

Grivory GV

**The Economical Alternative to Aluminium,
Magnesium and Zinc Alloy
Die-Cast Components**

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Weight reduction and savings in manufacturing costs – an everpresent challenge

In order to achieve the high standards required for surface quality, multi-stage post-treatment is necessary during the manufacture of articles made of die-cast zinc and aluminium alloys which are to be mounted in a visible position on the finished article.

- Deburring/deflashing
- Sand blasting with subsequent rotation polishing in a drum (tumbling)
- Surface treatment (painting or metal plating)
- Corrosion protection

This finishing treatment is an important cost factor which is in direct confrontation with the increasing pressure from end-users to reduce component costs. The challenge and task facing the EMS-GRIVORY research team was to develop a material with strength values comparable to those of metal die-cast alloys while at the same time producing a surface finish which eliminates the necessity of further treatment.

EMS-GRIVORY, the experts for high value plastic materials

The innovation and experience of EMS-GRIVORY's employees brought about the development of Grivory, a semi-aromatic thermoplastic which forms the matrix for Grivory GV variants with high levels of reinforcement. These materials, which have a high glass-fibre content, have proven to be particularly suitable as an alternative to metal alloys for die-cast articles.

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Grivory GV - The material

Grivory GV is the name given to a group of thermoplastic materials, reinforced with glass fibres, for injection moulding. Its most significant feature is the minimal change in property values which can be noted between the freshly injected (dry) and conditioned states. The high level of reinforcement of the matrix, i.e. up to 60 % glass fibres, makes it possible to reach the strength levels of commercially available die-cast alloy materials. Despite the high level of reinforcement the surface finish possible with Grivory GV is significantly better than that of other reinforced polyamides.

Grivory GV - A significant savings potential

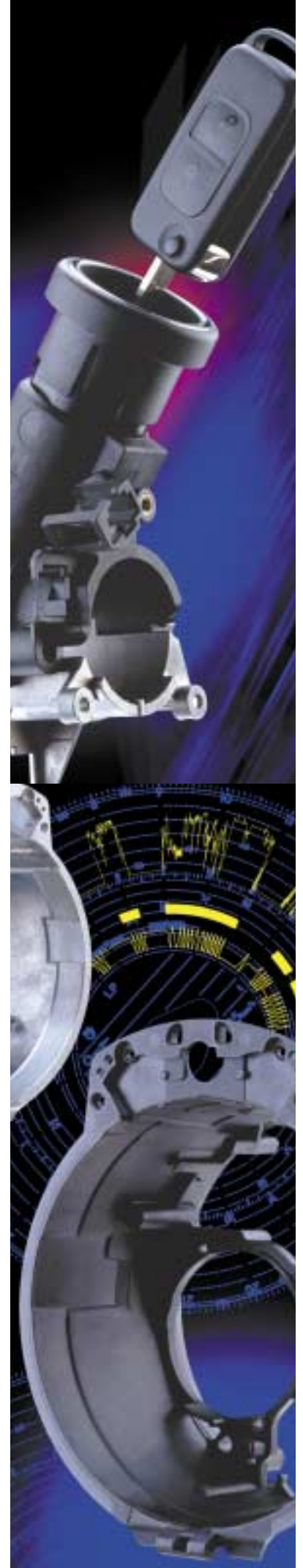
Using Grivory GV the mould life expectancy can be up to two or even four times that of aluminium and magnesium die-cast metal alloys without modification of the tool construction.

The simpler production procedures reduce or prevent formation of flashing and thus avoid the expensive post-treatment necessary for its removal.

A practical test on your own equipment will confirm that as parts made of Grivory GV do not require post-treatment, the cost of these articles can be considerably reduced, i.e. by between 20 and 50 %.

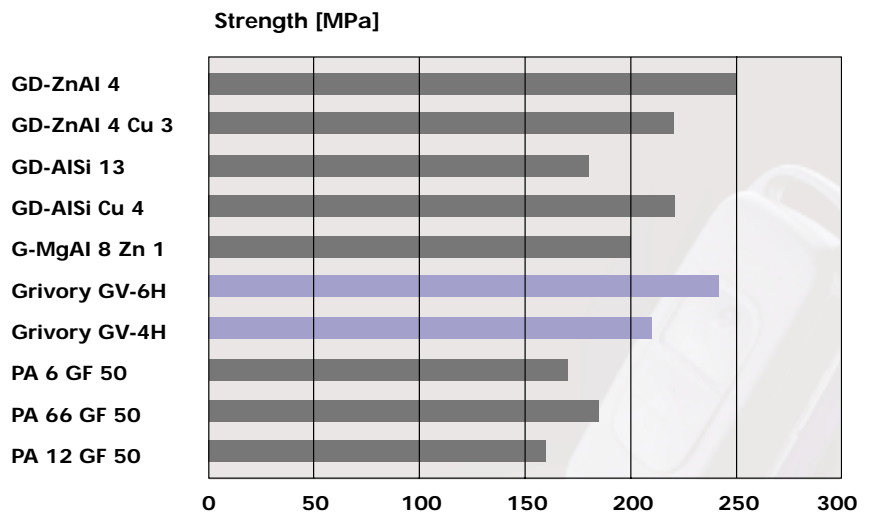
The product assortment of Grivory GV

- **Grivory GV-2H**
20 % glass fibres
- **Grivory GVN-35H**
35 % glass fibres with increased notched impact strength
- **Grivory GV-4H**
40% glass fibres
- **Grivory GM-4H**
40% mineral with isotropic shrinkage behaviour
- **Grivory GV-5H**
50 % glass fibres with good strength properties and a higher modulus of elasticity
- **Grivory GV-6H**
60 % glass fibres with modulus of elasticity values of 20'000 MPa.
- **Grivory GV-5H und GV-6H**
are particularly suitable for the substitution of zinc, magnesium and aluminium die-cast alloys



