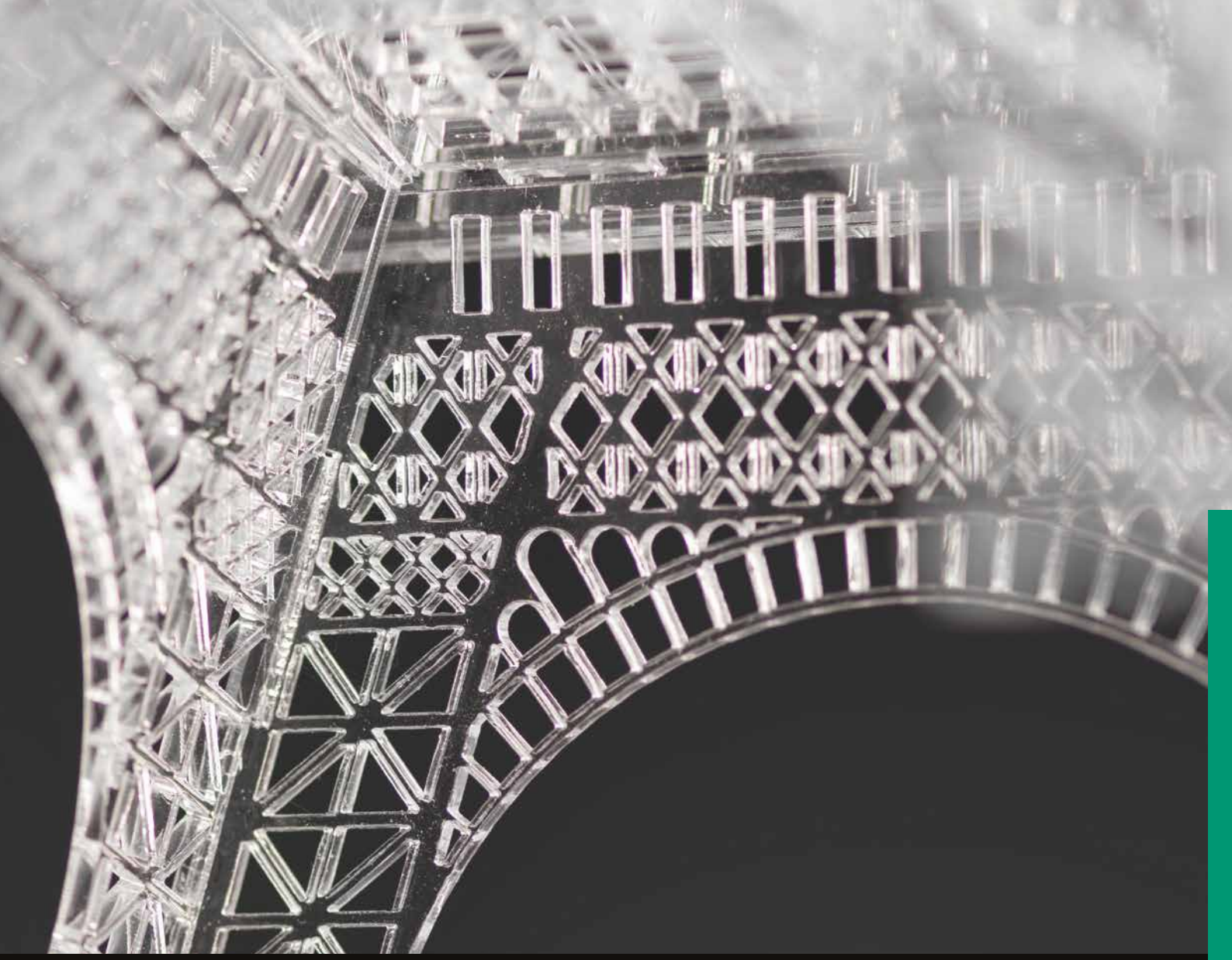


Plastic Sheets for Fabrication

Brett Martin

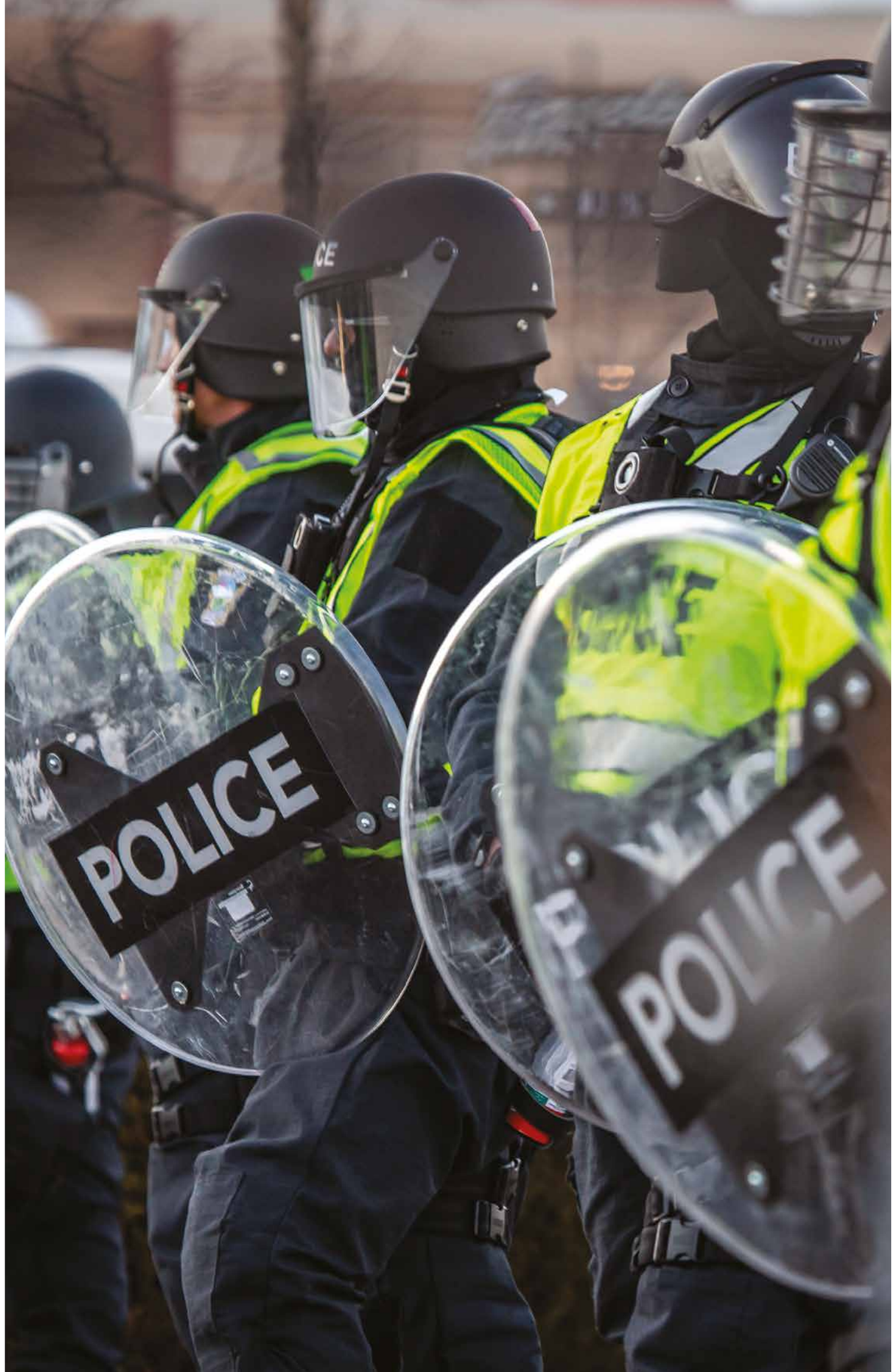
FLAT SHEET RANGE

Plastic Sheets for Fabrication

Brett Martin is the one stop shop for all flat sheet products including polycarbonate, acrylic, PETg, aPET and foam PVC flat sheets. Our range of products offers a great choice of material for fabricators, including products with a broad working temperature, outstanding formability, ease of cutting and machining, flexibility, impact strength and excellent fire performance.

