

Test Report

Report No.: A001R20160123028-4

Date: Jan.29, 2016

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Applicant: Wurth Colombia S.A.
Address: Trv.93 Nr.53-48 Bod.26, Bogota, Colombia

Report on the submitted samples said to be:

Sample Name : Safety glasses
Country of Origin : China
Sample Receiving Date : Jan.23, 2016
Testing Period : Jan.23, 2016 to Jan.29, 2016

Test Method : Please refer to next pages.

Test Result : Please refer to next pages.

Test Requested:

1. EN 166: 2001 Personal eye - protection - Specifications;
EN 167: 2001 Personal Eye-Protection - Optical test methods;
EN 168: 2001 Personal eye-protection - Non-optical test methods;
2. ANSI / ISEA Z87.1 - 2010 Occupation and Educational Personal Eye and Face Protection Devices.

Tested by: Jenson.Zhan

Zhanfeng, Jenson.Zhan

Test Engineer

Reviewed by: Jay.Liu

Liu Jinliang, Jay.Liu

Laboratory Supervisor

Approved by: Huangguohua

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Vice Laboratory Manager



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Test Result(s):
1. EN166:

Requirement			Testing		Results		
Test Items		According to Clause		According to			
		EN	Clause	EN		Clause	
General construction			166	6.1	--	--	P
Materials (Nickel release)			166	6.2	--	--	NA
Headbands			166	6.3	--	--	NA
Field of vision			166	7.1.1	168	18	P
Refractive powers (Unmounted oculars covering one eye)	Spherical refractive powers		166	7.1.2.1.1	167	3.1	NA
	Astigmatic refractive powers						
	Prismatic refractive powers						
Refractive powers (Mounted oculars and covering both eyes)	Spherical refractive powers		166	7.1.2.1.2	167	3.2	Optical Calss I
	Astigmatic refractive powers						
	Prismatic refractive powers						
Transmittance	Oculars without filtering action		166	7.1.2.2.1	167	6	NA
	Oculars with filtering action		166	7.1.2.2.2	167	6	P
	Ultraviolet Filter		170	4	167	6	NA
	Sunglare Filter for Industrial Use		172	4.1	167	6	P
Variations in transmittance (Exempt oculars without filtering action)	Oculars without corrective effect		166	7.1.2.2.3.1	167	7	P
	Oculars with corrective effect		166	7.1.2.2.3.2	167	7	NA

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Requirement			Testing		Results		
Test Items		According to Clause		According to			
		EN	Clause	EN		Clause	
Diffusion of light			166	7.1.2.3	167	4	P
Quality of material and surface			166	7.1.3	167	5	P
* Minimum robustness			166	7.1.4.1	168	4	NA
Increased robustness	Unmounted oculars		166	7.1.4.2.1	168	3.1	NA
	Complete eye-protectors and frame		166	7.1.4.2.2	168	3.2	P
Stability at an elevated temperature			166	7.1.5.1	168	5	P
Resistance to ultraviolet radiation (oculars only)			166	7.1.5.2	168	6	P
Resistance to corrosion (All metal parts only)			166	7.1.6	168	8	NA
Resistance to ignition			166	7.1.7	168	7	P
Protection against high-speed particles			166	7.2.2	168	9	P
Lateral Protection			166	7.2.8	168	19	NA**
Information supplied by the manufacturer			166	10	--	--	NR

- Note:**
1. P = Pass; F = Fail; NA = Not Applicable; N.R.=Not require;
 2. The applicant's attention was drawn that the manufacturer should not use the frame materials which are known to cause irritation, allergic or toxic reaction during wear in a normal state of health against significant proportion of users.
 3. *This requirement relates only to cover plates and oculars with filtering effect and not be assessed if these Items are intended to meet the requirements for increased robustness or resistance to high speed particles,in which case the requirements of 7.1.4.2 or 7.2.2 shallbe met.
 4. ** No claim provided by the applicant.

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General construction — Clause 6.1

Sample Number	Defects		Comment	Result(s)
	Observed	Absent		
1~20		X	--	P
Requirements: Eye-Protectors shall be free of projections, sharp edges or other defects which are likely to cause discomfort or injury during use.				

