CERTOTTICA

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TEST REPORT

Client:	BOLLE' PROTECTION
Address:	95 rue Louis Guèrin - 69 100 VILLEURBANNE FRANCE
Article:	Spectacle
Model:	RAIDER yellow lenses
Job no.:	C100796
Report no.:	102793
Receiving Date:	23/08/2010
Date of Test Begin:	08/09/2010
Date of Test End:	21/09/2010
Issuing Date:	22/09/2010
Standard Applied:	EN 166:2001

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 Test Report in digital format and the relevant attached file of the digital signatures are official documents. The validity of this Test Report can be checked at **http://www.certottica.org**.
Note 4: The tests were performed on specimens that sampled the customer.

Optical Tests

Quality of material and surface

Clause 7.1.3

Requirements

Except for a marginal area 5 mm wide, oculars shall be free from any significant defects likely to impair vision in use.

Outcomes

Sample	Defects	Test
102793 15sx	—	Pass
102793 15sx	—	Pass
102793 16sx	—	Pass
102793 16sx	—	Pass
102793 17sx	—	Pass
102793 17sx	—	Pass

Diffusion of light

Clause 7.1.2.3

Requirements

Le reduced luminance factor shall be not superior than 1 $cd\,m^{-2}\,lx^{-1}$ for welding filters, 0.75 $cd\,m^{-2}\,lx^{-1}$ for oculars used in eye-protectors against high speed particles, 0.5 $cd\,m^{-2}\,lx^{-1}$ for all other oculars.

Outcomes

Sample	ℓ^* ($cd\,m^{-2}\,lx^{-1}$)	Test
102793 15dx	0.10	Pass
102793 15sx	0.13	Pass
102793 16dx	0.11	Pass
102793 16sx	0.11	Pass
102793 17dx	0.10	Pass
102793 17sx	0.12	Pass

Trasmittance

Clause 7.1.2.2

Oculars with filtering action (filters) and housings for oculars with filtering action

Clause 7.1.2.2.2

Requirements

The trasmittance requirements for filtering oculars are specified in the EN 169 - *Welding filters*, EN 170 - *Ultraviolet filters*, EN 171 - *Infrared filters*, EN 172 - *Sunglare filters for industrial use* and EN 379, *Welding filters with switchable luminous transmittance*.

Goggles and face-shields mounting filtering oculars shall provide al least the same level of protection as given by the oculars.

Transmittance requirements

EN170 Clause 5.2

Requirements

Trasmittance requirements of the ultraviolet filters are stated on Table 1 of the standard.

Luminous Transmittance

Requirements

Luminous Transmittance, Tv, shall be not inferior to 1.2 %. For each shade number the minimum and maximum limits are reported in Table 1 of standard.

Outcomes

The Tv measurement values in percent and relative tests are:

Sample	Tv (%)	Test
102793 15sx	85.0	Pass
102793 15dx	84.7	Pass
102793 16sx	84.8	Pass
102793 16dx	84.8	Pass
102793 17sx	84.4	Pass
102793 17dx	84.2	Pass

Spectral Transmittance in the Ultraviolet and Visible Regions

Requirements

The maximum value of spectral transmittance from 210 to 313 nm, here indicated with Tmax210_313, and the maximum value of spectral transmittance from 313 to 365 nm, here indicated with Tmax313_365, must be inferior to limit specificated in Table 1 of standard.
The maximum value of spectral transmittance from 365 to 405 nm, here indicated with Tmax365_405, must be inferior to Tv.

Outcomes

Measurement values and relative test are:

Sample	Tmax210_313 (%)	Test	Tmax313_365 (%)	Test	Tmax365_405 (Tv)	Test
102793 15sx	0.0002	Pass	0.0003	Pass	0.14	Pass
102793 15dx	0.0002	Pass	0.0003	Pass	0.15	Pass
102793 16sx	0.0002	Pass	0.0003	Pass	0.14	Pass
102793 16dx	0.0002	Pass	0.0003	Pass	0.14	Pass
102793 17sx	0.0002	Pass	0.0003	Pass	0.14	Pass
102793 17dx	0.0002	Pass	0.0003	Pass	0.15	Pass

Oculars with the superior ability of the colors recognition (optional requirement)

EN170 - Clause 5.3

Q-factors

Requirements

Note: This clause is optional and apply to filters “with semaforic signals recognition superior ability”.
The value of the Q-factor of red, yellow, green and blue signals shall not be lower than 0.8 for filters declared appropriate for driving and use on the road. Quotients according to various signals are here identified as: Qred, Qyellow, Qgreen and Qblue.

