QR code
to get soft copy.

As a patent product, this tempered glass detector is used to verify if the glass has been tempered. It could make qualitative detection on stress and show edge stress distribution. It is suitable for glass processing industry and construction site.

Transmission detection on edge • Separable transmission detection • Folded reflection detection • Plane reflection detection

Parameters

Item	Parameter
Measurable Thickness	50mm
Continuous Lighting Time	45 minutes
Light Source Brightness	superior to 8500cd/m^2
Light Source Lifespan	6000 hours
Dimensions	120mm × 75mm × 45mm
Weight	450g

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Automatic Tin Side Detection System
TS2600

Online indentify tin side automatically without eyeballing.

Online detect automatically

Without visual observation

Automatic alarm

Scan QR code
to get soft copy.

TS2600 is an intelligent and automatic tin side detection system for float glass, mainly used in the production and processing industry. It is applied in the further processing of glass, such as laminating， tempering, coating, screen-printing, colored glazing and other glass further process production line, which is able to recognize the tin side of float glass rapidly and effectively, satisfying deep processing manufacturers' needs. This detection is innovative with independent intellectual property right and patent.

PCT Global Patent:

【Russia】RU 2497103 C2 【Korea】10-1303261 【U·S·A】US 8,729,504 B2

Design patent：ZL201030161198.4

Patent for utility models：ZL201020182123.9

Parameters

Item	Parameter
Working Mode Detection	Install on production line, automatic
Power Supply	AC 100～240V
Maximum Power	60W
Detection Distance	Light head to glass suiface:1～1.5mm; Distance of two heads:100mm
Measurable Thickness	1mm～19mm
Response Time	0.4s
Upper Probe Size	80mm × 65mm × 200mm
Light Source Size	250mm × 65mm × 160mm
Control Box Size	210mm × 90mm × 270mm
Interface	RS485, PLC relay interface

Remark:1. Aoptek reserve the right to modify the information, the actual instrument & manual be as final.
2.We suggest to measure glass which visible transmission is more than 30%.

Tin Side Detector
TS580

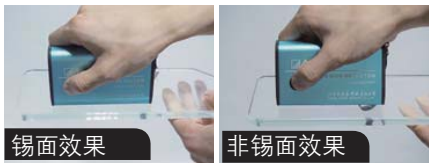
Portable meter with many invention patents.
Meet Standard: *CE, ROHS.*

Innovative patent product

Own multinational patents

“TIN” indication, easy to detect

Transmission viewing effect



Reflection viewing effect

Scan QR code
to get soft copy.

TS570 is used for identifying the tin side of float glass. Creative image with text indicator and light filtering technology ensures extraordinary effect. With built-in rechargeable lithium battery, compact and portable features, it is widely applied in glass deep processing industry for tin side identification. There are three using methods, transmission viewing method, reflection viewing method and edge viewing method, it is easy to operate and observe.

PCT Global Patent:

【Russia】RU 2497103 C2 【Korea】10-1303261 【U·S·A】US 8,729,504 B2
Design patent：ZL201030161198.4
Patent for utility models：ZL201020182123.9

Parameters

Item	Parameter
Working Mode	Handheld measurement
Detection	5V1A DC 110V ～ 220V AC input (lithium battery)
Power Supply	3000 hours
Dimensions	116mm × 70mm × 26mm
Packing Size	153mm × 127mm × 51mm
Weight	208g（with battery）

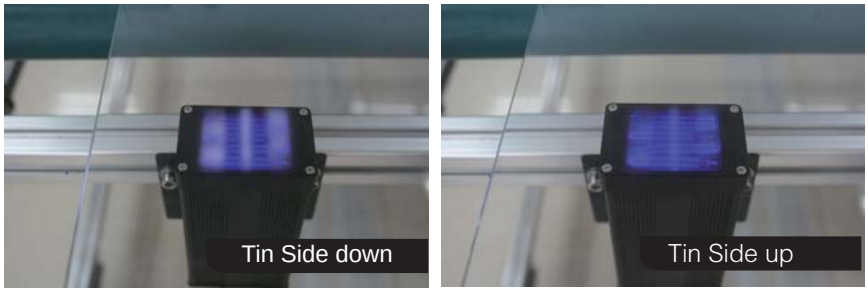
Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Tin Side Detector
TS1600

TS1600 is an detector installed on production line, visually identify tin side.

“TIN” indication patent with large area light source

Identify tin side by eyeballing



Scan QR code
to get soft copy.