CONTENTS

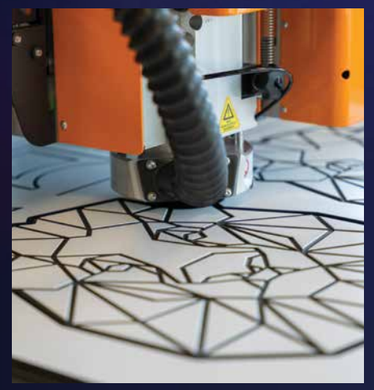
Brett Martin

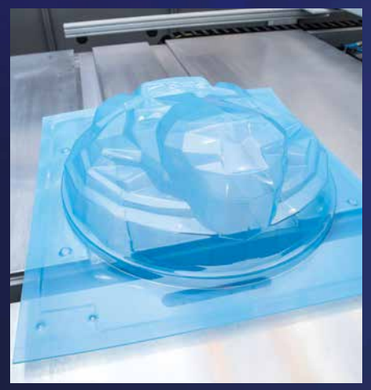


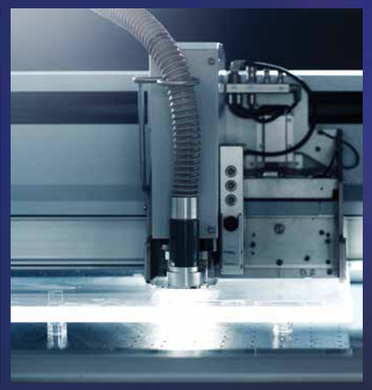
Types of Fabrication

Fabrication is the process of cutting, bending, shaping or bonding flat plastic sheets into a plastic structure which is either a finished product in its own right or forms part of an assembled finished product. Fabrication techniques suitable for Brett Martin's flat extruded plastics sheets include:

- Cutting
- Machining
- Drilling
- Bonding
- Thermoforming
- Vacuum forming
- Line bending
- Printing





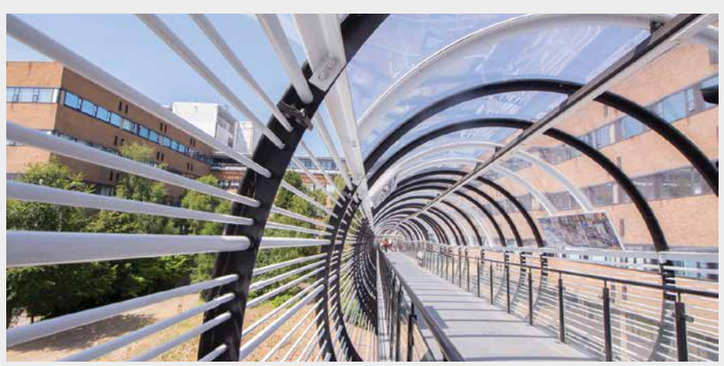


Applications

Fabrication techniques can create plastic components for an almost endless range of applications.

1 Shaped glazing for construction

- Rooflights
- Barrel vaults
- Domes
- Canopies
- Walkways
- Balconies
- Balustrades



2 Non-construction glazing

- Commercial fridge/freezer doors
- Vending machines
- Glazing around sports courts
- Sports dug out canopies

3 Safety & security

- Machine guards
- Visors
- Riot shields
- Partitions
- Prison windows
- Guard Rails

4 Sign & display

- Signs
- Store fixtures
- Point of sale displays
- Poster covers
- Picture frames
- Traffic signage

5 Interior design

- Furniture
- Shower enclosures
- Baths and basins
- Hot tubs
- Light fixtures
- Creative artwork

6 Other

- Industrial trays
- Acoustic barriers
- Street furniture
- Prosthetic check sockets

Material Selection

Our range of thermoplastic engineering materials has a wide range of properties which allow fabricators to match a Brett Martin product to the application requirements.

Whilst many of our products have similar properties, such as light weight, high light transmission and optical clarity, this table shows some of the properties that make one product more suitable for a particular application than another. Our Technical Department is able to offer advice on the suitability of our products for particular applications.

TRANSPARENT FLAT SHEET RANGE

Marlon FS | **Marlon FSX** | **Marlon FS Hard** | **Marlon FS BioPlus**

Polycarbonate
- Strength
- Technical performance
- Fire performance
- Resistance to high temperature environments
- UV resistant and abrasion resistant options available

Marpet-g FS

PETg
- Printability
- Excellent thermoformability
- Complex shapes achievable
- Chemical resistance
- UV resistant and Eco options available

Marpet-a FS

aPET
- Scratch and scuff resistance
- Chemical resistance
- Economic option for cold bend applications
- Anti-reflective option available

Marcryl FS

Acrylic
- Glass like appearance
- Can be edge polished
- Good scratch resistance
- Inherent UV resistance and weatherability
- Eco option availble

FOAMALUX FOAM PVC RANGE

Foamalux White | **Foamalux Light** | **Foamalux Colour**
- Silky smooth matt finish
- Range of vibrant colours
- Outstanding digital/screen print quality
- Easily fabricated, cut and routered

Foamalux Ultra
- High gloss finish
- Range of vibrant colours
- Outstanding digital/screen print quality
- Easily fabricated, cut and routered

Foamalux Eco | **Foamalux Xtra**
- Green choice
- Made with reclaimed material
- Lightweight - easy to handle and install
- Easy to cut, fabricate and bond

Foamalux Calibre
- Lightweight Foam PVC construction board
- Alternative to wood based construction materials
- Tight thickness tolerance for dimensional stability
- Hard flat durable surface
- Suitable for internal and external building applications

TRANSPARENT FLAT SHEET RANGE

Marlon FS

Available in Marlon BioPlus

EXTRUDED POLYCARBONATE FLAT SHEET

Sheet Size (mm)	Thickness (mm)
1220 x 2440	3, 4, 5 & 6
1250 x 2050	0.5, 0.75, 1, 1.5, 3, 4, 5 & 6
1250 x 2500	0.5, 0.75, 1 & 1.5
2050 x 3050	2, 3, 4, 5, 6, 8, 10, 12 & 15*

Clear · Opal · Bronze · Anti-reflective option

Marpet-g FS

FLAT PETg SHEET

Sheet Size (mm)	Thickness (mm)
1250 x 2050	0.5, 0.75, 1, 1.5 & 1.8
1250 x 2500	0.5, 0.75, 1, 1.5 & 1.8
2050 x 1250	2, 3, 4, 5, 6, 8, 10, 12 & 15*
2050 x 3050	2, 3, 4, 5, 6, 8, 10, 12 & 15*

Clear · UV resistant option* · Anti-reflective option* · Eco option**

*Subject to request. Minimum order quantities may apply
**Limited availability

Marlon FSX

Available in Marlon BioPlus

UV RESISTANT POLYCARBONATE FLAT SHEET

Sheet Size (mm)	Thickness (mm)
1220 x 2440	2, 3, 4, 5 & 6
2050 x 3050	2, 3, 4, 5, 6, 8, 10, 12 & 15*
2050 x 6110	3, 4, 5, 6, 8 & 10

Clear · Opal · Bronze · Anti-reflective option

Marpet-a FS

FLAT aPET SHEET

Sheet Size (mm)	Thickness (mm)
1250 x 2050	0.5, 0.75, 1, 1.5 & 2
1250 x 2500	0.5, 0.75, 1, 1.5 & 2

Clear · Anti-reflective option

Marlon FS Hard

Available in Marlon BioPlus

ABRASION RESISTANT POLYCARBONATE FLAT SHEET

Sheet Size (mm)	Thickness (mm)
2000 x 3000	2, 3, 4, 5, 6, 8, 10 & 12

Clear

Marcryl FS

FLAT ACRYLIC SHEET

Sheet Size (mm)	Thickness (mm)
1250 x 2500	2, 3, 4, 5, 6, 8 & 10
2050 x 3050	2, 3, 4, 5, 6, 8 & 10

Clear · Opal · Eco option*

*Limited availability

FOAMALUX FOAM PVC RANGE

Foamalux Colour

VIBRANT COLOUR RANGE

Sheet Size (mm)	Thickness (mm)
1220 x 2440	3 & 5
2050 x 3050	3 & 5

Red · Yellow · Green · Blue · Grey · Black

Foamalux Ultra

HIGH GLOSS FINISH

Sheet Size (mm)	Thickness (mm)
1220 x 2440	3 & 5

Red · Yellow · Green · Blue · Grey · Black · White

Foamalux White

PREMIUM CHOICE WHITE SHEET

Sheet Size (mm)	Thickness (mm)
1220 x 2440	1, 2, 3, 4, 5, 6, 8, 10, 13, 19 & 24
1560 x 3050	2, 3, 5, 10, 15 & 19
2050 x 3050	1, 2, 3, 4, 5, 6, 8 & 10

