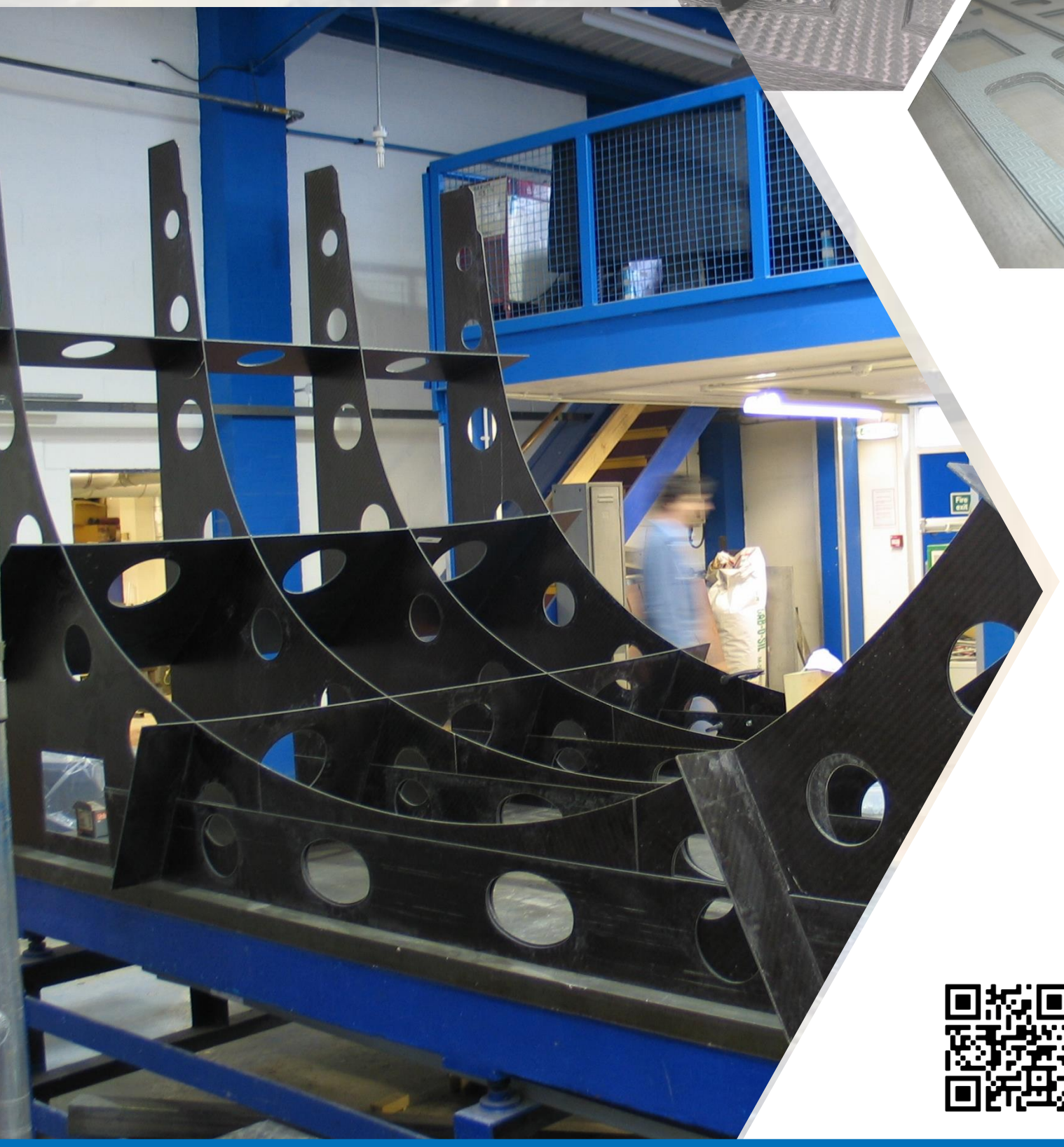
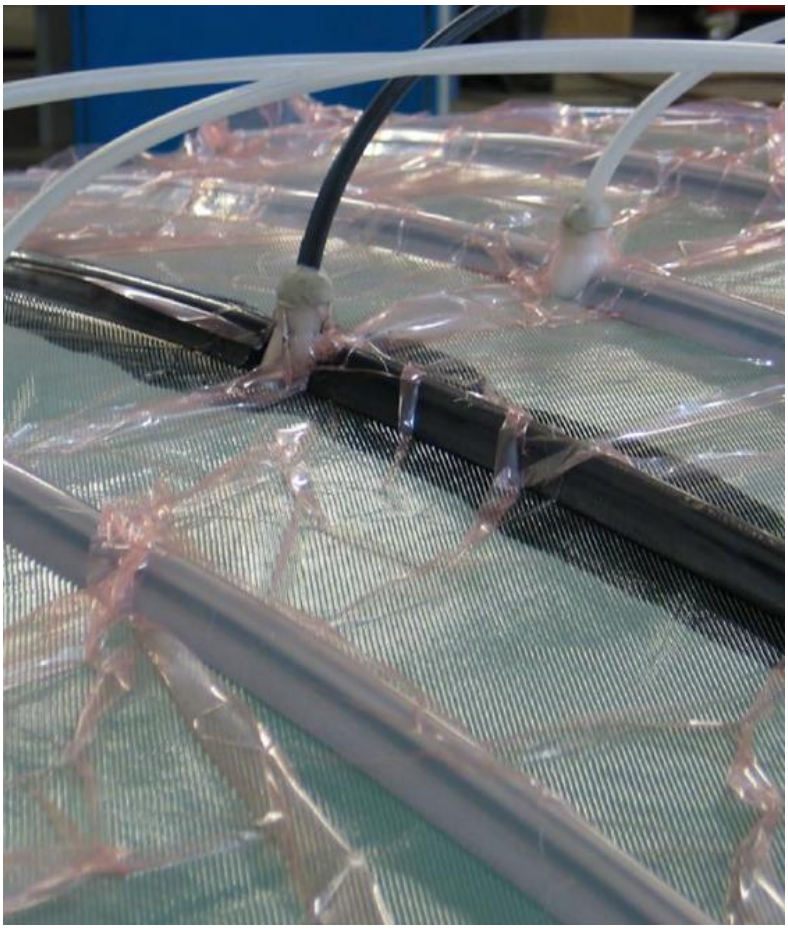
AIRTECH
ADVANCED MATERIALS GROUP

