

Grivory HT

Enhanced Performance at High Temperatures

EMS-GRIVORY



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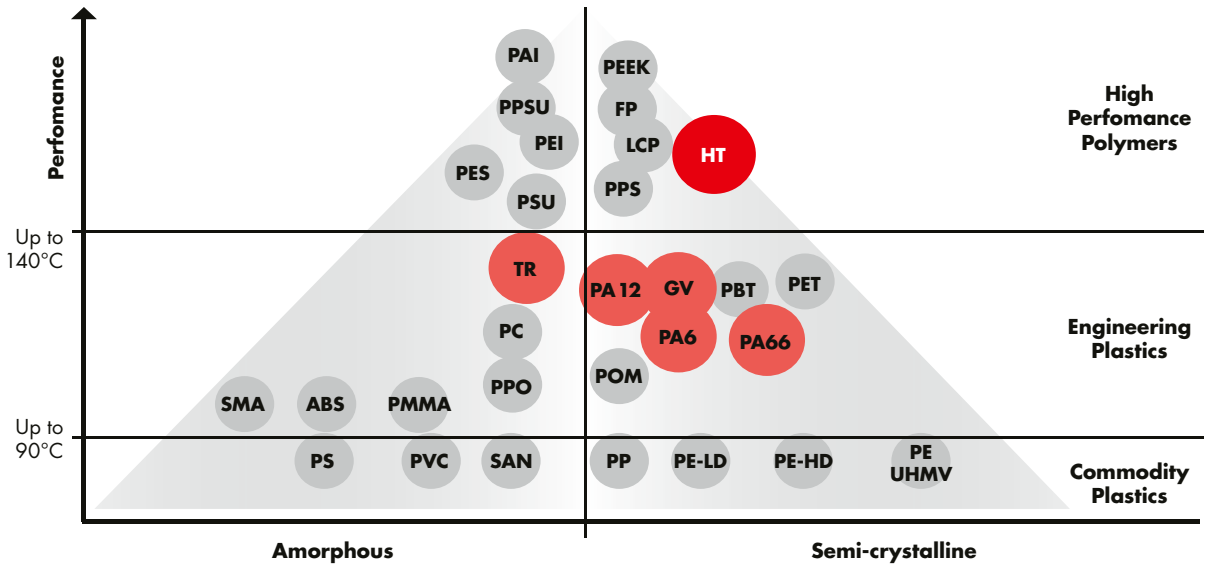
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Introduction

Grivory is the trade name for EMS-GRIVORY's family of semi-crystalline, partially aromatic polyamides. Grivory HT comprises of aromatic, semi-crystalline, high-performance products based on polyphthalamide (PPA) structure. Properties include:

- Excellent stiffness and strength at high operating temperatures
- Good resistance to chemicals and hot water
- Low absoption of moisture or water
- Low moisture effects on mechanical-physical properties
- Good dimensional stability and low warpage
- Good surface quality
- Economical manufacturing



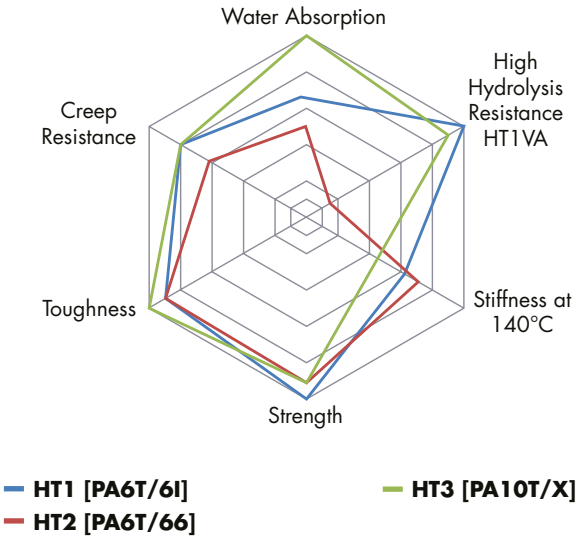
Grivory HT

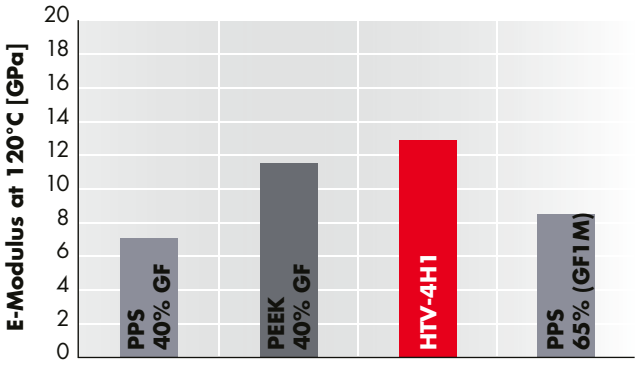
Grivor HT includes several families groups with different base polymers:

