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Test Report T4918-01-1 Issue 1
EN 166:2001
Shu Gie Industrial Co Ltd.
91532 Spectacles
26 August 2009

ACCREDITED
Certificate 1722.01

Approved by:

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Laboratory Manager

Prepared by:

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Laboratory Assistant

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Issued to: Shu Gie Industrial Co. Ltd.
Room #16, 5F/2 Cheng Kiung Road
Tainan City
Taiwan

Date: 26 August 2009
Report: T4918-01-1
Issue: 1

Objective:

Contract testing to EN 166:2001, "Personal Eye Protection - Specifications".

Clauses: 7.1 Basic requirements
7.2.1.2 Protection against optical radiation, Ultraviolet filters (EN 170:2002) *(Clear)*
7.2.1.4 Protection against optical radiation, Sunglare filters for industrial use (EN 172+A2:2001) *(Smoke)*
7.2.2 Protection against high-speed particles – Low energy impact (F) *(Clear and Smoke)*

Samples:

91532 Spectacles **(SG-200)**

Ocular Variant	Qty	Sample ID
Clear	30	8A-x
Smoke	30	8B-x

Date submitted: 03 August 2009

Procedures:

Testing protocols in accord with good laboratory practice were employed unless otherwise specified, for all tests. All tests were conducted in a standard laboratory atmosphere unless otherwise specified.

Testing procedures were followed as specified within:
EN 167:2001 "Personal eye-protection - Optical test methods"
EN 168:2001 "Personal eye-protection - Non-optical test methods"

Samples were randomly selected from the quantity provided and tested in the as-received condition unless otherwise stated.

When applicable, samples were assessed on medium (64mm IPD) headform.

Variation in luminous transmittance- P1 and P2, The actual variation is compared to the specification. If the actual variation does not meet the specification, then the corrected variation is used. The corrected variation is calculated from the difference between the theoretical and actual variation. The theoretical values are determined by applying Beer-Lambert's Law to the known thickness variation of the lens. Lens has a 44 mm vertical depth therefore 34 mm area measured.

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Assessment summary:

Dates tested: 19 through 24 August 2009

EN 166 Requirement	Compliant	Non-Compliant
6 Design and manufacture		
6.1 General construction	X	
6.2 Materials	Not assessed	
6.3 Headbands	Not applicable	
7.1 Basic requirements		
7.1.1 Field of vision	X	
7.1.2 Optical requirements		
7.1.2.1 Spherical, astigmatic, and prismatic refractive powers	Optical Class 1	
7.1.2.2 Transmittance		
7.1.2.2.1 Oculars without filtering action	Not applicable	
7.1.2.2.2 Oculars with filtering action	See 7.2.1	
7.1.2.2.3 Variations in transmittance	X	
7.1.2.3 Diffusion of light	X	
7.1.3 Quality of material and surface	X	
7.1.4 Robustness		
7.1.4.1 Minimum robustness	Not applicable	
7.1.4.2 Increased robustness	X	
7.1.5 Resistance to Ageing		
7.1.5.1 Stability at elevated temperatures	X	
7.1.5.2 Resistance to ultraviolet radiation (oculars only)	X	
7.1.6 Resistance to corrosion	Not applicable	
7.1.7 Resistance to ignition	X	
7.2 Particular requirements (Optional)		
7.2.1 Protection against optical radiation		
7.2.1.2 Ultraviolet filters (EN170)	X	
7.2.1.4 Sunglare filters for industrial use (EN172)	X	
7.2.2 Protection against high speed particles (F)	X	
7.2.8 Lateral Protection	X	
7.3 Optional requirements	None claimed	
9 Marking	Not assessed	
10 Information supplied by the manufacturer	Not assessed	

Samples as assessed meet the requirements of EN166:2001 and as a result of this assessment the following markings are suggested for a product in which the frame and ocular form a single unit:

Ocular Variant	Filter Type	Filter Scale	Temple Marking
Clear	Ultraviolet	2-1.2 or 2C-1.2	CE 'filter scale' 'mfg' 1 F - EN 166 F
Smoke	Sunglare	5-3.1	

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Results:

6.1 General construction; Result: Pass
Samples were assessed and found to be free from projections, sharp edges or other defects that are likely to cause discomfort or injury.

