

# AUTOMOTIVE AND TRANSPORTATION



# ABOUT

METYX Composites

METYX manufactures and supplies an extensive range of multiaxial, RTM and woven fabric technical textile reinforcements from its three 'state-of-the-art' production facilities in Turkey, Hungary and the USA, which all operate under ISO 9001, ISO 14001 and OHSAS accreditations.

In addition to automotive and transportation, other industries using METYX products include: wind energy, marine, infrastructure, building and construction, sport and leisure.

METYX has invested in production facilities and highly skilled staff to offer customers added value products, custom solutions, technical support and a highly responsive, reliable logistical supply service. To meet growing global demand, METYX continues to expand its technical fabric production and product offering.

## Your 'Solution Partner'

METYX offers its customer exceptional service, quality and logistical support, with technical expertise to help reduce costs and add real value to a business.

## Our Vision

"Our vision has always been to deliver a range of high quality products and services which give our customers a competitive advantage. We are totally committed to meeting the individual needs of our customers with tailor made solutions that add real value."

**Uğur Üstünel,**  
Managing Partner,  
METYX Group

## Products & Services for Automotive & Transportation

METYX has been supplying automotive and transportation customers for many years, providing prototyping, tool making and composite application solutions for trains, cars, buses, trucks, off highway and emergency vehicles.

The product range offered is focused on closed molding, particularly RTM, RTM Light and Infusion.

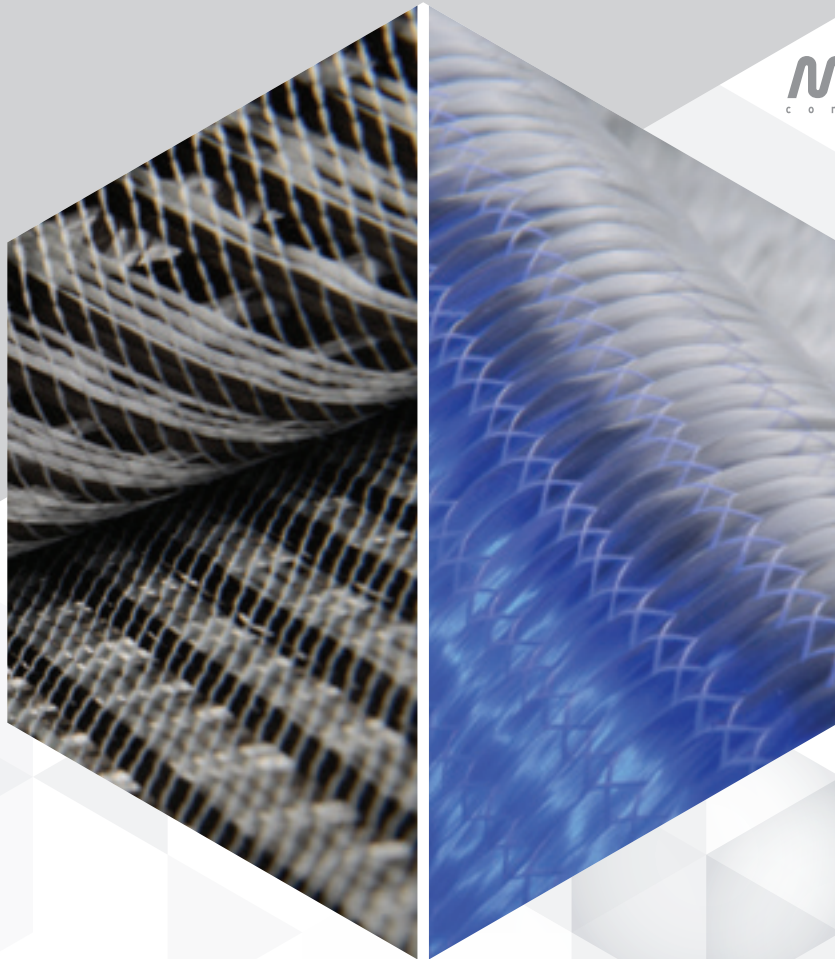
To better serve transportation markets, METYX has developed carbon fiber multiaxial, woven, webbed and spread tow technical fabrics, and expanded its slicing and kit cutting capabilities. To meet growing needs for environmentally friendly materials, flax based natural fiber products have also been developed for interior automotive applications.