With “TIN” indication patented technology, TS1600 can detect tin side efficiently by eyeballing in further processing, It is powered by AC and adopts large area light source. As a cost-effective detector, it extensively installed on glass deep processing production line in horizontal or upright type, such as tempering, coating, silk screen printing, glazing etc.

PCT Global Paten:

【Russia】RU 2497103 C2　【Korea】10-1303261　【U·S·A】US 8,729,504 B2

Design patent：ZL201030161198.4

Patent for utility models：ZL201020182123.9

Parameters

Item	Parameter
Working Mode	Install on production line and identify visually
Light Source Size	150mm × 80mm × 53 mm
Power Supply	AC110V～ 220V AC input
UV Lamp Lifespan	3000 hours
Weight	500g

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Abrasion Tester
BTA-5000

The first dedicated instrument to measure visible transmittance of safety glass.
Meet Standard: *ISO3537 Road Vehicles. Safety Glazing Materials. Mechanical Tests Third Edition.*

Standard Configuration
Dedicated for glass abrasion test

The first innovation
No need drilling
Cleaner with automatic switch
Multi-parallel units operation

Scan QR code
to get soft copy.

The instrument is used to test abrasion for float glass, coated glass and automobile glass. It is also essential for paint, coat, plastic layer, metal layer, plastic, textile, ceramic tile, wood floor, laminate floor, acrylic, furniture and other materials to test of firmness and abrasive resistance. The instrument is an intelligent product controlled by microprocessor, which was first initiated and developed by Aoptek in domestic.

Parameters

Item	Parameter
Rotation Speed	55-75 R/min (can be adjusted)
Revolutions	50, 100, 200, 300, 400, 500, 1000, 2000, 5000 (can be customized)
Sample	ϕ 100mm,100mm × 100mm, thickness<19mm, no drilling
Dimensions	260mm × 320mm × 250mm
Per Wheel Weight	500g (1000g are optional)
Power Supply	AC100V ~ 240V 3A (not including cleaner)
Rubber Wheel	Bought from Taber
Power	50W (not including cleaner)

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Glass Thickness Gauge
GlassMeter100

Self-developed portable meter for measuring IG thickness.

Simple Operation, fast measuring speed

Colorful LCD for easy reading

Sturdy & Durable

Economic meter

Scan QR code
to get soft copy.

GlassMeter100 can measure the thickness of single pane, insulating glass (including glass thickness, air space and overall IG thickness). It is an ingenious meter, which measure fast and can deduct ambient light automatically. Particularly, it is suitable for measuring installed glass, glazing glass in field. Users can operate this meter easily, and can conveniently find, read historical data records. Measuring data can be easily exported to the computer via a serial port or wireless for latter data processing.

Functions:

Measure thickness of architectural flat glass,
Measure glass thickness, air space of double and triple glazing.

Parameters

Item	Parameter	Item	Parameter
Dimensions	160mm × 73mm × 37mm	Weight	400g
Measurable Range	2～70mm Glass	Charging time	5 hours
Working time	10h continuing work on a single		
Measurable IG range	6+16A+6+16A+6		
Max deviation	±0.05mm，Thickness≤10mm		
	±0.1mm，10mm<Thickness≤20mmy		
	±0.2mm，20mm<Thickness≤40mm		
	±0.3mm，Thickness>40mm		
	Can not measure the patterned glass, glazed glass, frosted glass and other glass with scattering characteristics.		

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Online Low-E Detection System
Filmonitor AE5800

Self-developed online system for determining Low-E location and type.

Accurately determine type of coated glass

Automatically determine Low-E side

Combine optics with electromagnetic method
Small dimensions for easy installation

Scan QR code
to get soft copy.

AE5800 is installed on tempered glass production line or insulating glass production line, which can measure relative emissivity, and then determine the single pane is coated or not. Through adjustment, it can also distinguish coating type, meanwhile coated side and non-tin side can be visually displayed on the LCD screen. The system has PLC control interface, which can be linked to production line to avoid processing errors due to wrong side placement.

Parameters

Item	Parameter
Determine Coating Type	Hard Low-E glass, soft Low-E glass
Measurable Glass Thickness	2 – 19mm
Power Supply	DC24V/2A; AC220V
Output Interface	2 path, 24V signals, max current 300mA
Power Supply	220V 50Hz
Power	50W
Weight	5kg

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Low-E Coating Detector Series

ETEKT+ Low E Coating Detector (AE1601) / Single Pane Low-E Coating Detector (AE3600)

Inductive measurement without pins

LED indicator

Compact and portable

AE1601 • AE3600

Scan QR code
to get soft copy.