Foamalux Light

IDEAL FOR DIGITAL PRINTING

Sheet Size (mm)	Thickness (mm)
1220 x 2440	2, 3, 4, 5, 6, 8 & 10
1560 x 3050	2, 3, 5, & 10
2050 x 3050	2, 3, 4, 5, 6, 8 & 10

Foamalux Eco

Up to 60% reclaimed post production waste content

THE GREEN CHOICE

Sheet Size (mm)	Thickness (mm)
1220 x 2440	3, 5 & 10
2050 x 3050	3, 5 & 10

Foamalux Xtra

Up to 80% reclaimed content

ENVIRONMENTALLY FRIENDLY

Sheet Size (mm)	Single Sided Thickness (mm)	Double Sided Thickness (mm)
1220 x 2440	3, 5 & 6	10
1560 x 3050	-	10
1560 x 4050	-	10

Foamalux Calibre

PVC CONSTRUCTION BOARD

Sheet Size (mm)	Thickness (mm)
1220 x 2440	10, 19, 24 & 30
1220 x 3050	10, 19, 24 & 30

Marlon FS

AVAILABLE IN
Marlon BioPlus

Flat Polycarbonate Sheet

Marlon FS is a premium quality extruded flat polycarbonate sheet which provides 200 times more impact resistance than glass at only half the weight. The sheet is characterised by high optical clarity, light transmission, impact resistance, durability, design flexibility, thermal insulation and fire resistance.

Product Range

Colours	Clear, Opal, Bronze & Specials* (Green, Blue, Grey)
Textures	Embossed, Diamond Embossed*
Options*	Strong Adhesion Film for heavy fabrication
Specials*	Special transparent, translucent and opaque options are available on request

*Subject to request. Minimum order quantities may apply.
Please contact Brett Martin for further information.

Applications

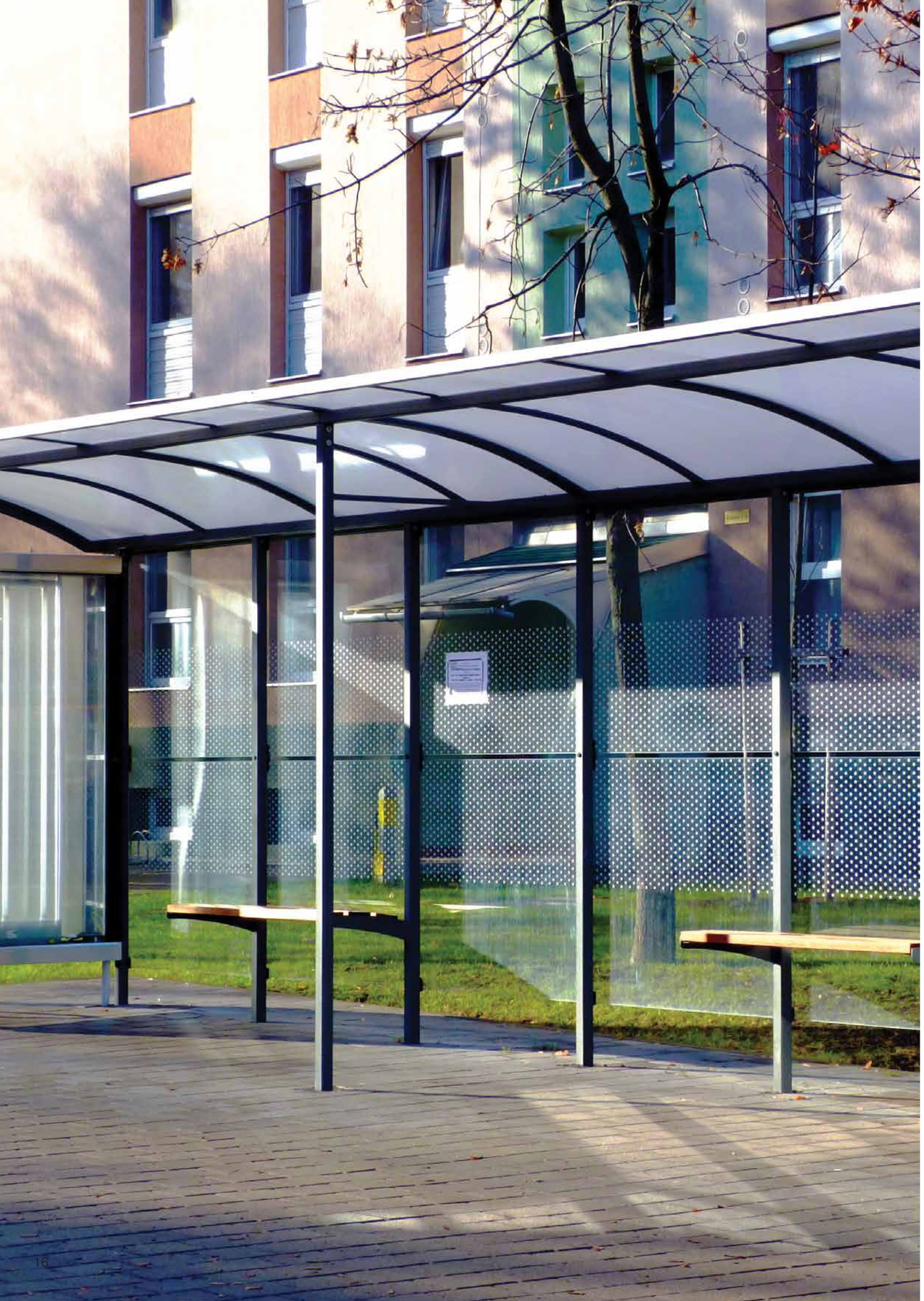
- Vertical glazing for internal applications e.g. partitions
- Safety and security glazing
- Machine guards
- Protective screens and visors
- Vending equipment
- Illuminated and non-illuminated signage
- Displays
- Poster covers
- Light fixtures
- Sports courts

Product Options

Sheet Size (mm)	Thickness (mm)
1220 x 2440	3, 4, 5 & 6
1250 x 2050	0.5, 0.75, 1, 1.5, 3, 4, 5 & 6
1250 x 2500	0.5, 0.75, 1 & 1.5
2050 x 3050	2, 3, 4, 5, 6, 8, 10, 12 & 15*

Product Features

- Excellent impact resistance – 200 times greater than glass
- Lightweight - half the weight of glass
- High natural light transmission
- Optically clear
- Thermally insulating
- Offers design flexibility
- Suitable for thermoforming
- Can be cold curved
- Easy to handle, install and clean
- Excellent fire performance
- 100% recyclable



Marlon FSX

AVAILABLE IN Marlon BioPlus

UV Protected Flat Polycarbonate Sheet

Marlon FSX features co-extruded UV protection on both sides of the sheet cutting out 98% of harmful UV radiation. The UV protective layer provides longer sheet life expectancy, prevents yellowing and guards against loss of strength. Combined with high impact and chemical resistance, light weight and high light transmission, Marlon FSX is the superior glazing material for architectural rooflights, vertical glazing and other outdoor glazing applications.

Product Range

Colours	Clear, Opal, Bronze & Specials* (Green, Blue, Grey)
Textures	Embossed, Diamond Embossed*
Options*	Strong Adhesion Film for heavy fabrication
Specials*	Special transparent, translucent and opaque options are available on request

*Subject to request. Minimum order quantities may apply.
Please contact Brett Martin for further information.

Applications

- Curved and flat rooflights
- Architectural roofing
- Sunrooms
- Canopies
- Covered walkways
- Balcony glazing
- Sound barrier walls
- Exterior signage - including illuminated signage
- Bus shelters
- Street furniture
- Dug outs

Warranty

Marlon FSX has a limited 10 year warranty against light transmission and weather breakage as outlined in the warranty statement, available separately.

