

ADHESIVE RESIN

ADMER™



AUTOMOTIVE



Mitsui Chemicals
Group

ADMER™ Adhesive Resin

ADMER™ KEY FACTS

- ⊕ **MALEIC ANHYDRIDE GRAFTED POLYOLEFIN**
- ⊕ **EXTRUDABLE**
- ⊕ **TIE RESIN**
- ⊕ **ADHERING TO BARRIER MATERIALS**
ETHYLENE VINYL ALCOHOL (EVOH), POLYAMIDE (PA), METALS

ADMER™ resins are modified polyolefins with functional groups, designed to bond to a variety of polyolefins, ionomers, polyamides, ethylene vinyl alcohol (EVOH), polyester (e.g. PET) and metals. They serve as **tie layer in multilayer applications** such as films, sheets, bottles, tanks, pipes, tubes and others and, thus, help to combine the excellent properties of incompatible materials, as, for example, gas barrier resins and moisture barrier resins.

ADMER™ resins are also used as coupling agents, compatibilizers and impact modifiers in various types of composites. ADMER™ adhesives are thermoplastics and can be as easily processed as any other polyolefin by (co-)extrusion or powder coating. ADMER™ is famous for its excellent quality and is therefore the world's leading polyolefin-based adhesive. Production sites all over the world assure a constant and convenient availability of our top quality adhesives.

- ⊕ ADMER™ RESINS ARE WELL KNOWN FOR SETTING THE MARKET STANDARDS IN TERMS OF QUALITY AND EFFICIENCY.
- ⊕ ADMER™ RESINS ARE **THE MISSING LINK FOR YOUR MULTILAYER INNOVATIONS!**

Multilayer Structure with ADMER™

Characteristics

1. STRONG ADHESION

By thermal reaction ADMER™ adheres to ethylene vinyl alcohol (EVOH), polyamide (PA), polyester (PET), polyolefins (PE, PP) and metals.

2. ADHESION DURABILITY

ADMER™ shows excellent long-term adhesion strength even after secondary processing like pasteurization, hot filling, boiling and sterilization.

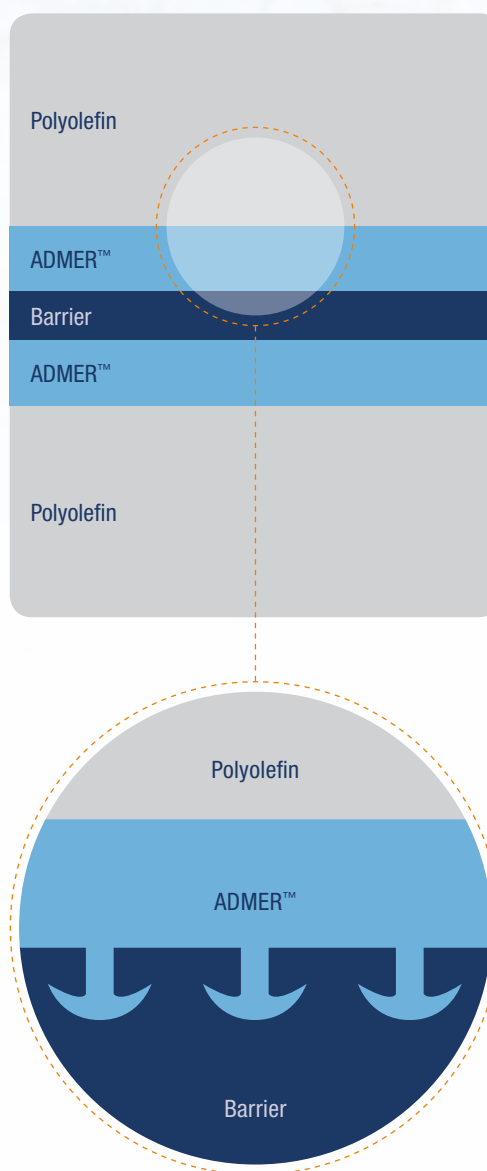
3. POLYOLEFIN-LIKE PROPERTIES

Since ADMER™ is based on polyolefins or co-polymers, it retains the physical properties of each polyolefin or co-polymer including mechanical strength, heat resistance, chemical resistance and recyclability.

