

# **Problems with Magnesium**

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# **The magnesium die casting supply base is generally small and poorly capitalized**

- Except for Meridian, not enough tech support for CAE-component & vehicle modeling.**
- Insufficient ability to improve process/quality, optimize mass and reduce cost.**
- Minimal ability to solve problems in fastening and corrosion durability.**
- Marginal R&D**

**Urban Legends**  
**About**  
**Magnesium**

- **Expensive**
- **Insecure supply**
- **Corrodes**
- **Properties poorly understood**
- **Fractures**
- **Not easily worked or joined**
- **Burns**

**Higher  
Cost**

- 1. Mg used to cost \$1.60/lb. But China changed the paradigms of pricing. At \$0.57/lb (FOB China), it was the same price/volume as Al up until last year, when US prices dropped to \$1.05-\$1.10/lb**
- 2. There is a current shortage of FeSi (50% of the cost of Pidgeon process). FeSi prices doubled, Chinese Mg doubled to \$1.15/lb in EU. Chinese canceled old contracts and Mg availability became scarce.**
- 3. In April, ITC approved USMag's antidumping; placed countervailing duties against Chinese & Russian Mg...prices expected to rise to \$1.30**
- 4. Al also increased ~50% in price (\$0.62-0.95/lb)**
- 5. All this in the short term. Prices will ↓ in long term**

# **Mg Components Have More Built-in Costs** **than Al and steel**

- **Coated fasteners for galvanic protection**
- **Coatings for general corrosion protection**
- **Incomplete databases = overdesigned = heavier than they should be = more added costs**
- **Additional repair costs for structural parts vs Al and steel fabs (cannot be straightened)**

# **Additional Manufacturing Cost Vs Al**

- **Melting. Cost of surface protection with protecting gas e.g. SF6/replacements**
- **Double metal losses from dressing and sludge (but with new gases, losses reduced)**
- **Almost impossible to recycling oily/wet turnings**

- **Al foundries recycle their scrap. Most Mg foundries don't; many do unofficially to add profits.**
- **Few on-line tests to qualify inclusions (chlorides, carbides, oxides, stringers) for cast quality.**

- **Upgrade plant fire protection**
- **Teach workers new technology**
- **Upgrade HPDC machines:**
  - **Faster shot speeds**
  - **Higher pressures**
  - **Varied control algorithms**
- **More expensive marketing, since urban legends about Mg abound.**

**But component costs are based on many variables besides metal costs...**

**DESIGN FOR  
LIGHT WEIGHT**

**(reduce amount of metal used)**

**LO COST, QUALITY  
FEEDSTOCK**

**(ingot, recycling)**

**LOWEST COMPONENT  
COST VS COMPETITIVE  
MATERIALS (with  
acceptable function)**

**LOW COST  
MANUFACTURING**

**(quality, efficiency, yield)**

**NEW CONCEPTS TO  
CUSTOMER FAST**

**(prototyping, rapid tooling)**