For the rail sector, METYX has fire approved reinforcements which meet the EN 45545-2 rolling stock fire, smoke and toxic fumes (FST) standard. METYX Fire Shield (FS) products are globally used by leading manufacturers to cost effectively mold fire rated FRP parts for trams, subway and overground trains.



Courtesy photo of Polkima





#### **Products and services offered include:**

- E-glass & R-glass standard and custom unidirectional (UD), biaxial, triaxial, quadraxial, Combi Mat & hybrid multiaxial fabrics.
- Carbon reinforcements – multiaxial and woven carbon fabrics (UD, biaxial, triaxial, quadraxial and E-glass / Aramid / Carbon Hybrids) standard fabrics, UD tapes, spread tow carbon fabrics and customized solutions.
- Webbed carbon woven fabrics - thermoplastic coated, thermoformable, high drapeability fabrics.
- METYCORE, METYCORE MAX and FS (Fire Shield) RTM reinforcements.
- In-house manufactured vacuum infusion consumables - peel plies, breather fabrics and flow meshes.
- Slicing, kitting and special finishing services for technical fabrics, PVC / PET foam cores, vacuum consumables.
- Composite tooling design and fabrication (plugs and molds).
- Engineering and production processing technical support.
- Prototyping and laboratory testing services.
- Bought-in products from approved suppliers: continuous filament mats (CFM), vacuum leak detectors, silicone mold making spray equipment, silicone materials and consumables, vacuum bagging materials, cores, mold release agents, surface veils, structural adhesives, resins, gelcoats, hardeners, sheet wax products.

**METYX helps composites manufacturers of automotive and transportation components to increase productivity, minimize costs and improve product quality.**

## “Meeting Production, Lightweight Design & Sustainability Needs”

### **Multiaxial Glass Fiber Fabrics**

Standard and custom made E-glass and lower density ‘hollow’ H-glass and lower density R-glass fiber multiaxial fabrics are manufactured by METYX in Turkey, Hungary and the USA on dedicated knitting production lines.

The range of high quality multiaxial glass fiber products available includes:

- UD fabrics and tapes in rolls from 200gsm up to 2,500gms in 127cm and 254cm width options, or cut to size as required in a choice of low and high density glass fabrics.
- Multiaxial fabrics in 1270 mm or 2540 mm widths, with areal weights from 200 gms up to 2,500 gms.
- Biaxial (0/90 and +45/-45) glass fabrics in 127 cm or 254 cm width options.
- Triaxial, Quadraxial and Combi mats .

## Carbon Fiber Reinforcements

For lightweight designs, standard and custom made carbon fiber products are offered. METYX has long-term supply partners for the high quality carbon fibers used to produce the multiaxial, woven, spreadable and webbed carbon fabric products available.

### Product Range:

UD / Biaxial / Triaxial / Quadraxial / Wovens / Hybrids / Webbed / Spread Tow fabrics from 50 gsm.

## Woven Fabric Reinforcements

METYX woven fabrics are made by interweaving continuous fiber rovings to produce biaxial fabrics that can be used with most open and closed mold resin systems. Woven fabrics are typically used to increase the flexural and impact strength of a laminate.

### Product Range:

Woven carbon fabrics in sizes up to 350 cm wide (100 gr/m<sup>2</sup> - 1,200 gr/m<sup>2</sup>).





## Webbed Carbon Fabrics

METYX 'webbed' carbon fiber woven fabrics combine higher mechanical performance with key processing benefits to meet the high productivity needs of automotive and transportation manufacturers. A thermoplastic web coating, which is varied according to the fabric areal weight, is uniformly applied to the woven fabric surface.

The webbing improves resin flow, makes the fabric less prone to deforming during dry lay-up and stabilizes the carbon fibers during the cutting process, so providing clean cut 'fringe free' fabric edges. Webbed carbon fabrics also have very good drapeability and can be thermoformed into preforms.