4. EASY PROCESSING

ADMER™, a thermoplastic, can be processed as easily as any other polyolefin by the following methods:

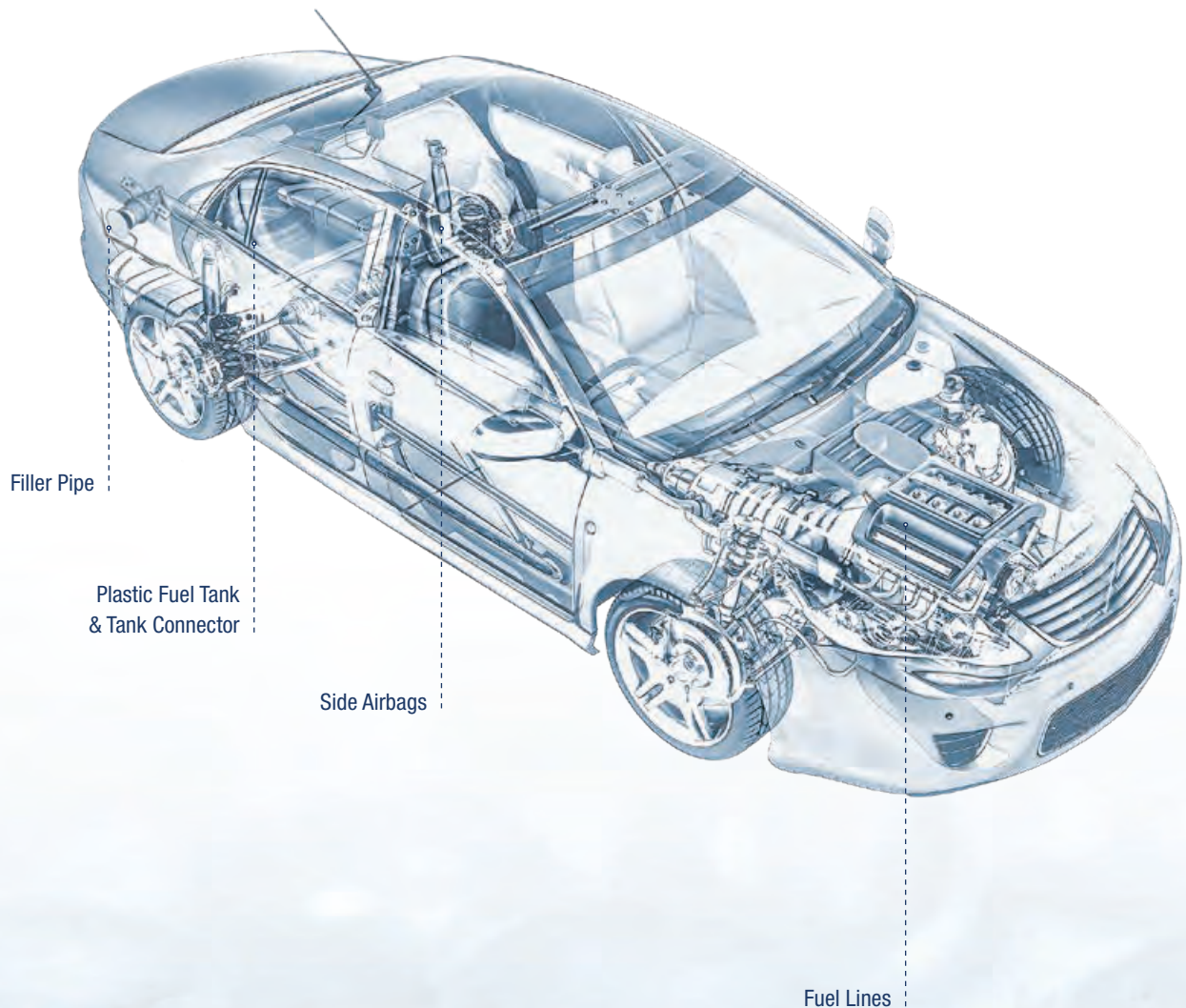
- ⊕ FILM CO-EXTRUSION
(CAST AND BLOWN FILM)
- ⊕ CO-EXTRUSION BLOW MOULDING
- ⊕ SHEET CO-EXTRUSION
- ⊕ TUBE CO-EXTRUSION
- ⊕ CO-EXTRUSION COATING
- ⊕ METAL COATING
- ⊕ CO-INJECTION



Automotive Applications



ADMER™ IS THE GLOBALLY LEADING TIE
RESIN IN CO-EXTRUDED PLASTIC FUEL TANKS



AUTOMOTIVE DEMANDS

Every vehicle contains about 30,000 parts. Industry demands for lightweight, recyclable parts have increased in line with needs for environment-friendly vehicles.