Outcomes

The measurement values of Qred, Qyellow, Qgreen, Qblue and the results of the relative tests are:

Sample	Qred	Test	Qyellow	Test	Qgreen	Test	Qblue	Test
102793 15sx	1.11	Pass	1.10	Pass	0.95	Pass	0.86	Pass
102793 15dx	1.11	Pass	1.10	Pass	0.95	Pass	0.86	Pass
102793 16sx	1.12	Pass	1.10	Pass	0.95	Pass	0.86	Pass
102793 16dx	1.11	Pass	1.10	Pass	0.95	Pass	0.86	Pass
102793 17sx	1.12	Pass	1.10	Pass	0.95	Pass	0.86	Pass
102793 17dx	1.11	Pass	1.10	Pass	0.95	Pass	0.86	Pass

Spectral Transmittance from 500 to 650 nm

Requirements

The minimun value of the spectral transmission factor in the wavelength interval from 500 to 650 nm, here named Tmin500_650, shall not be inferior to 0.2 Tv.

Outcomes

The minimun value measured of the spectral transmittance from 500 to 650 nm, is:

Sample	Tmin500_650 (Tv)	Test
102793 15sx	0.75	Pass
102793 15dx	0.75	Pass
102793 16sx	0.75	Pass
102793 16dx	0.75	Pass
102793 17sx	0.75	Pass
102793 17dx	0.75	Pass

Scale Number

Requirements

Table 1 of standard specify the scale number of filter. Filters that do not satisfy Clause 4d) relative to deviation of spectral transmittance from Tv in the interval from 405 a 610 nm are classified at the most code 2 if not otherwise declared.

Outcomes

Scale number of filter examinated is:

Sample	Scale Number
102793 15sx	2C - 1,2
102793 15dx	2C - 1,2
102793 16sx	2C - 1,2
102793 16dx	2C - 1,2
102793 17sx	2C - 1,2
102793 17dx	2C - 1,2

Variations in transmittance (Oculars without filtering action are exempt from this requirement)

Clause 7.1.2.2.3

Oculars without corrective effect

Clause 7.1.2.2.3.1

Requirements

The relative variation of the luminous transmittance around the visual centre(s) P_1 (and P_2) shall not exceed the values stated in Table 4 of the standard.

The relative difference in luminous transmittance, P_3, between left and right oculars shall not exceed the values stated in Table 4 of the standard or 20% whichever is greater.

Outcomes

Sample	P_1 (%)	Test	P_2 (%)	Test	P_3 (%)	Test
102793 15	0	Pass	0	Pass	0	Pass
102793 16	0	Pass	0	Pass	0	Pass
102793 17	0	Pass	0	Pass	0	Pass

Resistance to ultraviolet radiation (oculars only)

Clause 7.1.5.2

Requirements

The external surface of the filters is exposed to radiation of a 450W XBO Xenon lamp. The exposure time is 50 hours, the distance between filter and lamp is 300 mm, and the test equipment operate at environment temperature of 23 ± 5 Celsius degrees.
The absolute value of the relative variation of Tv after radiation shall not be greater than the values specified in Table 6 of EN166.
Measurement value of ℓ^* after radiation shall be not higher than 1, 0.75, 0.5 $cd\,m^{-2}\,lx^{-1}$ respectivily for welding filters, ocular for protection against high-speed particles, for all other type of oculars.

Outcomes

Measurement values of Tv and ℓ^* after irradiation, the relative variation of Tv and the test results are:

Sample	Tv (%)	$\Delta Tv/Tv$ (%)	Test	ℓ^* ($cd\,m^{-2}\,lx^{-1}$)	Test
102793 15sx	82.9	-2	Pass	0.08	Pass
102793 15dx	85.5	1	Pass	0.02	Pass
102793 16sx	83.9	-1	Pass	0.01	Pass
102793 16dx	85.7	1	Pass	0.02	Pass
102793 17sx	83.6	-1	Pass	0.04	Pass
102793 17dx	85.8	2	Pass	0.03	Pass

Optical Tests - Checked by: Renato Battistin

Laboratory Technical Manager: Giorgio Sommariva

Figure 1: Specimen picture.