

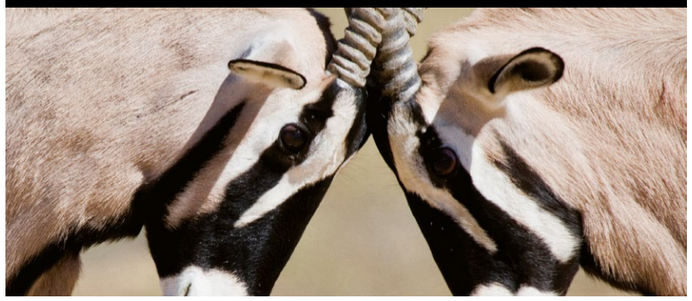
Your innovative development partner for cost and weight savings in automotive construction

EMS

EMS-GRIVORY

Long-fiber reinforced polyamides

Materials with spine



GRIVORY® EMS Grilamid® EMS GRILON® EMS

The LFT-polyamides from EMS-GRIVORY are long-fiber reinforced structural materials based on the tried and proven polyamides Grilamid GV and HT1, Grilamid PA12 and Grilon TS.

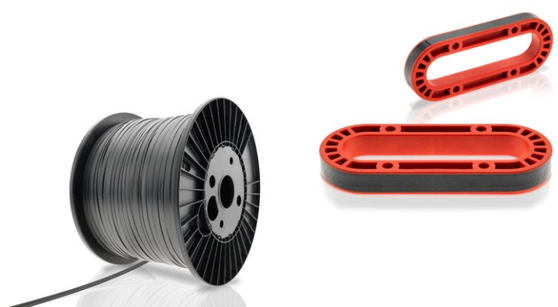
- A combination of high stiffness and exceptional notched impact strength
- High temperatures or moisture have little influence on the property values
- Very low creep
- Excellent permanent strength
- Little warpage

EMS Tape Technology (ETT)

Reinforcing tapes for lightweight design

Using a special pultrusion process, EMS-GRIVORY has developed endless, fiber-reinforced tapes in which the fibers all lie precisely in the direction of the band. The fibers are just as well impregnated as the granules, which means they have a degree of efficiency at the same level as the maximum achievable fiber properties.

- Less material required due to targeted reinforcement
- Increased stiffness and strength
- Elimination of weak points (weld lines)
- Significantly higher property levels
- Weight and cost reduction



Grivory HT



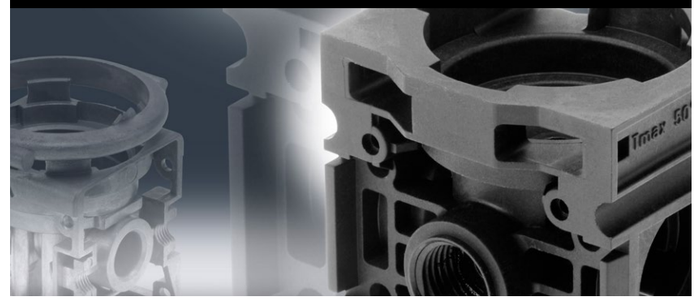
More performance at higher temperatures

GRIVORY® EMS

EMS-GRIVORY offers the widest range of polyphthalamides (PPA) available in the world and is market leader in Europe with these high-temperature polyamides.

- Stiffness and strength at high temperatures
- Very good creep resistance
- Property values are influenced very little by absorption of moisture
- High dimensional stability and low warpage
- Good resistance to chemicals and hydrolysis
- Good surface quality
- Efficient and low-cost manufacturing

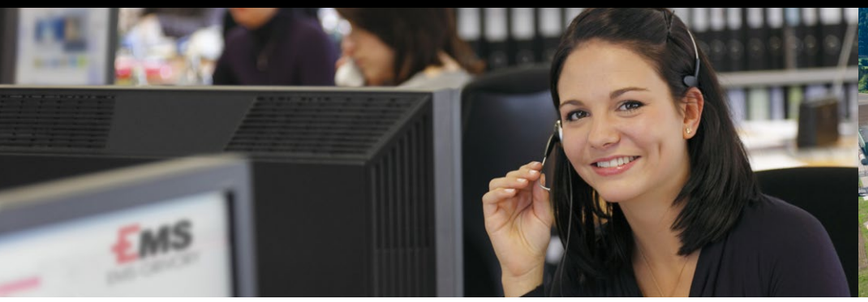
Grivory GV



The proven material for metal replacement

GRIVORY® EMS

- High stiffness and strength
- Property values remain unchanged after slight moisture absorption
- High dimensional stability and low warpage
- Good resistance to chemicals
- Good surface quality
- Efficient and low-cost manufacturing







