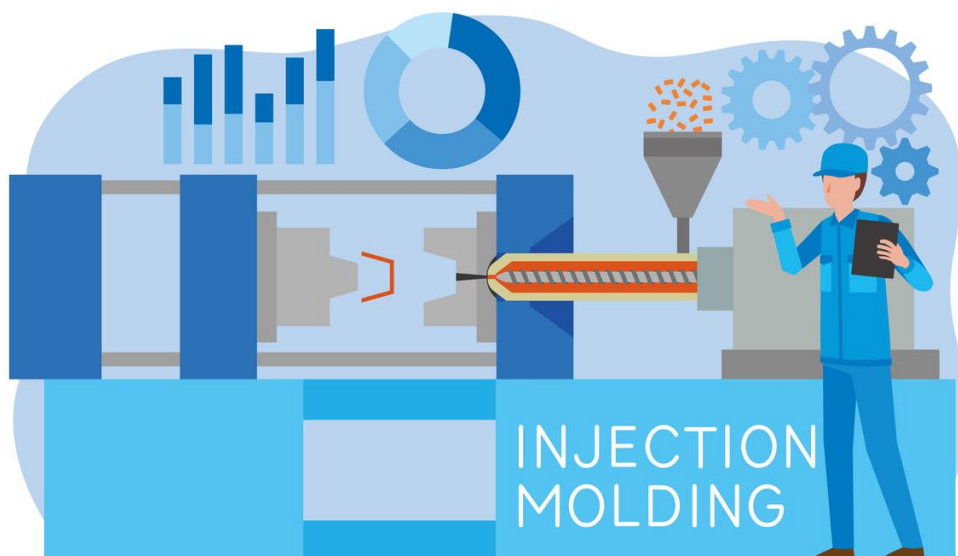




Mitsui Chemicals

Europe



Injection Molding material portfolio

*Resins, Compounds &
Composite reinforcements*

Hendrik Bernemann

Specialist Composites & Mobility

Technical Solutions Center

Mitsui Chemicals Europe GmbH, Düsseldorf, Germany

0→1 MAKE IT HAPPEN

July 2024

Company profile

Overview of Mitsui Chemicals, Inc.



Mitsui Chemicals
Europe



4 domains to resolve social challenges



Mobility

PP compounds • TAFMER™
ADMER™ • Mitsui EPT™ •
MILASTOMER™ • Composites



Life & Healthcare

Ophthalmic Lens Materials •
Dental Materials • Nonwovens •
Agrochemical products



ICT solutions

APEL™ • ICROS™ Tape •
High-performance food packaging
materials • Converting solutions



Basic & Green Materials

Phenol • PTA/PET • Polyolefins •
Polyurethane Materials

Established: 1997

Origin: 1912, Mitsui Mining

Head office: Tokyo, Japan

Employees: 18.933

(consolidated, as of 03/2023)