7.1.1 Field of view; Result: Pass
Samples assessed and a 22mm(W) x 20mm(H) ellipse could be described in full for each eye (64mm pupil distance)

7.1.2.1 Refractive powers

Spherical and astigmatic powers

Sample ID	Left Ocular		Right Ocular		Optical Class Met
	Spherical Power (m^{-1})	Astigmatic Power (m^{-1})	Spherical Power (m^{-1})	Astigmatic Power (m^{-1})	
Clear					
8A-1	-0.02	0.05	-0.02	0.05	1
8A-2	-0.03	0.03	-0.01	0.05	1
8A-3	-0.01	0.05	-0.02	0.06	1
Specification Optical Class 1: Optical Class 2: Optical Class 3:	 +/- 0.06 +/- 0.12 + 0.12 /- 0.25	 ≤ 0.06 ≤ 0.12 ≤ 0.25	 +/- 0.06 +/- 0.12 + 0.12 /- 0.25	 ≤ 0.06 ≤ 0.12 ≤ 0.25	

Difference in prismatic refractive power

Sample ID	Vertical Imbalance (cm/m)	Horizontal Imbalance (cm/m)	Optical Class Met
Clear			
8A-1	0.06	0.06 Base Out	1
8A-2	0.04	0.06 Base In	1
8A-3	0.06	0.05 Base Out	1
Specification Optical Class 1: Optical Class 2: Optical Class 3:	 ≤ 0.25 ≤ 0.25 ≤ 0.25	 ≤ 0.75 Base Out, ≤ 0.25 Base In ≤ 1.00 Base Out, ≤ 0.25 Base In ≤ 1.00 Base Out, ≤ 0.25 Base In	

7.1.2.2.3 Variations in transmittance *[filtering]*

Clear

Sample ID:	8A-4		8A-5		8A-6		Specification
Ocular:	Left	Right	Left	Right	Left	Right	
Maximum %T:	90.4	90.4	90.4	90.6	90.4	90.4	
Center %T:	90.3	90.3	90.2	90.2	90.2	90.2	
Minimum %T:	90.0	90.1	89.9	90.0	89.7	90.0	
Actual P1 & P2:	0.3	0.2	0.3	0.4	0.6	0.2	± 5%
P3:	0.0		0.0		0.0		± 20%
Pass/Fail:	Pass						

Smoke

Sample ID:	8B-4		8B-5		8B-6		Specification
Ocular:	Left	Right	Left	Right	Left	Right	
Maximum %T:	15.0	15.7	15.0	15.2	14.9	15.4	
Center %T:	13.8	14.3	14.0	14.1	14.0	14.2	
Minimum %T:	13.0	13.8	13.9	13.9	13.8	13.8	
Actual P1 & P2:	8.7	9.8	7.1	7.8	6.4	8.5	± 10%
P3:	3.5		0.7		1.4		± 20%
Pass/Fail:	Pass						

7.1.2.3 Diffusion of light

Sample ID	Measured Value ($cd/m^2/lx$)	Pass	Fail
Clear			
8A-4	0.14	X	
8A-5	0.10	X	
8A-6	0.12	X	
Smoke			
8B-4	0.10	X	
8B-5	0.11	X	
8B-6	0.09	X	
Specification:	≤ 0.75		

7.1.3 Quality of material and surface; Result: Pass

Samples assessed were found to be free of any optical defects that could impair vision.