Grivory HT1: PA6T/6I
Grivory HT2: PA6T/66
Grivory HT3: PA10T/X

EMS-GRIVORY has designed the Grivory HT families with a high performance profile. The main distinguishing feature of Grivory HT compared to other polyamides is its good performance at high temperatures. This makes it possible to produce injection moulded parts economically with excellent mechanical properties, heat resistance and chemical resistance.
Grivory HT is an ideal construction material as a metal replacement and offers excellent opportunities for cost, and weight reduction and energy savings.

HT Property comparison
[Scale of 1 to 10, where 10 is the highest]





Nomenclature Grivory HT

1. Base Polymer
HT1: PA6T/6I
HT2: PA6T/66
HT3: PA10T/X

3. Modification
A: Aqua (2nd Gen. HY/FWA)
S: Improved surface
Z: Impact modified

5. Head stabilisation
H: Standard
X: Electro compatible

Grivory HT	2	V	S	-	3	H	Blank	Colour xxxx

2. Reinforcement
C: Carbon fibre
M: Mineral
V: Glass fibre
VL: Long glass fibre

4. Reinforcement 1/10 weight %

5. Additional
FWA: drinking water / food approved
HY: Improved Hydrolysis
HYS: Hydrolysis & Demolding improved
LF: Low friction
LW: Laser-writable
V0: Flame retardant



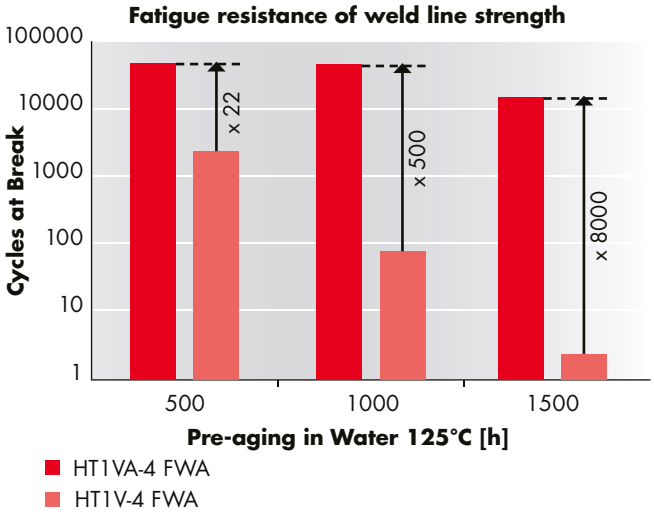
Product overview

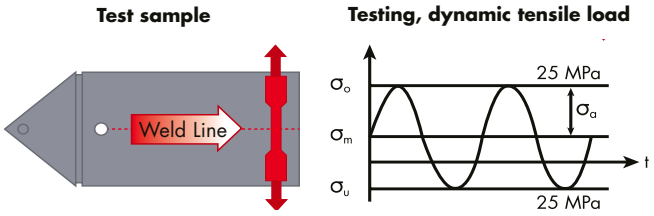
Property	Grade	HT1	HT2	HT3
High Hydrolysis resistance	HT1A-HY	X		
High Hydrolysis resistance/suitable for contact with food and drinking water	HT1A-FWA	X		
Electro compatible stabilization	X	X	X	X
Flame retardant, halogen free (UL 94, V0)	V0		X	X
Long glass fiber reinforced	VL	X		
Carbon-fiber reinforced	C		X	X
Low friction	LF		X	
Renewable raw materials				X