Field of vision — Clause 7.1.1 / EN 168:2001 Clause 18

Sample Number	Head-form		Exhibit minimum field of vision defined in the standard		Comment	Result(s)
	Medium	Small	Yes	No		
1~3	X		X		--	P
Requirements: Eye-Protectors shall be exhibit field of vision an area of not less than 22 mm in the horizontal length and 20mm in the vertical width in front of each eye.						

Refractive powers— Clause 7.1.2.1 .2 / EN 167:2001 Clause 3.2

Sample Number	Refractive powers						Difference in prismatic refractive powers(cm/m) (cm/m)			Result(s)
	Spherical(m ⁻¹)		Astigmatic(m ⁻¹)		Prismatic(cm/m)		Horizontal		Vertical	
	Left	Right	Left	Right	Left	Right	Base Out	Base In		
1	0.04	0.05	0.00	0.00	0.06	0.08	0.12	--	0.03	Optical class 1
2	0.05	0.05	0.00	0.00	0.09	0.08	0.13	--	0.04	
3	0.05	0.05	0.00	0.00	0.07	0.07	0.11	--	0.04	
Requirement: Permissible tolerances for refractive powers :										
Optical class 1	±0.06		0.06		0.12		0.75	0.25	0.25	
Optical class 2	±0.12		0.12		0.12		1.0	0.25	0.25	

Measurement Uncertainty (if necessary):

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Transmittance (Sunglare filter for industrial use) — Clause 7.1.2.2/ EN 167:2001 Clause 6
Personal eye protection - Sunglare filters for industrial use — EN 172:1994+A1:2000

Sample Number:			1		2		3		
Test Items		Requirements	Left	Right	Left	Right	Left	Right	
$\tau_V(\%)$ (380~780nm)		τ_V (380~780nm): /	11.5	11.7	11.5	11.8	11.4	11.7	
		Claim Scale number: /	5-3.1						
$\tau(\lambda)$ (%)	280~315nm	τ_V (100~17.8%): $\leq 0.1\tau_V$	0.1	0.1	0.1	0.2	0.1	0.1	
		τ_V (17.8~3.0%): $\leq 0.05\tau_V$	(0.05 τ_V =0.57~0.59)						
	315~350nm	τ_V (100~17.8%): $\leq \tau_V$	0.1	0.1	0.1	0.1	0.1	0.1	
		τ_V (17.8~3.0%): $\leq 0.5\tau_V$	(0.5 τ_V =5.7~5.9)						
$\tau(\text{SUVA})$ (%) (315~380nm)		τ_V (100~17.8%): $\leq \tau_V$	0.0	0.0	0.0	0.0	0.0	0.0	
		τ_V (17.8~3.0%): $\leq 0.5\tau_V$	(0.5 τ_V =5.7~5.9)						
Minimu spectral transmittance (500~650nm) (%)		$\geq 0.2\tau_V$	7.7	7.8	7.7	7.8	7.6	7.8	
			(0.2 τ_V =2.3~2.4)						
Recognition of signal light (Apply for scale number 5-1,1 to 5-3,1 and 6-1,1 to 6-3,1)		Red	$\geq 0,8$	0.94	0.94	0.93	0.94	0.94	0.94
		Yellow	$\geq 0,8$	0.89	0.89	0.89	0.89	0.89	0.89
		Green	$\geq 0,8$	1.05	1.05	1.05	1.05	1.05	1.05
		Blue	$\geq 0,8$	1.32	1.32	1.32	1.31	1.32	1.32
Result(s)			P		P		P		

Measurement Uncertainty (if necessary):

 Remark: Scale number = $1+7/3 \cdot \log(1/\tau_V)$

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Variation in transmittance - Clause 7.1.2.2.3

Sample Number	The relative difference of luminous transmittance (%)			Result
	Left	Right	Difference with mounted filters	
1	1.4*	2.0*	1.7	P
2	1.4*	0.6*	2.5	P
3	1.2*	1.1*	2.6	P