Composite Tooling Materials

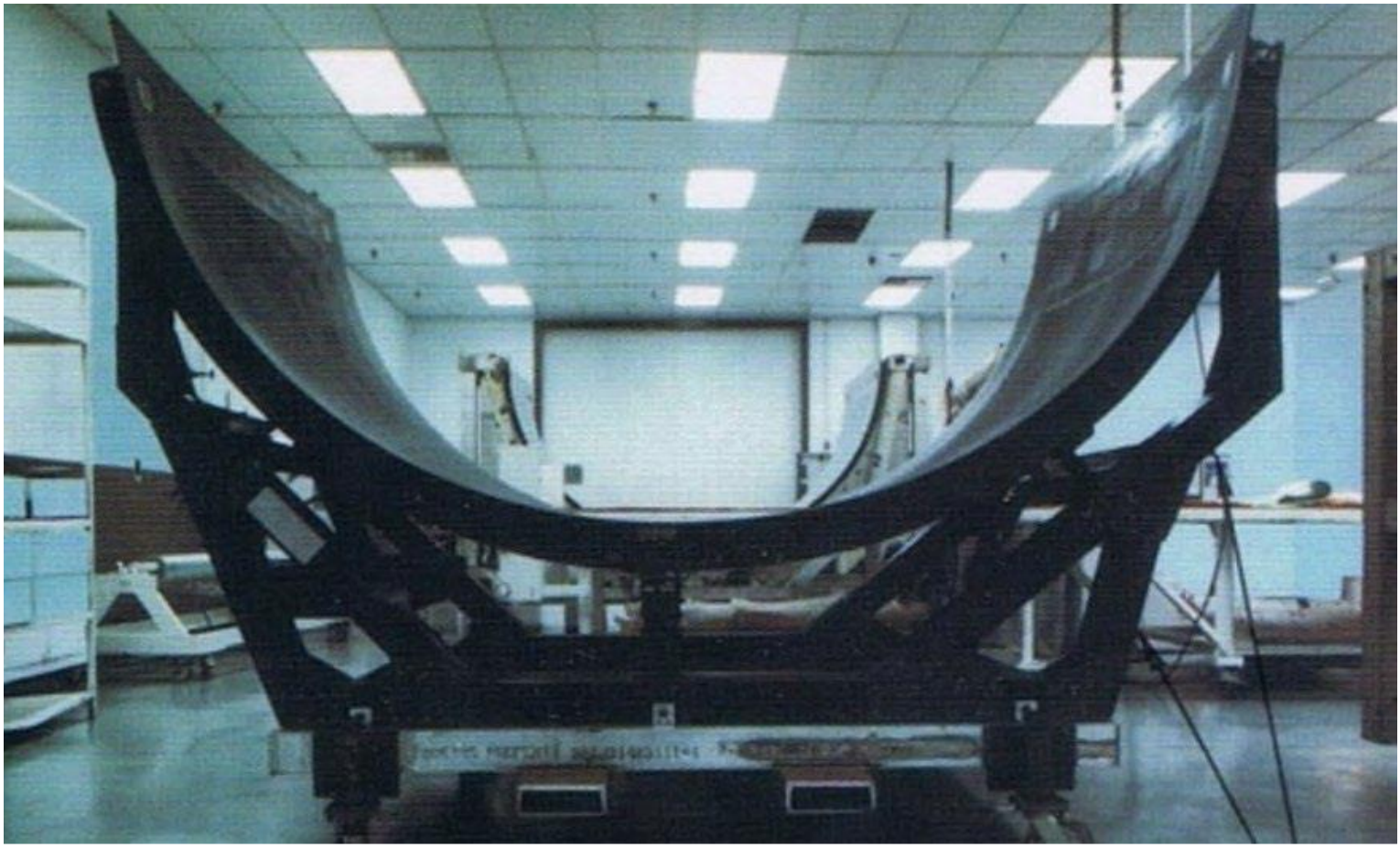


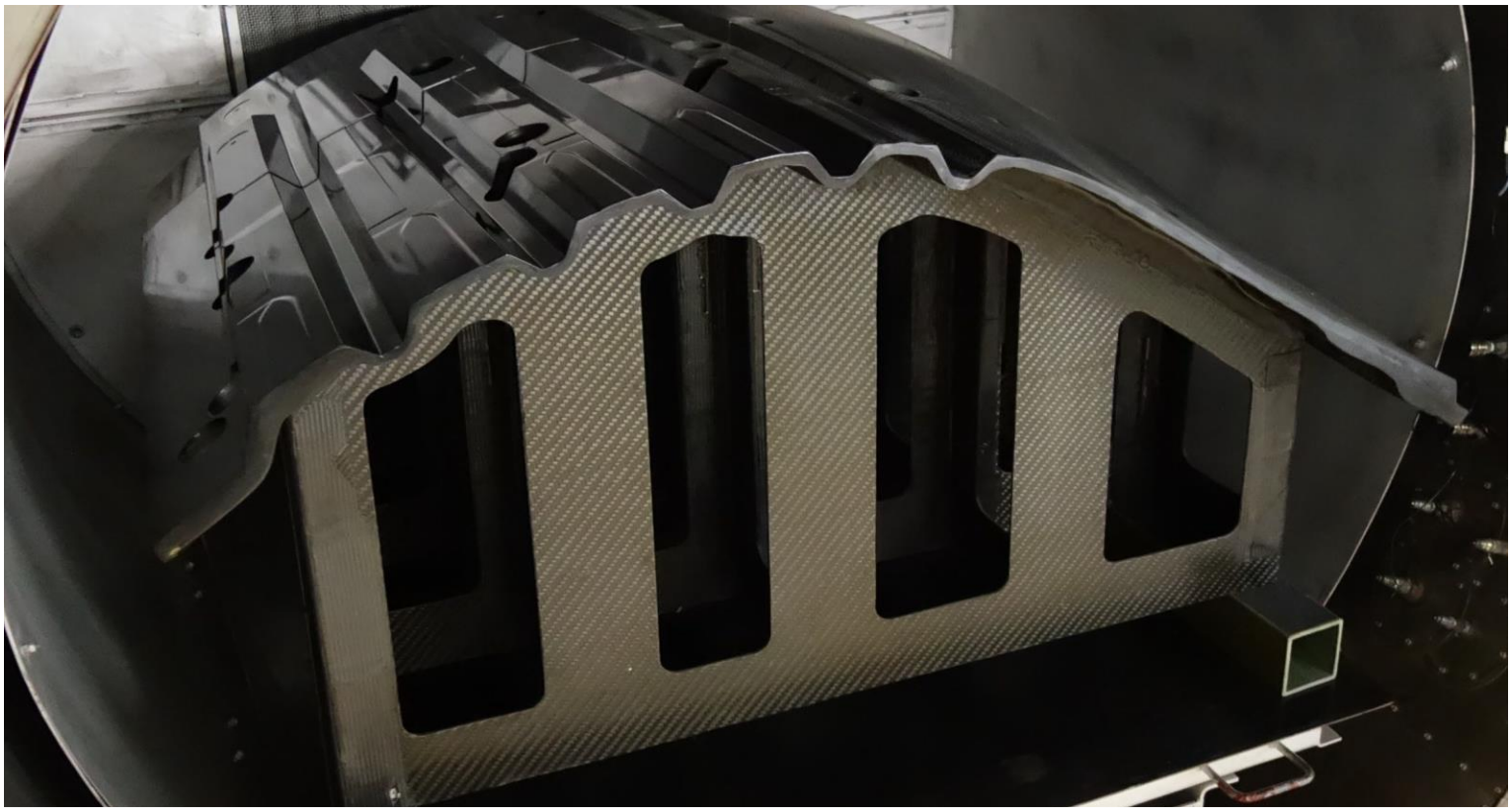
Composite Tooling Product

- Toolfusion® Infusion Resins
- Surfacing Resins
- LTC Prepregs
- Toolmaster® Prepregs
- Beta Prepreg
- CEP Prepreg
- Tooling Backup Boards
- Aircast Rubber Tooling
- Airpad Rubber Tooling



Airtech Innovations





airtech@airtech.com

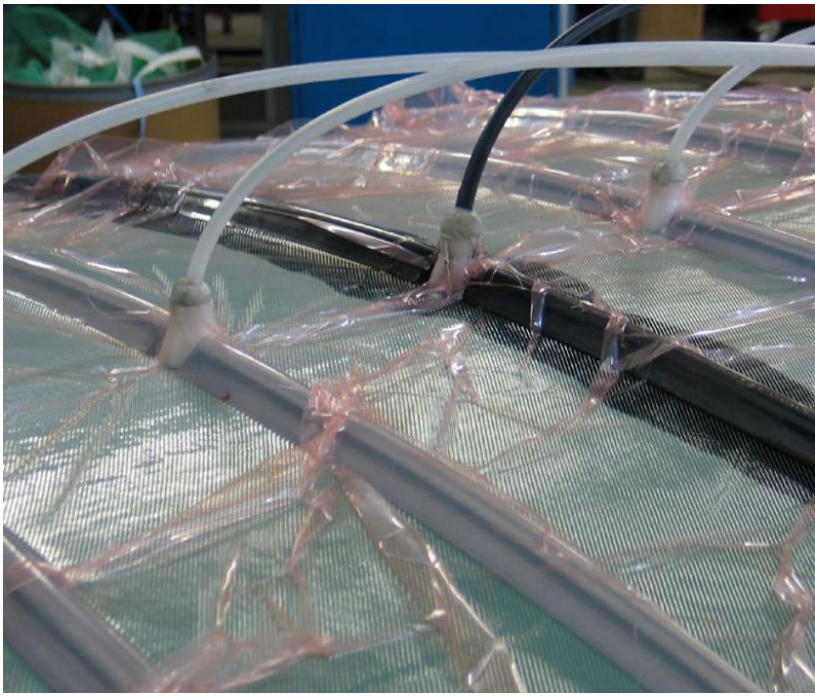
Toolfusion® Resin Infusion Tooling

Toolfusion® 1

Service Temperature	Initial Cure Temperature	Resin Type	Pot Life at 72°F (22°C)	Viscosity at 72°F (22°C)
375°F (191°C)	72°F (22°C) for 24 hours	Epoxy	75 minutes	600 cps

Benefits

- Toolfusion® 1 is a two-part, low viscosity epoxy infusion resin designed to produce prepreg quality, high temperature molds at a fraction of the cost. Standard infusion vacuum bagging is all that is required to produce autoclave quality laminates.
- Toolfusion® 1 requires room temperature master models and patterns further reducing the cost of composite tooling.
- No freezer storage, reducing logistic and storage costs.
- Low cost, low temperature master model materials can be used, significantly reducing total tooling costs.
- Room temperature curing avoiding costly autoclave cures and autoclave size limitations. Room temperature curing also avoids thermal expansion of master models which can lead to dimensional deviations



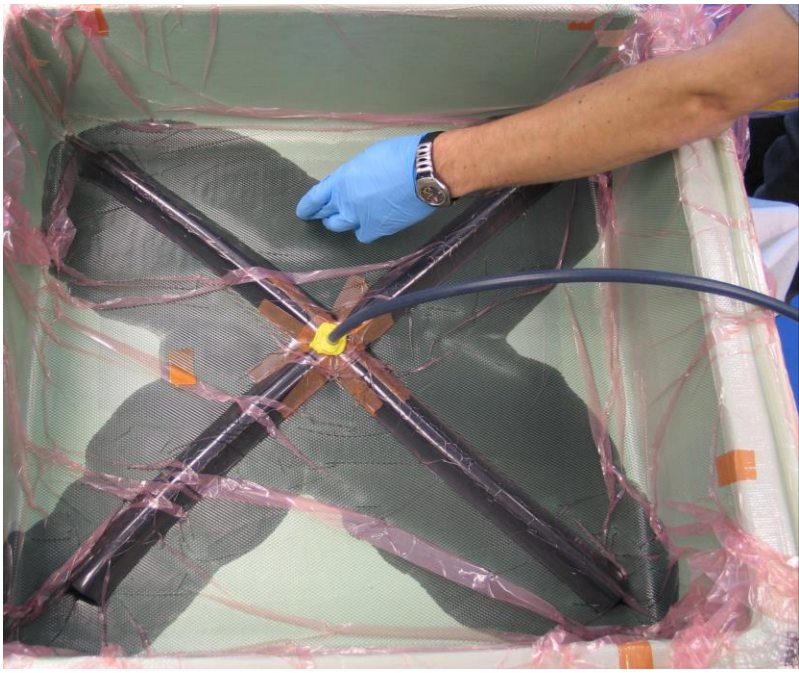
Low temperature curing resins for infusing masters, moulds, form tools & jigs

