QUINN Plastics Slovakia s.r.o.,
M.R. Štefánika 71
010 39 Žilina
SLOVAKIA

www.quinn-plastics.com

Technical Product Information

AKRYLON® XT

1. PRODUCT IDENTIFICATION

AKRYLON® XT is a registered trademark for extruded Polymethyl methacrylate (PMMA) sheets in the form of large dimensional sheets. The material is thermoplastic and suitable for forming, bending or direct use in the form of cut-to-size sheets, for indoor and outdoor applications.

1.1 Characteristics

AKRYLON® XT SHEETS

- have good optical properties, brilliant transparency, colour stability and high-quality surfaces
- are UV stabilised and remain colourfast for years
- have excellent clarity, colour and functional stability backed up with a ten years guarantee
- can be used in contact with foodstuffs
- have very good weathering and ageing resistance
- are good recyclable

1.2 Applications

CONSTRUCTION COMPONENTS

- Light domes, Partition walls, Glazing, Roofing, Roof hoods for caravans, Sound barriers

LIGHTING

- Covers for lighting, Illuminated panels

ENGINEERING COMPONENTS

- Housing, Machine covers, Displays, Glazing applications

ADVERTISING AND DECORATION

- Letters, Decorations, Advertising fittings, Advertising panels

OTHER APPLICATIONS

- Containers, Lettering templates, Sign equipments etc.,
- Solarium covers from UVT (UV-transmitted) grade

1.3 Fabrication and finishing techniques

AKRYLON® XT sheets are easy to handle.
They can be machined using all the usual methods, such as sawing, drilling, polishing etc., and they are easy to thermoform.
More detailed information on these items can be found in our USER GUIDE.

2. TECHNICAL INFORMATION

AKRYLON® XT sheets satisfy requirements specified in EN ISO 7823-2.

2.1 Colours available

AKRYLON® XT sheets are manufactured in 6 basic colour types:

- Clear - transparent colourless
- Clear UV transmitted
- Opals – white translucent
- Coloured transparent
- Coloured translucent
- Coloured opaque

Each colour is designated by a four-digit number code.
Standard colour assortment is assigned by actual colour chain. The numbers of standard colours are listened in annex A.
Other colours can be colour matched and produced to order, but they are subjected to special conditions, such as: required minimum order quantities, production lead times and special price conditions.
Minimum production runs:

- standard colours 3000 kg
- custom made colour 5000 kg

2.2 Dimensions and thickness available

AKRYLON® XT is manufactured in sheets with rectangular trimmed edges in:

- nominal **dimensions**

3050 x 2050 mm
2000 x 1000 mm
1500 x 1000 mm

On the basis of an agreement with the customer it is possible to supply also sheets being
cut on-line (i.e. on the on-line saw of extrusion line, directly during extrusion process)

- width from min. 300mm to max. 2060 mm (2100 mm not trimmed)
- length from min. 600 mm to max. 3500 mm (exceptionally to max. 6100 mm).

Smaller and/or accurate dimensions can be
cut to-size on a special off-line formatting saw

- minimum dimensions 100 x 50 mm
- maximum size 5000 x 2050 mm.

- **thickness**

from 1.8 up to 10 mm

- standard 1.8 – 2 – 2.5 – 3 – 3.5 – 4 – 5 – 6 – 8 – 10 mm

Other dimensions or thickness can be produced to order, but they are subjected to special conditions, such as: required minimum order quantities, production lead times, and special price conditions.

2.3 Packaging

AKRYLON® XT sheets are protected from both sides by self-adhesive PE protection film. PE film gives only protection to the product and the appearance of the film cannot be considered as a defect of the product as far as its damage does not cause damage to the sheet.

AKRYLON® XT sheets are described on protection PE film by trademark, colour, thickness, production ID number, or other data on request.

AKRYLON® XT sheets are packed on pallets in quantities which are listed in following table. The pallets are labelled by data card containing quantity, dimensions, thickness, colour, and production ID-batch number of the material on the pallet.
Different description, packaging or labelling can be made on request.

NUMBER OF SHEETS ON THE PALLET

Size	Thickness in mm								
	1.8	2	2.5	3	4	5	6	8	10
3050 x 2050 mm	80	70	60	50	35	30	25	18	15
2000 x 1000 mm		150		100	100	80	70	50	40
1500 x 1000 mm		150		100	100	80	70	50	40

The minimum weight of sheets on one pallet is 700 kg. If less quantity is ordered, the price of the pallet will be charged extra.