AE1601 is a portable instrument using a patented method to detect the presence and location of Low-E coatings or any other conductive coating on or within a window assembly. The ETEKT+ is designed to test single or double pane windows from a single side.
AE3600 checks both surfaces of single pane glass with one test from a single side. With one push of a button, users can determine if the meter is contacting the low E surface or if the coating is on surface two. It does not use contact pins, so there is no chance to scratch the glass surface.

Parameters

Item \ Model	AE1601	AE3600
Suitable Circumstance	Field measurement	Field measurement
Low-E location	√	√
Measurable Objects	Single Low-E coated glass IG Low-E glass Triple glazing Low-E glass	Single Low-E coated glass IG Low-E glass
Glass Thickness	Single Low-E coated glass: 2mm～12mm; IG Low-E glass: 4mm～16mm;	Max thickness of glass 13mm
Power Supply	9V alkaline battery	9V alkaline battery
Dimensions	115mm × 67mm × 30mm	95mm × 60mm × 25mm
Weight	About 160g	About 130g

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Glass Thickness & Low-E Detection Series

Glass-Chek ELITE Glass Thickness Meter & Low-E Detector (GC3200)
Glass-Chek PRO Glass Thickness Meter & Low-E Detector (GC3000)
Glass-Chek + Glass & Air Space Thickness Meter (GC2001)

LCD show

Convenient reading

Compact & portable

GC3200 • GC3000 • GC2001

Scan QR code
to get soft copy.

GC3200 is used for measuring triple glazing and laminated glass. It can give these readings: glass thickness, space width, film thickness and total thickness. It can also easily measure Low-E location and Low-E properties (soft Low-E or hard Low-E), can identify single silver, dual silver and triple silver Low-E coatings.

GC3000 is used for measuring triple glazing and insulating glass. It can give these readings: glass thickness, space width, and total thickness. It can also easily measure Low-E location and Low-E properties (soft Low-E or hard Low-E), can identify single silver, dual silver and triple silver Low-E coatings.

GC2001 is used for measuring insulating glass. It can give these readings: glass thickness, space width, and total thickness. It can also easily measure Low-E location.

Parameters

Item	GC3200	GC3000	GC2001
Measurable Objects	Single Low-E coated glass IG Low-E glass Triple glazing Low-E glass	Single Low-E coated glass IG Low-E glass Triple glazing Low-E glass	Single Low-E coated glass IG Low-E glass
Min Space Width	4.7mm	4.7mm	4.7mm
Power Supply	9V alkaline battery	9V alkaline battery	9V alkaline battery
Dimensions	145mm × 90mm × 43mm	145mm × 90mm × 43mm	143mm × 93mm × 43mm
Weight	about 320g	about 320g	about 320g

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Emissometer
Model AE1

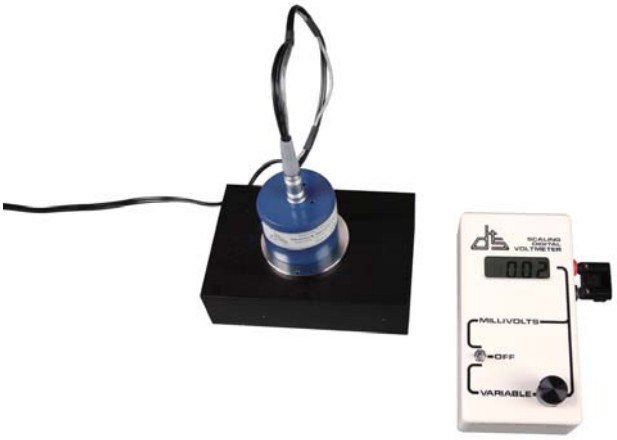
AE1 is a special purpose instrument for measuring emittance for kinds of materials.

Easy to operate

Rapid measurement

High repeatability

Inexpensive



Scan QR code
to get soft copy.

AE1 is a portable instrument and can measure emittance in field.

Measurable objects:

Low-E coated glass, solar absorption coating material, thermal insulation materials, camouflage coatings, aerospace special coatings.

Functions:

Fast measure hemispherical emittance and E value.