Product Options

Sheet Size (mm)	Thickness (mm)
1220 x 2440	2, 3, 4, 5 & 6
2050 x 3050	2, 3, 4, 5, 6, 8, 10, 12 & 15*
2050 x 6110	3, 4, 5, 6, 8 & 10

Product Features

- Enhanced protection against the effects of UV
- 200 times greater impact resistance than glass
- Lightweight - half the weight of glass
- Optically clear with high light transmission
- Ability to cold curve
- Excellent fire performance
- 10 year warranty
- 100% recyclable

Brett Martin

Marlon FS Hard

AVAILABLE IN Marlon BioPlus

Abrasion Resistant Flat Polycarbonate Sheet

Marlon FS Hard is an extruded polycarbonate flat sheet combined with an abrasion and chemical resistant coating. The highly resilient surface coating resists marks and scratches, vandalism, graffiti and physical attack and also withstands contact from a wide range of cleaning agents, organic solvents and corrosive elements. Marlon FS Hard offers a superior toughness to protect those areas where high performance and reliability are essential whilst providing high natural light transmission.

Product Range

Colours	Clear
Options*	Coating on one side only to allow reverse printing
Specials*	Special transparent, translucent and opaque options are available on request

*Subject to request. Minimum order quantities may apply.
Please contact Brett Martin for further information.

Applications

- Safety and security glazing e.g. prison windows
- Anti-vandal glazing
- Anti-vandal protection for displays
- Protective visors and shields
- Street furniture e.g. bus shelters
- High traffic vehicle windows e.g. train windows
- Guard rails
- Sound barriers

Warranty

Limited 10 year warranty relating to breakage, 5 year limited warranty in relation to light transmission and coating.

Product Options

Sheet Size (mm)	Thickness (mm)
2000 x 3000	2, 3, 4, 5, 6, 8, 10 & 12

Product Features

- Double sided advanced abrasion resistance
- Excellent impact resistance – 200 time greater than glass
- Lightweight - half the weight of glass
- Optical clarity and high light transmission
- Easy to handle, install and clean
- Excellent fire performance
- 5 year warranty
- 100% recyclable

Protection During Fabrication

Strong Adhesion Film

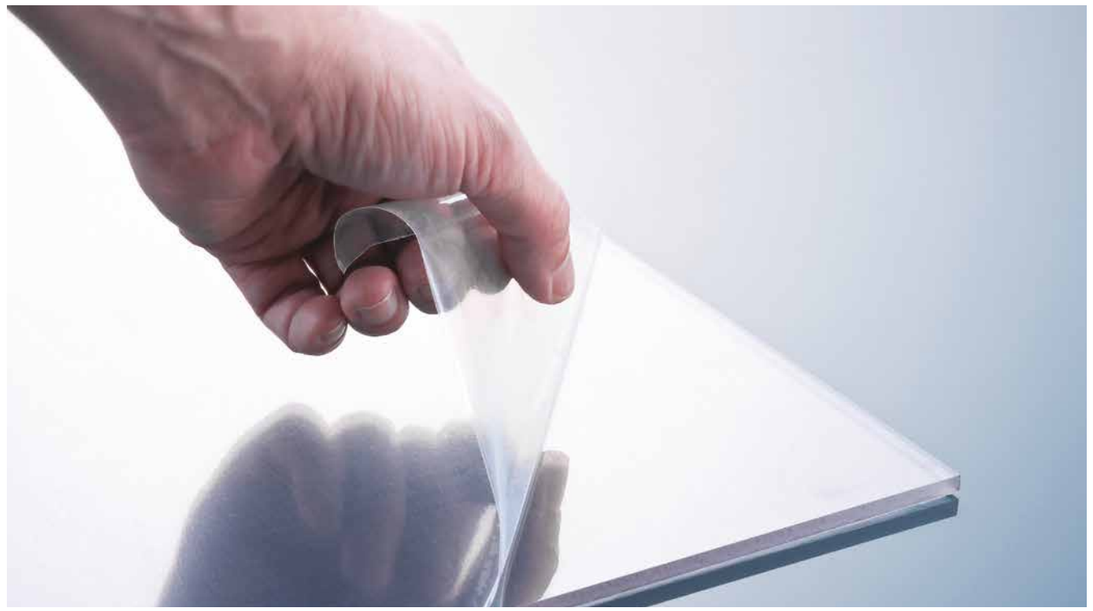
Strong Adhesion Film (SAF) is available for the Marlon FS and Marlon FSX polycarbonate product ranges (5-15mm), specifically aimed at high-end engineering and fabrication projects that require extra protection during repeated or aggressive processing, including drilling, 3D milling, warm & cold bending, thermoforming and cutting. SAF ensures that our polycarbonate sheet withstands these rigorous fabrication processes and protects the surface from scratching and abrasion at all times. The film is applied to both sides of the sheets, ensuring maximum protection.

Offering an adhesion level that is three times higher than standard film, SAF remains in place and intact during fabrication. It maintains its adhesion level and offers sufficient tack for reapplication in case the film needs to be peeled back.

SAF is glue-free, enabling the polycarbonate sheets to be used for warm bending or thermoforming, conditional on the shape of the design. The film offers a good joggability and is easy to remove without leaving a residue. It has a clear finish so the product remains visible.

Features and Benefits

- High adhesion level - 3 times higher than standard range
- Stays on during fabrication giving increased protection
- Double sided film protects both sides
- Good joggability
- Can be reapplied if peeled back for processing
- Glue-free, for use in warm bending and thermoforming
- Leaves no residue
- Clear to allow visual checks on product



Product Options

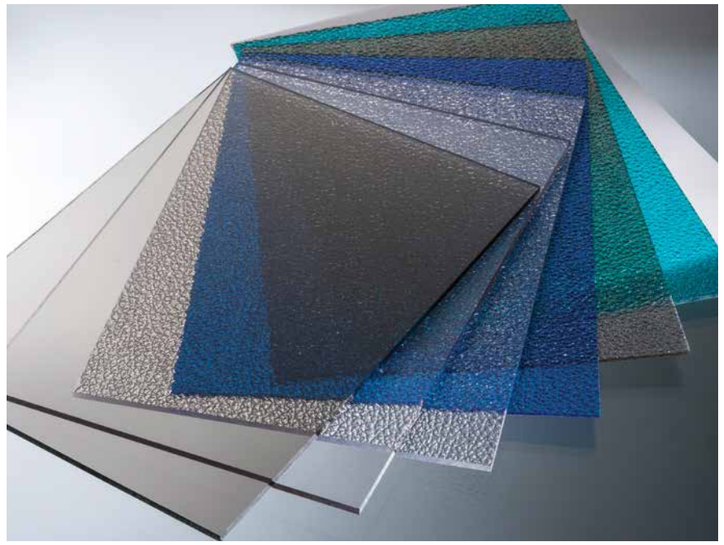
Marlon | Marlon FSX | Marlon FS Hard | Marlon FS BioPlus

Material Properties

Property	Standard	Value	Unit
Density	ISO 1183-1	1.2	g/cm³
Transmission at 3mm	ISO 13468-1	90	%
Flexural Strength	ISO 178	97	MPa
Tensile Strength at Yield	ISO 527	62	MPa
Heat Deflection Temperature	ISO 75-2	145	°C
Thermal Expansion	ISO 11359-2	0.065	mm/m°C
Service Temperature - Long Term	-	-20 to +100	°C
Service Temperature - Short Term Unstressed	-	-40 to +130	°C

Polycarbonate Processing Capabilities

- Cold curving
- Fabrication
- Routering, milling, sawing
- Guillotining, die cutting
- Drilling
- Thermoforming
- Welding
- Laminating
- Bonding
- Vinyl application
- Digital and screen printing



Polycarbonate Fabrication Guide

Marlon FS BioPlus

Marlon FS BioPlus, made with bio-circular attributed resin, is available across the entire Marlon FS range. Its material and processing properties are identical to the standard product.

Cutting/Machining

Polycarbonate flat sheet is easy to saw and cut on standard workshop equipment. It can be machined on conventional milling machines with standard high speed tools.

Recommendations	Circular Saw	Band Saw	Milling Machine
Clearance angle	20-30°	20-30°	20-25°
Rake angle	15°	0-5°	0-5°
Cutting speed	1800-2400m/min	600-1000m/min	100-500m/min
Feed speed	19-25m/min	19-25m/min	0.1-0.5mm/rev
Tooth spacing	2-5mm	1.5-2.5mm	-

Drilling

When drilling Marlon FS, metal drills without a specially ground bit can be used, though a thermoplastic specific bit would be preferential. Do not use cutting oils.