**Product Range:** Made to order.



### **CASE STUDY 01**

#### **METYX fabrics keep Sazcılar on the right track**

Sazcılar Otomotiv A.Ş. specializes in manufacturing sandwich composite components for automotive, rail, agricultural, off highway, military and security vehicles. For tram, subway and train projects, Sazcılar globally supplies leading OEMs, including Siemens, Bombardier and Hyundai Rotem.

For many years, Sazcılar has sourced METYX technical fabrics, such as FR rated quadraxial and unidirectional fabrics, used for various exterior and interior carriage and cab composite parts. METYX products are used with high confidence of both cost effective processing and reliable, long term performance.





## METAYCORE RTM Reinforcements

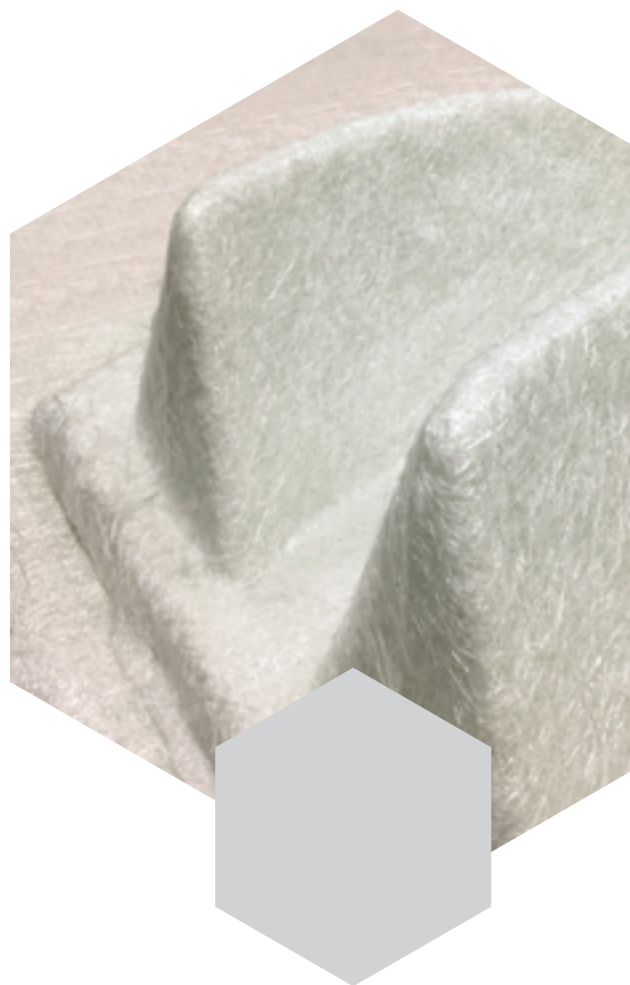
METAYX has extended its range of **METAYCORE RTM** reinforcement products, which all provide the key processing benefits of high drapability and excellent resin flow.

**METAYCORE** - Triple layered chopped strand mat (CSM) glass and polypropylene (PP) fabric, available from 150M/125PP/150M up to 1200M/250PP/1200M. Stitched mat, surface veil, biaxial skin and lighter core options are offered.

**METAYCOREMAX** - an engineered core between two layers of CSM glass fabric. A sandwich reinforcement product developed for easier closed molding of larger FRP parts and to reinforce highly filled resin systems.

**METAYCORE FS** (Fire Shield) and **METAYCORE MAX FS** are halogen free products, providing molders all the advantages of the existing Metaycore range, plus fire retardancy properties to help meet rail passenger fire protection standards for rolling stock with respect to fire propagation, smoke formation and toxic fumes.

**METAYCORE FS** has been independently assessed by the DAkkS accredited Brandhaus Rhein-Main test laboratory and passed: EN 45545-2 (02-2016); flame spread according to ISO 5658-2 (09-2006); heat release rate according to ISO 5660-1 (03-2015); smoke development according to DIN EN ISO 5659-2 (03.2013); toxicity according to DIN EN 45545-2 Annex C (02-2016).