Parameters

Item	Parameter
Output Mode	Digital display
Repeatability	±0.01 emittance units
Preheating Time	30 minutes
Power Supply	A Li-ion battery is optional for field measurement.
Probe Size	Φ55mm × 50mm
Voltmeter Dimensions	150mm × 85mm × 68mm
Case Dimensions	33cm × 40cm × 18cm

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Emissometer
AE2

AE2 is a special purpose instrument for measuring emittance for kinds of materials.

Lithium battery Powered

Portable carry

Easy operation Color display

Measure rapidly Goodrepeatability

Scan QR code
to get soft copy.

This is a portable instrument for measuring emissivity, with built-in lithium battery. It can be operated by one hand. The operation process is simple and convenient, and the measurement accuracy is high. It can be used in the field measurement of emissivity of various materials.

Measurable objects:

Low-E coated glass, solar absorption coating material, thermal insulation materials, camouflage coatings, aerospace special coatings.

Functions:

Fast measure hemispherical emittance and E value.

Parameters

Item	Parameter
Dimension(mm)	φ68x158
Weight	540g
Working temperature	0～40℃
Charging time	3h
Continuous working time	6h
Measurable range	0.05～0.87
Maximum allowable error	0.02
Working environment	＜910%Relative humidity
Lithium battery (not removable)	ICR18650 DC3.7V/2.2Ah x4

Remark: Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Emissometer for Insulating Glass
GlassMeter800

A multi-functional instrument for measuring emittance, Low-E location and thickness of insulating glass.

Multi-functions in one

Measure thickness
Low-E side
Emittance
Measure fast, Portable

Scan QR code
to get soft copy.

GlassMeter800 can measure thickness of single pane and insulating glass (including glass thickness, air space and overall IG thickness), as well as identify Low-E location and measure emittance. It is a compact meter, which measure fast and can deduct ambient light automatically. Particularly, it is suitable for measuring installed glass, glazing glass in field.

Functions:

Measure thickness of single pane,
Measure glass thickness, air space of double and triple glazing,
Identify Low-E location of single pane, double and triple glazing,
Measure emittance of single pane, double and triple glazing.

Parameters

Item	parameter	Item	parameter
Dementions	240mm × 135mm × 50mm	Weight	800g
Measurable side	Glass side， Low-E side	Measurable max thickness IG	6+16A+6+16A+6
Charing time	5h	Measuring time	10h
Working temperature	0~40℃	Working condition	<90%Relative humidity
Max deviation	Thickness	±0.05mm，Thickness≤10mm	
		±0.1mm，10mm<Thickness≤20mm	
		±0.2mm，20mm<Thickness≤40mm	
		±0.3mm，Thickness＞40mm	
	Emittance	±0.01mm	
Restriction	Can not measure the patterned glass, glazed glass, frosted glass and other glass with scattering characteristics. Avoid direct sunlight to the laser window when measuring.		

Remark: 1.If you want to know more information about GlassMeter800, please visit the website https://en.aoptek.com.
2.Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Handheld Device for Contactless Measuring of Sheet Resistivity
Stratometer G

Stratometer G is indispensable instrument for measuring Low-E coated glass covering by silicon nitride on surface.

Inductive measurement without pins

Nondestructive coatings

Rechargeable battery built-in

Scan QR code
to get soft copy.

The Stratometer G adopts principle of inductive measurement, has no pins contacting layers. It can not only measure conductive layer, but also measure nonconductive layer, which is a indispensable instrument for Low-E coated glass.

Measuring objects:

Low-E coated glass, TCO PV glass,

ITO glass, touch screen glass, LED glass,

Transparent conducting films,

Ortificial synthesis metal sheet and conductive paper,

Other conductive and semiconductor materials.

Functions:

Display readings in Ohm/sq or Siemens/sq.

Parameters

Item	Parameter	Item	Parameters
Resolution	0.5～2 Ohm/sq：0.001 Ohm/sq	Measuring Range	0.5～50 Ohm/sq
	2～20 Ohm/sq：0.01 Ohm/sq	Measuring Interval	2 seconds
	20～50 Ohm/sq：0.1 Ohm/sq	Interface	USB 2.0
Accuracy	0.5～5 Ohm/sq：5%	Working Temperature	+10～+45℃
	5～20 Ohm/sq：7%	Dimensions	23cm×7cm×4cm
	20～50 Ohm/sq：10%	Weight	About 510g

Remark:Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Device for Measuring Sheet Resistivity with 4-point Measuring Method

SD-800

Contact measure conductive coating with 4-piont

High precision

Dedicated to large pane measurement

Scan QR code
to get soft copy.