Countersink fixing is not recommended. Holes should be a minimum of 1.5 x hole diameter from the edge of the sheet. The hole diameter should be a minimum of 6mm larger than the fixing shank diameter for sheets up to 2m and an additional 3mm per meter length thereafter.

Parameter	Value
Clearance angle	5-8°
Tip angle	90-130°
Helix angle	Ca 30°
Rake angle	3-5°
Cutting speed	0.1-0.5mm/rpm
Drill tip speed	10-60m/min

Bonding

Polycarbonate can be bonded using one of the following adhesives: Epoxy, Polyurethane, Hot Melt or Silicone. Ask your adhesive supplier for the most appropriate type of adhesive for your particular application. Solvents such as Methylene Chloride give a good bond but can lead to stress cracking and are therefore not recommended.

Thermoforming

Before thermoforming, remove masking films and pre-dry at 120°C to remove absorbed moisture. Air circulation ovens with accurate temperature control are most efficient; air must circulate between sheets. Sheet age and storage conditions determine drying time. Dry storage can reduce pre-drying time in the oven by up to one third. Some experimentation is usually necessary. As moisture re-absorption starts when the dried sheet temperature falls below 100°C, thermoforming should be performed immediately after drying.

NOTE: Marlon FS Hard is not recommended for thermoforming.

The following points should be taken into account when vacuum forming:

- Pre-drying is essential - remove film prior to drying
- Sheets should be mounted vertically and air allowed to circulate
- Pre-drying should be at about 120°C and the sheet thermoformed soon after, as moisture will gradually be re-absorbed when cooled below 100°C
- Approximate drying time*: 3mm: 8 hours, 4mm: 13 hours, 5mm: 18 hours, 6mm: 24 hours, 8mm: 28 hours, 10mm: 30 hours, 12mm: 33 hours. *Drying time may vary depending on storage equipment.
- If material has been correctly stored in a dry place, drying time can be reduced by one third. Pre-drying may be dispensed if fast and effective heating is used e.g. infra-red heaters
- Secure clamping of material during forming is essential to avoid shrinking
- Heating to thermoforming temperatures of 175-200°C should be evenly applied to both sides of the sheet
- Parts should be allowed to cool in the mould to below 125°C and components must be completely rigid before removal from the mould

The following points should be taken into account when line bending:

- Pre-drying is not normally required
- Recommended temperature between 155°C and 165°C
- The area of material to be heated must be approximately five times as wide as the sheet thickness
- Up to and including 4mm thick can be bent when heated from one side only
- Over 4mm it is necessary to heat from both sides
- Bending sharp internal corners should be avoided
- Use a former radius at least equal to the sheet thickness

Marpet-g FS

Flat PETg Sheet

Marpet-g FS sheet is a clear transparent thermoplastic (polyethylene terephthalate glycol) co-polyester flat sheet that can be used as an alternative to polycarbonate, solid acrylic and clear PVC sheets. It offers excellent strength to weight ratio, outstanding optical clarity, superior chemical resistance, durability, fire resistance and is 100% recyclable.

It is easy to thermoform, particularly at low temperatures, and is suitable for printing. It can be formed into complex shapes which makes it ideal for use in sign, display and in-store fixtures.

We also offer Marpet-g FS Eco, an environmentally friendly PETg containing at least 50% regrind, which is produced on-site under closely monitored conditions to ensure consistent quality. Available in limited quantities, Marpet-g FS Eco reduces the amount of PETg waste that goes to landfill. It can be processed in the same way as the standard product.

Product Range

Colours	Clear
Options*	Eco, UV resistant, Anti-reflective

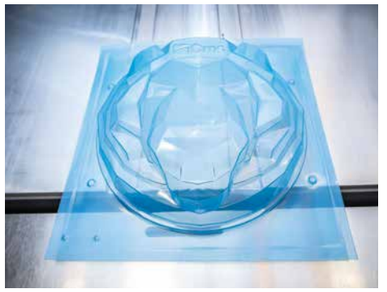
*Subject to request. Minimum order quantities may apply.
Please contact Brett Martin for further information.

Applications

- Point of sale equipment and displays
- 3D displays and graphic art
- Illuminated and non-illuminated signage
- Light boxes
- Shower surrounds
- Vending equipment
- Commercial fridge/ freezer doors
- Industrial trays
- Non-food packaging

Product Features

- Excellent thermoforming properties - no pre-drying required
- Easily machined and fabricated
- Suitable for digital printing
- Excellent strength to weight ratio
- Very good impact resistance
- Durable and chemically resistant
- Good optical clarity and light transmission
- Good fire performance
- UV resistant option available
- Eco option available
- Anti-reflective option available
- 100% Recyclable



Product Options

Marpet-g FS | **Marpet-g FS Eco**

Material Properties

Property	Standard	Value	Unit
Density	ISO 1183-1	1.27	g/cm^3
Transmission at 3mm	ISO 13468-1	88	%
Flexural Strength	ISO 178	80	MPa
Tensile Strength at Yield	ISO 527	50	MPa
Heat Deflection Temperature	ISO 75-2	72	˚C
Thermal Expansion	ISO 11359-2	0.065	mm/m˚C
Service Temperature- Long Term	-	-20 to +60	˚C

Marpet-g FS Product Options

Sheet Size (mm)	Thickness (mm)
1250 x 2050	0.5, 0.75, 1, 1.5 & 1.8
1250 x 2500	0.5, 0.75, 1, 1.5 & 1.8
2500 x 1250	2, 3, 4, 5, 6, 8, 10, 12 & 15*
2050 x 3050	2, 3, 4, 5, 6, 8, 10, 12 & 15*

*Subject to request.
Minimum order quantities may apply.

Marpet-g FS Eco** Product Options

Sheet Size (mm)	Thickness (mm)
1250 x 2050	0.5, 0.75, 1, 1.5, 2
2050 x 3050	2, 3

** Limited availability only

Processing

- Digital and screen printing
- Vinyl application
- Fabrication
- Routering, milling, sawing
- Guillotining, die cutting
- Engraving
- Laser cutting
- Drilling
- Thermoforming
- Welding
- Cold curving
- Laminating
- Bonding

PETg Fabrication Guide

Cutting / Machining

Marpet-g FS can be sawn using standard hand tools, circular saws and band saws with carbide-tipped blades that will produce the cleanest finish. Ensure that the blade is sharp and the material is clamped to prevent vibration which may result in cracking. Marpet-g FS is notch sensitive which can adversely affect the mechanical properties of the material.

Drilling

When drilling Marpet-g FS it is recommended to use drill bits designed for plastics. To avoid overheating, it is best to use compressed air or wide and highly polished flutes. To prevent vibration, which may result in cracking, it is recommended to clamp the part securely.

Die Stamping

Marpet-g FS can be die-cut, with excellent results on thinner sheets. Sharpened steel blades up to 2.5mm can be used. The back board must be correctly aligned for a clean cut, with the blade completely traversing the sheet to avoid notches. Ensure adequate allowance for thermal expansion.

Bending

Marpet-g FS is suitable for cold and hot bending techniques. Cold bending is ideal to create simple shapes. It is recommended to heat sheets above 3mm to produce more complex shapes. The best result is obtained by heating the sheet on both sides using an electric heater. When the optimum temperature is reached (+105˚C) the sheet can be bent with a small radius.

Thermoforming

Marpet-g FS can be easily thermoformed using general forming techniques including thermoforming, vacuum forming and line bending. Marpet-g FS does not require pre-drying and forms between 120 - 160ºC.

Bonding

Bonding Marpet-g FS can be achieved using suitable adhesive tape, mechanical fixing or welding. When using adhesives ensure they are chemically compatible with PETg. Adhesive types such as polyurethanes and two-component acrylics give good results.

Edge Finishing

Following cutting, a good edge finish can be obtained using a suitable polishing paste in conjunction with a medium density Reiter wheel, followed by a soft fabric polishing wheel without paste.

Printing

Marpet-g FS can be printed with standard screen and digital printers in conjunction with inks that are suitable for use with thermoplastic co-polyesters. It is recommended to protect the ink from scratches by applying a light coat of clear lacquer. Before printing ALWAYS clean the surface with a soft cloth and use ionized air to clear dust.

Installation

Applications of Marpet-g FS must make adequate allowance for thermal movement. Adequate clearance must be allowed in the holes drilled for fixing and sheet lengths have to be limited so that there is not excessive movement at the ends.