## Natural Fiber Textiles

Sustainable products enable manufacturers to produce 'greener' products and to meet legislation regarding end of vehicle life and recycling. To meet environmental needs, METYX has developed a range of natural fiber textile products for both thermoset and thermoplastic applications based on flax (linen) fibers; flax fibers have high mechanical strength, are easy to machine and are readily available.

The range of METYX natural fiber technical fabrics available includes:

- Grades for infusion or RTM molding with conventional thermoset resins or a bioresin.
- Grades with a thermoplastic matrix, for hot compression molding with thermoplastic composite materials.
- Non-crimp fabric (NCF), non-woven uni-directional and multiaxial flax non-woven fabrics, flax woven fabrics.

**Product Range:** Made to order.

## Custom Made Sustainable Products

To meet specific customer needs METYX can also produce customized sustainable product solutions using biocomposites as well as alternative production methods and other sustainable matrix materials.

Flax nonwoven impregnated with acrylic resin







## METYX Slicing & Kitting Services

A customized slicing and kit cutting service is provided by METYX factories in Turkey and Hungary for a wide range of cores, fabrics and vacuum consumables. Installed equipment includes 'state-of-the-art' 5-axis CNC processing centers for kitting, plus high productivity slicing machines, which rapidly cut to size foam block materials.

## Core Material Kitting & Special Finishing

The kitting centers cost effectively machine all foam core materials including PET and PVC. Finishing options include: grooved, perforated, scrim fabric applied, single/ double contoured or custom combinations.

Kits are cut, shaped, and preformed as needed to the highest levels of accuracy, supplied with full traceability.

All kit designs are fully evaluated by experienced METYX engineers, supported with CAD data. A key objective is to provide customers with added value kitting solutions for faster and easier dry lay-up for higher productivity molding.

## Fabrics & Vacuum Consumable Kitting

A kitting service is also offered for the complete range of METYX technical fabrics and vacuum consumables such as peelply, flow mesh, and breather fabrics. To minimize waste and reduce costs, CNC kit cutting machines able to handle fabrics up to 3,5 M wide are used for large orders.



## METYX Tooling Center

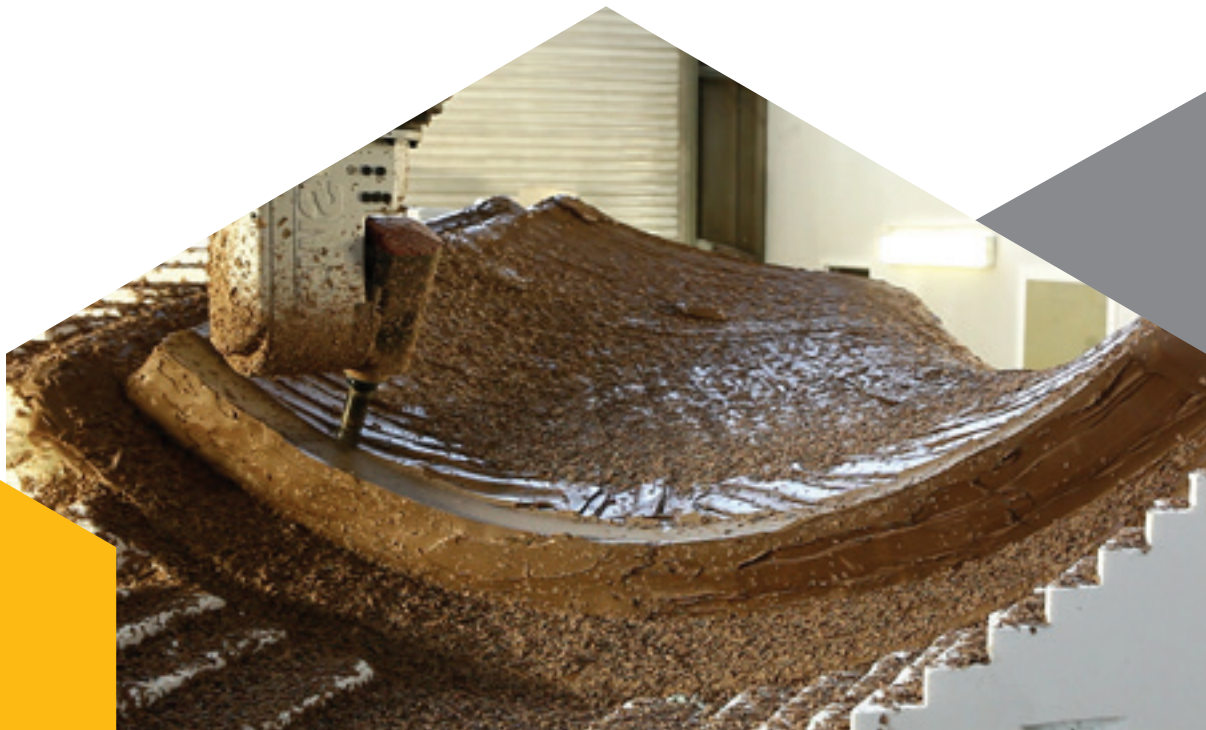
METYX has a dedicated Tooling Business Unit, located in the 27,500 sq.m 'state-of-the-art' production facility at Manisa, Turkey. It offers design and manufacturing support to customers looking for affordable, high quality tooling solutions. Single and multi-split FRP molds are produced for: hand lay, spray up, RTM, and infusion processes.