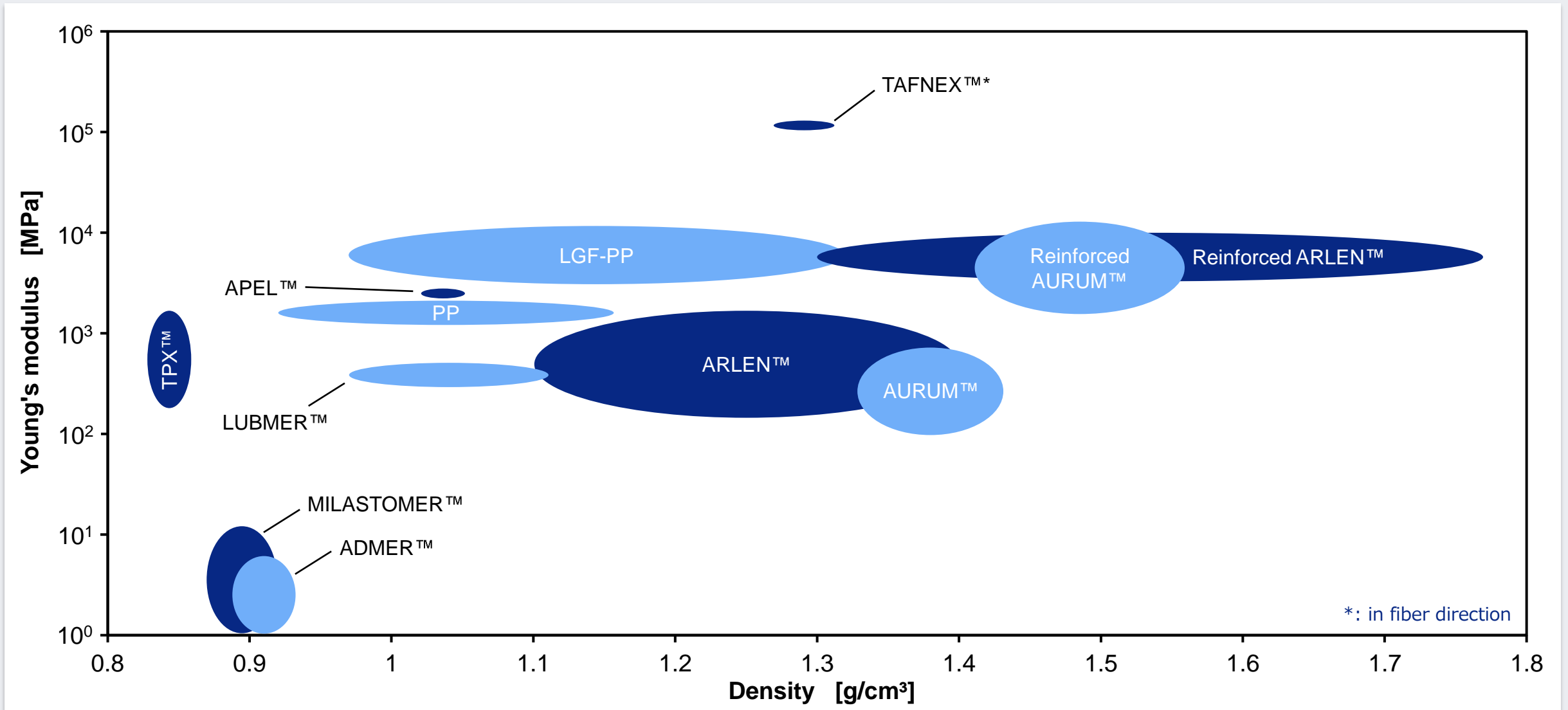
Subsidiaries & Affiliates: 165

Turnover: 11,84 billion €

(consolidated / FY2022)



Name	Polymer	Type	Main application fields	Contact (Technical)
ADMER™	PE or PP	Adhesive resin	Automotive Packaging	Mr. Claas Mester (claas.mester@mcie.de)
APEL™	COC	Neat resin	Medical Optics	Mr. Samer Ziadeh (samer.ziadeh@mcie.de) Ms. Csilla Horváth (csilla.horvath@mcie.de)
ARLEN™	PA6T (PPA)	Neat resin Compound	Automotive Electronics (ICT)	
AURUM™	TPI	Neat resin Compound	Automotive Industrial	
LUBMER™	(UHMW-)PE	Neat resin	Sliding components	
TPX™	PMP	Neat resin	Food	
MILASTOMER™	TPE	Neat resin	Automotive	Mr. Akio Hayakawa (akio.hayakawa@mcie.de)
-	PP	Compound LGF-Compound	Automotive	Mr. Marco van Putten (marco.vanputten@mp-ace.eu)
TAFNEX™	PP	<u>CF reinforced composite:</u> UD tape Structural sheet Woven sheet Design sheet	Automotive Sports & Leisure	Mr. Christos Karatzias (christos.karatzias@mcie.de) Mr. René Laschak Pinto Gonçalves (rene.Laschak@mcie.de) Mr. Hendrik Bernemann (hendrik.bernemann@mcie.de)