Toolfusion® 3

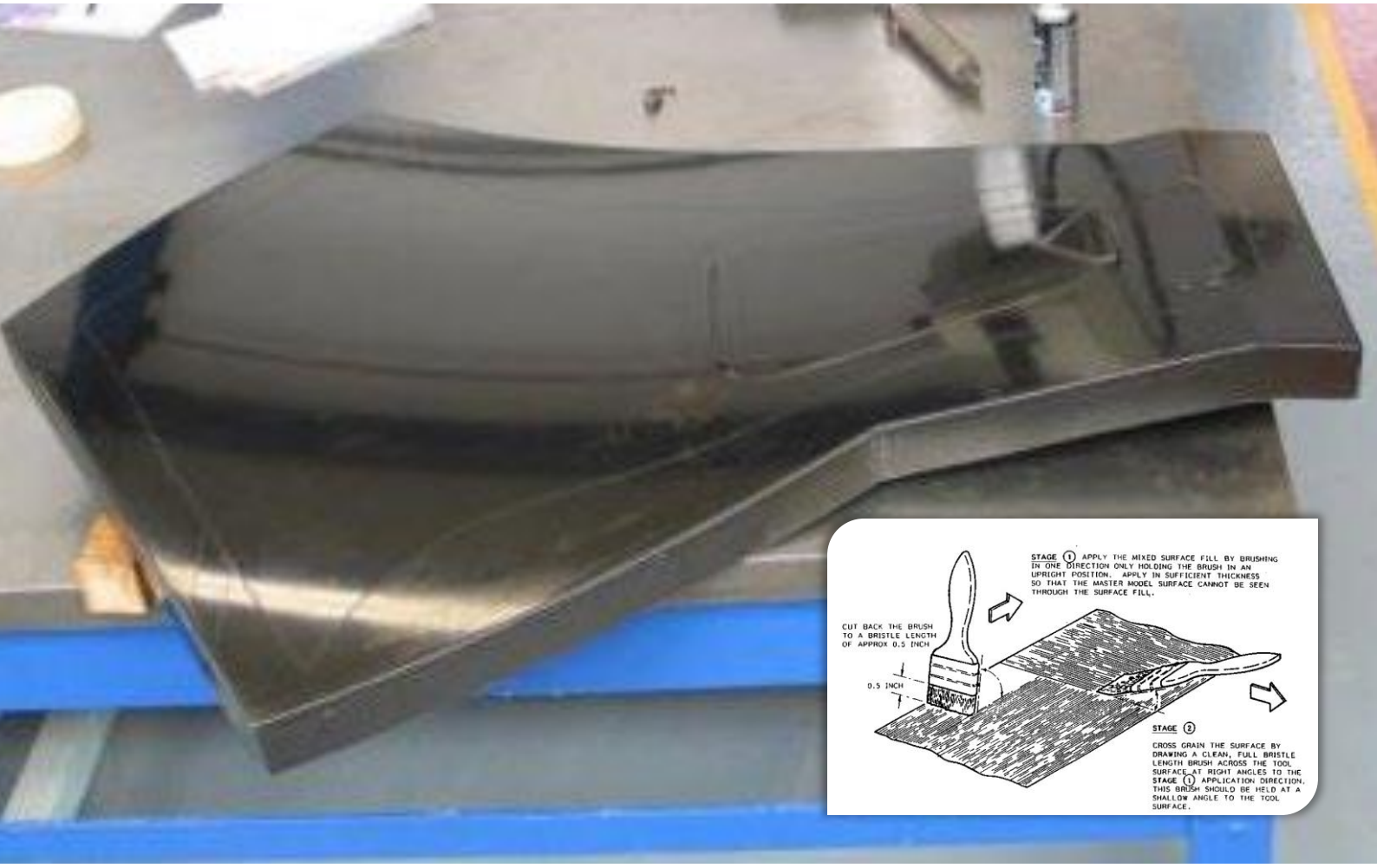
Service Temperature	Initial Cure Temperature	Resin Type	Pot Life at 72°F (22°C)	Viscosity at 72°F (22°C)
424°F (218°C)	120°F (49°C) for 12 hours	Epoxy	300 minutes	450 cps

Benefits

- Toolfusion® 3 is a two-part low viscosity epoxy infusion resin formulated to produce pre-preg quality, composite moulds.
- Toolfusion® 3 has a low initial cure temperature of 120°F (49°C) and can be post cured to achieve a high glass transition temperature of 424°F (218°C). Void contents of less than 1% are achievable.
- Toolfusion® 3 will work in various RTM and VARTM processes including single and double bag arrangements to produce autoclave quality laminates.
- No cost of freezer storage or autoclave curing.
- Low resin viscosity and long pot life means high quality laminates and longer lasting mold tools.
- Outstanding toughness & stability at high temperature, means longer lasting mold tools.



Laminating & Surface Coat Resins



Infusioncoat®

Service Temperature	Material Type	Tack free time
375°F (191°C)	Graphite filled epoxy	2-4 hours at 72°F (22°C)

Description

Infusioncoat® is a black surface coat designed for use with Toolfusion® 1 tooling resin or other applications where a non-sagging surface coat is required.

The product eliminates the need to use fabric tackifiers to hold the first ply on the pattern often resulting in minor surface defects.

- Very thixotropic, will hang on vertical surfaces.
- Compatible with Airtech infusion systems.
- Reduces possibility of surface porosity.

Laminating & Surface coat resins

TMR 2001A / TMH 2001B Laminating resin

Service Temperature	Material Type	Gel Time
400°F (204°C)	Epoxy laminating system	3-4 hours (100g at 72°F (22°C)

Description

TMR 2001 is a two part lightly filled high temperature epoxy laminating system. TMR 2001 has improved workability vs. standard laminating systems and provides long working time for fabrication of larger and more complicated tools.

TMR 2001 has very high heat resistance and will provide long term service in oven and autoclave applications. TMR 2001A and TMH 2001B are considered a low hazard potential safety system and does not contain any regulated or restricted raw materials. TMR 2001A and TMH 2001B do not contain VCHD, MDA or any aniline derivatives.

TMSF 5001A / TMH 5001B Surface coat resin

Service Temperature	Material Type	Tack Free Time
400°F (204°C)	Graphite filled surface coat	2-3 hours at 72°F (22°C)

Description

TMSF 5001A and TMH 5001B is a black graphite filled surface coat resin. The resin and hardener are of the low toxicity category, as they do not contain VCHD or MDA. TMSF 5001 is a thixotropic paste that yields a smooth mixed viscosity for easy application and minimum sag on vertical surfaces. TMSF 5001 is easy to scribe and resists stress cracking in oven and autoclave applications.

TMSF 5005A / TMH 5005B Surface coat resin

Service Temperature	Material Type	Tack Free Time
400°F (204°C)	Silicon-carbide filled surface coat	8-10 hours (at 72°F (22°C)

Description

TMSF 5005A and TMH 5005B is a black silicon-carbide filled surface coat resin designed to be used with our TMR 2001 high temperature epoxy laminating resin and all our infusion resin systems. The resin and hardener are of the low toxicity category, as they do not contain VCHD or MDA. TMSF 5005 is a thixotropic paste that yields a smooth mixed viscosity for easy application and minimum sag on vertical surfaces. TMSF 5005 is extremely hard and will be difficult to sand after cure. Because of the small amount of hardener used with this product, take extra care to ensure a complete and thorough mix.

TMSFR 5100A / TMSFHR 5100B Surface coat resin

Service Temperature	Material Type	Tack Free Time
400°F (204°C)	Filled Epoxy	7-9 hours (at 72°F (22°C)

Description

TMSFR 5100A and TMSFHR 5100B is a two-part surface coat that can be used with our standard curing TMGP and TMFP prepregs or our low temperature curing LTC prepregs. The surface coat will eliminate surface pitting, provide a protective layer to prevent fibre damage and provide a smooth surface for applying scribe lines.

Low Temperature Curing Prepregs

Benefits

- **Low cure temperature** 140ºF (60ºC) for 12 hours with 100 psi autoclave pressure for a service temperature of 356°F (180°C). Lower cost masters and lower CTE effect, greater tooling accuracy, less tool/part reworking.
- Workable shop time is **7 day out life** at 72ºF (22ºC) with good tack to maximise work crew flexibility
- There is a **lower pressure cure option** when tools are made with Surface fill resins
- Light weight fiberglass fabrics 9.6 oz./yd² (325 g/m²) for surface plies and 18.2 oz./yd² (617 g/m²) for fast bulk ply lay-up.
- Light weight carbon fabrics 5.7 oz./yd² (193 g/m²) for surface plies and 19 oz./yd² (644 g/m²) for fast bulk ply lay-up.

LTC Prepregs

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 72°F (22°C)
355°F (180°C)	140°F (60°C)	Epoxy	5 - 7 Days

Description

LTC prepregs offer a low temperature cure and high temperature use after post cure. LTC prepregs allow the use of lower cost master model materials.

LTC-F5500 is a lightweight fiberglass/epoxy tooling prepreg used to produce molds with a low temperature initial cure and high temperature capabilities after post cure.

LTC-F5600 is a heavy weight fiberglass/epoxy tooling prepreg used to produce molds with a low temperature initial cure and high temperature capabilities after post cure.

LTC-G1400 is a lightweight carbon/epoxy tooling prepreg used to produce molds with a low temperature initial cure and high temperature capabilities after post cure.

LTC-G1600 is a heavy weight carbon/epoxy tooling prepreg used to produce molds with a low temperature initial cure and high temperature capabilities after post cure.

LTC3 Prepregs

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 72°F (22°C)
392°F (200°C)	112°F (44°C)	Epoxy	4-5 Days

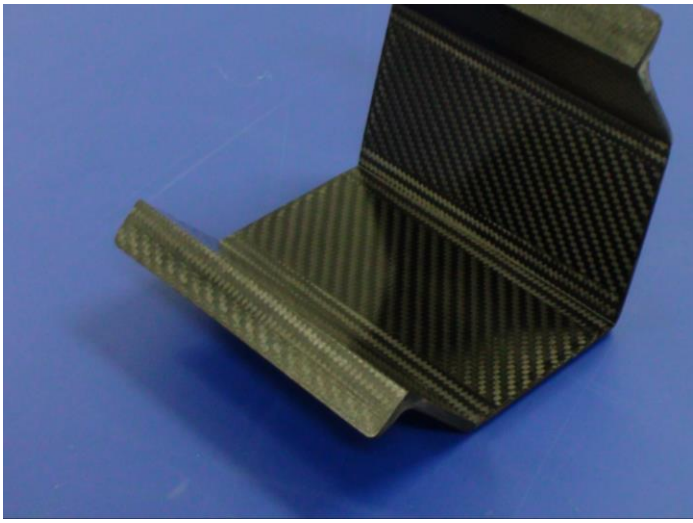
Description

LTC3 prepregs offer a low temperature cure and high temperature use after post cure. LTC prepregs allow the use of lower cost master model materials.