Requirements:

1. Variations in luminous transmittance(Table 1)

Luminous transmittance		Permissible relative variation (%)
Less than (%)	Up to (%)	
100	17.8	±5
17.8	0.44	±10

2. The relative difference in luminous transmittance between left and right filters not exceed the value of table 1 or 20% whichever is greater;

Measurement Uncertainty (if necessary):

Remark: *= Compensated Uniformity, and uniformity may be affected by thickness of the lens sample;

Diffusion of light — Clause 7.1.2.3 / EN 167:2001 Clause 4

Sample Number	Samples type	Diffusion of light (cd/m ²) / lx		Result(s)
		Left	Right	
1	For oculars used in eye-protectors against high speed particles;	0.11	0.12	P
2		0.14	0.21	P
3		0.19	0.16	P

Requirements:

The maximum value of the reduced luminance factor shall be :

 -1.00(cd/m²) / lx for welding filter;

 -0.75(cd/m²) / lx for oculars used in eye-protectors against high speed particles;

 -0.50 (cd/m²) / lx for all other oculars;

Measurement Uncertainty (if necessary):

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Quality of material and surface — Clause 7.1.3 / EN 167:2001 Clause 5

Sample Number	Defects		Comment	Result(s)
	Observed	Absent		
1~6		X	--	P
Requirements: Except in a marginal area 5 mm wide, oculars shall be free from any significant defects likely to impair vision in use, such as bubbles, scratches, inclusions, dull spots, pitting, mould marks, scouring, grains, pocking, scaling and undulation.				

Increased robustness — Clause 7.1.4.2 / EN 168:2001 Clause 3.1

Sample Number	Test temperature(℃)	Test position	Defects		Comment	Result(s)
			Observed	Absent		
5	55	The left eye frontal		X	--	P
6	-5			X	--	P
7	55	The right eye frontal		X	--	P
8	-5			X	--	P
9	55	The left eye side		X	--	P
10	-5			X	--	P
11	55	The right eye side		X	--	P
12	-5			X	--	P
Requirements: The following defects shall not occur: 1. ocular fracture: 2. Ocular deformation;						

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Stability at an elevated temperature — Clause 7.1.5.1 / EN 168:2001 Clause 5

Sample Number	Apparent deformation		Comment	Result(s)
	Observed	Absent		
13		X	--	P
14		X	--	P
15		X	--	P
Requirements: Assembled eye-protectors shall show no apparent deformation;				

Resistance to ultraviolet radiation (oculars only) — Clause 7.1.5.2 / EN 168:2001 Clause 6

Samples type		Sample Number					
Eye-protectors against high speed particles;		1		2		3	
Test Items		Left	Right	Left	Right	Left	Right
The relative change of luminous transmittance(%)	Before Expose	11.5	11.7	11.5	11.8	11.4	11.7
	After Expose	11.5	11.5	11.5	11.7	11.3	11.6
	Difference	0.0	-1.7	0.0	-0.8	-0.9	-0.9
Reduced scattered light coefficient (cd/m ²) / lx	Before Expose	0.11	0.12	0.14	0.21	0.19	0.16
	After Expose	0.12	0.14	0.15	0.20	0.18	0.19
Result(s)		P		P		P	

Requirements:

1. Variations in luminous transmittance (Table 1)

Luminous transmittance		Permissible relative variation (%)
Less than (%)	Up to (%)	
100	17.8	±5
17.8	0.44	±10

2. Reduced scattered light coefficient

The maximum value of the reduced luminance factor shall be:

- 1.00(cd/m²) / lx for welding filter;
- 0.75(cd/m²) / lx for oculars used in eye-protectors against high speed particles;
- 0.50 (cd/m²) / lx for all other oculars;

Measurement Uncertainty (if necessary):

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Resistance to ignition — Clause 7.1.7 / EN 168:2001 Clause 8

Sample Number	Continued combustion		Comment	Result(s)
	Yes	No		
5		X	--	P
6		X	--	P
7		X	--	P
Requirements: Eye-protectors shall be considered to be satisfactory if no parts ignites or continues to glow after removal of the steel rod.				