EMS-GRIVORY is part of the business area High Performance Polymers within the EMS Group. The headquarters are located at Domat/Ems in Switzerland. Further production sites can be found in Germany, China, Taiwan and the USA. Our customers benefit from a close, global cooperation between the organizations of marketing and sales, research and development, application development and production.

EMS-GRIVORY – The leading specialist for high-performance polyamides in automotive construction

EMS-GRIVORY is one of the most efficient companies involved in development and manufacture of high-quality polyamides for use in the automotive industry. EMS-GRIVORY stands for products which open up new application areas with their specific property values. Our products focus on the combination of cost savings, functionality and reliability. Along with high-quality materials, our customers can also benefit from know-how from our own development center. This is the basis for development and applications promising success in the automotive industry.



Target achievement together with the customer

Tailor-made solutions are our target. To achieve this, it is not enough just to supply a suitable material; it also needs to be processed in an optimal way. For this reason, we not only develop the right polymer materials, but also provide support for our customers with component development and mould design as well as with manufacture and testing of prototypes. In this way, our customers receive a complete system solution with comprehensive service and benefit from added value with regard to cost savings, weight reduction and freedom of design. We aim to provide a first class performance in our development work, advice and services.



Famous worldwide – Versatile in use

Our high-performance polymers are well-known worldwide under the brand names Grivory®, Grilamid® and Grilon®. They are delivered to customers in granule form and undergo further processing using injection-moulding and extrusion methods.

Weight and cost reduction – our strengths in automotive construction

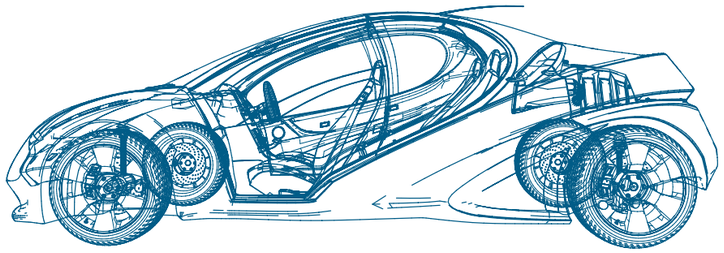
For more than 40 years, EMS-GRIVORY has made a decisive contribution towards the development of highest quality modern automotive components. The requirements demanded of our design materials are extremely high. They must ensure a reduction in fuel consumption, weight savings and lower emissions as well as being easy to process and recyclable. These demands must be met – despite the need for increasing comfort and safety requirements.

In vehicle interiors, our polyamides replace conventional die-cast alloys in functional parts such as arm rests, covers or supporting components for instrument panels. Metal is also replaced in external applications such as door handles, wing mirrors or windscreen wiper systems. In addition, our polyamides are resistant to chemicals, corrosion and weathering and make efficient production of media-carrying pipe lines, such as fuel or cooling water lines, possible.

Our materials are also in particular demand for the production of components used in the engine compartment. For this kind of application we have developed particularly heat-resistant, high-performance polyamides which can be used to make turbo-charged air pipes, charged-air coolers, heat exchangers or throttle body housings. Materials from EMS-GRIVORY are also found in automotive electrical and electronic applications which must work reliably without fail under extreme climate conditions. Our polyamides are also used in chassis and power train applications requiring good resistance to engine oil and hydraulic fluid. Examples of this kind of application are clutch components, braking or steering systems.

Automotive manufacturers throughout the world have faith in the high quality materials from EMS-GRIVORY.