2.4 Storage

❑ AKRYLON® XT sheets have to be stored in dry and dust free area, protected against damage and deformation. Thermal source distance has to be least 1 m. Temperature inside storage house should not be allowed to fall bellow 5°C and overrun 35°C.

During the storage of AKRYLON® XT sheets it is not recommended:

- exposure to direct sunlight or heat radiation, long term open-air exposure
- storage together with organic solvent and other chemicals
- permanent asymmetrical loading, deflection or multilevel stacking of pallets
- laid on or leaned towards sharp edges

Depending on storage and climatic conditions, plastic sheets absorb moisture. Although humidity absorption has no practical influence on the physical properties, it may interfere during further processing of the sheets at higher temperatures e.g. during bending, or heating before thermoforming. Therefore, according to the intended use, the sheets may have to be pre-dried. Normally pre-drying of AKRYLON XT sheets with high moisture contents is performed in an oven with air circulation, at 75°C, during 1-2 hrs. for 1 mm of the sheet thickness.

IMPORTANT INFORMATION:

❑ AKRYLON® XT sheets are protected from both sides by self-adhesive protection PE film, which could be left on the sheet without possible changes in adhesion and/or mechanical properties of the protection film during a period max. 6 months, provided that the material has been all the time stored only inside, and upon strict application of all manufacturer's storage instructions and recommendations.

3. TECHNICAL DATA SHEET

3.1 Typical mechanical and chem. physical properties

Properties	Test Method	Unit	Value
Density	ISO 1183	g/cm^3	1.19
Water absorption (24h/23°C, 4mm)	ISO 62	%	0.2
Forming temperature air pressure		°C	140 – 160
Forming temperature vacuum		°C	160 – 190
Mechanical			
Tensile strength	ISO 527-2	MPa	70
Elongation at break	ISO 527-2	%	4
Tensile modulus	ISO 527-2	MPa	3200
Flexural strength	ISO 178	MPa	115
Flexural modulus	ISO 178	MPa	3300
Ball indentation hardness	ISO 2039-1	N/mm^2	175
Impact strength Charpy unnotched	ISO 179-1	kJ/m^2	17
Impact strength Charpy notched	ISO 179-1	kJ/m^2	2
Thermal			
Vicat softening temperature (B 50)	ISO 306	°C	105
Temperature of deflection under load (A 1.8MPa)	ISO 75	°C	95
Coefficient of Linear Expansion	DIN 53752	K^{-1}x10^{-5}	7
Thermal conductivity	DIN 52612	W/mK	0.18
Service temperature continuous use		°C	70
Max. temperature short term use		°C	90
Degradation temperature		°C	> 280
Optical			
Light transmission (3mm)	ISO 13468-1	%	93
Refractive Index	ISO 489	n_D^{20}	1.492
Acoustical			
Airborne sound insulation	EN 1793 - 2	dB	> 24
Electrical			
Surface resistivity	IEC 60093	Ω	3x10^{15} - 3x10^{16}
Volume resistivity	IEC 60093	Ω x m	1x10^{13} - 5x10^{13}
Electrical strength	IEC 60243-1	kV/mm	10
Dielectric strength	DIN 53481	kV/mm	30
Dielectrical dissipation factor 50 Hz	DIN 53483-2		0.06
Dielectrical dissipation factor 1 KHz	DIN 53483-2		0.04
Dielectrical dissipation factor 1 MHz	DIN 53483-2		0.02
Relative permittivity 50 Hz	DIN 53483-2		2.7
Relative permittivity 1 KHz	DIN 53483-2		3.1
Relative permittivity 1 MHz	DIN 53483-2		2.7

All listened data are typical values intended for guidance only.