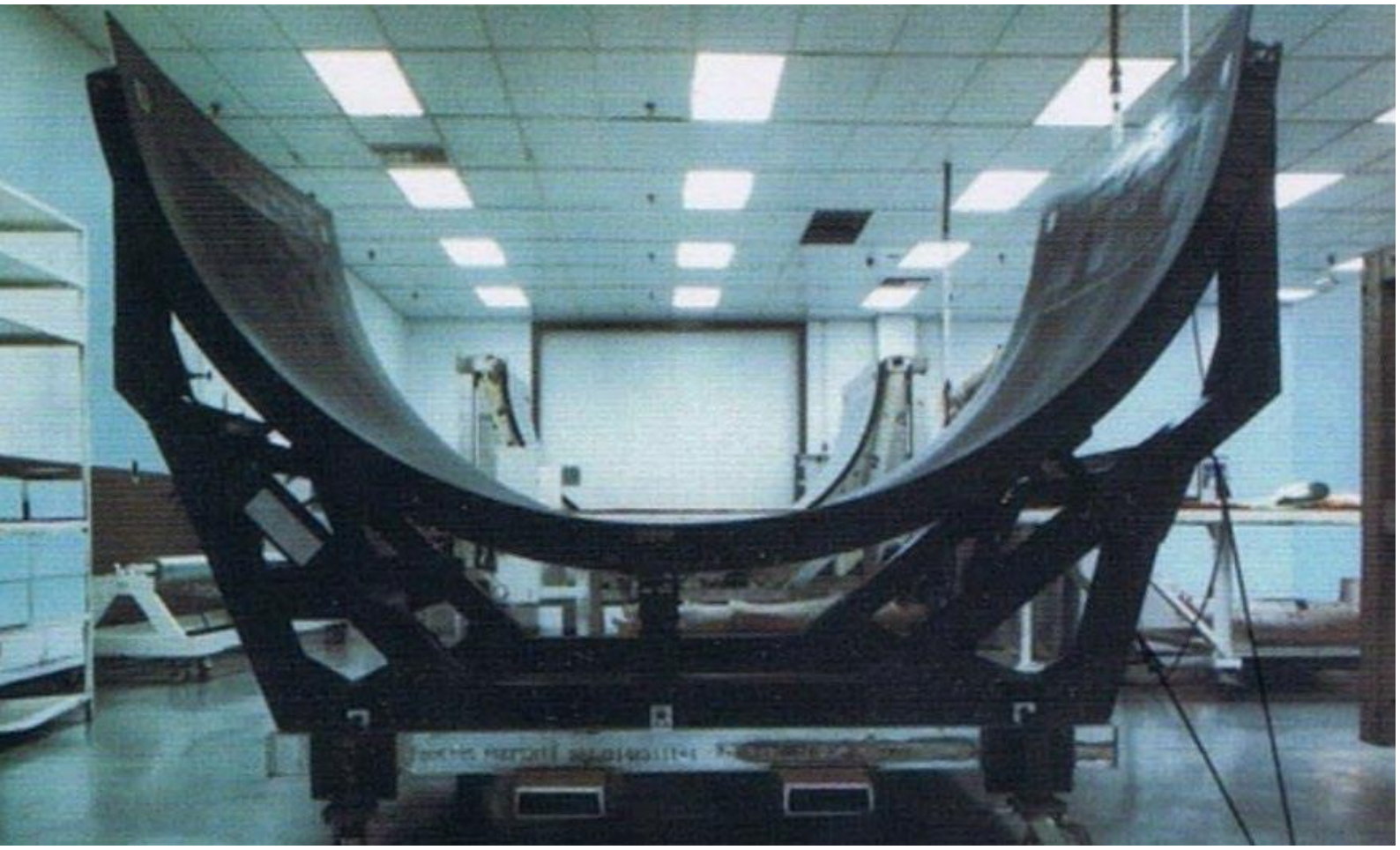
LTC3-G1400 is a lightweight tooling prepreg with a low temperature for the manufacture of composite tooling laminates capable of high temperature use.

LTC3-G1600 is a heavy weight tooling prepreg with a low temperature cure for the manufacture of composite tooling laminates capable of high temperature use.

LTC3-G1800 is a heavier weight tooling prepreg used to produce moulds with a low temperature cure. The heavy weight material is used to build laminate bulk faster thus reducing the number of plies required. Saving up to 30% labour time on standard laminates, plus cost savings.



Toolmaster® Prepregs



Benefits

- Lower CTE effect, **greater tooling accuracy**.
- Toolmaster® prepregs can be used to fabricate composite moulds with service temperature 400°F (204°C). Requires a minimum initial cure at 210ºF (100ºC) for 4 hours with 80 psi autoclave pressure.
- Workable time of **40 day out life at 72ºF (22ºC)** with good tack. There is a lower pressure cure option when tools are molded with Surface fill resins.
- **Excellent adhesive properties**, so bonds very well with Airpad for fabrication of pressure intensifiers and caul sheets.

Toolmaster® Tooling Prepregs

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 72°F (22°C)
400°F (204°C)	250°F (121°C)	Epoxy	40 Days

Description

Airtech TMFP & TMGP prepregs are proven tooling materials on long running programs. The initial 250°F (121°C) cure with an optional 200°F (93°C) cure offer a medium temperature cure, with long term high temperature performance.

TMFP 3100 is a lightweight fiberglass/epoxy tooling prepreg used on the first and last plies.

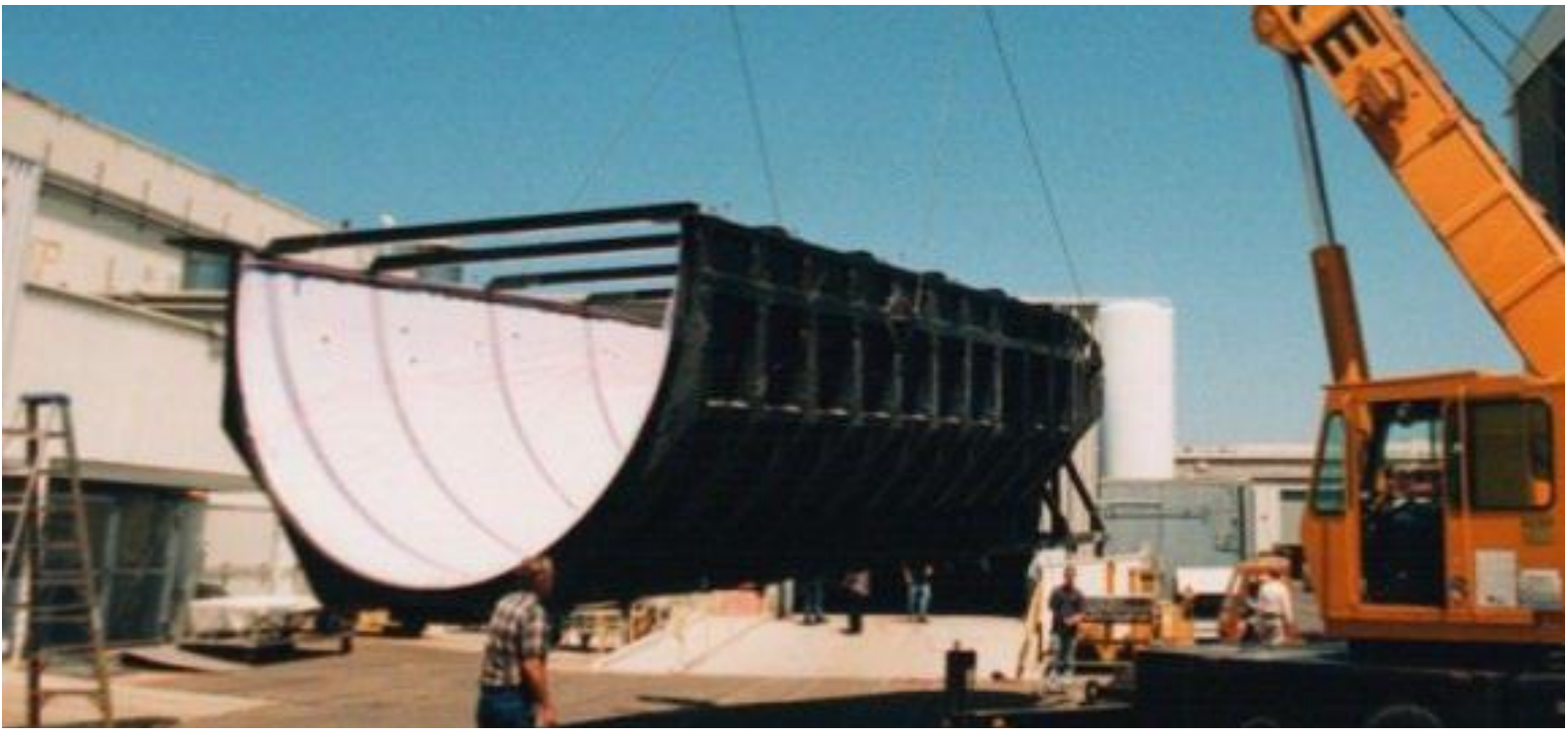
TMFP 3200 is a heavy weight fiberglass/epoxy tooling prepreg used to produce molds with a medium temperature initial cure and high temperature capabilities after post cure.

TMGP 4000 is a lightweight carbon/epoxy tooling prepreg used to produce molds with medium temperature initial cure and high temperature capabilities after post cure. TMGP 4000 can also be used to reinforce our Airpad rubber tooling, see Airpad data sheet in the Rubber Section.

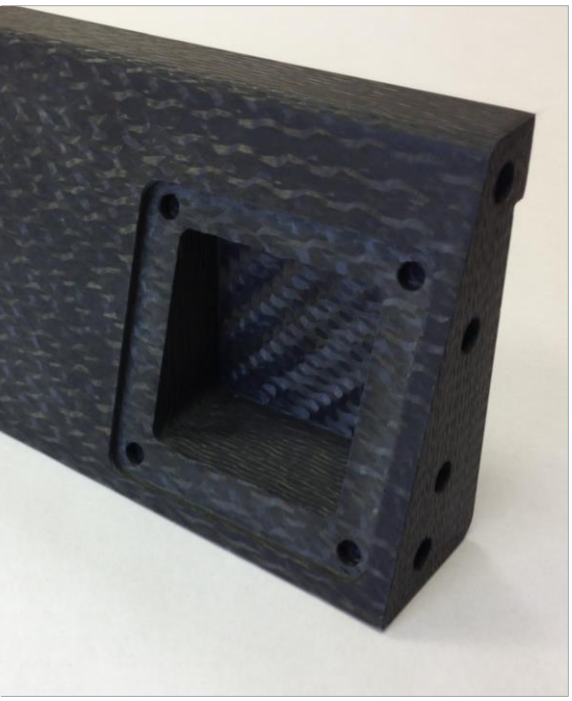
TMGP 4100 is a medium weight carbon/epoxy tooling prepreg that can be used to produce molds with a medium temperature initial cure and high temperature capabilities after post cure. This product is also ideal for Airpad reinforcement.

TMGP 4200 is a heavy weight carbon/epoxy tooling prepreg that can be used to produce molds with a medium temperature initial cure and high temperature capabilities after post cure.

