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Jarosław Kusior, MA

CERTIFIED TRANSLATION OF THE ORIGINAL DOCUMENT PREPARED IN POLISH

[Remarks of the translator have been entered in italics and included in square brackets]

Tłumacz przysięgły języka angielskiego
Sworn translator of English

mgr Jarosław Kusior

CIOP PIB

CENTRAL INSTITUTE FOR LABOUR PROTECTION –
NATIONAL RESEARCH INSTITUTE
ul. Czerniakowska 16, 00-701 Warszawa

ilac-MRA

PCA
Polskie Centrum Akredytacji
BADANIA
AB 038

PPE DEPARTMENT

EYE AND FACE PROTECTION LABORATORY

TEST REPORT

Order no.: 269/PB-COV/2020/NO

Order subject: Face shield tests

Ordering Party: Tech Design Aleksandra Klimek
ul. Grota Roweckiego 203, 52-214 Wrocław

Test report preparation date: 22.04.2020

Lead tester: Krzysztof Płachta [*signature*]

Authorized by: Grzegorz Owczarek [*signature*]

Approved by: [*stamp:*] Testing and Calibration Laboratory Team Manager mgr Karolina Burza [*signature*]

This test report contains test results included in the accreditation scope and non-accredited test results. The test results outside of the accreditation scope are marked with (*).

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FACE SHIELD TESTING

1. **Test subject**
   CoverOne face shield: CVO-1 - 15 samples.

2. **Test sample reception date:**
   9/4/2020
   Sample registration number: 23/2020

3. **Test execution date:**
   20/4/2020

4. **Declaration**

4.1. The test samples covered by this report relate only to the provided samples.
4.2. This report, without written consent of CIOP-PIB, shall not be reproduced otherwise than in full.
4.3. The report contains 7 numbered pages.

5. **Test scope**

Accredited test:

- Quality of the optical material and its surface PN-EN 167:2005.
- Spherical optical power PN-EN 167:2005.
- Astigmatism PN-EN 167:2005.
- Prismatic power difference PN-EN 167:2005.
- Reduced light scattering luminance coefficient PN-EN 167:2005.
- Light transmission coefficient, ultraviolet transmission spectral coefficients PN-EN 167:2005.
- Resistance to UV radiation PN-EN 167:2005, PN-EN 168:2005.
- Resistance to elevated temperatures PN-EN 168:2005.
- Improved impact resistance PN-EN 168:2005.
- Resistance to high-speed particle impact (B) PN-EN 168:2005.
- Ignition resistance PN-EN 168:2005.

Non-accredited tests:

- Field of view PN-EN 168:2005.
- Protection against liquid splashes PN-EN 168:2005,
- Corrosion resistance PN-EN 168:2005.

6. **Test location:**

6.1. Eye And Face Protection Laboratory.
6.2. CIOP-PIB, ul. Wierzbowa 48, 90-133 Łódź.

7. Test results

The study results are presented below.

Quality of the optical material and its surface

Tested feature	Sample number					Requirement pursuant to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	1	2	3	4	5		
Nicks	no	no	no	no	no	Except for the 5 mm wide boundary area, no damage that could worsen vision	Meets the requirements of PN-EN 166:2005, cl. 7.1.3
Vesicles	no	no	no	no	no		
Cracks	no	no	no	no	no		
Inclusions	no	no	no	no	no		
Fogging	no	no	no	no	no		
Pitting	no	no	no	no	no		
Mould impressions	no	no	no	no	no		
Scratches	no	no	no	no	no		
Grains	no	no	no	no	no		
Pinholes	no	no	no	no	no		
Flaking	no	no	no	no	no		
Surface waviness	no	no	no	no	no		

Spherical optical power

Sample number	Optical power with sharp image vision [m^{-1}]		Spherical optical power of sample [m^{-1}]	Requirement pursuant to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	horizontal test strips	vertical test strips			
1	0.02	0.02	0.02	±0.06 [m^{-1}]	Meets the requirements of PN-EN 166:2005 cl. 7.1.2.1.2 for class 1 optical execution
2	0.02	0.02	0.02		
3	0.03	0.02	0.02		
Average spherical optical power of trial			0.02		

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Astigmatism

Sample number	Optical power with sharp image vision [m^{-1}]		Astigmatism [m^{-1}]	Requirement pursuant to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	horizontal test strips	vertical test strips			
1	0.02	0.02	0.00	0.06 [m^{-1}]	Meets the requirements of PN-EN 166:2005, cl. 7.1.2.1.2 for class 1 optical execution
2	0.02	0.02	0.00		
3	0.03	0.02	0.01		
Average spherical optical power of trial			0.00		

Prismatic power difference

Specification		Sample number			Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
		4	5	6		
Prismatic power	"inside base"	no	no	no	For class 1: lower than 0.75 [cm/m] outside base, horizontally	Meets the requirements of PN-EN 166:2005, cl. 7.1.2.1.2
	"outside base"	yes	yes	yes		
Prismatic power difference [cm/m]	horizontally	0.35	0.35	0.30		
	vertically	0	0	0		

Reduced light scattering luminance coefficient

Sample number	Reduced light scattering luminance coefficient [cd/(m2 x lx)]	Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
6	0.39	0.75 $\frac{\text{cont.}}{m^2 \cdot lx}$	Meets the requirements of PN-EN 166:2005, cl. 7.1.2.3
7	0.40		
8	0.40		

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Light transmission coefficient, ultraviolet transmission spectral coefficients