3.2 Standard quality parameters

Properties	Test Method	Unit	Value
❑ **Appearance**	EN ISO 7823-2		*
❑ **Thickness tolerance** < 3 mm ≥ 3 mm	Article 3.1 herein	mm	 ± 10 % ± 5 %
❑ **Tolerances on length and width** cut-on-line	Article 3.1 herein	mm	Up to 1000 mm - 0 / +3 mm More than 1000 mm - 0 / +0.3 %
❑ **Tolerances on length and width** cut-to-size	Article 3.1 herein	mm	- 0 / + 1 mm
❑ **Rectangularity** width < 2000 mm ≥ 2000 mm	Article 3.1 herein	mm	max. 3 mm max. 5 mm
❑ **Shrinkage** (dimensional change) at elevated temperature thickness 1.8 up to 2,5 mm 3 mm 3.5 up to 10 mm	EN ISO 7823-2	%	parallel to the the extrusion direction / perpendicular to extrusion direction max. 10 / max. 2 max. 4 / max. 2 max. 3 / max. 2
❑ **Planarity**	Article 3.3 herein	mm	max. 2 mm
❑ **Colour**	Article 3.4 herein	-	in accordance with agreed standard
❑ **Light transmission** Clear thickness 3 mm Coloured all thickness	EN ISO 13468-1	%	 93 are listed in annex A
❑ **Haze** clear 1900 (all thickness)	ISO 14782	%	0.6

***Appearance**

- The surface of the sheet must be smooth and glossy. There are not acceptable any surface defects, scratches or marks larger than 5 mm^2 each, anywhere on the sheet surface.
- Inside of the sheet are not acceptable any bubbles, large inclusions, cracks, foreign-matters or other inclusion defects larger than 3 mm^2.
- Between two acceptable surface or inclusion defects must be a distance at least 500 mm in any direction.

For other details regarding appearance kindly refer to EN ISO 7823-2, point 4.2.

3.3 Testing of quality parameters

3.3.1 Tolerance of dimension

The thickness is measured to the nearest 0.05 mm, using a calibrated micrometer.
The length, width and rectangularity are measured to the nearest 1 mm, using a calibrated measuring-tape.
The rectangularity is expressed as a difference between the lengths of both diagonals of a rectangular sheet.

3.3.2 Shrinkage

The shrinkage (dimensional change) at elevated temperature is determined in accordance with EN ISO 7823-2.

3.3.3 Planarity

The planarity (flatness) is determined as a deviation of the flat sheet specimen (dimensions of the specimen are 1000 mm x 400 mm) from the planar testing plate etalon.
The specimen is placed horizontally on an absolutely planar surface of testing plate. The gap between the surface of testing plate and sheet specimen is measured on seven different points – four points on the longer side and three points on the shorter side of the sheet specimen. The measurement is performed on both the faceplate and the reverse side as well. The planarity value is the biggest deviation from the plain pad measured.

3.3.4 Colour

A comparison between the sample of colour sheet and reference colour standard is determined by the spectrophotometric measurement.

3.3.5 Light transmission

Light transmission (visible spectrum 400 – 700 nm) is different for clear and coloured sheets. It depends on quantity and kind of colour concentrate and also on thickness of sheet.
The total luminous transmittance is determined by spectrophotometer using illuminant D65 in accordance with ISO 13468-1.

3.4 Quality certificate

Guaranteed quality parameters of AKRYLON® XT sheets are declared by Quality Certificate enclosed to every batch of the subject delivery.

4. STATEMENTS

4.1 Food approval statement

QUINN Plastics Slovakia s.r.o. Žilina, as a manufacturer of the PMMA polymer and extruded PMMA sheets under the brand name AKRYLON®XT herewith declares, that the composition of the polymer complies with regulations regarding the composition requirements for the materials allowed to come into contact with food according to following legislation:

EEC	Directive 2002/72/EC (August 6, 2002)
ITALY	D.M. 21.03.73 and following updating and modifications, particularly D.M.26.04.93, N° 220 and D.M. of 24.09.96, N° 572
USA	FDA Code of Federal Regulation 21, Part 177, §177.1010 – Part 178, §178.3297

The above information does not relate to finished articles made from AKRYLON®XT. Therefore, it is the responsibility of the final product manufacturer to ensure that the requirements according to all applicable national rules and regulations for materials used in contact with food are met.

4.2 Fire classification

AKRYLON® XT sheets are classified in accordance with EN 13501-1

- Reaction to fire classification: **E**

4.3 Quality management

AKRYLON® XT sheets are manufactured and audited for quality in compliance with the certified and regularly audited production and quality management system according to EN ISO 9001:2000.

4.4 Safety data statement

Safety data sheets for AKRYLON® XT in accordance to 2001/58/EC are available upon request.