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7.1.4.2.2 Increased robustness - Complete eye-protectors

Sample ID	Location	Conditioning	Velocity (m/s)	Pass	Fail
Clear			5.1m/s 22mm 43g Drop Ball 1.3m		
8A-7	Left Frontal (1)	55°C		X	
8A-8				X	
8A-9	Right Frontal (2)			X	
8A-10				X	
8A-11	Left Lateral (3)			X	
8A-12	Right Lateral (4)			X	
8A-13	Left Frontal (1)	-5°C		X	
8A-14				X	
8A-15	Right Frontal (2)			X	
8A-16				X	
8A-17	Left Lateral (3)			X	
8A-18	Right Lateral (4)			X	
Smoke					
8B-7	Left Frontal (1)	55°C		X	
8B-8				X	
8B-9	Right Frontal (2)			X	
8B-10				X	
8B-11	Left Lateral (3)			X	
8B-12	Right Lateral (4)			X	
8B-13	Left Frontal (1)	-5°C		X	
8B-14				X	
8B-15	Right Frontal (2)			X	
8B-16				X	
8B-17	Left Lateral (3)			X	
8B-18	Right Lateral (4)			X	

7.1.5.1 Stability at elevated temperatures; Result: Pass
Samples assessed had no visible deformation.

7.1.5.2 Resistance to ultraviolet radiation - Transmittance

Sample ID	Before (%T)	After (%T)	Relative Change (%)	Pass	Fail
Clear					
8A-4	90.3	90.0	-0.332	X	
8A-5	90.2	90.2	0.00	X	
8A-6	90.2	90.1	-0.111	X	
Specification:			±5		
Smoke					
8B-4	14.3	14.1	-1.40	X	
8B-5	14.0	14.1	0.71	X	
8B-6	14.2	14.1	-0.70	X	
Specification:			±10		

7.1.5.2 Resistance to ultraviolet radiation - Diffusion of Light

Sample ID	Measured Value ($cd/m^2/lx$)	Pass	Fail
Clear			
8A-4	0.14	X	
8A-5	0.12	X	
8A-6	0.15	X	
Smoke			
8B-4	0.15	X	
8B-5	0.17	X	
8B-6	0.12	X	
Specification:	≤ 0.75		

7.1.7 Resistance to ignition; Result: Pass

Samples did not ignite or continue to glow after removal of the steel rod.

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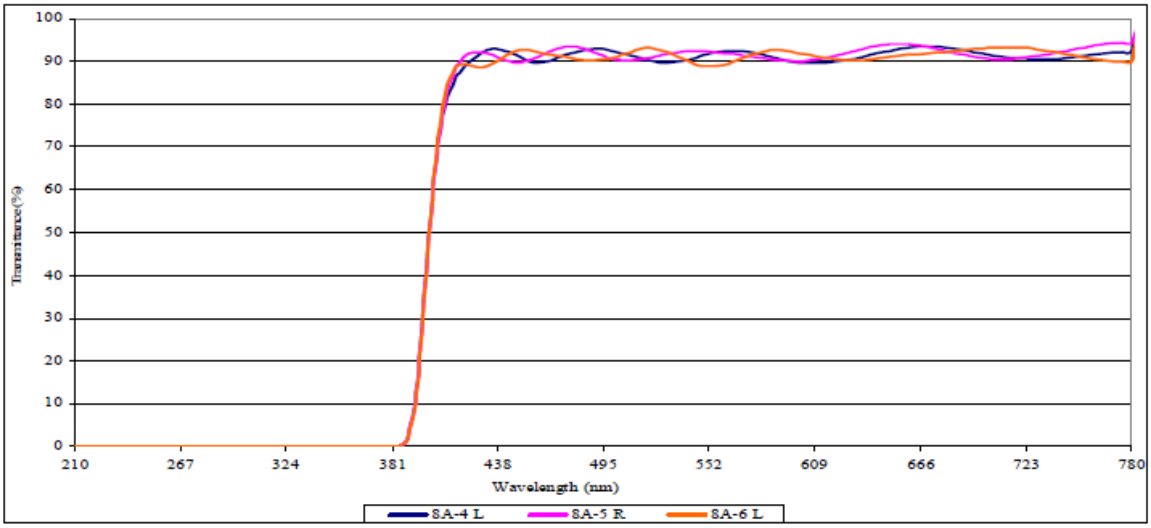
7.2.1.2 Protection against optical radiation - Ultraviolet filters (EN 170)