Weight and cost savings through metal replacement in automotive applications

4





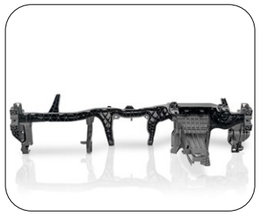






Good scratch resistance and stiffness
Suitable for laser welding
Resistant to chemicals

CAR KEY
Grivory GV



Good stiffness and strength
High weight savings vs. metal

INSTRUMENT PANEL SUPPORT
Grivory GVL



Low fogging
High dimensional stability
Low warpage

LENS HOLDER / SUPPORT FRAME
Grivory HT





Piano black finish without painting
Excellent scratch resistance

AIR VENT
Grilamid TR



Good pressure-cycle resistance
Permanent heat-ageing resistance at temperatures above 210 °C

TURBOCHARGED-AIR COOLER – SIDE COMPONENT
Grilon TS



Resistance to chemicals
Simple colouration
Excellent surface quality

STEERING COLUMN GEAR SHIFT
Grivory GV



Stiffness and creep resistance at high temperatures
Excellent resistance to chemicals (hot oil)

GEAR SHIFT MODULE
Grivory HT



High dimensional stability
Excellent resistance to cooling fluid at high temperatures

THERMOSTAT HOUSING
Grivory HT



High dimensional stability
Excellent resistance to liquid automotive media

CLUTCH COMPONENTS
Grivory HT









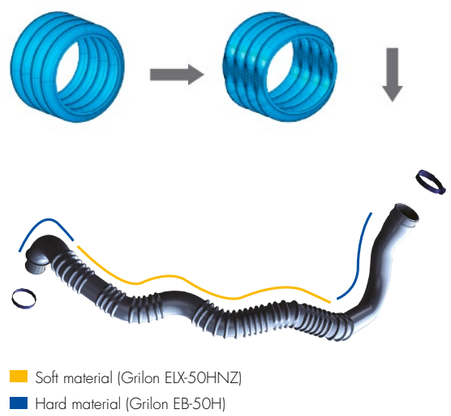
2D – Conventional blow-moulding technology
- For the manufacture of simple part geometries

3D – Blow-moulding technology
- For the manufacture of seamless shaped parts with more complex part geometries
- 3D shaping is carried out either by automated tube manipulation and/or suction blow moulding

In addition, in blow-moulding processes, inserts similar to those used in injection-moulding (retainers, grommets etc.), can be used in/on the shaped part and fixed by over blowing.

Sequential co-extrusion technology
- Allows use of two different materials to achieve different part properties (e.g. hard and soft segments)
- High part quality through simple control of the layer thickness and elimination of the pinch-off weld
- High cost-saving potential of up to 30% from a reduction in assembly steps and components

MOAX© Design
The MOAX design, patented by EMS, provides the unique possibility of combining part properties, such as flexibility, low elongation and stiffness, according to customer requirements. In this way, considerable cost and weight savings can be achieved.



Application		Polymer	Material	Filler	Impact strength	Melt strength
Cold side	Air pipes in charged-air systems	PA6	Grilon EB 50 H	-	Good	High
			Grilon EB 50 HDZ	-	Very good	High
			Grilon BRZ-350 H	-	Excellent	High
		PA6 Elastomer	Grilon ELX 40 HNZ	-	Excellent	High
			Grilon ELX 50 HNZ	-	Excellent	High
		PA6 + GF	Grilon EBVZ-15 H	15%	Very good	High
			Grilon EBV-15 H	15%	Good	High
			Grilon EBV-2H	20%	Good	Very high
Hot side		PA6 + 66	Grilon XE 3966	-	Good	High
			Grilon XE 4242	15%	Good	High
			Grilon EBGM-20 HX	15% + Nano	Good	Very high
Crankcase vent		PA12	Grilamid L 25 ANZ	-	Excellent	Very high
			Grilamid LV-2 ANZ	20%	Good	Very high

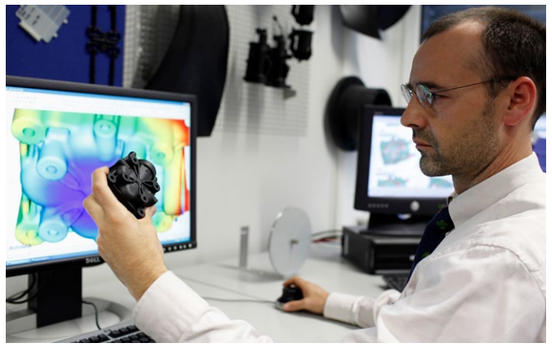
Experienced application experts with technical know-how in the market segments automotive, electro & electronics, industry & consumer goods, optics and packagings, provide support in the development of new applications from the idea right up to serial production.