Technical Data	TMFP 3100 Fibreglass	TMFP 3200 Fibreglass	TMGP 4000 Carbon	TMGP 4100 Carbon	TMGP 4200 Carbon
Weight	9.6 oz./yd^2 (325 g/m^2)	18.2 oz./yd^2 (617 g/m^2)	5.6 oz./yd^2 (193 g/m^2)	10.5 oz./yd^2 (365 g/m^2)	19 oz./yd^2 (644 g/m^2)
Resin Content	45 +/-3 %	37 +/-3 %	47 +/-3 %	42 +/- 3 %	37 +/- 3 %



Beta Prepreg



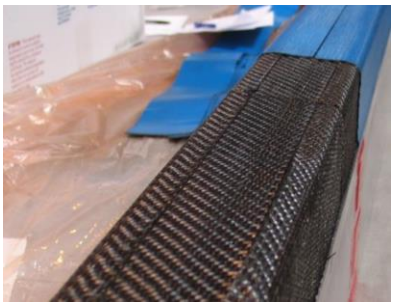
Benefits

- 6 month out life makes mold fabrication easier with greater schedule flexibility.
- Longer tool life and reduced cost of repair due to high Tg. & microcrack resistance.
- Mold thick section & machine complex detail to achieve higher surface quality.
- Exceptionally low resin shrinkage & low heat release (exotherm) results in low residual laminate stress & reduced springback.
- 90% Retention of Shear Strength after 10,000-hours ageing at 347°F (175°C).
- Autoclave cure 365°F (185°C) for 3 hours with 28”Hg. Vacuum bag & 100 psi (7 Bar) pressure.

Superb high stability room temperature storage tooling system

Beta Prepregs

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 72°F (22°C)
425°F (218°C)	355°F (180°C)	Benzoxazine	6 Months



Description

Beta Prepregs are based on Benzoxazine resin chemistry taking advantage of the latest resin and toughening technology to provide outstanding ease of use and performance. Beta Prepregs are stable for a minimum of six months at room temperature. Beta Prepreg has exceptionally low resin shrinkage during cure and develops a very high glass transition temperature.

TMBG-3 is a lightweight Beta Carbon Prepreg for surface plies.

TMBG-6 is a medium weight Beta Carbon Prepreg used for cauls and tools that are post machined.

TMBG-12 is a heavy weight Beta Carbon Prepreg used in conjunction with TMBG-3 or by itself for tools that are post machined.

Beta TX670 DISCO Prepreg

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 72°F (22°C)
425°F (218°C)	365°F (185°C)	Benzoxazine	6 Months

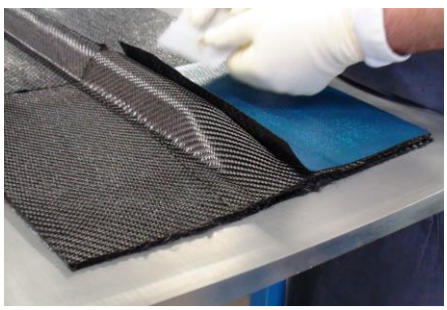
Description

Beta TX670 DISCO is a prepreg sold in sheet format. This special format allows for simpler and faster layups. Beta TX670 DISCO Prepreg has a 0°,+/-60° orientation, is quasi-isotropic within each ply, and comes with an engineered cut pattern that improves drapability.

A high-performance tooling prepreg which combines benzoxazine resin with a balanced triaxial fabric with discontinuous fibres. The 'snowflake' cut pattern limits the tow length to <4.5 inches maximum. Beta TX670 has all the features of the Benzoxazine resin plus more

OOA Beta Prepreg

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 72°F (22°C)
425°F (218°C)	350°F (177°C)	Benzoxazine	6 Months



Description

OOA Beta Prepreg is a new benzoxazine formulation that allows autoclave and out of autoclave (OOA) processing. OOA Beta Prepreg offers long term storage at room temperature. OOA Beta Prepreg has low resin shrinkage during cure and has a high glass transition temperature.

OOA Beta Prepreg TMBG-3 is a light weight prepreg for surface plies.

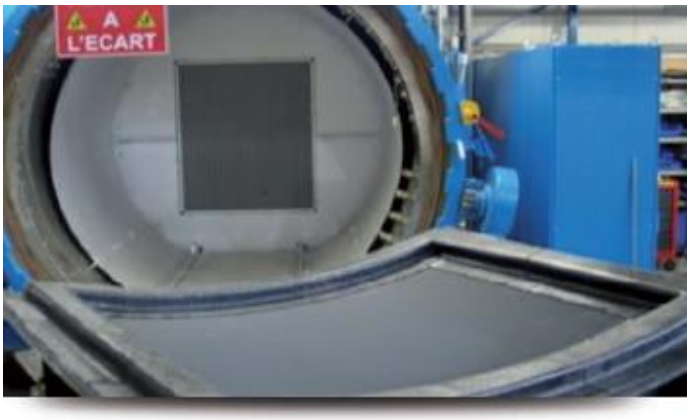
OOA Beta Prepreg TMBG-6 is a medium weight prepreg used for cauls and tools that are post machined.

OOA Beta Prepreg TMBG-12 is a heavy weight prepreg that can be used in conjunction with the two prepregs above or alone for tools that are post machined.

CEP Prepregs

Benefits

- **Longer high temperature life**, so lower life cycle cost
- Easier to work with than other high temperature resins systems. **Reducing cost of manufacture**.
- Lower moisture absorption means **less risk of surface porosity** during part manufacture.
- Low initial cure temperature option in comparison to other high temperature prepregs.



High temperature mold tools

CEP Prepregs

Service Temperature	Initial Cure Temperature	Resin Type	Shelf Life at 72°F (22°C)
450°F (232°C)	354°F (179°C)	Cyanate / Epoxy	20 days

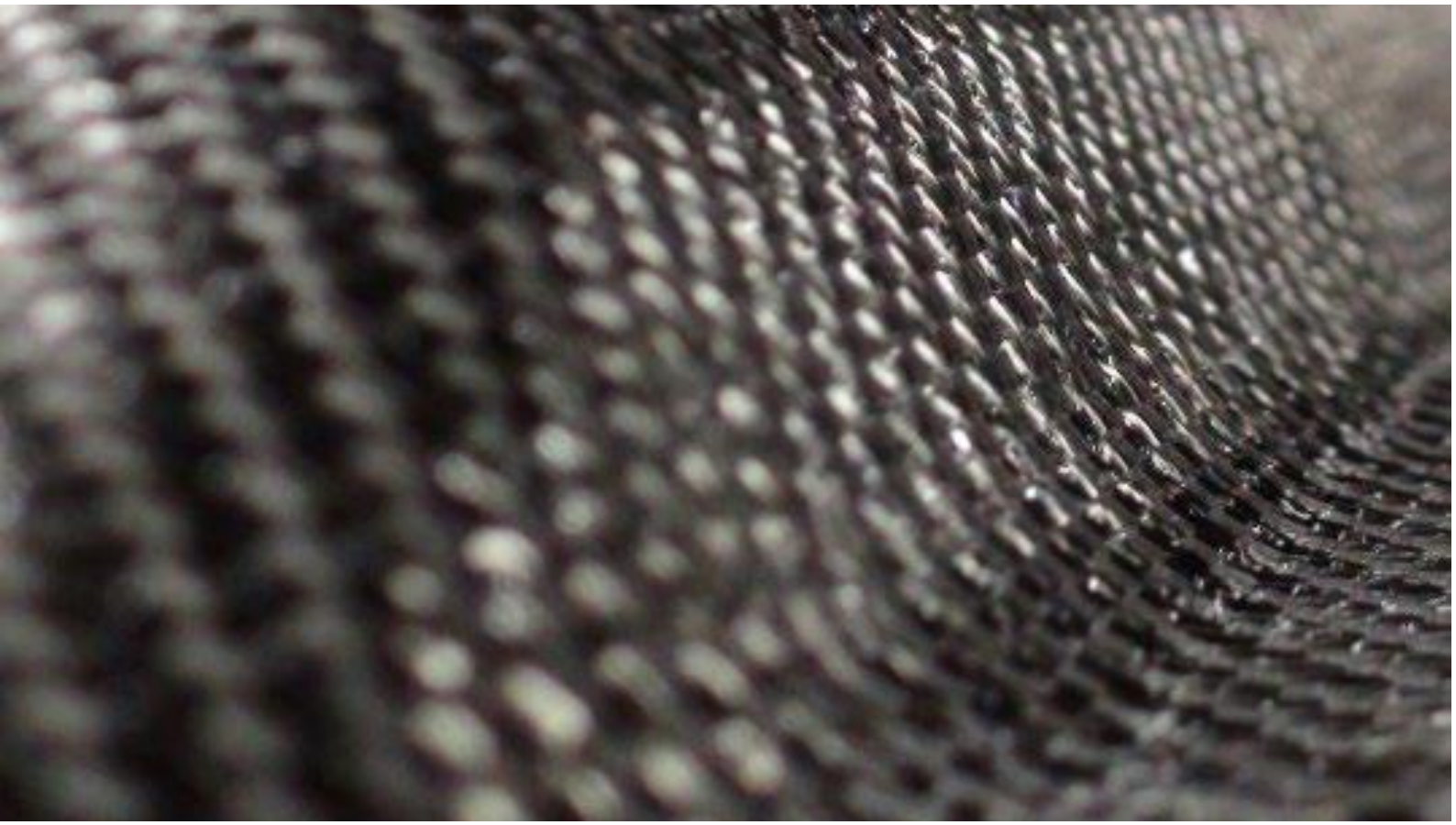
Description

Airtech CEP prepregs are based on a unique cyanate / epoxy resin chemistry. Airtech CEP prepregs have an optional 250°F (120°C) cure cycle that offers greater processing flexibility.

CEP-G3 is a lightweight tooling prepreg with a high glass transition temperature (Tg).

CEP-G12 is a heavy weight tooling prepreg with a high glass transition temperature (Tg).