Resins & Compounds





ADMER™ adhesive resins are modified **Polyethylene (PE) or Polypropylene (PP)** resins designed to create a bond between a variety of polyolefins, ionomers, polyamides, ethylene vinyl alcohol (EVOH), butenediol vinyl alcohol (BVOH), polyvinyl alcohol (PVOH), polyester (e.g., PET), coatings, inorganics and metals. Therefore, ADMER™ enables the combination of otherwise incompatible materials in multilayer/multi-material applications across several industries. ADMER™ is mainly used in co-extrusion and coating processes. However, there are two grades that have been designed for (multi-shot or 2k) Injection Molding applications: AT1870E (PE-based) and QS615E (PP-based).



High adhesion
strength



Excellent adhesion
durability



Excellent
processability

Multi-shot injection
2k injection



High adhesion
strength



Excellent adhesion
durability



High shear
resistance



Automotive
Plastic fuel tank valves
(combining HDPE & PA)



Local production
in Europe



Packaging
Coffee capsules
(combining PP & EVOH)



APEL™, **Cyclo Olefin Copolymer (COC)** is an amorphous and transparent resin with excellent optical properties. APEL™ has been contributing to “smaller and lighter lens design”, with the highest refractive index and lowest birefringence among amorphous polymers, which enables replacement of conventional lens materials such as glass or PMMA. APEL™ maintains its performance in severe environments such as high humidity and high temperature.



High refractive index | High transparency | Low birefringence



Dimensional stability



High chemical resistance



Excellent electrical characteristics



High heat resistance



High moisture resistance

Characteristics
Applications



Imaging
HUD
HMD (AR / VR)



Medical
PTP packaging sheets
Pre-filled syringes
Bottles / containers



Camera lenses
Smartphones
Automotive



ARLEN™ is a modified **Polyamide 6T** that improves the weak points of conventional Polyamide resins by incorporating aromatic rings into the basic skeleton. Thus, ARLEN™ can be used for applications in severe environments where unmodified Polyamide resins are unsuitable due to their lower heat resistance and high moisture absorption.



High dimensional
accuracy*



High heat
resistance



High mechanical
strength**



Low water
absorption



Good chemical
resistance



Color
selection

*: Low warpage grades

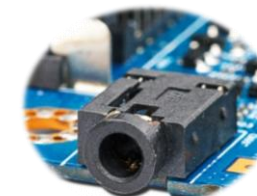
** : also at high temperatures

Characteristics
Applications



Automotive

Busbars
Pyro fuses
Connectors
Pistons
Housings
and more...



Electric (ICT)

Connectors
Actuators
Jacks



Commercially available ARLEN™ compounds include the following additives & fillers:

- Flame retardant
- Impact modifier
- Glass fibers (up to 50 %)
- Halogen & halogen-free versions
- Wide range of colors






AURUM™ is the world's only moldable **Thermoplastic Polyimide (TPI)**. With the highest glass transition temperature of any thermoplastic resin ($T_g = 245\text{ °C}$), it is a super high-grade performance plastic that can be used to replace metals, ceramics and other polymers like PEEK. AURUM™ is attracting increasing attention due to its outstanding characteristics that help to meet the demands of the 21st century.



 High dimensional accuracy

 Very high heat resistance

 Excellent wear properties

 Excellent cleanliness

 High resistance to chemicals & radiation

 Excellent electrical insulation

Characteristics
Applications



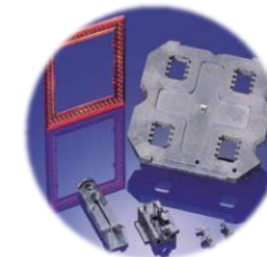
Automotive

Magnet wires
Busbars
Thrustwashers
Bearings / Bushings
Sealings
and more...