Marpet-a FS

Flat aPET Sheet

Marpet-a FS aPET is a high optical grade amorphous polyester sheet from Brett Martin. Combining exceptional quality, excellent transparency, impact strength, chemical resistance and fire performance, Marpet-a FS is ideal for applications which require its high performance characteristics and processability.

Its ability to cost effectively machine, cold bend and print makes Marpet-a FS, and its anti-reflective option Marpet-a FS AR, particularly well suited to fabrication of items for the visual communications sector including point of purchase display stands, poster glazing and illuminated signage.

Marpet-a FS may be thermoformed and hot line bent within a controlled temperature range to avoid crystallisation.

Due to its superior strength and resistance to breakage Marpet-a FS is also equally suitable for safety equipment such as machine guards and visors.

Product Range

Colours	Clear
Options*	Anti-reflective option

*Subject to request. Minimum order quantities may apply.
Please contact Brett Martin for further information.

Applications

- Point of sale displays
- Poster covers
- Photo frames
- Shop fittings
- Cold food storage
- Machine guards
- Protective screens
- Visors
- Glazing

Product Features

- High optical grade material
- Good scratch and scuff resistance
- Superior chemical resistance
- Temperature range -20°C to + 60°C
- High impact strength
- Resistant to breakage at sub-zero temperatures
- Excellent fire performance
- Anti-reflective option available
- 100% recyclable

Product Options

Marpet-a FS | Marpet-a FS AR

Material Properties

Property	Standard	Value	Unit
Density	ISO 1183-1	1.33	g/cm^3
Transmission at 3mm	ISO 13468-1	86	%
Flexural Strength	ISO 178	86	MPa
Tensile Strength at Yield	ISO 527	55	MPa
Heat Deflection Temperature	ISO 75-2	67	°C
Thermal Expansion	ISO 11359-2	0.065	mm/m°C
Service Temperature - Long Term	-	-20 to +60	°C

Marpet-a FS Product Options

Sheet Size (mm)	Thickness (mm)
1250 x 2050	0.5, 0.75, 1, 1.5, & 2
1250 x 2500	0.5, 0.75, 1, 1.5 & 2

Marpet-a FS AR Product Options

Sheet Size (mm)	Thickness (mm)
1250 x 2050	0.5*, 0.75, 1, 1.5, 2*

*Subject to request.
Minimum order quantities may apply.

Processing

- Screen printing
- Vinyl application
- Fabrication
- Routering, milling, sawing
- Guillotining, die cutting
- Laser cutting
- Engraving
- Drilling
- Welding
- Cold curving
- Laminating
- Bonding

aPET Fabrication Guide

Cutting / Machining

Marpet- a FS can be cut using standard tools used for metal and woodworking. Carbide-tipped tools are recommended. To avoid melting and cracking the sheet the blade should be sharp, the material clamped and the guide close to prevent vibration. Guillotining is also possible as Marpet-a FS is thinner than 3mm.

Drilling

When drilling Marpet-a FS it is recommended to use drill bits designed for plastics. To avoid overheating, it is best to use compressed air or wide and highly polished flutes. To prevent vibration, which may result in cracking, it is recommended to clamp the part securely.

Die Stamping

Marpet-a FS can be die-cut with a sharpened steel blade up to 2mm. The blade must completely traverse the sheet to avoid notches. Ensure adequate allowance for thermal expansion.

Bending

Marpet-a FS sheets of less than 3mm can be cold bent using presses or bending machines. Excessive speed during the process may cause the sheet to stress and break.

Marpet-a FS sheets may be heat bent using heating elements in a linear manner such as incandescent wire bending equipment. The sheet requires local heating to 100°C. Once the ideal temperature is reached the sheet is removed from the heating element placed in a mould or clamped into position until the material rigidifies. Excessive temperatures may cause crystallised whitening in the heated area.

Thermoforming

Thermoforming is not recommended for Marpet-a FS as the sheets may crystallise resulting in whitening. However, if Marpet-a FS is to be thermoformed, temperatures between 100°C and 160°C, short heating times and rapid cooling of the moulded part are recommended to preserve the transparency of the material. Where possible sheets should be heated from both sides to minimise heating time and help prevent crystallisation. Very high temperatures can reduce the impact strength of the material. Mould temperature must not exceed 60°C. Pre drying is not required.

Bonding

Recommended adhesives include cyanoacrylates, and two part component polyurethanes and epoxies. Refer to the adhesive manufacturer's guidelines for suitability of the adhesive to both the application and environment in which it will be used. For the surfaces to be joined adequately they must fit and be smooth and unpolished. Make allowance for adhesives which contact whilst drying. It is not possible to use adhesives with solvents due to chemical resistance.

Edge Finishing

Following cutting, a good edge finish can be obtained using a suitable polishing paste in conjunction with a medium density Reiter wheel, followed by a soft fabric polishing wheel without paste. Flame polishing the edge is also possible with a standard butane torch or a hot nitrogen welding torch. Ensure the torch is not to close to the edge to avoid crystallised-whitening or over softening the material. Minor scratches to the sheet surface may be successfully removed by careful application of a butane torch or hot nitrogen welding torch.

Marcryl FS

Flat Acrylic Sheet

Marcryl FS is a top quality extruded acrylic sheet with a high gloss finish that offers a combination of excellent optical clarity and weatherability. The versatility, ease of fabrication and scratch resistance of Marcryl FS make it suitable for a wide variety of applications in interior design, point of sale and display, fabrications and building industries. Marcryl FS can be flame polished creating a bright, shiny edge finish.

We also offer Marcryl FS Eco, an environmentally friendly extruded acrylic containing at least 50% regrind, which is produced on-site under closely monitored conditions to ensure consistent quality. Available in limited quantities, Marcryl FS Eco reduces the amount of acrylic waste that goes to landfill. It can be processed in the same way as the standard product.

Product Range

Colours	Clear, Opal
Options*	Eco

*Limited availability

Applications

- POS and 3D Displays
- Fabrication
- Picture framing
- Poster covers
- Menu boards
- Illuminated and non-illuminated signage
- Furniture
- Interior design projects
- Creative artwork
- High traffic acoustic barriers
- Glazing

Product Features

- Glass-like optical quality and high light transmission
- Weight savings over glass
- Good scratch resistance – polishing removes scratches easily
- Easy to edge polish
- Suitable for thermoforming
- UV resistant and outstanding weatherability
- 100% recyclable

Product Options

Marcryl FS | **Marcryl FS Eco**

Material Properties

Property	Standard	Value	Unit
Density	ISO 1183-1	1.19	g/cm^3
Transmission @3mm	ISO 13468-1	92	%
Flexural Strength	ISO 178	105	MPa
Tensile Strength @Yield	ISO 527	72	MPa
Heat Deflection Temperature	ISO 75-2	95	°C
Thermal Expansion	ISO 11359-2	0.065	mm/m°C
Service Temp - Long Term	-	-20 to +80	°C

Marcryl FS Product Options

Sheet Size (mm)	Thickness (mm)
Clear	
1250 x 2500	2, 3, 4, 5, 6, 8 & 10
2050 x 3050	2, 3, 4, 5, 6, 8 & 10
Opal	
2050 x 3050	3, 4, 5

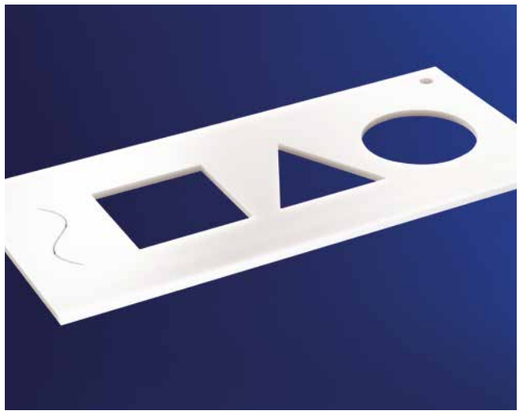
Marcryl FS Eco* Product Options

Sheet Size (mm)	Thickness (mm)
1250 x 2050	1.9, 3.8

*Limited Availability

Processing

- Digital and screen printing
- Vinyl application
- Fabrication
- Routering, milling, sawing
- Guillotining, die cutting
- Laser cutting
- Engraving
- Drilling
- Edge polishing
- Thermoforming
- Welding
- Laminating
- Bonding



Acrylic Fabrication Guide

Cutting / Machining

Marcryl FS is easy to saw and cut on standard workshop equipment. It can be machined on conventional milling machines with standard high speed tools. Notches adversely affect the mechanical properties of acrylic and should be avoided. If the feed rate is too low, unwanted heat build up may occur at the cut edges. The blades of circular saws should only protrude slightly beyond the sheet. Switch on the saw before starting the cut. Secure the sheet against fluttering or vibration. Marcryl FS can also be laser cut.