4.5 Statement on 10-years guarantee for outdoor use suitability

1. AKRYLON®XT sheets are made of a high quality raw material, Polymethylmethacrylate (PMMA), suitable for outdoor use.
QUINN Plastics Slovakia, s.r.o., provides a 10 years warranty for flat transparent AKRYLON®XT sheets for minimum light transmission and mechanical properties as described below. The warranty shall come into the force on the day the AKRYLON®XT sheets are delivered to the customer.

2. This warranty applies exclusively to standard AKRYLON®XT sheets used correctly as flat sheets, which are installed, handled, machined, fabricated and maintained according to QUINN Plastics Slovakia, s.r.o., recommendations and instructions. The purchaser is presumed to be informed of said recommendations and instructions. If this is not the case he can obtain said documents through the sales representative or authorised distributor.

3. No warranty will be available for sheets that have been exposed to corrosive materials or environments.

4. In the event of a claim against this warranty, the sheets and the original sales receipt must be returned to QUINN Plastics Slovakia, s.r.o., via the sales representative or original authorised distributor.

5. The extent of change in light transmission will be measured according to test method DIN 5036. Multiple samples will be taken from the sheet and cut into sizes suitable for testing, the samples will be cleaned prior to testing and, if necessary, polished. AKRYLON®XT sheets showing a change in light transmission which is less than 4% of the original value as defined by QUINN Plastics Slovakia, s.r.o., in Technical Data Sheet on AKRYLON®XT, will not be a subject to any claim. This part of the warranty applies to flat clear sheets but not to coloured ones.

6. The mechanical properties are defined by the tensile strength (ISO 527). Multiple samples will be taken and a sheet showing a change of less than 10% in the tensile strength compared to its original value, as defined by QUINN Plastics Slovakia, s.r.o., in Technical Data Sheet on AKRYLON®XT, will not be a subject to any claim.

7. In the event of a claim against this warranty proving justified, QUINN Plastics Slovakia, s.r.o., will provide a replacement for the material at issue without any other liability for any other additional indemnification whatsoever.

Up to 5 years time from the purchase date, QUINN Plastics Slovakia, s.r.o., will replace 100% material. Between 5-7 years time from the purchase date, QUINN Plastics Slovakia, s.r.o., will replace 60% material. Between 8-10 years time from the purchase date, QUINN Plastics Slovakia, s.r.o., will replace 30% material.
If replacement material cannot be provided within a reasonable period of time, QUINN Plastics Slovakia, s.r.o, may choose to refund the relevant cost of the material without any other liability for any additional indemnification whatsoever. This warranty does for instance, not cover (re)installation expenses or any other incidental costs which may result from a breakage.

8. There are no express or implied, written or oral warranties and or representations by QUINN Plastics Slovakia, s.r.o., including warranties and representations of merchantability or fitness of purpose, except as set forth herein.

4.6 Chemical resistance

AKRYLON® XT resists well rough climatic conditions, moisture, bacteria and microorganisms. It resists efficiently water (also sea-water), alkalis and aqueous solutions of inorganic salts. Certain acids (hydrofluoric, hydrocyanic) and concentrated acids of sulphur, phosphorus, nitrogen and chlorine, attack AKRYLON® XT. Liquids can be classified into 4 group according to their aggresivity to AKRYLON® XT :

- very active solutions: MMA, chlorinated carbohydrates, etc.
- less active solutions: aromatic carbohydrates, aldehydes, ketones and esters of organic acids
- hot liquids attacking AKRYLON® XT: ethyl alcohol, methyl alcohol, butyl alcohol
- solutions which AKRYLON® XT is resistant to

Resistance of AKRYLON® XT to chemicals depends on a number of factors: duration of exposure, temperature, internal and surface stress, …

Chemical resistance of AKRYLON® XT to certain agents:

1 - AKRYLON® XT dissolves in agent
2 - AKRYLON® XT swells in agent
3 - AKRYLON® XT is attacked by agent
4 - AKRYLON® XT resists to agent