The services provided by application development include:
- Support during the concept phase and check of requirements
- Feasibility tests and economic analyses for new applications
- Recommendation of the optimal material and individual comparison tests
- Support with component and mould design
- Process optimisation and development of processing methods and subsequent processes
- Advice on component-specific tests and quality features
- Component analysis using CT technology (computer tomography)

Computer Assisted Technical Service (CATS)
EMS-GRIVORY helps customers already in the concept and design phase with realistic simulations. In this way, using finite element analysis methods, the distribution of forces and component deformation can be calculated and optimised. Any weak points in the design can be identified and suitable modifications examined. If the anisotropy of fiber-reinforced plastics or other non-linear geometry and material effects play a significant role in component behaviour, these can be taken into account during the calculations.
EMS-GRIVORY also offers customers the possibility of simulating injection-moulding processes to optimise production. A rheological simulation makes it possible to evaluate the positioning of sprue and gate systems; filling problems such as weld lines or air inclusions can be recognised in preparation for mould manufacture. Through complex optimisation of material data, EMS-GRIVORY is able to make qualitative and quantitative use of shrinkage and warpage forecasts for initial mould corrections.

Technical Customer Service
EMS-GRIVORY is present with local technical customer service in all main markets. This makes a very quick reaction time for customer contact possible, and ensures that rapid solutions for customer problems are achieved.

Experienced processing experts accompany component production from initial sampling right up to serial production operations.



Technical Processing Centre
At its headquarters in Switzerland, EMS-GRIVORY has a comprehensive processing centre at its disposal, equipped with injection-moulding and extrusion machines.

This is supplemented by further local centres at locations in Asia and the USA.

The injection-moulding equipment covers all standard processes, but special process technology such as multi-component injection moulding, gas-assisted injection moulding or injection compression moulding is also possible. For extrusion applications, EMS-GRIVORY has at its disposal equipment for tube extrusion and injection blow moulding as well as cast and blown film extrusion.

This equipment can be made available to customers for tests, sampling, prototype manufacture and pilot production. Process engineers also work on development and application of new process methods for EMS polymers in the focus segments.

Grilamid TR

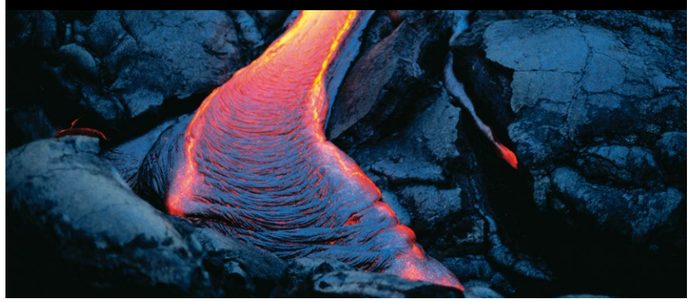


Transparent polyamide for the highest requirements

Grilamid TR® EMS

- High transparency
- Clear, neutral inherent colour
- Excellent cyclic bending strength
- Good resistance to chemicals and stress cracking
- Low moisture absorption
- Low specific weight
- Simple processing
- High heat distortion temperature

Grilon



Premium Polyamide

GRILON® EMS

- High strength and stiffness
- High impact strength
- High heat distortion temperature
- Good abrasion and friction properties
- Resistant to many chemicals
- Good electrical properties
- Economic processing

Grilamid L/S

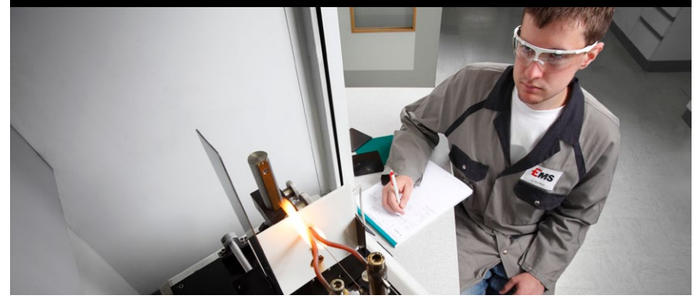


Technical plastics for the highest demands

Grilamid® EMS

- Very low moisture absorption and very good dimensional stability
- Very good resistance to chemicals and weathering
- Very good hydrolysis resistance
- Lowest density of all polyamides
- High impact strength at temperatures as low as – 40 °C
- Problem-free processing, wide processing window