Strength comparison metal / plastic

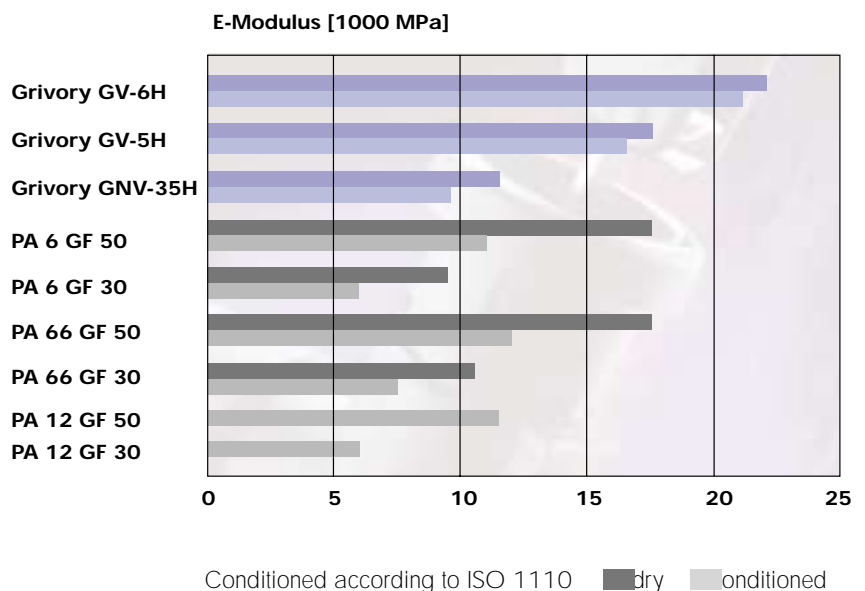
Results of a strength comparison in a conditioned state show that Grivory GV is comparable to commercially available die-casting alloys.



Plastic in a conditioned state according to ISO 1110, metals according to DIN 1743, 1725, 1729, 9715

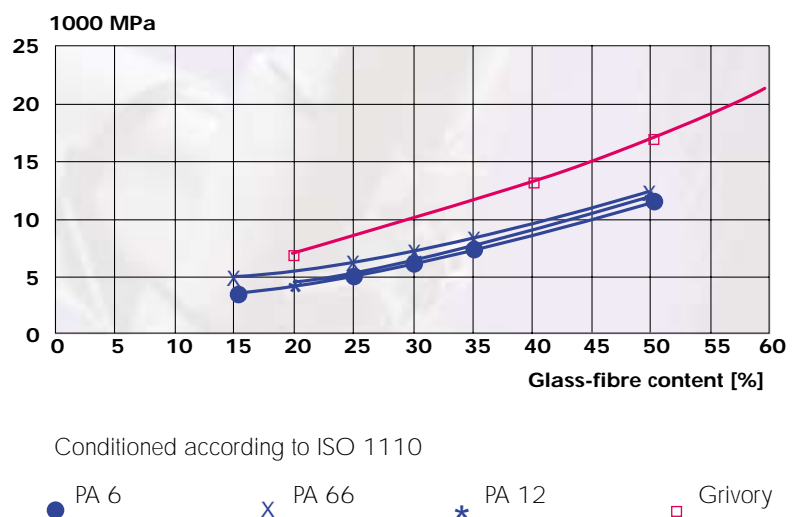
Modulus of elasticity dry/conditioned

A minimum reduction in the modulus of elasticity is given for Grivory GV from the dry to the conditioned state.



Modulus of elasticity conditioned

Grivory GV shows significant superiority in respect to PA 6 and PA 66 containing high levels of glass-fibre reinforcement.





What does EMS-GRIVORY have to offer as a development partner?

EMS-GRIVORY offers support in the choice of the right raw material for every application. But we can offer more! We want to achieve a close cooperation with you – our customer – resulting in solutions to your problems and developing tailor-made products.

Almost as important as the production of the material are the technical steps leading to the end-product. EMS-GRIVORY develops these techniques and processes, then hands them over to the customers for their use.

In the Applications Technology Department state-of-the-art equipment for processing performance polymers is at our disposal. Here injection moulds are optimized, bonding methods are tested, processing techniques are developed and data for practical applications is determined. All necessary steps to achieve the expected results. Our customer services include:

- **Construction advice**
- **FEM calculations**
- **Moldflow analyses**
- **Prototype tooling**
- **Support for processing techniques**
- **Analyses and test procedures/testing**

The recommendations and data given are based on our experience to date, however, no liability can be given with their usage and processing.

Domat/Ems, February 2001



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