Others (Industrial)

Bearings / Bushings
Electrical connectors
Carriers
and more...





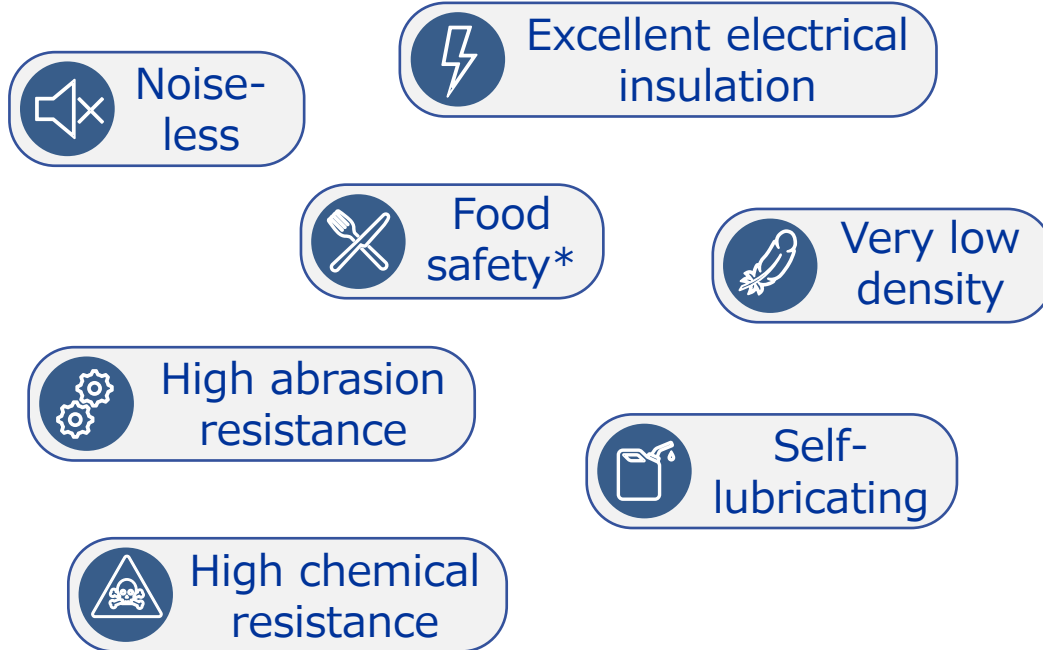
Commercially available AURUM™ compounds include the following additives & fillers:

- Glass fibers (30 %)
- Carbon fibers (30 %)
- PTFE
- Graphite





LUBMER™ is a (UHMW-)Polyethylene that is moldable which enables new possibilities for this type of polymer. It can be utilized for injection molded parts or as a PFOA free replacement of PTFE for tribology modification of engineering plastics such as PA6, PA66 or PC. With its self-lubricating characteristic, it is highly suitable for all kinds of sliding components.



*: valid for specific grades





TPX™ is a **Polymethylpentene (PMP)** that offers a unique combination of transparency, heat resistance and releasability. It is the lightest polymer material for commercial use and can be used for a wide range of applications. In addition, it can also be used as a resin modifier for PP, PET, TPO and PA. TPX™ by Mitsui Chemicals is halogen-free and the only PMP material commercially available.



High chemical
resistance



Very low
density



Food
safety*



High
transparency



Excellent gas
permeability



High heat
resistance



Excellent
releasability



bio content
possible

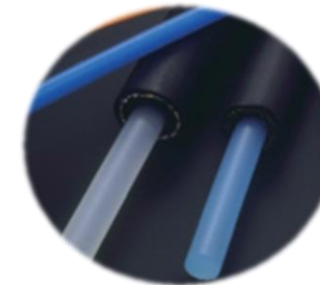
Characteristics

Applications



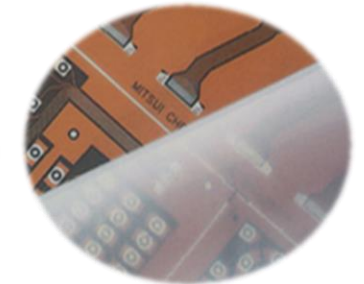
Food industry

Packaging
Containers



Processing aids

Release films for FPC
Release paper for synthetic leather
LED mold cups
Mandrels / sheaths for rubber hose