SD-600 adopts 4-point measuring method to measure sheet resistivity of conductive coatings. Its pins are thick and smooth, can be flexible for not easily scratching layers. Multiple measuring ranges can be selected, display readings in Ohm/sq or Siemens/sq. Calibration data and measurement results are automatically stored.

Measuring objects:

Low-E coated glass, TCO PV glass,
ITO glass, touch screen glass, LED glass,
Transparent conducting films,
Artificial synthesis metal sheet and conductive paper,
Other conductive and semiconductor materials.

Parameters

Item	Parameter
Measuring Method	4-point measuring method
Measuring Range	0～200K Ohm
Operating Temperature	0～50℃
Battery Duration	4～6 hours
Dimensions	300mm × 290mm × 120mm
Weight	about 1.5kg

Remark:Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Device for Non-contact Measuring of Sheet Resistivity
SRM-14T

A dedicated instrument for non-contact measuring sheet resistivity.

Contactless
No pins

Automatic calibration
Peak monitor

Scan QR code
to get soft copy.

The SRM-14T adopts principle of inductive measurement, has no pins contacting layers. It can not only measure conductive layer, but also measure nonconductive layer.

Measuring objects:

Low-E coated glass, TCO PV glass,
ITO glass, touch screen glass, LED glass,
Transparent conducting films,
Artificial synthesis metal sheet and conductive paper,
Other conductive and semiconductor materials.

Parameters

Item	Parameter	Item	Parameter
Standard range	0.5～20Ω/□	Other Measuring Range	1～40/ 2～80/ 5～200 Ohm/sq
Accuracy	0.5～5 Ohm/sq 2%		10～400 Ohm/sq 10～800 Ohm/sq
	5～10 Ohm/sq 3%	Resolution	0.5～4.999: 0.001 Ohm/sq
	10～20 Ohm/sq 5%		5～49.99: 0.01 Ohm/sq
	10～100O Ohm/sq +/-2%		50～100: 0.1 Ohm/sq
	100～200Ohm Ohm/sq +/-3%	Measuring Speed	2 s
	200～400/Om Ohm/sq +/-5%	Measuring Distance	1, 10, 25mm
	400～800Ohm Ohm/sq +/-7%	Operating Temperature	0～45℃
LCD Display	4.3 inch touch screen (10 x 9cm), 480 x 272 pixels		
Dimensions	260mm×130mm×260mm		

Remark:Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

R-CHEK Surface Resistivity Meter
RC3175/RC2175

Surface Resistivity Meter: 0.1-199.9Ohms RC3175
Surface Resistivity Meter:1-19990Ohm RC2175

Measure conductive coating with 4-piont
High precision

Pins are smooth
No scratching coatings

Fast measurement

RC3175	•	RC2175	•	RC3175/RC2175 Probe

Scan QR code
to get soft copy.

The meter is used to measure sheet resistivity of conductive coatings.

Measuring objects:

Low-E coated glass, TCO PV glass,
ITO glass, touch screen glass, LED glass,
Transparent conducting films,
Artificial synthesis metal sheet and conductive paper,
Other conductive and semiconductor materials.

Parameters

Item	RC3175	RC2175
Measuring Range	0.1～199.9 Ohm/sq	1～19990 Ohm/sq.
Resolution	0.1 Ohm/sq	1 Ohm/sq.
Accuracy	0.9 %	0.9 %
Dimensions	115mm × 68mm × 30mm	115mm × 68mm × 30mm
Weight	About 150g	About 150g

Remark:Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

SPARKLIKE LASER

Gasglass Laser is based on laser technology (TDLAS) operating in 760nm range. It measures oxygen, and therefore the result can be converted to argon and krypton just as well as xenon.

New era of IG measurment

Nondestructive measurement

Thickness can be measured

Scan QR code
to get soft copy.

Gasglass Laser measures gas concentration on triple and double glazed units through coatings and laminations. Thanks to advances in technology, it is now possible to measure more products produced - all without breaking the unit or having extra components inside. Gasglass Laser opens a whole new world to online gas detection for IG manufacturers, because it's possible to gain superior quality by measuring more units than ever before.

