



## trimal®-04

Recycling alloy for high pressure die cast components with high ductility and energy absorption capability

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The **trimal®-04** (AlSi10MnMg) alloy is a recycling alloy with reduced iron content, which makes it highly ductile in its as-cast state. In addition, targeted heat treatment gives the material a good energy absorption capability. The alloy is produced at the TRIMET Aluminium SE recycling plants in Gelsenkirchen and Harzgerode using selected scrap.

The outstanding castability and mold-filling behavior of the **trimal®-04** alloy is primarily due to a silicon content of approx. 10% by weight. Due to the reduced iron content, a defined addition of manganese reliably reduces the tendency to stick to the die. The strength and hardness are controlled by the magnesium content. In addition to the above-mentioned measures, a refinement of the eutectic silicon with strontium makes the material more ductile and gives it a good energy absorption capability in its as-cast state.

## Chemical composition

The following table shows a reference analysis for the described material in weight percent. Customer specifications may vary.

| %    | Si   | Fe  | Cu  | Mn  | MG   | NI   |
|------|------|-----|-----|-----|------|------|
| Min. | 9.0  |     |     | 0.4 | 0.15 |      |
| Max. | 11.0 | 0.3 | 0.1 | 0.8 | 0.30 | 0.10 |

| %    | Zn   | Pb   | Ti   | Sr        | o. each | o. total |
|------|------|------|------|-----------|---------|----------|
| Min. |      |      |      | modified* |         |          |
| Max. | 0.10 | 0.10 | 0.15 |           | 0.05    | 0.2      |

\*A permanent refinement with strontium is common practice.

## Mechanical properties

The following mechanical properties were determined on oil pans. The elongation figures are related to the bottom area with a medium wall thickness of 2.5 mm. The hardness was measured in the flange (wall thickness of 6.5 mm). Partial T0 heat treatment in the bottom area is possible to increase the ductility. The figures should be viewed as reference values for this alloy using the high pressure die casting process.

| Temper | Yield Strength<br>Rp0.2, MPa | Tensile Strength<br>Rm, MPa | Elongation<br>A % | Hardness<br>HB |
|--------|------------------------------|-----------------------------|-------------------|----------------|
| F      | > 130                        | > 290                       | > 7               | > 75           |
| T0     | > 85                         | > 190                       | > 10              | > 75           |

## Applications

**trimal®-04** is suitable for die casting parts which have to possess good elongation and energy absorption capabilities in the as-cast state. Possible applications include ductile oil pans, covers, or housing components with similar requirements.



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