Others

Experimental apparatuses
Heat resistant wraps
Hollow fiber

*: valid for specific grades



MILASTOMER™ is a **Thermoplastic Elastomer (TPE)** made of olefin-based rubber and polyolefin resin. It is available in a wide range of grades, ranging from grades which are flexible like vulcanized rubber to grades which are semi-hard like LDPE. Additionally, there are grades available that have been developed for specific applications as well as grades containing renewable raw material for improved sustainability.



High heat
resistance*



High chemical
resistance**



Excellent
weatherability***



High rubber
elasticity



Excellent electrical
insulation



Very low
density

30 % bio content grade
Reduced CO₂ emissions
compared to PVC powder slush

Characteristics
Applications



Automotive interior skins
(MILASTOMER™ SH series)
More information on next page



Automotive exterior
Mud guards
Deflectors
Steering boots
Gaskets/Seals
and more...

Non-Automotive
Joints
Hoses
Hole plugs
and more...



Local production
in Europe

*: compared to other elastomers

** : excluding aromatic organic solvents, gasoline,
mineral oil etc.

***: not applicable for all grades



Leather imitation incl. stitching:



Grab handle

Console skin

IP garnish skin

PP compound (substrate + stitch)

MILASTOMER™ (skin)

Cross section

i The stitch imitation technology shown above is patented by a Japanese Tier 1.

- High quality leather-like design (incl. stitching)
- One-step process (2k Injection Molding) instead of multi-step process incl. manual labor
 - Cost reduction

Further parts possible as well.



Mitsui Prime ACE produces customized, partially long glass fiber (LGF) reinforced **Polypropylene (PP)** compounds. They are mainly used for automotive applications but are suitable for other industries as well. The compounds enable molded-in coloring as well as Class A surfaces. The LGF-PP compounds can be used to replace metal or engineering plastics in some applications to achieve lighter and more sustainable parts.



Characteristics
Applications



High chemical
resistance



Very low
density



High water
resistance



Excellent surface
characteristics



High
durability



Recycling content
(PCR) available



Local production
in Europe

Automotive interior*

Instrument panels
Center consoles
Trims
and more...



Automotive exterior

Tailgates
Bumpers
Trims
and more...



*: incl. combination with
MILASTOMER™ shown on previous page

PP compounds are customized to the application:

- Talc: 5 to 30 %
 - Rubber
 - Recycling content (PCR)
 - Color masterbatch
 - Aluminium flakes (for metallic look)
- and more...*



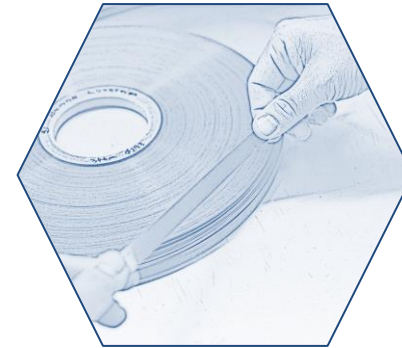
Class A surface
Scratch & UV resistance
Molded-in color (or paintable)

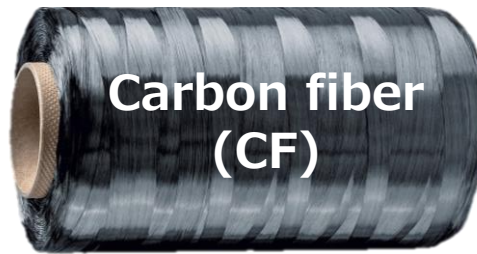
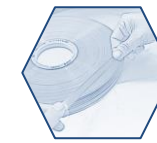
LGF-PP compounds are further customized with:

- Long glass fibers: 10 to 50 %

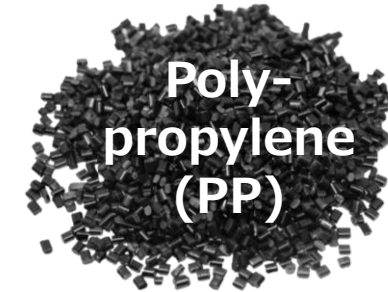


Composite reinforcements





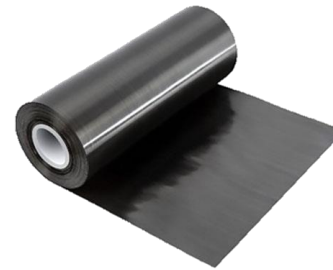
Carbon fiber
(CF)



Poly-
propylene
(PP)



Highly bonded interface through
the use of a unique sizing agent

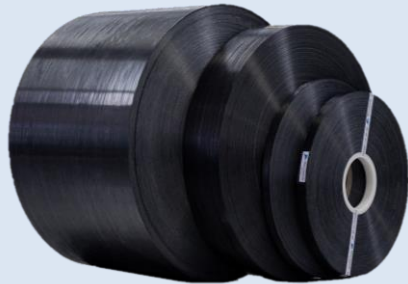


Fully impregnated high
performance CF-PP UD tape

Option 3 Tube



Option 1 Tape



- Width [mm]: 3 to 600
- Fiber content [vol.-%]: 40 | 50

Regular grade ↗

Option 2 Sheet



Structural

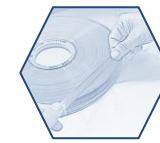
Woven

Design

- Customized to YOUR needs
- Combination with other PP composite materials possible
(GF-PP, Flax-PP and more...)

Composite reinforcements

TAFNEX™ - Injection molded parts



Mitsui Chemicals
Europe



Design sheet



Structural sheet



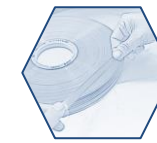
Tube



Local tape
reinforcement

Composite reinforcements

TAFNEX™ - Mechanical recycling into injectable compound



Mitsui Chemicals
Europe



Exemplary TAFNEX™
part (bumper beam)

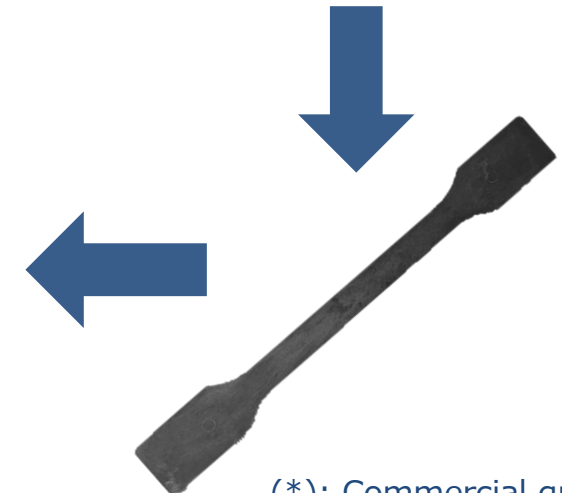


Intermediate
material (flakes)



rLFT compound for
injection molding

Property	Test standard	Unit	Value	
			TAFNEX™ hybrid bumper beam rLFT	CF30GF10-PP LFT(*)
Fiber weight content	ISO 11667	%	44 (CF: 30 GF: 14)	40 (CF: 30 GF: 10)
Tensile strength	ISO 527	MPa	115	145
Tensile modulus	ISO 527	GPa	20	14.5
Flexural strength	ISO 178	MPa	202	221
Flexural modulus	ISO 178	GPa	22.4	10



(*): Commercial grade



Mitsui Chemicals
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