Technical Data	CEP-G3	CEP-G12
Weight	5.7 oz./yd^2 (193 g/m^2)	19 oz./yd^2 (644 g/m^2)
Resin content	37 +/- 3 %	37 +/- 3 %



Tooling Boards

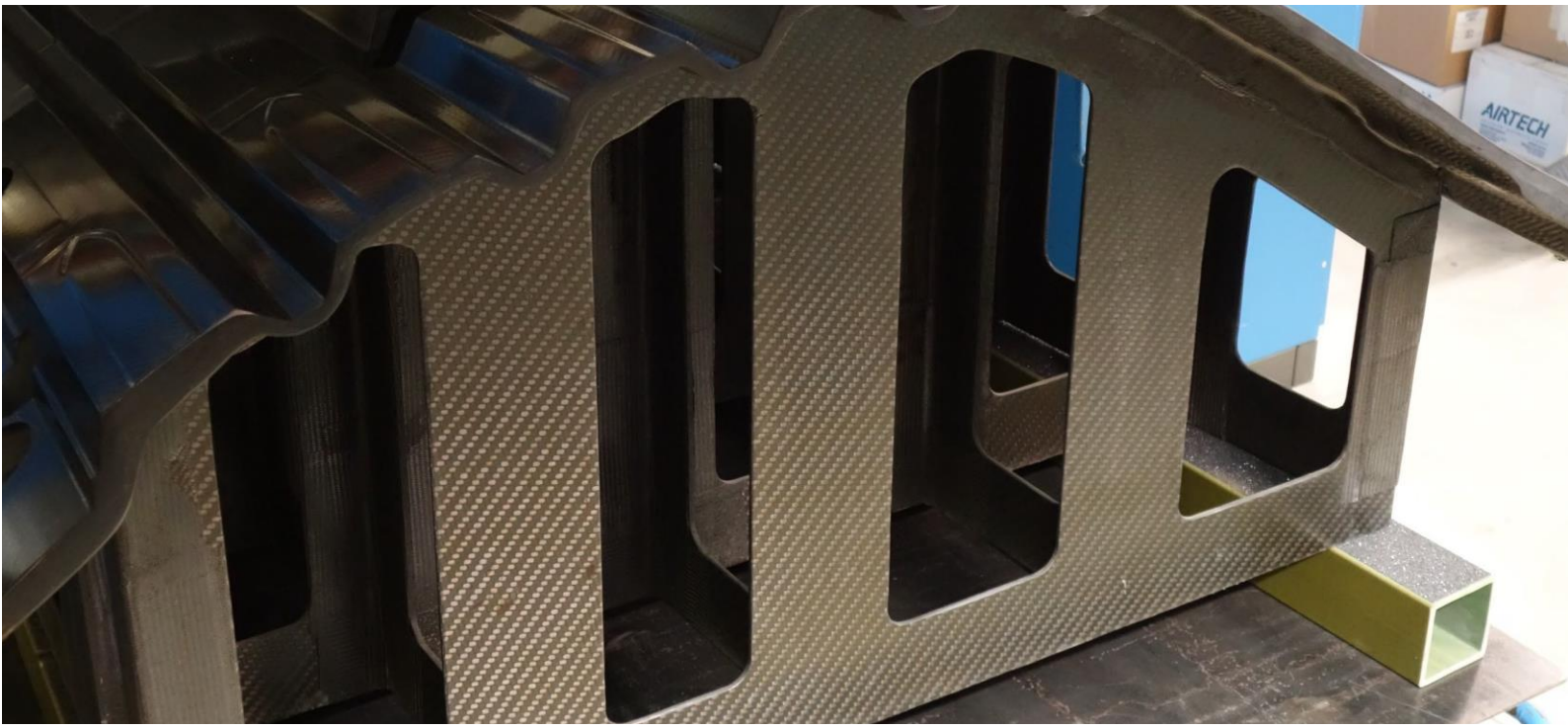
High temperature carbon/epoxy & fibreglass/epoxy tooling boards

Toolmaster® TB-G48 & TB-F48

Material Type	Tg. by DMA	Thickness	Size
TB-G48 Carbon / Epoxy TB-F48 Fiberglass / Epoxy	425°F (218°C)	¼ inch (6mm)	4′ x 8′ (1.22m x 2.44)

Description

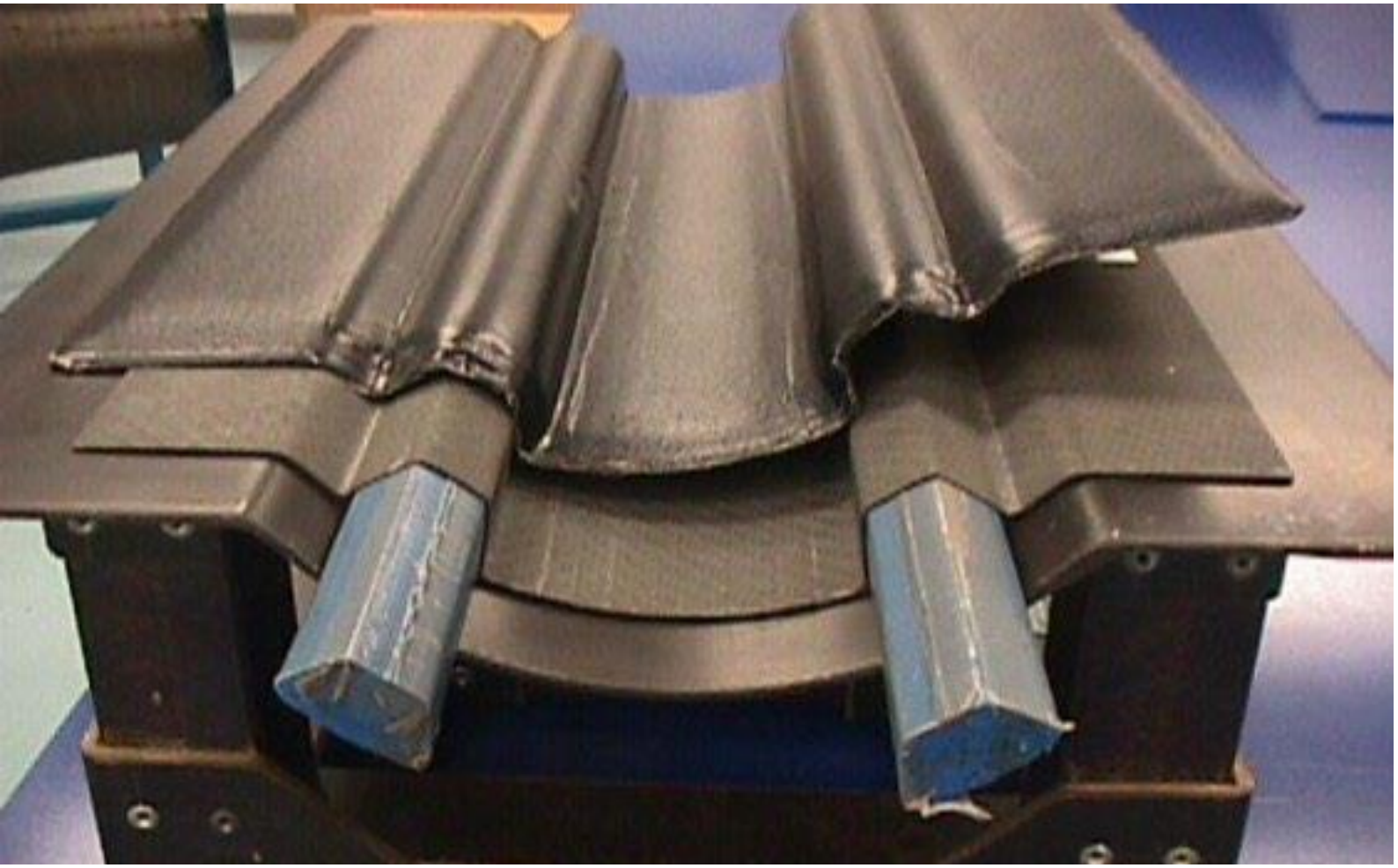
Toolmaster® TB-G48 and Toolmaster® TB-F48 are high temperature solid laminate tooling boards fabricated from high quality woven fabric and epoxy resin. Tooling boards are fabricated with easily removable release ply on each side to provide surfaces suitable for bonding.



Benefits

- **High temperature stability:** The high glass transition temperature delivers stability at high temperature, ensuring long tool life and reducing life cycle costs.
- **Textured & protected with peel ply:** Both sides of the panel have a highly visible peel ply layer in place, providing surface protection during storage and machining. Removal of the peel ply leaves a textured surface for bond preparation.
- **Thick section formats:** In addition to the standard board sizes, the Airtech TB-G48 can also be supplied custom manufactured in thick sections - ideal for when boards need to be machined to profile for bonding jigs.
- **Optimized laminates:** Laminate constructions can be optimized for cost or performance by selection of fabric styles and orientations.

Aircast Tooling Rubber



Benefits

- Pressure intensifiers improve the moulded finish of parts **reducing cost of rework** and scrap parts.
- Thermal expansion properties can be used to develop additional pressure to aid moulding parts.
- Aircast can be cured at room temperature, **reducing cost of intensifier moulds** and improving accuracy.

Castable silicone rubber for high temperature applications

Aircast 3700

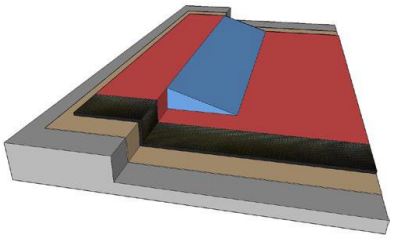
Maximum Use Temperature	Density	Elongation at Break	Hardness	Coef. of thermal expansion
450°F (232°C)	0.045 lb/in^3 (1.25 g/cm^3)	180%	50 +/-5 Shore A	140x10-6 in/in/°F (252 x 10-6 cm/cm/°C)

Description

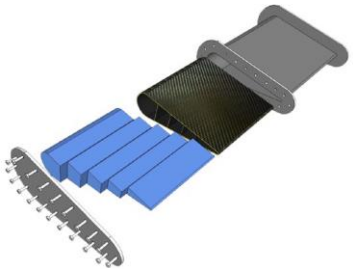
Aircast 3700 is a two-component modified RTV compound designed for use in the manufacturing of flexible molds and mandrels. Aircast 3700 is also ideal for casting pressure pads. The high differential in thermal coefficient of expansion between Aircast 3700 and a mold makes it useful in trapped rubber molding.

- Pressure intensifiers improve the moulded finish of parts reducing cost of rework and scrap parts.
- Thermal expansion properties can be used to develop additional pressure to aid moulding parts.
- Aircast can be cured at room temperature, reducing cost of intensifier moulds and improving accuracy.