The METYX Tooling team has particular expertise in producing large scale composite plugs and molds, so are able to supply tooling for large parts in buses, trucks and trains, such as sub components, body and roof sections.

Master Plug (Pattern) Production - Standard master plugs are designed and manufactured in-house using an epoxy tooling paste.

### Key METYX Master Plug features include:

- Expertise in machining tooling board, PU and Epoxy paste plug making materials
- Shape stability, with 5-axis CNC milled accuracy and finish
- Large plug production capabilities - up to 32.8' x 20.3' x 13.1' (10m x 6.2m x 4m)
- High gloss surface finish - no imperfections
- Vacuum tested to ensure no leaks
- Modular production of single or multi sectioned plugs
- Integrated plug heaters can be specified



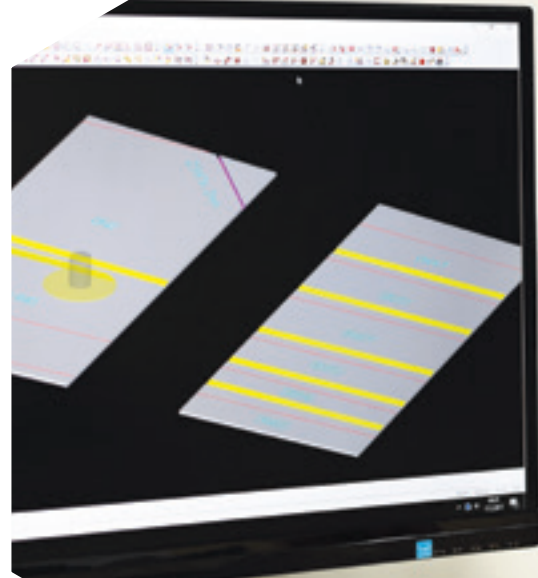


**FRP Mold Tools** – FRP molds are produced from high quality defect free master plugs.

Direct negative molds are cost effectively produced for prototypes, one off or short run components – the direct molding technique is ideal for projects with a limited budget or tight timescale needing a rapid tooling solution.

**Key METYX FRP Mold Tool features include:**

- Only quality UPR / VE / Epoxy tooling materials are used for high durability
- Mold shell supports as needed for tool life
- Excellent part production repeatability
- Water based heating system options
- Laser scanning
- QC documentation
- Mold commissioning



## CASE STUDY 02

### 'All composite' body firefighting vehicles

Volkan Group is a leading manufacturer of firefighting vehicles and equipment, used in civilian and military airports and industrial plants in 38 countries worldwide.

The Aircraft Rescue and Firefighting (ARFF) Lion rapid response unit is the first in the Volkan fleet to have a lightweight 'all composite' body and front cabin, produced by vacuum infusion.

METYX Composites supplies Volkan glass multiaxial fabrics, PVC foam cores, and vacuum consumables, including flow mesh and peel ply.