Parameters

Item	Parameter
Specifications	Head dimensions 350mm x 150mm x 350mm, connect line 2m
Weight	Main unit:16 kg, Measuring head:6 kg
Accuracy	± 1,5% Std *
Standard Deviation	± 1,5%
Measuring Time	11 - 30 seconds (depends on the settings and IG structure)
Max Thickness	50mm
Min Interval	2mm
Power Supply	100-240 VAC, 50/60 Hz
Max Power	250W
Display	10,1" touch screen with pen
Connector	4x ODU multipin, RJ-45, 2x USB 2.0, VAC Power (C14)
Software	Windows 7, customize Gasglass laser (built-in parts)
Data Logging Capability	SSD Storage (15 GB), USB/Network transfer

Remark:Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

SPARKLIKE HANDHELD

Gasglass V2 is based on plasma emission spectroscopy to non-invasive test IG gas concentration.

Plasma emission spectroscopy
Non-invasive for IG structure

Accurate measurement
High repeatability

Scan QR code
to get soft copy.

GASGLASS V2 is the world's first non-destructive argon analyzer. It has been the industry standard for non-invasive measurement - and used by IG manufacturers, window and door manufacturers, testing laboratories, building quality inspectors and construction consultants worldwide. It's possible to conduct quick and accurate tests with Gasglass Handheld V2. Test already installed units or perform long term testing to their production.

Measuring objects:

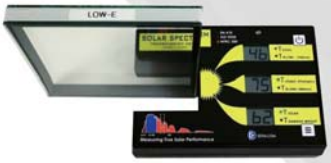
IG filled with inert gas.

Parameters

Item	Parameter
Measuring Range	Gas concentration >50%
Power Consumption	40W
Display	128 × 64 pixel LCD screen
Measurement Time	1S
Data logging Capability	1900 measurements
Dimensions	265mm × 190mm × 90mm
Weight	2kg
Operating Conditions	0～35℃
Power Supply	19.8V Li-Ion Battery，2.0A

Remark:Aoptek reserve the right to modify the information, the actual instrument & manual be as final.

Solar Spectrum Transmission Meter / SS2450



Uv%, Visible%, Solar%, Infrared%（900-1000nm）
Infrared%（780-1700nm+）, Damage Weight Coefficient

Window Energy Profiler / WP4500

SHGC, Uv%, Visible%, Infrared% (700nm+)

Window Energy Meter / WE2500

SHGC, Uv%, Visible%

"Spectrum Detective" Energy Transmission Meter / SD2400

Uv%, Visible%, Infrared% (700nm+)

Solar Transmission & Power Meter / SP2065

Solar%, BTU

UV Transmission Meter / UV1265

Uv%

Vacuum Feedthrough / FT-KF25-10

UV Demo Lamp 365nm/UV1390

365nm

Certification & Honor

Chinese National High-tech Enterprise ;

Pass IS09001;

Independent Import &Export Right;

Member of Capital technology platform;

Beijing certificated Software Enterprise;

Member of Vacuum Glass Specialized Committee;

Member of Machinery & Equipment Specialized Committee;

Member of China Architectural and Industrial Glass Association;

Member of China Architectural and Industrial Glass Association;

Vice-director Unit of China Photovoltaic Glass Association;

Editor of 10 international, national and industry standards;

34 international and domestic patents;

software copyright;

products get Beijing Independent Innovation Awards;

One National Torch Plan project;

One project supported by Ministry of Science and Technology Innovation Fund;

2 projects supported by Beijing Science Committee Innovation Fund;

One project supported by Transformation of Scientific and Technological Achievements Awards;

One project supported by Regional Development Special Fund of Beijing Financial Bureau;

2 projects awarded by Fengtai Patent Transformation Program;

One project supported by Fengtai Science Committee Innovation Fund.

Compilation Aoptek participate

SEMI PV47-0513 - Specification for Anti-Reflective-Coated Glass, Used in Crystalline Silicon Photovoltaic Modules

Solar glass. Part 2:Transparent conductive oxide coated glass

Test method for optical properties of photovoltaic glass

Anti-reflective coated glass for photovoltaic modules

Standard for daylighting design of buildings
Methods of whiteness specification

The white standard plate for colorimetry and photometry

Glass in the Transparent Part of Passive Low-energy Building

The technical specification of energy efficient glass for building

AOPTEK®
Advanced Optics

+86-10-5112 2588

Add:#19 Bldg，No.26 Waihuanxi Rd, Fengtai Science Park, Beijing, 100070, China.

E–mail:sales@aoptek.com

Web:https://en.aoptek.com

2017年第四版第1次印刷 2000册