Clear

Sample ID:	8A-4	8A-5	8A-6	Specification Scale Number 2-1.2 or 2C-1.2
Luminous (Tv)	91.0	91.4	91.0	74.4 to 100%
313nm	1.1E-4	1.1E-4	1.1E-4	≤ 0.0003%
365nm	2.9E-4	3.0E-4	3.1E-4	≤ 10%
Max. 210 to 313nm	1.2E-4	1.2E-4	1.2E-4	≤ 0.0003%
Max. 313 to 365nm	3.7E-4	3.8E-4	3.7E-4	≤ 10%
Max. 365 to 405nm	66.2	66.0	67.2	< Tv
Optional requirements for oculars with enhanced color recognition:				
Min. 500 to 650nm	89.6	90.1	88.8	≥ 0.2 Tv
Attenuation Quotients:				
Red Signal	0.99	1.00	1.00	≥ 0.8
Yellow Signal	1.00	1.00	1.00	
Green Signal	1.00	1.00	1.00	
Blue Signal	1.00	1.00	1.00	
Scale number met	2-1.2 or 2C-1.2			



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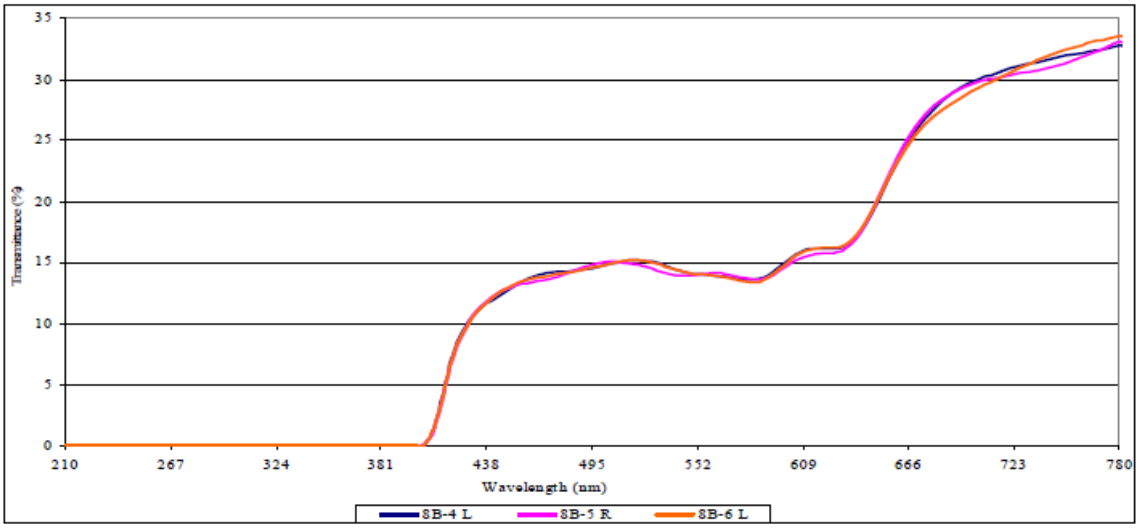
7.2.1.4 Protection against optical radiation - Sunglare filters for industrial use (EN 172)