Adhesive resin for multilayer fuel tanks (generally ADMER™ is not coloured)

Fuel Tank

STRUCTURE OF MULTILAYER PLASTIC FUEL TANK

HDPE / **ADMER™** / EVOH / **ADMER™** / REGRIND / HDPE

ADMER™ is used as a tie layer resin in integrated plastic fuel systems. Available in pellet form, this high performance adhesive resin shows superior long term adhesion, toughness, aging resistance and enables fuel system suppliers and OEMs to deliver fuel components with low permeation and superior durability.

LOW-PERMEATION IN FUEL SYSTEMS

For many years, Mitsui Chemicals has been working with automotive suppliers to develop improved multilayer plastic fuel systems. The tie layer resin is used extensively by the automotive industry worldwide, and Mitsui Chemicals is continuously making improvements to accommodate alternate fuels and advances in fuel system technologies.

The industry's premier multilayer fuel system components benefit from the application of EVOH as low-permeation barrier material.

By chemical reaction to the EVOH, ADMER™ enables the cost efficient production of multilayer tanks. Main feature of these co-extruded tanks is a consistent permeation resistance to evaporative emissions. This superior resistance to gasoline permeability ensures that OEMs meet environment, regulatory and industry requirements which are constantly reinforced.

Standard Grades for Automotive Applications

PLASTIC FUEL TANKS (PFT) AND FILLER PIPES

GT6E: Our standard and top-selling PFT grade. ADMER™ GT6E is a maleic anhydride grafted, LLDPE-based adhesive designed for multilayer plastic fuel tanks composed of PE and EVOH.

GT6E

PE-Grade
MFR: 1.1
Density: 0.92

ITEM	VALUE	UNIT	ASTM TESTING METHOD
MFR (190°C , 2.16kg)	1.1	g/10 min	D1238
Density	0.92	g/cm ³	D1505
Tensile Strength at Yield	11	MPa	D638
Tensile Strength at Break	25	MPa	D638
Elongation at Break	> 500	%	D638
Izod Impact Strength	No Break	J/m ²	D256
Shore Hardness	51	D scale	D2240
Vicat Softening Point	102	°C	D1525
Melting Point	122	°C	D3418

FUEL LINES

QB520E: Our standard grade for multilayer fuel lines, certified by the OEMs. ADMER™ QB520E is a maleic anhydride grafted, homo PP-based adhesive.



GT7E SHOWS SUPERIOR ADHESION LEVEL AT 80°C AND AT ROOM TEMPERATURE, WHILE RETAINING EXCELLENT IMPACT RESISTANCE

GT7E: Next generation grade with improved adhesion performance. ADMER™ GT7E is a maleic anhydride grafted, LLDPE-based adhesive designed for multilayer plastic fuel tanks composed of PE and EVOH. It offers advanced adhesion durability, fuel resistance and processability.

ITEM	VALUE	UNIT	ASTM TESTING METHOD
MFR (190°C , 2.16kg)	1.0	g/10 min	D1238
Density	0.93	g/cm ³	D1505
Tensile Strength at Yield	15	MPa	D638
Tensile Strength at Break	29	MPa	D638
Elongation at Break	> 500	%	D638
Izod Impact Strength	No Break	J/m ²	D256
Shore Hardness	59	D scale	D2240
Vicat Softening Point	108	°C	D1525
Melting Point	127	°C	D3418

GT7E

PE-Grade
MFR: 1.0
Density: 0.93

ITEM	VALUE	UNIT	ASTM TESTING METHOD
MFR (230°C , 2.16kg)	1.8	g/10 min	D1238
Density	0.90	g/cm ³	D1505
Tensile Strength at Yield	21	MPa	D638
Tensile Strength at Break	16	MPa	D638
Elongation at Break	> 500	%	D638
Izod Impact Strength	470	J/m ²	D256
Shore Hardness	64	D scale	D2240
Vicat Softening Point	140	°C	D1525
Melting Point	161	°C	D3418