Recommendations	Circular Saw	Band Saw	Milling Machine
Clearance angle	10-15°	20-30°	2-10°
Rake angle	0-5°	0-5°	0-5°
Cutting speed	1800-2400m min	600-1000m min	100-2000m min
Feed speed	10-25m min	20-25m min	0.1-0.5mm rev
Tooth spacing	9-20mm	1.5-3.3mm	-

Drilling

Use only compatible cutting oils or emulsions for cooling when drilling Marcryl FS. Fixing threads should only be used if there is no alternative, the sheet may break as a result of notching. The hole should be at least 1.5 x hole diameter from the edge of the sheet. When drilling thin sheet it is advisable to clamp them to a flat solid surface. Do not punch a centre hole prior to drilling as this will cause stress to build up in the sheet. In order to locate the drill a pilot hole should be drilled first. Special ground bits are required when drilling Marcryl.

Parameter	Value
Clearance angle	3°
Tip angle	60-90°
Helix angle	12-16°
Rake angle	0-4°
Cutting speed	0.1-035mm/rpm
Drill tip speed	10-60m/min

Bonding

Marcryl FS can be bonded using acrylic cements. It is imperative that the material selected is compatible and suitable for the intended end use. Care must be taken to avoid stress cracking. A cycanocrylate adhesive is suggested for use when bonding Marcryl to other substrates such as metal, glass or wood.

Thermoforming

Marcryl FS can be highly stretched at relatively low temperatures. The forming process can occur more slowly, as it is of a rubbery nature and the surface quality of the semi-finished material is largely retained. Prior to pre-drying or thermoforming it is recommended that the protective film is removed as heating may result in it adhering to the sheet.

Pre-drying is not normally required when line bending or if fast effective heating is used. If required pre-dry between 75 - 80ºC for 24 hours for sheets with a relatively high moisture content. Thermoforming should be carried out as soon as possible after pre-drying, as re-absorption of moisture will occur.

When using thermoplastic moulding techniques the material should be heated to 140 - 170ºC, some experimentation may be required to maintain the good optical quality of the surface.

Flame Polishing

Marcryl acrylic flat sheet can be flame polished. Normally the marks of the preceding sawing or milling operation are still visible after polishing unless an intermediate step of scraping the edge smooth is carried out. The edges must be free from notches, swarf or dust and oils or greases.

Thicker sheets cannot normally be flame polished because of the excessive surface stress that can build up during the treatment. Ensure that the flame does not touch the area behind the edge as this may result in thermal stress build up which could lead to cracking or crazing during further treatment or in use. A high temperature flame is most appropriate. Do not allow the flame to remain stationary otherwise the material may scorch, bubble, become discoloured and even catch fire.

Foamalux

Foam PVC Sheet

Our Foamalux range can easily be printed, cut, drilled, shaped and bonded allowing flexibility and creativity of design when fabricating everyday objects or one-off items. With bright white, matt and gloss, colours end environmentally friendly products, our Foamalux range offers a wide choice of options.

Within our Foamalux range we have two products. Foamalux Eco and Foamalux Xtra, which contain up to 80% regrind. In addition to the black core containing regrind, Foamalux Xtra has white surfaces suitable for printing made from virgin PVC.

Product Range

Product Range	Foamalux White, Foamalux Light, Foamalux Colour, Foamalux Ultra, Foamalux Xtra, Foamalux Eco, Foamalux Calibre
Colours	Bright White, Red, Yellow, Green, Blue, Grey, Black
Surface	Matt, Gloss
Options	Foamalux Xtra – single sided or double sided, Foamalux Calibre – weatherable UV grade

Applications

- Point of sale displays
- Signage
- Shop fittings
- Shelving
- Furniture and cabinetry
- Vehicle fittings and linings
- Window frames, trims and shutter boxes
- Fascias and soffit boards
- Exhibition stands
- Partitions
- Site hoardings
- Freezer linings
- Backing boards
- Pet enclosures
- Large letters and decorative shapes

Product Features

- Easily machined and fabricated
- Suitable for digital and screen printing plus vinyl application
- Lightweight
- Smooth surface
- White products give excellent colour reproduction
- Strong, rigid, durable
- Moisture, mould and chemical resistance
- Provides acoustic and thermal insulation
- Good fire performance
- Eco options available
- Foamalux Calibre – UV resistant option available
- Foamalux Calibre provides dimensional stability

Product Options & Properties

Foamalux White

Property	Standard	Value	Units
Density	-	0.55-0.75	g/cm³
Moisture Absorption	ISO 62	<0.25	% by weight
Shore Hardness	ISO 868	>30	-
Tensile Strength	ISO 527	15	MPa
Flexural Modulus	ISO 178	1100-1300	MPa
Impact Resistance (Charpy)	ISO 179-1/1eU	11	kJ/m²
Thermal Expansion	ISO 11359-2	0.068	mm/m°C
Service Temperature	-	-20 to +60	°C

Sheet Size (mm)	Thickness (mm)
1220 x 2440	1, 2, 3, 4, 5, 6, 8, 10, 13, 19 & 24
1560 x 3050	2, 3, 5, 10, 15 & 19
2050 x 3050	1, 2, 3, 4, 5, 6, 8 & 10

Foamalux Light

Property	Standard	Value	Units
Density	-	0.45-0.55	g/cm³
Moisture Absorption	ISO 62	<0.25	% by weight
Shore Hardness	ISO 868	>30	-
Tensile Strength	ISO 527	15	MPa
Flexural Modulus	ISO 178	900-1100	MPa
Impact Resistance (Charpy)	ISO 179-1/1eU	10	kJ/m²
Thermal Expansion	ISO 11359-2	0.068	mm/m°C
Service Temperature	-	-20 to +60	°C

Sheet Size (mm)	Thickness (mm)
1220 x 2440	2, 3, 4, 5, 6, 8 & 10
1560 x 3050	2, 3, 5, & 10
2050 x 3050	2, 3, 4, 5, 6, 8 & 10

Foamalux Colour

Property	Standard	Value	Units
Density	-	0.50	g/cm³
Moisture Absorption	ISO 62	<0.25	% by weight
Shore Hardness	ISO 868	>30	-
Tensile Strength	ISO 527	15	MPa
Flexural Modulus	ISO 178	900-1100	MPa
Impact Resistance (Charpy)	ISO 179-1/1eU	14	kJ/m²
Thermal Expansion	ISO 11359-2	0.068	mm/m°C
Service Temperature	-	-20 to +60	°C

Sheet Size (mm)	Thickness (mm)
1220 x 2440	3 & 5
2050 x 3050	3 & 5

Foamalux Ultra

Property	Standard	Value	Units
Density	-	0.60-0.80	g/cm³
Moisture Absorption	ISO 62	<0.25	% by weight
Shore Hardness	ISO 868	>50	-
Tensile Strength	ISO 527	25	MPa
Flexural Modulus	ISO 178	1600-1800	MPa
Impact Resistance (Charpy)	ISO 179-1/1eU	14	kJ/m²
Thermal Expansion	ISO 11359-2	0.068	mm/m°C
Service Temperature	-	-20 to +60	°C

Sheet Size (mm)	Thickness (mm)
1220 x 2440	3 & 5

Foamalux Xtra

Property	Standard	Value	Units
Density	-	0.55-0.65	g/cm³
Moisture Absorption	ISO 62	<0.25	% by weight
Shore Hardness	ISO 868	>30	-
Tensile Strength	ISO 527	17	MPa
Flexural Modulus	ISO 178	1000-1200	MPa
Impact Resistance (Charpy)	ISO 179-1/1eU	12	kJ/m²
Thermal Expansion	ISO 11359-2	0.068	mm/m°C
Service Temperature	-	-20 to +60	°C

Sheet Size (mm)	Single Sided (S1) Thickness (mm)	Double Sided (S1) Thickness (mm)
1220 x 2440	3, 5 & 6	10
1560 x 3050	-	10
1560 x 3050	-	10