Acetone	1	Potassium hydroxide up to 65°C	4	Potassium permanganate N/10	4
Acetonitrile	2	Sodium hydroxide up to 65°C	4	Methane	4
Acetophenone	2	Vapours of chlorine – dry	3	Methyl alcohol	2
Allyl alcohol	2	Chloramine solution up to 2%	4	Methyl ether	2
Ammonia 30% solution, up to 20°C	4	Ammonium chloride up to 20°C	3	Nicotine	4
Ammonia 10% solution, up to 60°C	4	Potassium chloride conc.	4	Nitrobenzene	2
Amyl acetate	1	Aluminium chloride conc.	4	Nitrovarnishes	2
Amyl alcohol	2	Sodium chloride up to 20°C	4	Vinegar	4
Aniline	2	Ferrous chloride conc.	4	Plant oils	4
Benzaldehyde	2	Ferric chloride conc.	4	Transformer oil	4
Benzene	1	Chloroform	1	Sulphur dioxide, liquid	2
Petrol without aromates	4	Chlorinated lime	3	Carbon monoxide	4
Petrol with aromates	2	Chlorine water	4	Paraffin pure	4
Benzoyl chloride	2	Potassium chromide 10% up to 20°C	4	Hydrogen peroxide up to 40%	4
Vapours of bromine	3	Isopropyl alcohol	2	Kerosene	4
Butyl acetate	1	Potassium cyanide conc.	4	Petroleum ether	4
Butyl alcohol	2	Hydrocyanic acid liquid	2	Sodium sulphur monoxide conc.	4
Cyclohexane	4	Citric acid at 20°C	4	Carbon disulphide	2
Dibuthyl phthalate	2	Nitric acid 10% at 20°C	4	Hydrogen disulphide	4
Dichlorobenzene	2	Hydrofluoric acid up to 20°C	4	Ammonium sulphate conc.	4
Diethylene glycol	4	Phosphoric acid 50% up to 20°C	4	Manganese sulphate conc.	4
Diethyl ether	2	Phosphoric acid 25% up to 60°C	4	Copper sulphate conc.	4
Potassium nitrate	4	Hydrochloric acid up to 20°C	4	Ferrous sulphate conc.	4
Silver nitrate	4	Hydrochloric acid 20 - 60°C	3	Sulphuryl chloride	2
Potassium dichromate	4	Formic acid 25% at 20°C	4	Turpentine	4
Ethyl acetate	1	Formic acid conc.	2	Tetrachloro methane	2
Ethyl alcohol conc.	2	Glacial acetic acid	1	Toluene	2
Ethyl alcohol up to 20%	4	Acetic acid 50% at 20°C	4	Trichloro ethylene	1
Ethylene dichloride	1	Acetic acid 10% at 60°C	4	Animal fats	4
Ethyl ether	2	Sulphuric acid, conc. 20 - 60°C	3	Potassium carbonate conc.	4
Phenol	2	Oxalic acid, conc. 20 - 60°C	4	Sodium carbonate conc.	4
Formaldehyde 40%	4	Trichloroacetic acid	2	Wine	4
Phosphates	4	Tartaric acid, conc. 20 - 60°C	4	Sea water	4
Photographic solutions	4	Cresol	2	Xylene	2
Glycol	4	Lanolin	4		

Important note:
Above chart serves just like basic reference, it is strongly recommended to carry out specific resistance test for actual application conditions.

4.7 Thermal insulation reference data

AKRYLON®XT sheets used in glazing applications result in considerable energy cost savings by preventing excessive heat loss in winter and blocking heat entry in summer. The heat loss factor, normally referred to as the K-value, of AKRYLON® XT is significantly lower than for glass at the same thickness. Some examples of the heat insulation performance of AKRYLON® XT in single, double and triple glazing system are given below and compared with glass.

Construction			**AKRYLON® XT**		**Silicate glass**	
thickness (mm)	**airgap** (mm)	**Construction thickness** (mm)	**K-value** (W/m^2*K)	**weight** (kg/m^2)	**K-value** (W/m^2*K)	**weight** (kg/m^2)
Single glazing						
2	-	2	5.54	2.38	5.83	4.96
3	-	3	5.39	3.57	5.80	7.44
4	-	4	5.24	4.76	5.77	9.92
5	-	5	5.10	5.95	5.74	12.40
6	-	6	4.96	7.14	5.71	14.88
8	-	8	4.72	9.52	5.66	19.84
10	-	10	4.49	11.90	5.60	24.80
Double glazing						
2	5	9	3.34	4.76	3.55	9.92
2	10	14	2.94		3.10	
2	15	19	2.77		2.91	
3	5	11	3.23	7.14	3.53	14.88
3	10	16	2.85		3.09	
3	15	21	2.69		2.90	
4	5	13	3.12	9.52	3.50	19.84
4	10	18	2.77		3.07	
4	15	23	2.62		2.88	
5	5	15	3.02	11.90	3.48	24.80
5	10	20	2.69		3.05	
5	15	25	2.55		2.87	
Triple glazing						
2	2 X 5	16	2.39	7.14	2.55	14.88
2	2 X 10	26	2.00		2.11	
2	2 X 15	36	1.84		1.94	
3	2 X 5	19	2.30	10.71	2.53	22.32
3	2 X 10	29	1.94		2.10	
3	2 X 15	39	1.79		1.93	
4	2 X 5	22	2.22	14.28	2.52	29.76
4	2 X 10	32	1.88		2.09	
4	2 X 15	42	1.74		1.92	
5	2 X 5	25	2.15	17.85	2.50	37.20
5	2 X 10	35	1.83		2.08	
5	2 X 15	45	1.70		1.91	