Protection against high-speed particles — Clause 7.2.2 / EN 168:2001 Clause 9

Impact speed of ball: 45+1.5/-0 m/s for low energy Impact (F)					
Sample Number	Impact Position	Defects		Comment	Result(s)
		Observed	Absent		
13	The left eye frontal		X	--	P
14			X	--	P
15	The right eye frontal		X	--	P
16			X	--	P
17	The left eye side		X	--	P
18			X	--	P
19	The right eye side		X	--	P
20			X	--	P
Requirements: The following defects shall not occur: 1. ocular fracture 2. ocular deformation: 3. ocular housing or frame fracture					

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2. ANSI / ISEA Z87.1 - 2010 Occupation and Educational Personal Eye and Face Protection Devices:

CLAUSES	REQUIREMENTS	RESULTS
5. General Requirements		
5.1 Optical Requirements		
5.1.1	Optical Quality	P
5.1.2	Luminous Transmission (Applicable for clear lenses)	NA
5.1.3	Haze (Applicable for clear plano lenses)	NA
5.1.4	Refractive Power, Astigmatism, Resolving Power, Prism and Prism Imbalance for Plano Protectors (Exempt from the requirement for the filter lenses of shade 9 or higher.)	P
5.2	Physical Requirements	P
5.2.1&5.2.2	Drop Ball Impact Resistance	P
5.2.3	Ignition (exclusive of textiles or elastic bands)	P
5.2.4	Corrosion Resistance of Metal Components	NA
5.2.5	Minimum Coverage Area	P
5.3	Minimum Lens Thickness (Remark: For the spectacle-plano&impact rated, no the requirement)	NA (See Remark)
5.4	Marking Requirements (Remark: No making provided by the applicant)	NA (See Remark)
5.5 Other Requirements		
5.5.1	Goggles: The vented portion shall be such that the openings exclude spherical objects 1.5mm (0.06 in.) in diameter or greater and shall be no direct straight-line passage.	NA
5.5.4	Frames for Replaceable or Removable Lenses: Shall be supplied with detailed specifications on the required lens bevel design or mounting technique and nominal lens sizing required to conform to ANSI/ISEA Z87.1-2010.	NA
5.6 Replaceable Lenses		
5.6.1	Goggles: -Round lenses measuring 50 mm shall have a dimensional tolerance of ± 0.2 mm; -Rectangular lenses measuring 51 x 108 mm shall have a dimensional tolerance of ± 0.8 mm.	NA

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CLAUSES	REQUIREMENTS	RESULTS
6. Impact Protector Requirements		
6.1&6.1.2	Impact Rated Protectors: -Impact-rated protectors and replaceable components shall meet the impact requirements and marking requirements in this standard. -Frames shall meet with high mass impact and high velocity impact (Exempt from the penetration requirement.)	P
6.1.3	Lateral (Side) Coverage	P
6.2 Impact Requirements		
6.2.2	High Mass Impact	P
6.2.3	High Velocity Impact	P
6.2.4	Penetration Test (lenses only)	P
7. Optical Radiation Protector Requirements		
7.1 Transmittance of Lenses		
7.1.2	Clear and Filter Lenses	NA
7.1.4	Visible Light Filters (Refer to ANSI Z80.3-2008)	P
7.1.5	Variations in Luminous Transmittance	P
7.2.1	Goggles: Housings of goggles intended to provide protection against optical radiation shall meet the transmittance requirements for Shade 6 or higher.	NA

Remark: P = Pass; F = Fail; NA = Not Applicable, NR=Not Required; X=Checked;

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Optical Quality —Clause 5.1.1 & 9.1
Physical Requirements —Clause 5.2

Sample Number	Defects, Projections or Sharp Edges		Comment	Results
	Observed	Absent		
1		X	--	P
Requirements: -Protector lenses shall be free of striae, bubbles, waves and other visible defects which would impair their optical quality. -Protectors shall be free from projections, sharp edges or other defects which are likely to cause discomfort or injury during use.				