QB520E

PP-Grade
MFR: 1.8
Density: 0.90

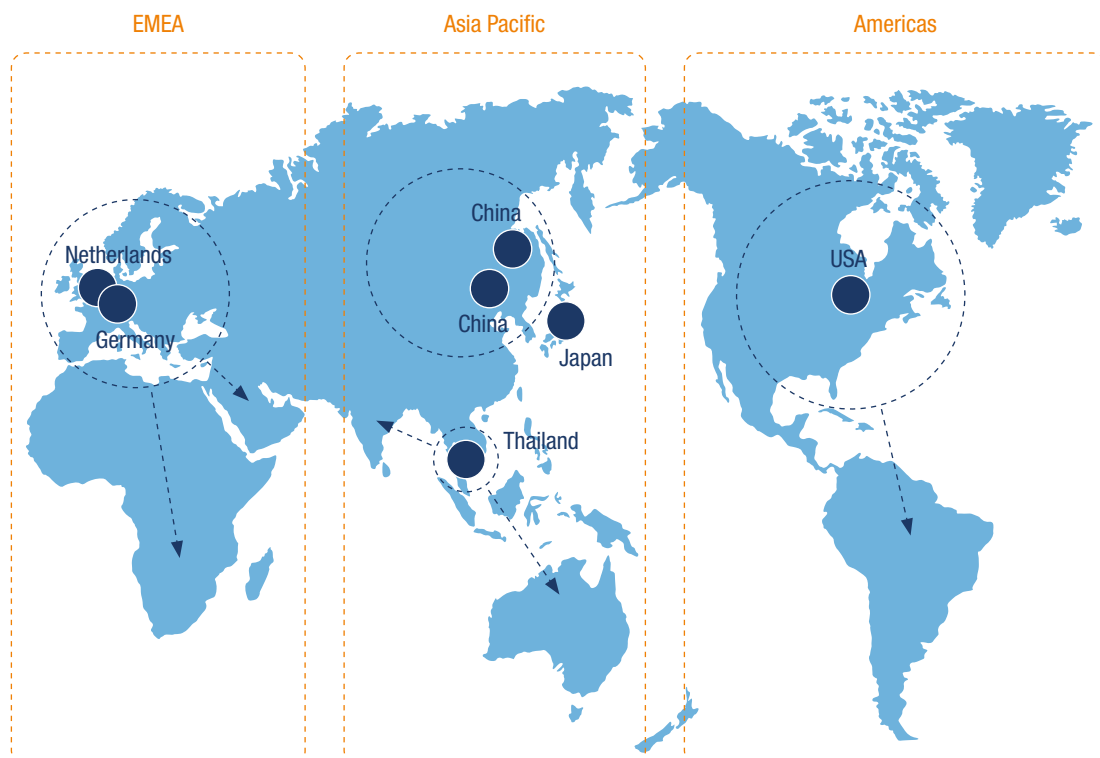
ADMER™ Production



ADMER™, the global market leader in extrudable tie resins, is produced in Europe, Asia and America – hence, worldwide availability is assured. The European market is served from our production sites in Germany and the Netherlands.

GLOBAL SUPPLY CAPABILITY OF ADMER™

Global Market Coverage from 3 Regions



Packaging Units

Dear Sarit,

Please allow me to compliment your company, as agent for MITSUI, and Mitsui themselves, for the excellent service provided to us. No other agent nor supplier manages to supply as you and Mitsui do.

With 25 years in Plastopil, in import, I do have with what to compare! – and can only thank you and Mitsui; and let you know that your excellent customer service is much appreciated.

Best regards,
Barbara Hazan | Imports
Plastopil Hazorea Company Ltd.

25 kg PE-bags on CP1 wooden pallets;
Pallet dimension in m:
1.10 × 1.30 × 1.80
(width × length × height)



1,000 kg net pallet weight big bags or delivery in silo truck (bulk) available on request.



500 kg octabins (cardboard boxes) on CP3 wooden pallets;
Pallet dimension in m:
1.15 × 1.15 × 1.20
(width × length × height)



Handling Procedure



Store inside



Keep dry



Keep out of sun

STORAGE

ADMER™ resins are supplied in the form of small, free flowing pellets and can be easily handled with commercially available equipment.

As long as ADMER™ is stored under good conditions, it does not require any special care in storage. Precaution should be taken in opening the package to avoid contamination by foreign materials.