Foamalux Eco

Property	Standard	Value	Units
Density	-	0.50-0.60	g/cm³
Moisture Absorption	ISO 62	<0.25	% by weight
Shore Hardness	ISO 868	>30	-
Tensile Strength	ISO 527	15	MPa
Flexural Modulus	ISO 178	900-1100	MPa
Impact Resistance (Charpy)	ISO 179-1/1eU	12	kJ/m²
Thermal Expansion	ISO 11359-2	0.068	mm/m°C
Service Temperature	-	-20 to +60	°C

Sheet Size (mm)	Thickness (mm)
1220 x 2440	3, 5 & 10
2050 x 3050	3, 5 & 10

Foamalux Calibre

Property	Standard	Value	Units
Density	-	0.5	g/cm³
Shore Hardness	ISO 868	>40	-
Thermal Expansion	ISO 11359-2	0.068	mm/m°C
Service Temperature	-	-20 to +60	°C
Moisture Absorption	ISO 62	<2	% by weight
Screw Pull	ASTM D1761-20	65	N/mm

Sheet Size (mm)	Thickness (mm)
1220 x 2440	10, 19, 24 & 30
1220 x 3050	10, 19, 24 & 30

Processing

- Digital and screen printing
- Vinyl application
- Spray painting
- Fabrication
- Routering, milling, sawing
- Guillotining, die cutting
- Engraving
- Drilling
- Thermoforming
- Welding
- Cold curving
- Laminating
- Bonding

Foamalux Fabrication Guide

Cutting/Machining

Different methods of cutting are appropriate for different thicknesses of Foamalux, ranging from hand tools to power saws. Sheets 1- 2mm thick can be cut with shears. Sheets 1-3mm thick can be cut with a craft knife. Sheet exceeding 3mm in thickness should be sawn. See below for guidelines of pitch, clearance angle and feed speed. Guillotines can be used for rough cutting but are not usually employed to finish-cut as their action compresses the sheet and can give a poor edge finish. Water-jet cutting is suitable. Laser cutting is not recommended for use in conjunction with Foamalux PVC sheets.

Recommendations	Circular Saw	Band Saw
Angle	10-15°	30-40°
Rake angle	0-8°	0-8°
Cutting speed	1000-3000m min	1000-3000m min
Feed speed	6-30m min	6-30m min
Tooth spacing	5-15mm	2-8mm

Milling and Routering

All types of milling machines and routers can be used to machine Foamalux if suitable tool geometry and cutting conditions are used.

Vacuum clamping machines are ideal as they are less likely to mark the surface than mechanical clamping. Where sheets are mechanically clamped, load spreading pads should be used to avoid surface marks.

Die Cutting

Flat shapes with complex outlines can be die cut from thinner sheets - up to 4mm thick – using sharp, accurately set, steel rule dies. Best results are obtainable by preheating sheets to a maximum of 35°C to prevent fracturing the edges. Narrow sections and radii less than 3mm should be avoided.

Stamping

Foamalux can be stamped out but this is usually limited to thinner sheets and deformation of the cut edges may be observed. The material temperature should be approximately 20-30ºC to obtain the best edge finish.

Drilling

Standard twist bits for metal are suitable for holes up to 12mm diameter in all thicknesses. Holes over 12mm in diameter can be drilled with flat bits, normally used for drilling wood. Above 25mm diameter it is necessary to use hole saws or circular cutters.

Parameter	Value
Tip angle	100-110°
Helix angle	30°
Drill speed	1000-3000 rpm
Tip speed	0.2-0.5mm/rev

Finishing

Sheet edges can be finished by filing, sanding, grinding, planing or using a deburring tool, for example, a flat steel edge scraper. Such finishing operations on the sheet surfaces will expose the inner cell structure which might be undesirable in some applications. Glossy surface finishes can be obtained using soft buffing wheels and applying polishing compound, but avoid abrading the surface.

Forming - general

Components which are relatively simple and shallow can be formed from Foamalux. An elastic state is reached between the temperature range 115-130ºC. As Foamalux is a cellular material it is not suitable for forming operations which involve excessive stretching in the elastic state.

Cold bending

Sheets up to 6mm can be cold bent into basic shapes. The recommended temperature for cold bending is at least 20°C, preferably higher. The minimum bending radius is approximately 100 times the thickness of the sheet, for example 300mm for a 3mm sheet. Foamalux sheets should always be bent across the manufacturing direction to reduce the risk of breakage.

In order to cold bend sheets thicker than 6mm, deep parallel scores can be cut along the length of the sheet.

Hot line bending

Foamalux can be folded on a simple jig fitted with a forming tool having a radius of about two and a half times the sheet thickness. Prior to folding, localized strip heating to about 130°C is required.

Prior to bending thicker sheets (10mm or above) it is important that any excess material at the inside of the bend is removed. This can be achieved by milling out a V groove.

Drape forming

Where a specific thickness of Foamalux is to be curved to a smaller diameter than is possible by cold bending, it is possible to do this by softening a panel to an elastic state, draping over an appropriately shaped pattern and retaining it until cooled and rigid.

Thermoforming

Foamalux sheets do not need to be pre-dried prior to forming. As Foamalux foam PVC has a relatively low density, heating and cooling cycles are faster than with solid thermoplastics.

Thermoforming Foamalux sheets at temperatures higher than 180°C, will overheat and discolour and eventually destroy the sheet. The temperature of the sheets is far more important than the temperature set on the machine.

Bonding

Foamalux can be bonded to itself and a variety of materials such as ABS, GRP, Polycarbonate, uPVC and various woods and metals. Recommendations on adhesives used for bonding are made on the basis of tests, following each manufacturer's recommendations on surface preparation, bonding conditions, application of primers and adhesives.

When welding, the same methods and PVC filler rods used for solid PVC welding can be used, achieving a bond strength ratio of 50-90%.

Printing

Foamalux is suitable for digital printing, screen printing and the application of vinyl graphics. Print on the filmed side of the sheet. Film should be removed slowly, in one direction to avoid additional static charge build up.

Installation

It is essential to consider thermal expansion when installing Foamalux sheets both in indoor and short term outdoor applications. This movement must not be inhibited otherwise distortion, warping or localised buckling will occur.

Panel orientation should be considered when mounting, always matching the direction of extrusion in adjacent panels. This is particularly important for coloured Foamalux where the refractive index viewed along the direction of extrusion may vary to that viewed across the direction of extrusion, resulting in a slight optical colour variation.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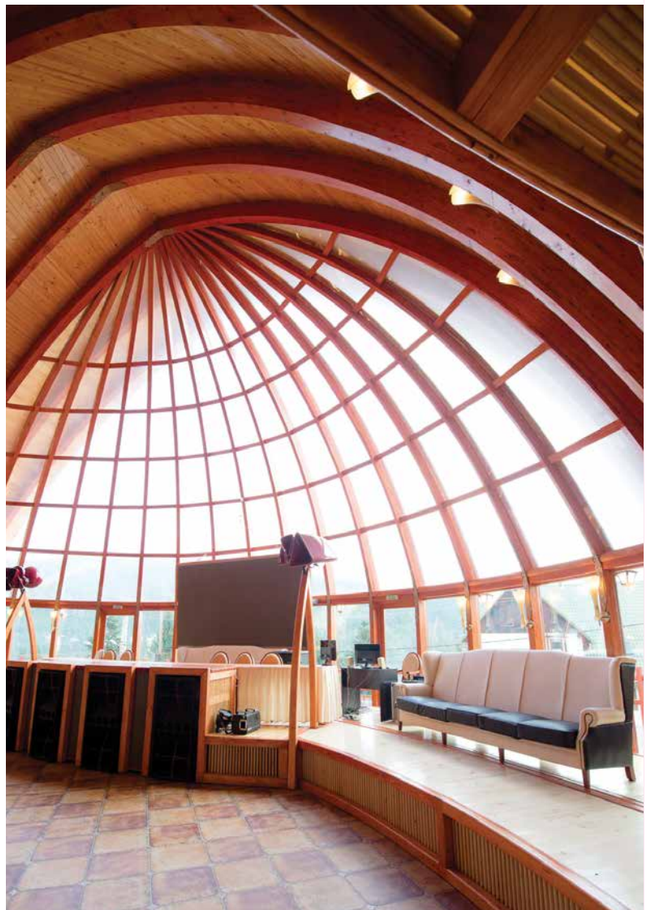


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