Product characterisation



Our material testing department has modern, comprehensively equipped testing laboratories carrying out the following tests:

- Mechanical and thermal tests
- Flammability tests
- Electrical tests
- Rheological tests
- Resistance to the influence of automotive media and environmental conditions
- Burst pressure, creep, cyclic bending, hot-water circulation tests
- Permeation tests
- Thermo-analyses
- Spectroscopy, chromatography and microscopy



EMS-GRIVORY worldwide
www.emsgrivory.com

EMS-GRIVORY - The leading manufacturer of high-performance polyamides
EMS-GRIVORY is the leading manufacturer of high-performance polyamides and the supplier with the widest range of polyamide materials. Our products are well-known throughout the world under the trademarks Grilamid, Grivory and Grilon.

We offer our customers a comprehensive package of high-capacity and high-quality products along with segment-specific advisory competence in distribution and application development. We maintain our market leadership through continual product and application development in all segments.

EMS-GRIVORY Europe

Switzerland
EMS-CHEMIE AG
Business Unit EMS-GRIVORY Europe
Via Innovativa 1
7013 Domat/Ems
Switzerland
Phone +41 81 632 78 88
Fax +41 81 632 76 65
welcome@emsgrivory.com

Germany
EMS-CHEMIE (Deutschland) Vertriebs GmbH
Warthweg 14
64823 Gross-Umstadt
Deutschland
Phone +49 6078 783 0
Fax +49 6078 783 416
welcome@de.emsgrivory.com

France
EMS-CHEMIE (France) S.A.
855 Avenue Roger Salengro
Boîte postale 16
92370 Chaville
France
Phone +33 1 41 10 06 10
Fax +33 1 48 25 56 07
welcome@fr.emsgrivory.com

Great Britain
EMS-CHEMIE (UK) LTD.
Forest Lodge
Dunston Business Village
Dunston
Stafford ST18 0LQ
Great Britain
Phone +44 1785 283 739
Fax +44 1785 283 722
welcome@uk.emsgrivory.com

Italy
EMS-CHEMIE (Italia) S.r.l.
Via Carloni 56
22100 Como (CO)
Italia
Phone +39 011 0604522
Fax +39 011 0604522
welcome@it.emsgrivory.com

EMS-GRIVORY Asia

China
EMS-CHEMIE (China) Ltd.
227 Songbei Road
Suzhou Industrial Park
Suzhou City 215126
Jiangsu Province
P.R. China
Phone +86 512 8666 8180
Fax +86 512 8666 8210
welcome@cn.emsgrivory.com

EMS-CHEMIE (Suzhou) Ltd.
227 Songbei Road
Suzhou Industrial Park
Suzhou City 215126
Jiangsu Province
P.R. China
Phone +86 512 8666 8181
Fax +86 512 8666 8183
welcome@cn.emsgrivory.com

Taiwan
EMS-CHEMIE (Taiwan) Ltd.
36, Kwang Fu South Road
Hsin Chu Industrial Park
Fu Kou Hsiang
Hsin Chu Hsien 30351
Taiwan, R.O.C.
Phone +886 3 598 5335
Fax +886 3 598 5345
welcome@tw.emsgrivory.com

Korea
EMS-CHEMIE (Korea) Ltd.
#817 Doosan Venturedigm,
415 Heungan Daero,
Dongan-gu, Anyang-si,
Gyeonggi-do, 431-755
Republic of Korea
Phone +82 31 478 3159
Fax +82 31 478 3157
welcome@kr.emsgrivory.com

Japan
EMS-CHEMIE (Japan) Ltd.
EMS Building
2-11-20 Higashi-koujiya
Ota-ku, Tokyo 144-0033
Japan
Phone +81 3 5735 0611
Fax +81 3 5735 0614
welcome@jp.emsgrivory.com

EMS-GRIVORY America

United States of America
EMS-CHEMIE (North America) Inc.
2060 Corporate Way
P.O. Box 1717
Sumter, SC 29151
USA
Phone +1 803 481 61 71
Fax +1 803 481 61 21
welcome@us.emsgrivory.com

EMS-GRIVORY,
a business unit of the EMS Group

EMS-GRIVORY

10.002e 5.2017 1000 EMS-GRIVORY