



Prüfschein

Test Certificate

Ausgestellt für:
Issued to: Protech Leaded Eyewear
10415 Riverside Drive, #107
RM/STE 107
Palm Beach Gardens, FL 334 104278
USA

Prüfgrundlage:
In accordance with: EN 61331-1:2014 and EN 61331-3:2014

Gegenstand:
Object: X-ray shielding glasses

Typ:
Type: Heavy-duty protective eye-glasses

Kennnummer:
Serial No.: ID see page 2

Prüfscheinnummer:
Test Certificate No.: 6253817

Datum der Prüfung:
Date of test: 2017-06

Anzahl der Seiten:
Number of pages: 3

Geschäftszeichen:
Reference No.: 6.25-38-17K

Im Auftrag
On behalf of PTB



Dr. Ludwig Büermann

Braunschweig, 2017-06-22

Siegel
Seal



Im Auftrag
On behalf of PTB



Andreas Eßmann

1 Scope

Determination of the lead equivalent value δ_N according to EN 61331-1 clause 5.4 at the "150 kV" radiation quality using the narrow beam geometry according to EN 61331-1 clause 4.2. According to EN 61331-3 clause 13.3 δ_N shall be not less than 0,5 mm Pb.

2 Description of the samples and results:

Heavy-duty protective eye-glasses, leaded, nominal 0,75 mm Pb.

Material type	Identification	Lead equivalent value measured at 150 kV comply with 13.3 of EN 61331-3
Protective eye-glasses	65 mm RWB-46 400B C/T:2.5mm	Yes
Protective eye-glasses	73 mm RWB-46 600B C/T:2.5mm	Yes
Protective eye-glasses	73 mm RWB-46 800B C/T:2.5mm	Yes
Protective eye-glasses	80 mm RWB-46 400B C/T:2.5mm	Yes
Protective eye-glasses	71 mm SF Progressive Blank RWB-46 ADD +2.50 600B L	Yes

3 Results

3.1 Statement of compliance

The lead equivalent thickness measured at 150 kV for the samples listed in 2 were all greater than 0,5 mm. The lead glasses listed in 2. comply with IEC 61331-3 clause 13.

4 Single results of attenuation ratios and lead equivalent values

4.1 Narrow beam condition according to EN 61331-1 clause 4.2

F_N	Attenuation ratio measured with narrow beam condition		
δ_N	Lead equivalent determined with narrow beam condition		
R_N	Ratio δ_N / nominal lead thickness		
ALXX	Radiation Qualities according to EN 61331-1 Table 1		
XX	x-ray tube high voltage in kV		
65mm RWB-46 400B			
Quality	F_N	$\delta_N / \mu\text{m}$	> 500
AL150	43,63	702,9	Y
73mm RWB-46 600B			
Quality	F_N	$\delta_N / \mu\text{m}$	> 500
AL150	52,28	755,6	Y
73mm RWB-46 800B			
Quality	F_N	$\delta_N / \mu\text{m}$	> 500
AL150	49,22	737,9	Y
80mm RWB-46 400B			
Quality	F_N	$\delta_N / \mu\text{m}$	> 500
AL150	44,00	705,4	Y
Progressive Blank 71 mm SF RWB-46			
Quality	F_N	$\delta_N / \mu\text{m}$	> 500
AL150	6290,00	2450,0	Y

Uncertainty of δ_N :

The relative expanded uncertainty of the measured lead equivalent δ_N is 4%.

The uncertainty stated is the expanded measurement uncertainty obtained by multiplying the standard measurement uncertainty by the coverage factor $k = 2$. It has been determined in accordance with the "Guide to the Expression of Uncertainty in Measurement (GUM)". The value of the measurand then normally lies, with a probability of 95 %, within the attributed coverage interval.

5 Materials and methods used for testing

Materials and methods used for the testing are described in the Technical Report 2016 JINST 11 T09002 (freely available online <http://iopscience.iop.org/article/10.1088/1748-0221/11/09/T09002>).