Refractive Power, Astigmatism, Resolving Power —Clause 5.1.4& 9.4

Sample Number	Protector	Left			Right			Results
		Spherical Results Power (D)	Astigmatic Power (D)	Resolving Power	Spherical Power (D)	Astigmatic Power (D)	Resolving Power	
1	Spectacle	0.04	0.00	35	0.05	0.00	35	P
Specification	Spectacle	+/- 0.06	≅ 0.06	Pattern 20	+/- 0.06	≅ 0.06	Pattern 20	
	Goggle	+/- 0.06	≅ 0.06	Pattern 20	+/- 0.06	≅ 0.06	Pattern 20	
	Faceshield	No requirement		Pattern 20	No requirement		Pattern 20	
	Welding helmet lenses	+/- 0.06	≅ 0.06	Pattern 20	+/- 0.06	≅ 0.06	Pattern 20	

Measurement Uncertainty (if necessary):

Remark: The tolerance on refractive power and astigmatism power are not requirement for faceshield windows;

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Refractive Power, Astigmatism, Resolving Power —Clause 5.1.4& 9.4

Sample Number	Protector	Vertical Imbalance (Δ)	Horizontal Imbalance (Δ)		Prismatic (Δ)		Results
			Base Out	Base In	Base In	Right	
1	Spectacle	0.0	0.11	--	0.07	0.08	P
Specification	Spectacle	≦ 0.25	≦ 0.50	≦ 0.25	≦ 0.50		
	Goggle	≦ 0.125	≦ 0.50	≦ 0.125	≦ 0.25		
	Faceshield	≦ 0.37	≦ 0.75	≦ 0.125	≦ 0.37		
	Welding helmet lenses	≦ 0.25	≦ 0.75	≦ 0.25	≦ 0.50		

Measurement Uncertainty (if necessary):

Drop Ball Impact Resistance —Clause 5.2.1&5.2.2& 9.6

Sample Number	Impact Position	Defects		Comment	Results
		Observed	Absent		
3	Left		X	--	P
4	Right		X	--	P
5	Left		X	--	P
6	Right		X	--	P

Requirements:

A complete device shall fail if any of the following occurs:

- piece fully detached from the inner surface
- fracture
- penetration of the rear surface
- lens not retained

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Ignition — Clause 5.2.3 & 9.7

Sample Number	Continued combustion		Comment	Results
	Observed	Absent		
6		X	--	P

Requirements:

The frame shall be no continued combustion after withdrawal of the test rod.

Minimum Coverage Area — Clause 5.2.5

Sample Number	Type	Test Position	Minimum Coverage area		Comment	Results
			Pass	Fail		
2	For adult	Left	X		---	P
		Right	X		---	P

Requirements:

- For adult: The eyewire and lens shall cover in plane view an area of not less than 40 mm in width and 33 mm in height (elliptical) in front of each eye, centered on the geometrical center of the lens.
- For childre n: The eyewire and lens shall cover in plane view an area of not less than 34mm in width and 28 mm in height (elliptical), centered on the geometrical center of the lens.

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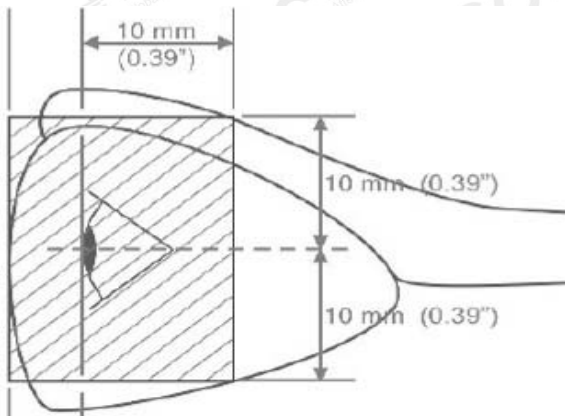
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Lateral (Side) Coverage — Clause 6.1.3