DRYING

Since ADMER™ is a non-hygroscopic material, it absorbs less moisture than non-polyolefinic polymers. Therefore, ADMER™ does not require drying prior to processing.

DISPOSAL

ADMER™ can be re-used, recycled or incinerated with energy recovery. We do not recommend to dispose of ADMER™ on a landfill. ADMER™ should not be dumped into the environment.

Prior to using ADMER™ products, please read carefully its Product Group Safety Information Sheet according to Article 32 of Regulation (EC) No. 1907/2006 (REACH). Safety Data Sheets according to Article 31 are not required for ADMER™.





Processing Parameters

PROCESSING

The recommended temperatures for ADMER™ are as follows:

PE-BASED GRADES					
C1	C2	C3	C4	AD	Die
180 - 200 (°C)	180 - 200 (°C)	200 - 230 (°C)	200 - 230 (°C)	200 - 230 (°C)	200 - 230 (°C)
PP-BASED GRADES					
C1	C2	C3	C4	AD	Die
200 - 230 (°C)	200 - 230 (°C)	200 - 250 (°C)	230 - 250 (°C)	230 - 250 (°C)	230 - 250 (°C)

- ⊕ MAXIMUM TEMPERATURE: 300°C
- ⊕ TEMPERATURES ABOVE THE UPPER LIMIT OR LONG RESIDENCE TIMES OF MOLTEN RESIN MAY LEAD TO DECOMPOSITION OF THE POLYMER.
- ⊕ DECOMPOSITION PRODUCTS MAY BE CARBON MONOXIDE, CARBON DIOXIDE, HYDROCARBONS AND WATER.

SHUTDOWN

The following procedure is recommended whilst the extrusion process is either interrupted or terminated.

- ⊕ **LESS THAN 2 HOURS:** SCREW ROTATION CAN BE STOPPED MAINTAINING TEMPERATURE.
- ⊕ **MORE THAN 2 HOURS:** PURGE OUT AND SHUT DOWN IN ACCORDANCE WITH COMMON PROCEDURE.

PURGING

Below you will find the recommended purging materials and their extrusion temperatures for a permanent shutdown.

	MATERIALS	TEMPERATURE (°C)
PE-based grades	Polyethylene*	200 - 230
PP-based grades	Polypropylene	230 - 250

*Low density polyethylene (LDPE) is recommendable.

Regulatory Compliance

⊕ COMPLIANCE WITH REACH:

All ADMER™ monomers and additives, if applicable, have been pre-registered both by Mitsui Chemicals Europe GmbH and our EU suppliers or non-EU suppliers (via Only Representative). Registration of the major monomers was done by MCE in September 2010. Some substances have been or will be registered by our suppliers.

ADMER™ is in compliance with the requirements of Annex XVII of the REACH Regulation (EC) No. 1907/2006.

Substances listed on the REACH Candidate List of SVHCs (as amended on 17th December 2015) are not contained in ADMER™ concentrations at or above 0.1% by weight.

⊕ AUTOMOTIVE APPLICATIONS:

To help our customers verify compliance with ELV Directive 2000/53/EC and amendments we create Material Data Sheets in IMDS and send them to our customers. Our products are free of any declarable or prohibited substances according to GADSL (Global Automotive Declarable Substances List) and in compliance with Automotive Lists, e.g. Ford, Toyota, Renault, GM etc.

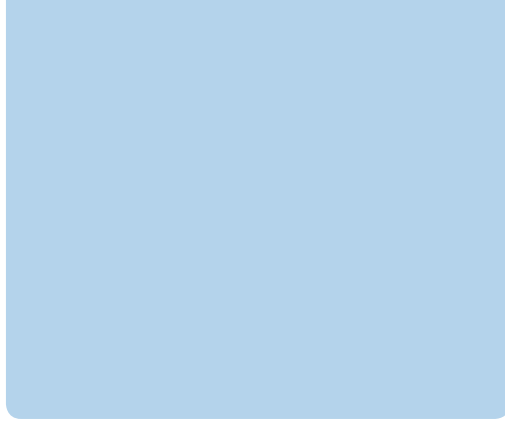
⊕ COMPLIANCE WITH LEGISLATION RELEVANT TO ELECTRICAL AND ELECTRONIC EQUIPMENT:

