Rapport
Report

Oppdragsgiver *Client*	**Utførende enhet/lab.** *Department/laboratory responsible*
Xplosafe AS Økrisletta 15, 1340 Skui	Kiwa AS 3601 KONGSBERG

Rapportnr. *Report no.*

ENG-25NO-00188OR01

Tittel *Title*

Explosion test according to EN 13124-2

Dato *Date*	**Utarbeidet av** *Prepared by*	**Innleveringsdato for prøve** *Date of receipt of test object*
26.3.2025	Asgeir Haukaas	NA
		Prøvetaking utført av Kiwa *Sampling by Kiwa* Nei *No*

Revisjonsnr. *Revision no.*	**Konfig.kont.** *Config.contr.*	**Antall sider** *No. of pages*	**Ant. vedlegg** *No. of append.*
-	Ja *Yes*	9+2	1

Dato for bevitnelse/date for witness	**Akkreditert test (ISO 17025)** *Accredited test (ISO 17025)*	**Kundens ref.** *Client's ref.*	**Bestillingsnr.** *Order no.*
25.3.2025	Nei *No*	Kai Børre Andersen, Weldingh, Espen	-

Fordeling *Distribution*

Klient: PDF
KIWA AS

Kiwa AS

Postadresse:
Postboks 141 Økern
NO-0509 Oslo

Besøksadresse:
Kabelgaten 2,
NO-0580 Oslo

Tlf.: +47 22 86 50 00
E-post: firmapost@kiwa.com

Web: kiwa.no
Org.no. 976 491 696

1. Introduction

XploSafe AS has engaged Kiwa AS to witness a blast test of a window intended for use in construction machinery where there is a risk of explosives detonating near the machine. The windows are glued together. See pictures.

The burst test was carried out on 25.03.2025 at Franzefoss Pukkverk at Ringeriksveien 219 in Bærum. The test is in accordance with EN 13124-2 and EN 13123-2. The window size is the one used on machines today

Image 1. Window made of polycarbonate mounted in a frame on an 8-foot container.

1. Reference

NS-EN 13124-2-2004; Windows, doors and shutters - Explosion resistance - Part 2: Outdoor testing
NS-EN 13123-2-2004; Windows, doors and shutters - Explosion resistance - Requirements and classification - Part 2: Outdoor testing

2. Execution

The test was carried out at an ambient temperature of 15°C and a humidity of 30% RH.

3 kg of dynamite was placed 3 meters from the window and at a height of 500 mm.

The window consists of 3 parts and is glued. The material of the window is made of polycarbonate Saphir®. The window is installed in the same way as if it were placed in a machine.

Details:
• Window is polycarbonate Saphir®.
• The window is 12mm thick

The data on the glue is as follows:
• Window glue: Betaseal 1580
• Primer: Betaprime 5404
• Sealant (between the panes): Würth STP Transparent

• The dynamite was placed 0.5 meters above the ground on a polystyrene beam 3 meters from the window

3. Photos

Image 2. 3 kg of dynamite placed 3 meters in front of the window with a height of 0.5 meters

Image 3. Before blasting.

Image 4. Before blasting.

Image 5. After the explosion. The window is undamaged.

Image 6. The window without damage. The sealant holding 2 of the windows was slightly damaged. About 25cm of the sealant was blown away by the pressure.

4. Conclusion

According to EN 13124-2 and EN 13123-2, the method shall be classified according to table 1. This test satisfies class EXR2-NS.

There was only minor damage to the sealant, see picture 6.

The classes EXR1 to EXR5 (see Table 1) are in order of increasing explosion resistance. When a window, door or shutter achieves a particular class it also automatically achieves all lower classes.

Table 1 — Classification, charge mass and range

Classification code	Charge mass (kg)	Stand-off (m)
EXR1	3	5,0
EXR2	3	3,0
EXR3	12	5,5
EXR4	12	4,0
EXR5	20	4,0

NOTE Results of the tests are further notated with an addition of an S or NS suffix with regard to the presence or absence of splinters originating from the rear (protected) face of the test specimen.

EXAMPLE 1 EXR1 (S) Splinters ejected from rear face (protected side) of the glass or infill material.

EXAMPLE 2 EXR1 (NS) No splinters ejected from rear face (protected side) of the glass or infill material.

5. Data sheet. SAPHIR

TRANSPARENT PRODUCTS – POLYCARBONATE SHEETS

SAPHIR®

arla
www.arlaplast.com

SAPHIR® is hard coated polycarbonate sheet with glass like appearance suitable for flat applications. The high impact strength of polycarbonate is combined with improved weather and chemical resistance. The product offers protection against abrasion compared to standard plastic sheets.

SAPHIR® is resistant to many of the most common chemicals, and the hard coat also provides an excellent protection against graffiti and vandalism.

SAPHIR® weighs about half of standard glass, yet the product is virtually unbreakable. SAPHIR® has an outstanding clarity, the hard coat improves the light transmission of the polycarbonate sheet.

ALSO AVAILABLE:
Double side coating, one side coating, any transparent colour or tint.

SAPHIR® BENEFITS:

- Abrasion and Impact Resistant
- Chemical Resistance
- UV Stability
- High optical quality and outstanding clarity
- More than 10 times the impact strength of high impact PMMA

APPLICATION AREAS:

Anti-vandal glazing, security glazing, safety screens and acoustic screens, Industrial equipment (machine coverings, machine protections), Indoor and outdoor signs, vending machine faces and many different kinds of technical parts.

DELIVERY PROGRAM:

Standard size: 2000 x 3000 mm

Thickness range: 2 – 12 mm

1 side or 2 sides coated

Special sizes and thicknesses on request

SAPHIR® TECHNICAL SPECIFICATIONS

Property	Value	Unit	Standard
Physical properties			
Density	1,2	g/cm^3	ISO 1183
Refractive index (20 °C)	1,586		ISO 489
Moisture absorption 24 hours, 23 °C, 50% RH	0,15	%	ISO 62
Mechanical properties			
Tensile strength at yield (at break)	60 (70)	N/mm^2	ISO 527
Elongation at yield (at break)	6 (110)	%	ISO 527
Elastic modulus	>2300	N/mm^2	ISO 527
Flexural modulus	>2300	N/mm^2	ISO 178
Charpy unnotched impact strength -40 °C	NB	kJ/m^2	ISO 179/1eU
Charpy notched impact strength -30 °C	11	kJ/m^2	ISO 179/1eA
Izod notched impact strength +23 °C	65	kJ/m^2	ISO 180/1A
Izod notched impact strength -30 °C	10	kJ/m^2	ISO 180/1A
Thermal properties			
Linear coefficient of thermal expansion (20-70 °C)	65x10^{-6}	K^{-1}	ISO 11359-2
Thermal conductivity	0,20	W/m.K	ISO 8302
Coating properties			
Adhesion	GT-0		DIN 53151 / ISO 2409
Taber Abrasion, CS 10F, 500g, 100 / 500 cycles	2 / <9	% Haze	ASTM D1044

Arla Plast AB · BOX 33, Västanåvägen · SE 590 30 Borensberg · Sweden
Phone +46 141 20 38 00 · Fax +46 141 414 30 · E-mail: info@arlaplast.se · www.arlaplast.com

arla
www.arlaplast.com