Sample Number	Minimum side shield protection		Comment	Results
	Pass	Fail		
2	X		--	P
Requirements: The impact rated protectors shall provide continuous lateral coverage from the vertical plane of the lenses tangential to a point not less than 10 mm posterior to the corneal plane and not less than 10 mm in height above and not less than 10 mm in height below the horizontal plane centered on the eyes of the headform. (see Figure).			Figure: 	

High Mass Impact Test — Clause 6.2.2&9.11

Sample Number	Impact Position	Defects		Comment	Results
		Observed	Absent		
7	Left		X	--	P
8	Right		X	--	P
9	Left		X	--	P
10	Right		X	--	P
Requirements: A complete device shall fail if any of the following occurs: <ul style="list-style-type: none"> - piece fully detached from the inner surface - fracture - penetration of the rear surface - lens not retained 					

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High Velocity Impact Test (Impact-rate protector) —Clause 6.2.3&9.12

Device Type: Spectacles			Defects		Comment	Results
Sample Number	Impact Position		Observed	Absent		
11	Left	Center		X	--	P
12		30° Temporal		X	--	P
13	Right	Center		X	--	P
14		30° Temporal		X	--	P
15	90° above10mm			X	--	P
16	90° below 10mm			X	--	P
Requirements: A complete device shall fail if any of the following occurs: -piece fully detached from the inner surface -fracture -penetration of the rear surface -lens not retained -Any piece adhering to the contact paste, or observes contact paste on the projectile or complete device.					Table: High Velocity Impact Testing	
					Welding helmets	45.7 m/s
					Spectacles	45.7 m/s
					Goggles	76.2 m/s
					Faceshields	91.4 m/s

Plastic Lens Penetration Test (for Plastic lenses only) —Clause 6.2.4&9.13

Sample Number	Impact Position	Defects		Comment	Result
		Observed	Absent		
17	Left		X	--	P
18	Right		X	--	P
19	Left		X	--	P
20	Right		X	--	P
Requirements: A complete device shall fail if any of the following occurs: -piece fully detached from the inner surface -fracture -penetration of the rear surface -lens not retained					

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Transmittance of Visible Light Filters — Clause 7.1.4 (Refer to ANSI Z80.3 Clause 4.6)

Sample Number : 1					
Test Items		Requirements	Left	Right	Results
Luminous Transmittance T _L (380-780nm)		--	13.5	13.8	Light, medium to dark
		Claimed Shade Scale: (Not Provided)			
Normal Use (%)	τ _{UVB} *	Light, medium to dark : ≡ 0.125τ _v ; Very dark ,Strongly colored: ≡ 1%	0.0 (0.125τ _v =1.7)	0.0 (0.125τ _v =1.7)	P
	τ _{UVA} *	Light , medium to dark : ≡ τ _v Very dark,Strongly colored: ≡ 0.5τ _v	0.0 (0.5τ _v =6.8)	0.0 (0. 5τ _v =6.9)	
High and Prolonged Exposure	τ _{UVB}	≡ 1%	0.0	0.0	P
	τ _{UVA}	≡ 0.5τ _v	0.0 (0.5τ _v =6.8)	0.0 (0. 5τ _v =6.9)	

Remark: *Wave length range: UVA—280nm~315nm; UVB—280nm~315nm

Variations in Luminous Transmittance — Clause & 7.1.5 & 9.2

Sample Number : 1				
Test Items	Requirements	Left	Right	Results
* T_L (380-780nm)	--	13.5	13.8	Shade Scale:3.0
Variations in Luminous Transmittance(R*) (%)	<input checked="" type="checkbox"/> General Purpose Filters: For shades 1.3 through 3.0: $0.90 \leq R \leq 1.10$; For shades 4 through 14 : $0.80 \leq R \leq 1.25$; <input type="checkbox"/> Special-purpose Filters: Tinted: $0.90 \leq R \leq 1.10$; Extra Dark: $0.80 \leq R \leq 1.20$;	1.0		P

Remark: * R is the ration of the two measured transmittances, one for each lens of a pair, or at points directly infront of each eye for a single lens.

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Sample Description

1	Gray protective glasses
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The photo of the sample



AGC authenticate the photo on original report only

*** End of Report***

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