## Specialist Injection Equipment & Silicone Mold Making Partners

Closed mold injection equipment: METYX can provide technical assistance with requirements for closed mold injection equipment such as: vacuum pumps, resin transfer molding and resin infusion injection machines. METYX works in close partnership with UK based Composite Integration Ltd., an innovative, world leading RTM and infusion technology design and injection equipment manufacturing company.

Silicone mold making: For the Turkish market, METYX provides technical support and complete systems for silicone mold making. Specialist spray equipment, silicone materials and consumables are sourced from Silicone Composites Ltd., which is a partner company with Composites Integration Ltd.

Silicone Composites' practical knowhow about silicone processing coupled with Composite Integration's skills in designing and building world-class equipment provides unparalleled molding making products and expertise.

## Vacuum Consumables & Bought-in Products

METYX manufactures a range of peel ply, flow mesh, and breather fabric vacuum consumables, supplied in bulk, on a roll, or as cut to size kits, as well as sourcing a wide range of bought-in products needed by customers for manufacturing FRP parts.

The range of high quality materials, infusion consumables and ancillary manufacturing products sourced from leading suppliers includes: 3B continuous filament mats (CFM), vacuum leak detectors, vacuum bagging consumables, core materials, Axel and TR Industries mold release agents, JM surface veils, adhesives, resins and gel coats, hardeners, sheet wax products. Key stockholding and reordering is provided to strategic customers for the key materials regularly needed for manufacturing composite wind turbine blades and other components, with a tailored logistics supply chain service.



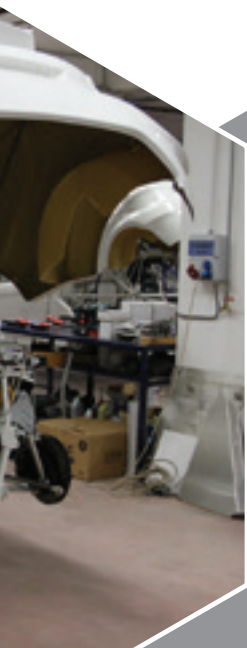
### CASE STUDY 03 Avitas Motorsport design with confidence

Avitas Motorsport designs and manufactures unique performance cars, such as the 'SuperCar Lites' Rallycross model, to compete in international racing events.

To minimize weight, the Avitas design engineers specified METYX carbon woven fabrics for the SuperCar Lites' single piece main body CFRP molding and an aramid knitted fabric for the high impact resistant hood.

"We specify METYX reinforcement fabrics for all of the composite body parts fitted in our racing cars, which work exceptionally well under very demanding race conditions."

- Avitas Motorsport Director,  
Halid Avdagic





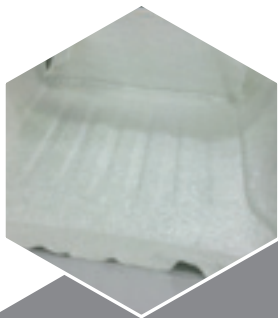
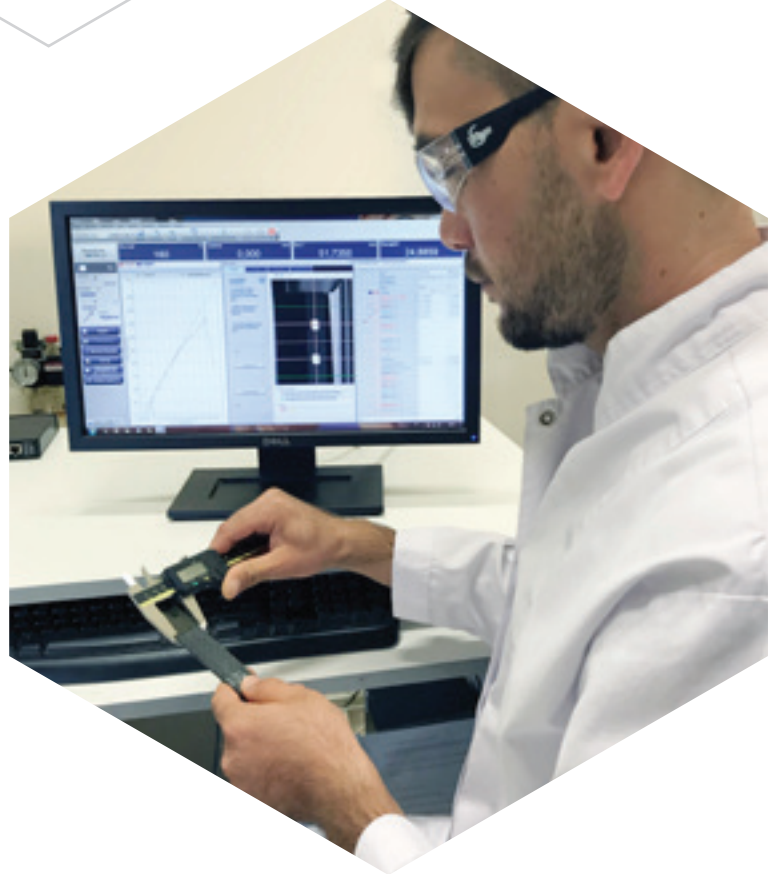
## Other Services