4.8 Advice on disposal

AKRYLON® XT waste can be recycled according to material recycling regulations. It is recommended to grind the AKRYLON® XT waste (cuttings, defective products from thermoforming, products that do not meet the dimensional requirements) to elements with suitable dimensions and use them as recyclable material in extrusion process. The recyclable material cannot be contaminated with dust, mechanical dirt, oils etc.
In case of impossibility of further utilization it is recommended to dispose the waste in accordance with local regulations. Generally possible ways of disposal are dumping or combustion.
These recommendations also refer to the disposal of packaging materials.

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010 39 Žilina
SLOVAKIA

www.quinn-plastics.com

ANNEX A

Number codes of standard colours and light transmission

Number code	Colour	Thickness	Light Transmission (%)
1900	clear	3 mm	93
1250	transparent red	3 mm	32
1270	transparent red	3 mm	34
1320	transparent orange	3 mm	48
1350	transparent orange	3 mm	71
1360	transparent orange	3 mm	44
1440	transparent yellow	3 mm	77
1530	transparent silicate green (glass look)	3 mm	89
1560	transparent green	3 mm	76
1570	transparent green	3 mm	24
1580	transparent bottle green	3 mm	13
1620	transparent blue	3 mm	69
1640	transparent blue	3 mm	22
1660	transparent blue	3 mm	15
1673	transparent fluo -blue	3 mm	90
1750	transparent pink	3 mm	80
1801	transparent smoked grey	3 mm	79
1805	transparent smoked brown	3 mm	48
1807	transparent smoked brown	3 mm	29
1812	transparent smoked brown	3 mm	13
1855	transparent smoked green	3 mm	25
1868	transparent smoked blue	3 mm	38
1870	transparent smoked blue	3 mm	22
2020	opaque black	3 mm	0
2220	translucent red	3 mm	15
2240	translucent red	3 mm	14
2350	translucent orange	3 mm	14
2450	translucent yellow	3 mm	19
2470	translucent yellow	3 mm	21
2650	translucent blue	3 mm	24
2910	opal white	3 mm	89
2945	opal white	3 mm	26
2960	opal white - blue	3 mm	30
3910	opaque white	3 mm	7

			UV Transmission * (%)
1900 UVT	clear - UV transmitted	all thickness	min. 85

* UV transmission is determined using UV-meter.

Light Transmission (LT) is determined by the spectrophotometer as an average transmission at the wavelength range from 400 to 700 nm.

- **AKRYLON® XT colours** (transparent, translucent, opaque)
  - LT and colour shade is the same for each thickness
- **AKRYLON® XT white opals**
  - LT depends on sheet thickness (the bigger thickness, the lower light transmission).

  The light transmissions of the white opals are mentioned hereinafter in the separate table in detail.

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AKRYLON® XT white opals - light transmission

Number code	Colour	Thickness	Light Transmission (%) (average 400 – 700 nm)
2910	white opal	2 mm	93 ± 1
		2.5 mm	91 ± 1
		3 mm	89 ± 1
		4 mm	83 ± 1
		5 mm	80 ± 1
2945	white opal	2 mm	34 ± 2
		3 mm	26 ± 2
		4 mm	20 ± 2
		5 mm	17 ± 2
		6 mm	14 ± 2
2960	white opal – blue	2 mm	45 ± 2
		3 mm	30 ± 2
		4 mm	25 ± 2
		5 mm	16 ± 2
		6 mm	13 ± 2