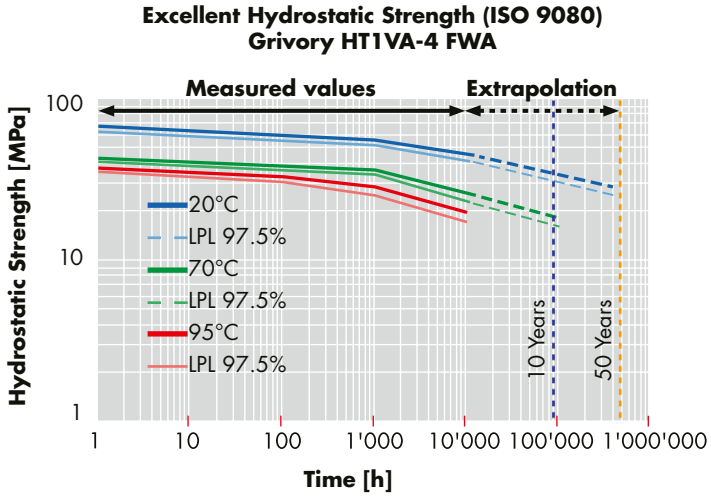
Highlights

Grivory HT1VA High Hydrolysis Resistance

Grivory HT1VA is the new generation of optimized high hydrolysis resistant products. Products offer outstanding fatigue resistance of weld line strength, exceptional long term behavior and excellent hydrostatic strength. Improved demolding increases design freedom by opening the possibility for complex geometries. Processing is similar to Grivory HT1 where the melting temperature is 320°C to 340°C and tool temperature starts at 130°C. The product assortment comprises grades with electro-compatible stabilization and approvals for use in direct contact with food / drinking water.







Grivory HT1VA Core products

Property	Standard	Unit	HT1VA-35 HYS	HT1VA-4 HY	HT1VA-4 FWA	HT XE 10814[1]	HT1VA-5 HY	HT1VA-5 FWA
Degree of reinforcement	ISO 3451	%	35	40	40	40	50	50
E-Modulus	ISO 527	GPa	13.5/13.5	14.5/14.5	14.5/14.5	14.5/14.5	18.0/18.0	18.0/18.0
Tensile Strength at Break	ISO 527	MPa	230/220	250/230	250/230	250/230	275/260	275/260
Charpy Impact +23°C	ISO 179	kJ/m²	50/50	70/70	70/70	70/70	70/70	70/70
Charpy Notched Impact +23°C	ISO 179	kJ/m²	11/11	11/11	11/11	11/11	12/12	12/12
Melting Point	ISO 11357	°C	310/-	325/-	325/-	325/-	325/-	325/-
Heat Deflection HDT/C 8.0 MPa	ISO 75	°C	155/-	200/-	200/-	200/-	200/-	200/-
Density	ISO 1183	g/cm³	1.47/-	1.53/-	1.53/-	1.53/-	1.64/-	1.64/-
Water Absorption, 23°C	ISO 62	%	3.5/-	3.5/-	3.5/-	3.5/-	3.0/-	3.0/-
Moisture Absorption, 23°C/50%	ISO 62	%	2.0	1.5	1.5	1.5	1.3	1.3
Shrinkage Long./Trans.	ISO 294	%	0.2/0.9	0.10/0.55	0.10/0.55	0.10/0.55	0.05/0.45	0.05/0.45
Melt Temperatures	–	%	320 to 330	330 to 340	330 to 340	330 to 340	330 to 340	330 to 340
Tool Temperature	–	°C	≥ 130	≥ 140	≥ 140	≥ 140	≥ 140	≥ 140

[1]GF40, Laser transparent

Grivory HT1VA-35 HYS
Active Cooling Valve

Key properties: High hydrolysis resistance
Excellent demolding perfomance





Basic Product Assortment

HT1

Grades	Reinforcement	Characteristics
HTV-3H1 HTV-4H1 HTV-5H1 HTV-6H1	30% glass fiber 40% glass fiber 50% glass fiber 60% glass fiber	Exhibiting well-balanced mechanical, chemical, and thermal perfo-mance. Usage for functional parts in contact with chemicals at high applications temperatures.
HTV-4X1 HTV-5X1 HTV-6X1	40% glass fiber 50% glass fiber 60% glass fiber	Electro-compatible stabilisation. For application requiring resistance to high electrical voltage, in humid and hot environ-ments.
HT XE 12301 HT XE 12303 HT XE 12304	40% glass fiber 50% glass fiber 60% glass fiber	For higher CTI values, electro-compatible stabilization.
HT XE 16125	50% Long glass fibre	High stiffness, high creep resistance.

HT2

Grades	Reinforcement	Characteristics
HT2V-3H HT2V-4H HT2V-5H HT2V-6H	30% glass fiber 40% glass fiber 50% glass fiber 60% glass fiber	General purpose, with well-balanced mechanical and thermal properties. Suitable for water-cooled moulds.
HT2V-3X V0 HT2V-4X V0 HT2V-5X V0	30% glass fiber 40% glass fiber 50% glass fiber	Flame retardant, halogen-free, UL 94 V0.
HT2V-3H LF	30% glass fiber	Low friction, exhibiting im-proved tribological properties.
HT2C-3X	30% carbon fiber	Electrically conductive, unbeat-able strength/ density ratio.
HT2C-3X LF	30% glass fiber	Electrically conductive, unbeat-able strength/ density ratio, low friction, exhibiting improved tribologi-cal properties.