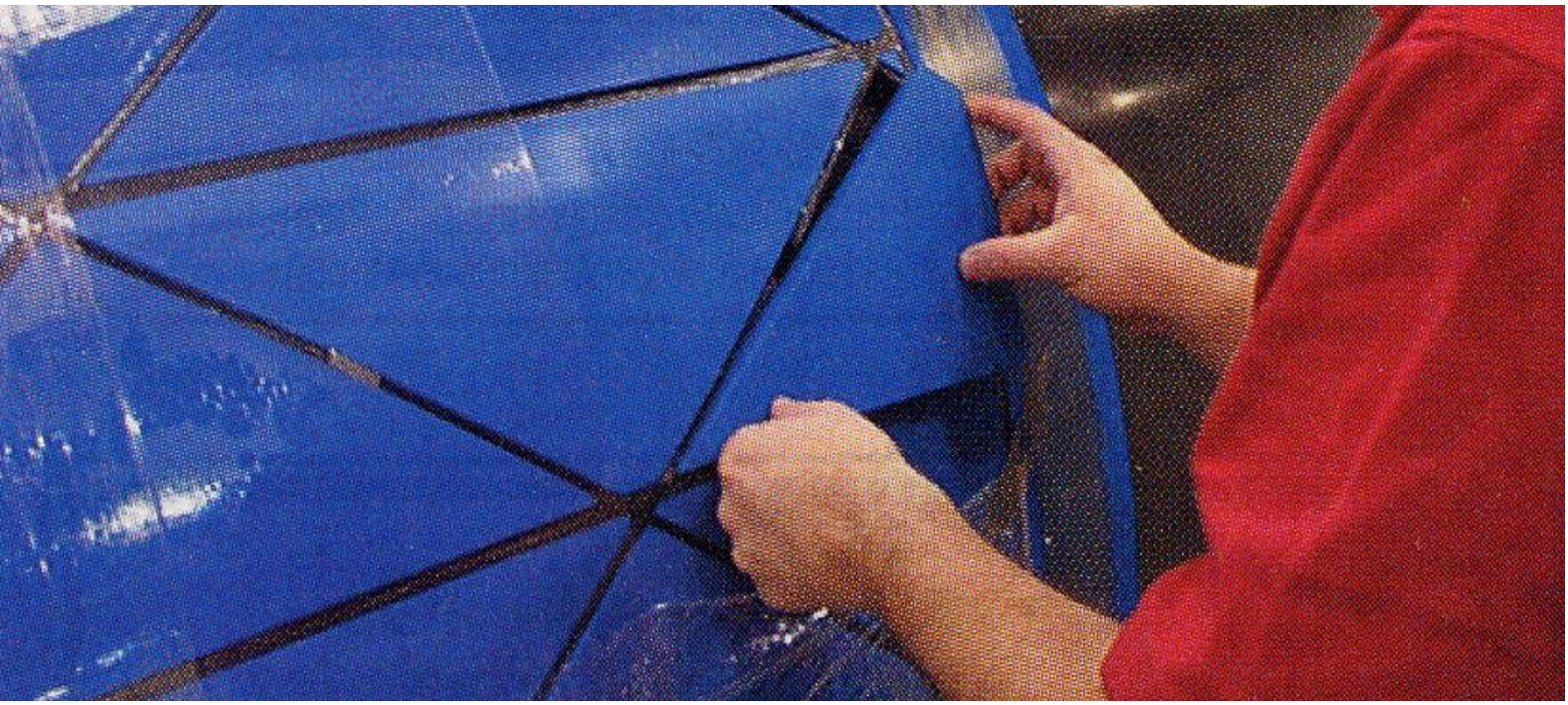
Bolt head protection moldings



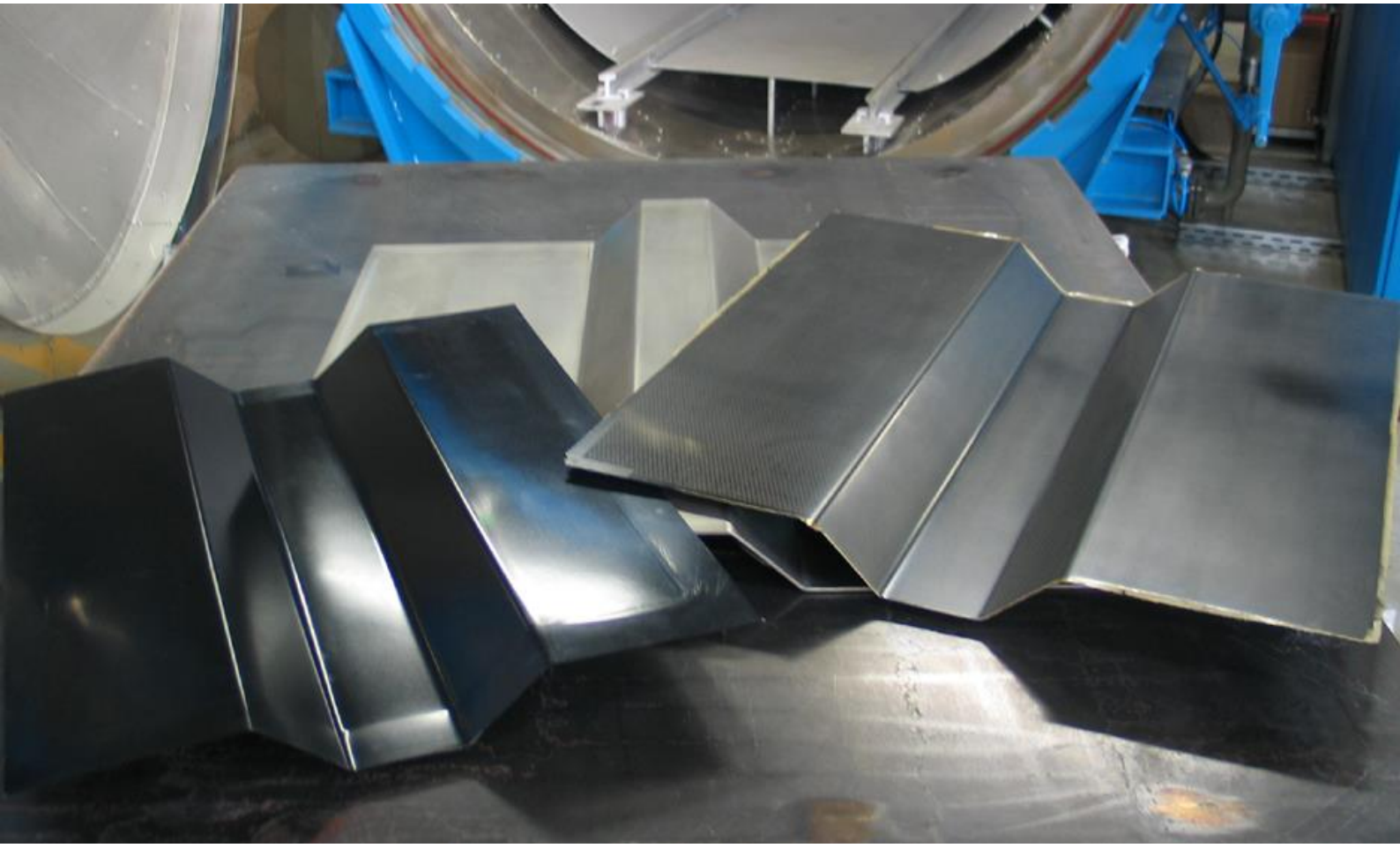
Pressure intensifiers

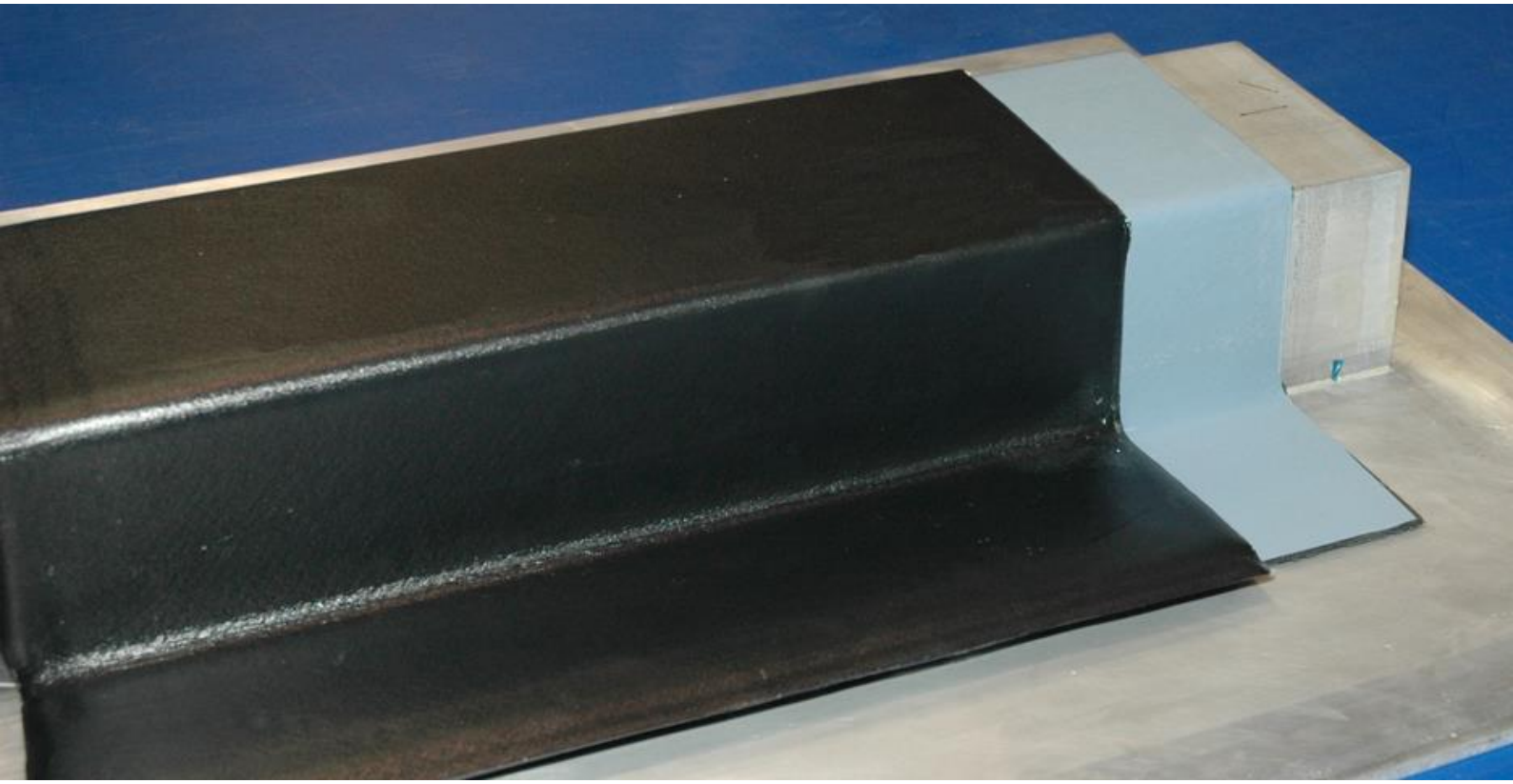


Mandrels for trapped rubber molding



Airpad Tooling Rubber

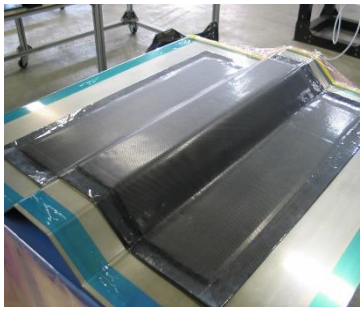




Rubber materials for pressure intensifiers and caul sheets

Airpad

Maximum Use Temperature	Material Type	Colour	Tensile Strength	Hardness
400°F (204°C)	Non-silicone rubber	Black	1300 psi (8.96 MPa)	70 Shore A



Benefits

- Airpad is an uncured, non-silicone rubber for manufacture of pressure caul sheets, flexible mandrels and rubber tooling.
- Airpad caul sheets improve part quality on the vacuum bag side of the part.
- Mould a smooth "Bag side" surface. Improve part quality with better thickness control & Corner consolidation. Eliminate surface wrinkling, voids & porosity.
- Avoid part distortion due to uneven laminate consolidation during cure.