- * Directive 2011/65/EU as amended (RoHS2)
- * Directive 2012/19/EU as amended (WEEE)
- * Directive 2003/11/EC Brominated Flame Retardants

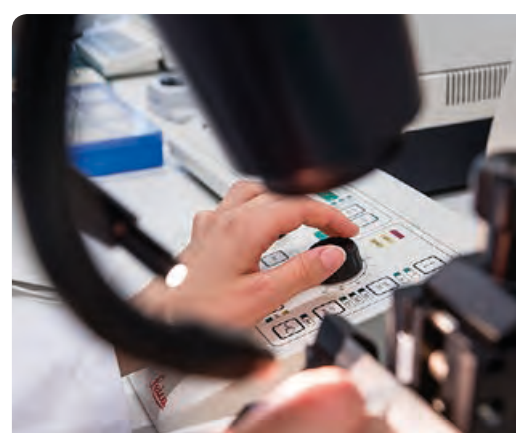
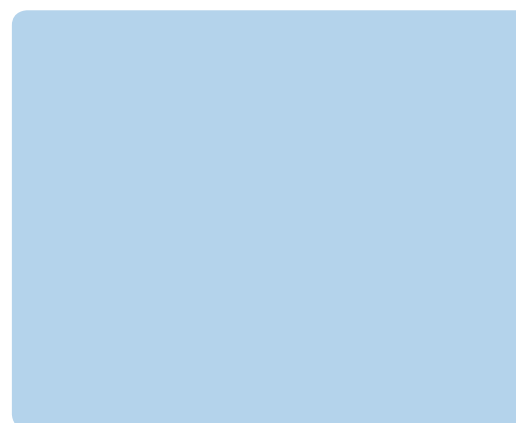
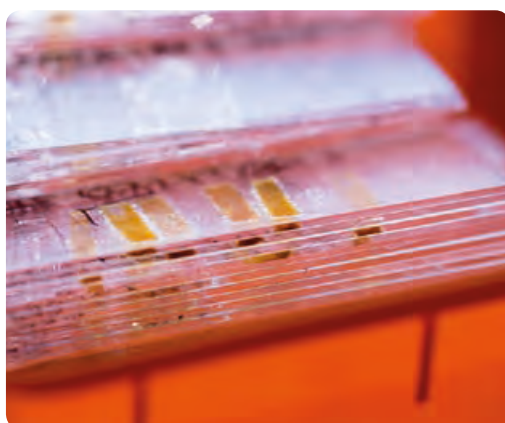
⊕ FURTHER LEGISLATIVE COMPLIANCE:

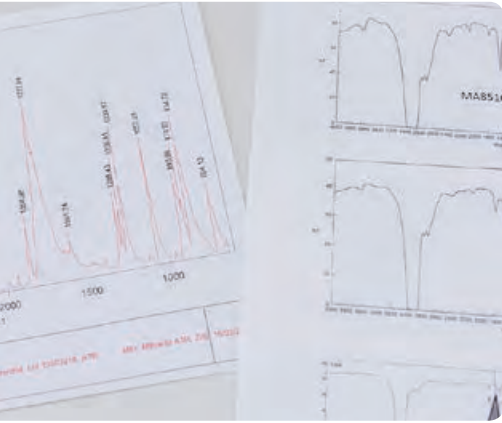
- * Directive 2005/84/EC as amended (Phthalates in Toys and Childcare Articles)
- * Directive 2009/48/EC (Safety of Toys)
- * DIN EN 71-3 on Toys
- * Cosmetic Products Regulation (EC) No. 1223/2009
- * California Proposition 65 (Status 4.12.15)

Status: May 2016

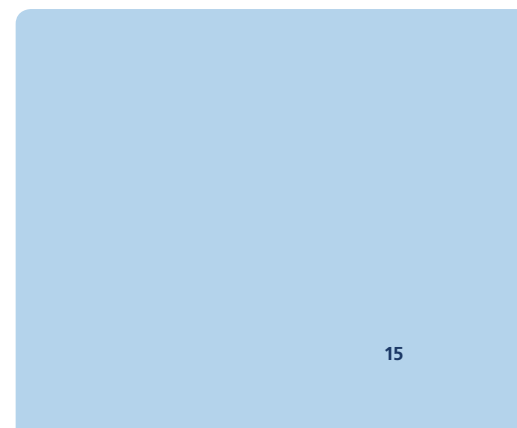
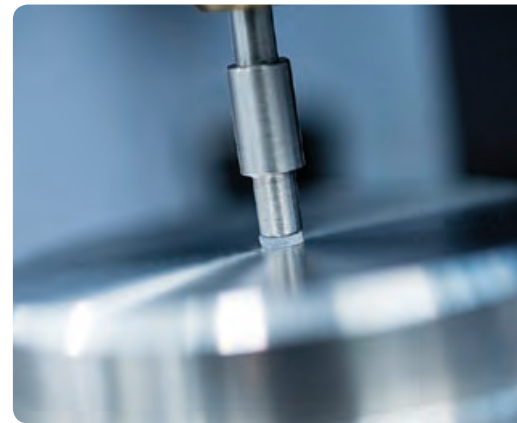