Smoke

Sample ID:	8B-4	8B-5	8B-6	Specification Scale Number 5-3.1
Luminous (Tv)	14.7	14.6	14.7	8.0 to 7.8 %
Max. 280 to 315nm	<1E-4	<1E-4	<1E-4	≤ 0.01 Tv
Max. 315 to 350nm	<1E-4	<1E-4	<1E-4	≤ 0.5 Tv
Mean 315 to 380nm	<1E-4	<1E-4	<1E-4	≤ 0.5 Tv
Requirements for "Driving and Road Use:				
Luminous (Tv)	14.7	14.6	14.7	≥ 8.0%
Min. 500 to 650nm	13.6	13.6	13.4	≥ 0.2 Tv
Attenuation Quotients:				
Red Signal	1.15	1.14	1.15	≥ 0.8
Yellow Signal	1.03	1.03	1.03	
Green Signal	0.99	0.99	0.99	
Blue Signal	1.05	1.05	1.05	
Scale number met	5-3.1			



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7.2.2 Protection against high-speed particles

Sample ID	Location	Velocity (m/s)	Pass	Fail
Clear				
8A-19	Left Frontal (1)	46.3	X	
8A-20		46.3	X	
8A-21		46.6	X	
8A-22		46.6	X	
8A-23	Right Frontal (2)	46.3	X	
8A-24		46.6	X	
8A-25		46.6	X	
8A-26		46.3	X	
8A-27	Left Lateral (3)	46.3	X	
8A-28		46.6	X	
8A-29	Right Lateral (4)	46.3	X	
8A-30		46.6	X	
Smoke				
8B-19	Left Frontal (1)	46.6	X	
8B-20		46.6	X	
8B-21		46.3	X	
8B-22		46.6	X	
8B-23	Right Frontal (2)	46.3	X	
8B-24		46.6	X	
8B-25		46.3	X	
8B-26		46.6	X	
8B-27	Left Lateral (3)	46.3	X	
8B-28		46.6	X	
8B-29	Right Lateral (4)	46.3	X	
8B-30		46.6	X	

7.2.8 Lateral protection; Result: Pass

Samples prevent the tip of a 2mm rod from touching the lateral impact regions of the headform.

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Sample photographs:

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22. In the event that payment is not received within 15 days of invoice date, Client agrees to pay a late payment charge on the unpaid balance equal to 1-1/2% per month or the maximum charge allowed by law, whichever is less, and all costs and expenses, including attorney's fees where recovery of the same is not prohibited by law, incurred by ICS in collecting such invoices.
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Organismo Notificato UE n. 0530 - Autorizzato dal Ministero dello Sviluppo Economico e dal Ministero del Lavoro e della Previdenza Sociale con D.L. 12/12/07.

TEST REPORT

Client:	SHU GIE INDUSTRIAL CO.,LTD
Address:	RM16 5F NO.2 CHENGGONG ROAD - 70443 TAINAN CITY TAIWAN
Article:	Spectacle
Model:	91532 - Clear oculars (SG-200)
Job no.:	C130348
Report no.:	131418
Receiving Date:	02/04/2013
Date of Test Begin:	11/04/2013
Date of Test End:	19/04/2013
Issuing Date:	30/04/2013
Standard Applied:	EN 166:2001 - Personal eye-protection - Specifications

Note 1: This Test Report is valid exclusively for the specimens utilized for tests and any modification shall be solely performed with the issuing of a new test report.
Note 2: The partial reproduction of this Test Report is permitted against written authorization by Certottica.
Note 3: The tests were performed on specimens that sampled the customer.

CERTOTTICA Longarone S.C.a R.L.

Mechanical Tests

Resistance to fogging of oculars

Clause 7.3.2

Requirements

Note: This test does not assess resistance to fogging of the complete of the complete eye-protector.

The oculars shall remain free from fogging for a minimum of 8 s when tested according to clause 16 of EN 168:2001.

Outcomes

The tested samples have given the following results:

Sample	Time (s)	Test
130852 37sx	58	Pass
130852 37dx	> 60	Pass
130852 38sx	> 60	Pass
130852 38dx	56	Pass

Laboratories Technical Manager: Giorgio Sommariva

CERTOTTICA Longarone S.C. a R.L.