Airpad HTX

Maximum Use Temperature	Material Type	Colour	Tensile Strength	Hardness
400°F (204°C)	Uncured non-silicone rubber	Grey	1900 psi (13.1 MPa)	70 Shore A

Benefits

- Airpad HTX is an uncured non-silicone rubber that can be made into caul sheets and flexible mandrels. Airpad HTX can be reinforced with prepregs or dry fabrics.
- Longer high temperature life, so lower life cycle cost.
- Use release liquid on 3D curved caul sheets for complex shapes parts.
- Avoid part distortion due to uneven laminate consolidation during cure.

Airpad HTS 5553

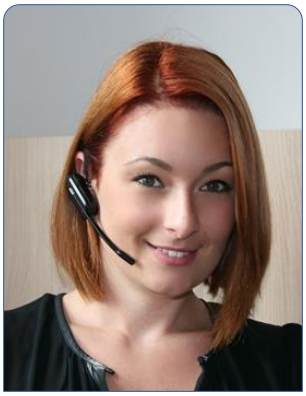
Maximum Use Temperature	Material Type	Colour	Tensile Strength	Hardness
450°F (232°C)	Uncured fiberglass reinforced rubber	Red	450 psi (3.10 MPa)	55 +/- 5 Shore A

Benefits

- Airpad HTS5553 is a fibreglass reinforced silicone rubber that has high reversion resistance and strength.
- It can be used for manufacture of pressure intensifiers, bladders and pressure caul sheets.
- Will improve part quality on the bag side of molded parts.
- Can be used over complex surface to produce a smooth finish.

Airtech Customer Service

Global manufacturing & Local Inventories
Delivering Short Lead Times. AAMG: >98% OTD

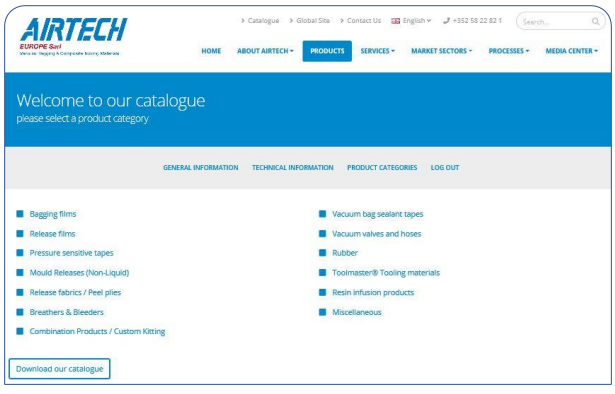


Customer Service
Team Contacts

Development, Innovation &
Continuous Improvement

Technical Support, Training Workshop & On-site Training Support

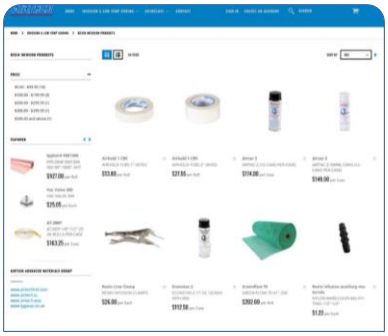
Quality System
Accreditation



Online Catalogue with
Technical Data Sheet &
Safety Data Sheet to
Download, available in 6
languages.

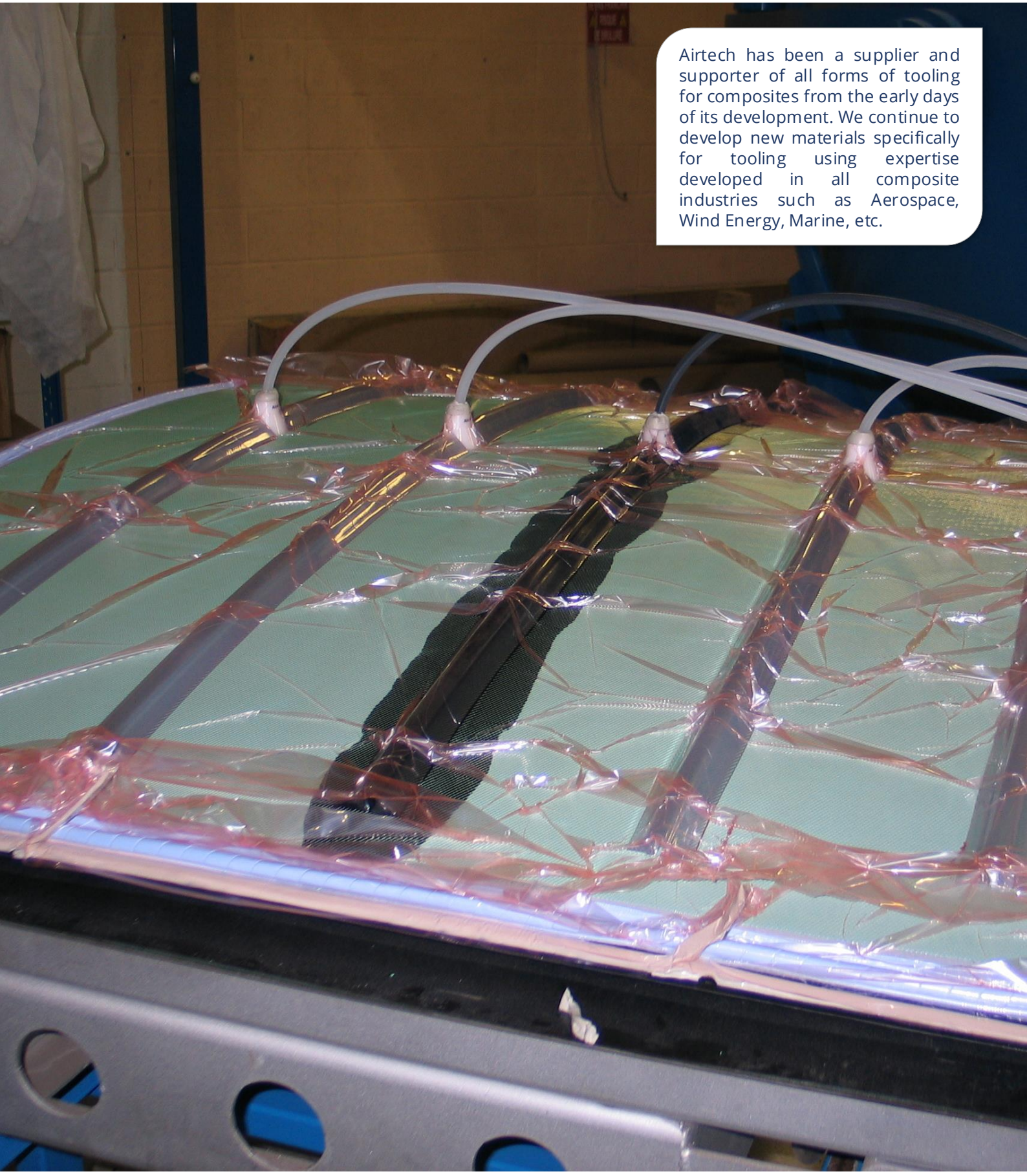
Sample Service

Check our Online store
Fast ordering and shipping!
Choose from the Airtech online
range of products for Resin Infusion:
https://estore.airtech.lu/



Recyclable Packaging

Dedicated to the needs of our customers



Airtech has been a supplier and supporter of all forms of tooling for composites from the early days of its development. We continue to develop new materials specifically for tooling using expertise developed in all composite industries such as Aerospace, Wind Energy, Marine, etc.

Need more information, a quote or a sample?

Please contact our customer service team:

www.airtech.com

About Airtech

www.airtech.com

www.airtech3D.com

- Airtech Advanced Materials Group is the largest manufacturer of vacuum bagging and composite tooling materials for prepreg / autoclave, resin infusion, and wet lay-up processes up to 426°C. Our product line consists of: vacuum bagging films , release films, pressure sensitive tapes, mould releases (non-liquid), peel plies, breathers & bleeders, sealant tapes, vacuum bag connectors & hoses, rubber, pressure pads, cutting tools, vacuum leak detectors, shrink tape, PTFE coated fibreglass, tooling prepregs and resins, and carbon and glass reinforcements.
- With 50 years of extrusion experience, we've taken the next step into additive manufacturing. Print-Tech® is our new large scale additive manufacturing or 3D printing tooling service for composites. Large scale tooling in the form of trim fixtures, holding fixtures, and layup moulds can be designed, tooled, and built faster without compromise quality. Also, we manufacture a full line of Dahltram® tooling and Dahlpram® purging resins.
- Airtech Advanced Materials Group is family owned. We have seven locations strategically placed worldwide: Huntington Beach, California, USA; Chino, California, USA; Springfield, Tennessee, USA; Differdange, Luxembourg; Chadderton, England; Goa, India and Tianjin, China. All of our facilities offer technical assistance and are ready to meet your composite producti on challenges.
- Airtech is an ISO 9001:2015 / AS9100 Rev. D registered company.

Airtech Advanced Materials Group

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