Laboratory





Our customer service laboratory is designed to evaluate and rate our customers' products. We are well equipped for microscopic, mechanical, thermal and physical evaluations of plastic products from the packaging, automotive and industrial sector, e.g. films, tubes, bottles, fuel tanks and pipes. Some of our standard evaluations are: Adhesive strength measurement, determination of layer thicknesses, structural analysis of multilayer films, gel analysis and thermal analysis.



Our Quality Policies

More than 40 years experience in adhesive technologies and an outstanding expertise in various industries make us a competent partner for your business. ADMER™ resins for Europe, Middle East and Africa (EMEA) are produced in Germany and the Netherlands. The production in the heart of Europe assures highest quality standards, which are reflected by the following certifications:

CERTIFICATIONS

- ⊕ **ISO/TS 16949** (QUALITY MANAGEMENT SYSTEM)
- ⊕ **OHSAS 18001** (OCCUPATIONAL HEALTH- AND RISK MANAGEMENT SYSTEM)
- ⊕ **ISO 14001** (ENVIRONMENTAL MANAGEMENT SYSTEM)
- ⊕ **DIN EN ISO 50001:2011** (ENERGY MANAGEMENT SYSTEM)

CHEMICAL MANAGEMENT

Mitsui Chemicals sets to achieve its long-term chemical management goal, which is in line with guidelines set by the World Chemical Summit for Sustainable Development (WSSD), by 2020.

To contribute to a sustainable society, Mitsui Chemicals will establish LCIA technology for assessment of environmental impact of its economic activities and establish sustainability indices to support development of environment friendly products while staying in harmony with the global environment.

To contribute to a safe society, Mitsui Chemicals will employ product stewardship concepts to assess risks of its products and share this information with its stakeholders.



ENVIRONMENT

- ⊕ Contribute to environmental preservation through new products and technologies.
- ⊕ Assess and reduce the environmental load of products through their entire life cycle from research and development to final disposal.



QUALITY

- ⊕ Supply high-quality products and services that earn the trust and satisfaction of customers so that they feel confident when using them.



OCCUPATIONAL HEALTH & SAFETY

- ⊕ Give priority to safety, and aim for accident and injury-free operations.
- ⊕ Promote the formation of an appropriate work environment and support a proactive health program for employees.
- ⊕ Implement safety measures and procedures for handling chemical substances to prevent injury or harm to workers and others associated with those activities on site and in distribution, as well as customers.



PROMOTING SELF-MANAGEMENT

- ⊕ Strive for continuing improvements in environmental measures, occupational health and safety, and quality, beginning with compliance with applicable laws and regulations based on voluntary adherence to RC principles.

Mitsui Chemicals around the World



OVERSEAS SITES

- Offices
- Manufacturing Sites
- R & D Facilities



Company Name

Mitsui Chemicals, Inc.

Established

October 1, 1997

President & CEO

Tsutomu Tannowa

Head Office

Shiodome City Center, 1-5-2 Higashi-Shimbashi
Minato-ku, Tokyo 105-7117 Japan
Telephone: +81-3-6253-2100
Facsimile: +81-3-6253-4245
www.mitsuichem.com

Paid-in Capital

125 billion yen

Employees

14271 (Consolidated / As of March 31, 2014)

Subsidiaries & Affiliates

135

Domestic Manufacturing Sites

6

Domestic Sales Offices

Head Office and three branches

Number of Shares

1,022,020,076

Business Groups

Functional Chemicals
Functional Polymeric Materials
Polyurethane
Basic Chemicals
Petrochemicals
Film / Sheets

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GmbH**

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