Sample number	Light transmission coefficient [%]	Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
6	89.47	The light transmission coefficient should be greater than 74.4%	Meets the requirements of PN-EN 166:2005, cl. 7.1.2.2.1
7	89.74		
8	89.43		

Resistance to ultraviolet radiation

Sample number	Reduced light scattering luminance coefficient after illumination	Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
3	0.55	0.75 $\frac{\text{cont.}}{m^2 \cdot lx}$	Meets the requirements of PN-EN 166:2005, cl. 7.1.5.2
4	0.52		
5	0.55		

Resistance to ultraviolet radiation

Sample number	Light transmission coefficient prior to illumination [%]	Light transmission coefficient after illumination [%]	Relative change of the light transmission coefficient [%]
6	89.47	88.78	0.77
7	89.74	88.99	0.83
8	89.43	88.64	0.88
Requirement pursuant to PN-EN 166:2005		After illumination, the permissible relative change of the light transmission coefficient is: - ±5% for a light transmission coefficient from 100% to 17,8%	
Requirement compliance/non-compliance assessment		Meets the requirements of PN-EN 166:2005, cl. 7.1.5.2	

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Resistance to elevated temperature

Sample number	Tested feature	Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	Visible face shield deformations		
6	no	Fitted eye protection measures shall not exhibit visible deformations	Meets the requirements of PN-EN 166:2005, cl. 7.1.5.1
7	no		
8	no		

Improved resistance to impact with a speed of 5.1 m/s using a steel ball

Tested feature	Sample number[1)]								Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	1.2	3.4	5.6	7.8	9	10	11	12		
Protective glass shattering	no	no	no	no	no	no	no	no	Should not lead to damage: glass shattering, glass deformation, frame or holder breakage	Meets the requirements of PN-EN 166:2005, cl. 7.1.4.2
Protective glass deformation	no	no	no	no	no	no	no	no		
Protective glass frame shattering	no	no	no	no	no	no	no	no		

[1)]Samples: *1, 2 - impact at point "left eye, front", sample conditioned at (+55±2) ℃*
3, 4 - impact at point "left eye, front", sample conditioned at (-5±2) ℃
5, 6 - impact at point "right eye, front", sample conditioned at (+55±2) ℃
7, 8 - impact at point "right eye, front", sample conditioned at (-5±2) ℃
9 - impact at point "left eye, side", sample conditioned at (-55 ±2) ℃
10 - impact at point "left eye, side", sample conditioned at (-5±2) ℃
11 - impact at point "right eye, side", sample conditioned at (+55±2) ℃
12 - impact at point "right eye, side", sample conditioned at (-5±2) ℃

Resistance to high-speed particle impact using a steel ball hitting with a speed of 45 m/s

Tested feature	Sample number[1)]				Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	1, 2, 3, 4	5, 6, 7, 8	9, 10	11, 12		
Protective glass shattering	no	no	no	no	Should not lead to damage: glass shattering, glass deformation, frame or holder breakage the side shield is sufficient when it protects against the rod touching impact point surroundings.	Meets the requirements of PN-EN 166:2005, cl. 7.2.2
Protective glass deformation	no	no	no	no		
Protective glass frame shattering	no	no	no	no		
Sufficient side protection shield	yes	yes	yes	yes		

[1)]Samples: *1, 2, 3, 4 - impact at point "left eye, front", sample conditioned at (+23± 5) ℃*
5, 6, 7, 8 - impact at point *"right eye, front", sample conditioned at (+23±5) ℃*
9, 10 - impact at *point "left eye, side", sample conditioned at (+23+5) ℃*
11, 12 - impact at *point "right eye, side", sample conditioned at (+23±5)) ℃*

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Ignition resistance

Tested feature	Sample number			Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	10	11	12		
sample burns	no	no	no	In the course of the test, none of the shield elements neither ignited nor glowed after removing the steel rod	Meets the requirements of PN-EN 166:2005, cl. 7.1.7
sample glows	no	no	no		

Field of view test *

Specification	Sample number			Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	2	3	5		
The shield provides a minimum field of view	yes	yes	yes	An eye protection shall provide a minimum field of view defined by two ellipses, while there are positioned and centred at a distance of 25 mm from the eyes within a head model.	Meets the requirements of PN-EN 166:2005, cl. 7.1.1

Protection against liquid splashes *

Sample number	Specification		Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	The shield covers the rectangular eye area	Shield vertical central line depth [mm][1)]		
9	yes	165	Face shields protect the rectangular eye area within a head model. A shield shall have a field of view with a minimum vertical central line depth of 150 mm.	Meets the requirements of PN-EN 166:2005, cl. 7.2.4
10	yes	166		
11	yes	165		

[1)]The central vertical line depth measurements were performed taking into account the actual field of view for a shield installed in a frame supplied by the manufacturer.

Corrosion resistance*

Specification	Sample number			Requirement acc. to PN-EN 166:2005	Requirement compliance/non-compliance assessment
	4	7	8		
Metal element surfaces remained smooth and free from oxidations	yes	yes	yes	All metal parts of the eye protection shall have smooth surfaces, free from oxidation traces	Meets the requirements of PN-EN 166:2005, cl. 7.1.6

End of report

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Register No. 1004/2020
I, Jaroslaw Kusior, sworn translator of English
hereby certify that this is a true copy of the original document submitted in **POLISH.**

Fee charged according to effective Regulation of the Minister of Justice on the Sworn Translator's Remuneration for Translation Services of January 24, 2005 Dziennik Ustaw (Polish Journal of Laws) of 2005 No. 15 item 131

Wrocław, 17.08.2020

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