HT3: PPA partially based on renewable raw material

Grades	Reinforcement	Characteristics
HT3Z HT3Z LF BLACK 9564	0	Low friction, exhibiting im-proved tribological properties.
XE 4063 BLACK 9238	GF30	General purpose, high dimensional stability.
XE 4095	GF50	High flow
XE 4101 BLACK 9225	GF40	Drinking water and food approved. [1]
XE 4027	GF30	Flame retardant UL 94 V0

[1] NSF 61 82°C; ACS 23°C; KTW 23°C; W270/ DIN EN 16421 Food contact: EU 10/2011; USA FDA Food Contact Notification 1170; JP Notification No. 196 / 2020

Service and Support

EMS-GRIVORY - Your development partner for innovative solutions
EMS-GRIVORY is global leader in the development and production of high-performance polymers. As a development partner, EMS provides support throughout the entire development process, from the initial idea to series production.

Ideas and solutions
Providing solutions and generating ideas, EMS develops innovative, cost-effective and sustainable applications together with the customer.

Individual material adaptations
EMS adapts materials precisely for specific applications and legal requirements, including customer-specific colors and test samples.

Simulation and optimization
Simulations are used to optimize component designs and injection molding processes, thus reducing costs and saving development time.

Environmentally-friendly solutions and sustainability
EMS attaches great importance to environmentally-friendly and sustainable production and provides a wide range of bio-based materials and recyclate. All production sites worldwide are CO_2-neutral.

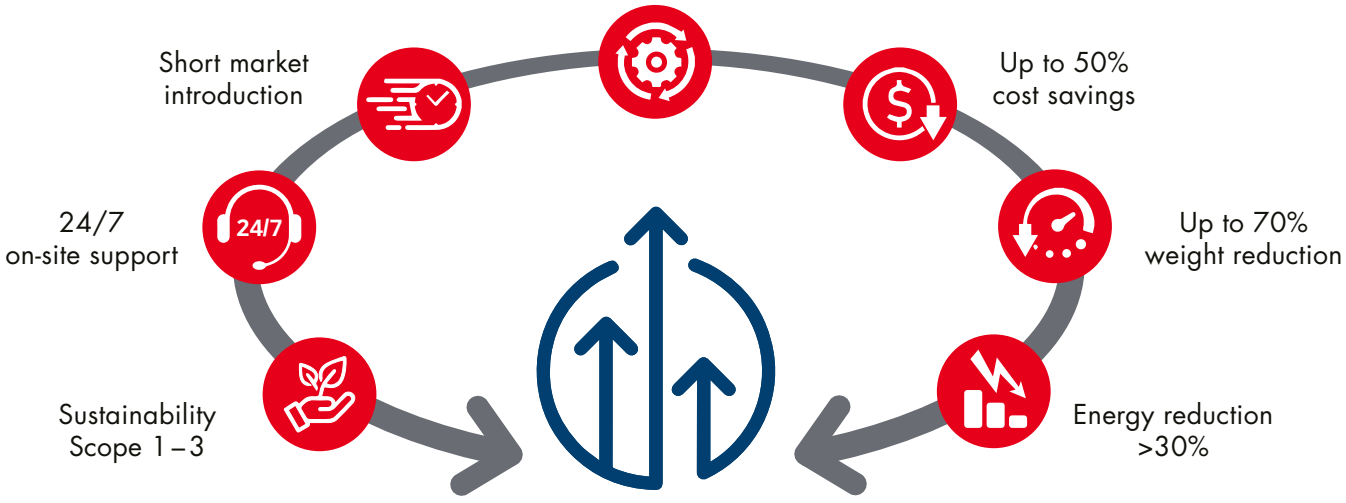
Product characterization and approvals
Modern and extensively equipped test laboratories provide fast, targeted support for customer-specific applications and developments. Materials are approved worldwide for use in contact with food and drinking water, sanitary components and electrical appliances.

Series start-up and on-site support
EMS supports series start-up 24/7 on site for efficient production.

Global partner
With global production sites, on-site technical support and global application development centers, EMS provides uniformly high standards and service quality worldwide.

EMS-GRIVORY
The Best Solution!
Innovative. Fast. Successful.

EMS as development partner



The best solution with EMS



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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.

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