### Engineering Services & Support

METYX offers engineering support using the very latest design and production software to customers in all industrial market sectors, including wind energy. Services provided include: laminate design and engineering (FEA), process engineering support; rapid prototyping; tooling consultancy.

### Laboratory & Testing Services

METYX offers extensive laboratory and rapid response testing services to its customers. METYX lab technicians have expertise in hand lay-up, vacuum infusion, RTM, hot pressing and lab scale production of composite laminates. Capabilities include flow testing, plus fabric, laminate and base materials testing to provide key physical and mechanical property data.



### **CASE STUDY 04** **METYCORE for pick-up truck hardtops**

The Dr. Hörn Group, based in Ostroda, Poland, manufactures glass fibre (GRP) and thermoformed plastic parts for pick-ups and other commercial vehicles. OEM customers includes: Nissan Europe, Mitsubishi Europe, Volkswagen AG and Isuzu Benelux.

Light RTM is used to mold the MI DC RH04 gelcoated GRP hardtop for the Mitsubishi L200 pick-up truck, reinforced with a custom width METYCORE 450M/250PP1/450M fabric. METYCORE has high drapability, enables rapid resin flow and provides an excellent surface finish, with no print through.

METYCORE is specified by Dr. Hörn as the preferred RTM reinforcement fabric for high quality pick-up hardtops.





## Responsive Logistics Service

METYX has invested in extensive warehousing and logistics facilities both at the Manisa factory in Turkey, which handles local and export orders, and at the factory at Kaposvár in Hungary which mainly supplies EU customers. METYX has strategic supply chain partnership agreements with key marine customers to ensure that a highly responsive, reliable delivery and logistics service is provided.

The Manisa factory, with its expanded warehousing and distribution facilities, supplies customers nationally across Turkey. Export customers are also well served from the port close to the factory at Izmir and from nearby Istanbul airport for shipments needing a fast airfreight delivery service.



## Quality Systems

METYX has ISO 9001 Quality, ISO 14001 Environmental and OHSAS 18001 Occupational Health & Safety Management Systems certification.

Ongoing investments are made in latest technologies available to ensure that the very highest quality standards are maintained. This has included the installation of surveillance camera systems on production lines which constantly monitor product quality in real time.

METYX has gained a variety of independent accreditations and certification needed to serve global OEMs and industry suppliers in demanding markets such as: marine, automotive and wind energy.

YILDIZ UNIVERSITY  
AESK CLUB



ULUDAĞ UNIVERSITY  
MAKİNE TEAM



ÇUKUROVA UNIVERSITY  
ELECTROMOBİLE TEAM



İSTANBUL UNIVERSITY  
MİLAT 1453 TEAM



## Supporting future engineering talent

METYX annually sponsors engineering university concept vehicle projects, providing materials and technical advice to student teams to help turn design ideas into reality.

METYX strongly believes that supporting engineering student projects increases their understanding of composite materials, to help secure a better future for the industry



[www.metyx.com](http://www.metyx.com)

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