



# Manufacturing for Fuel Economy

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# ***Introduction***

*T-Mag Pty. Ltd.* is a private company with the following shareholders:



***Alloy Technologies International***

Producer of commercial castings



***Flotek Engineering and Hydraulic Services***

Casting machine construction



***Sage Automation***

Control and Electronics



***Commonwealth Scientific & Industrial Research Organisation (CSIRO)***

T-Mag process inventor and R & D provider



***Inventure Partners***

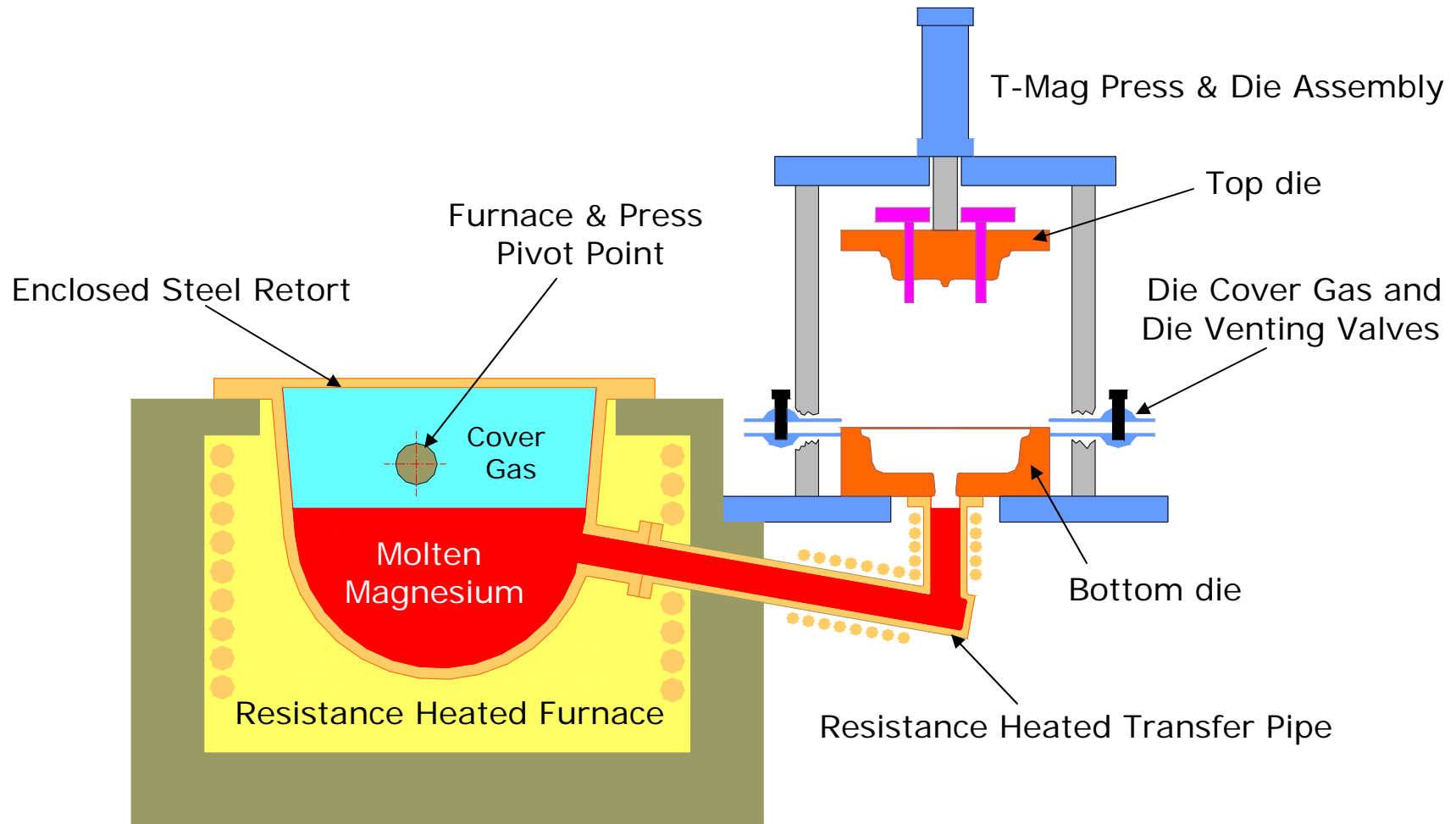
Commercialisation strategies

# *Video*



Insert video link

# T-Mag Casting



# *Environmental Advantages*



T-Mag is a fully enclosed melting and casting system, therefore:

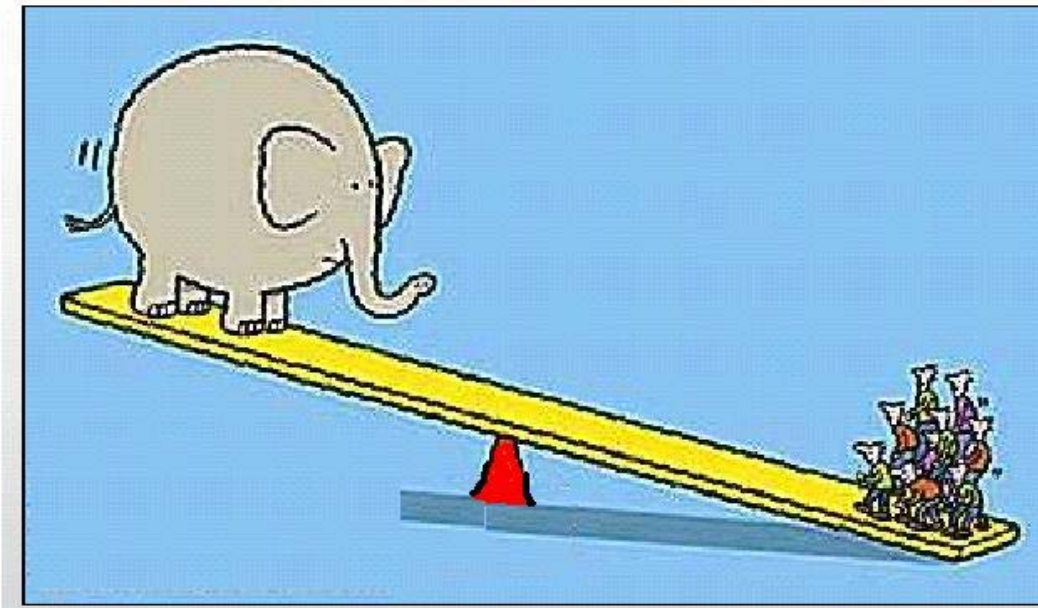
- Flux-less metal preparation
- Minimal cover gas usage
- Small machine footprint

# Magnesium

Magnesium Wheel



Elephant sized fuel saving benefits!!



Aluminium Wheel



# *Magnesium*

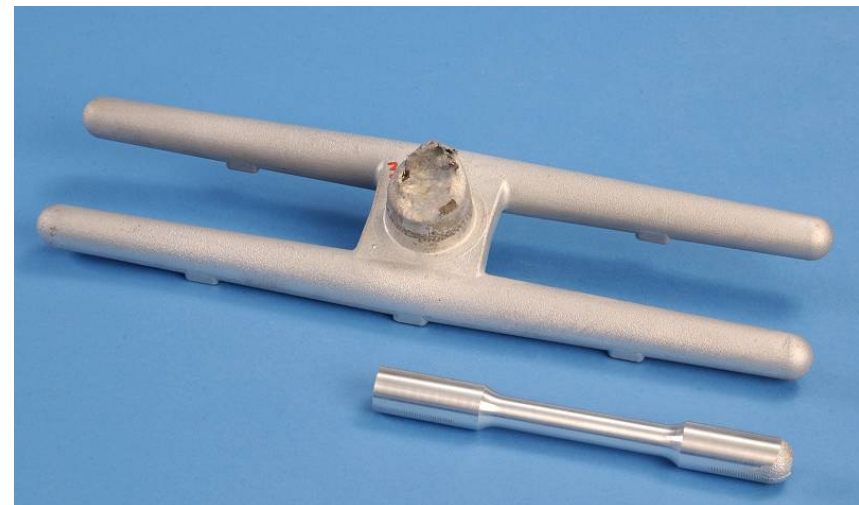
The **attraction** of magnesium (alloys) to customers is the lower density compared to other materials. This means:

- Lighter parts, as the required mechanical properties are met.
- Aluminium alloys are the obvious material to beat.

Magnesium alloys (e.g. AZ91): ~ 1810 kg/m<sup>3</sup>

Aluminium alloys (e.g. 601): ~ 2690 kg/m<sup>3</sup>.

- Mg is 66% the density of Al on a volume basis.



# T-Mag Costs

ATTRIBUTE	MAGNESIUM CASTING PROCESSES				
	SAND CASTING	GRAVITY PM CASTING	<i>T-Mag</i>	LOW PRESSURE PM CASTING	HIGH PRESSURE DIE CASTING
Castable Surface Detail	<b>Low</b>	<b>Medium</b>	Medium	<b>Medium</b>	<b>High</b>
Sand Cores for Hollow Features	<b>Yes</b>	<b>Yes</b>	Yes	<b>Yes</b>	<b>No</b>
Tooling Cost	<b>Low</b>	<b>Medium</b>	Medium	<b>Medium</b>	<b>High</b>
Potential Casting Soundness	<b>High</b>	<b>High</b>	High	<b>High</b>	<b>Low</b>
Heat Treatable Castings	<b>Yes</b>	<b>Yes</b>	Yes	<b>Yes</b>	<b>No</b>
Weldable Castings	<b>Yes</b>	<b>Yes</b>	Yes	<b>Yes</b>	<b>No</b>
Casting Yield %	<b>50% Typical</b>	<b>60% Typical</b>	90% Typical	<b>90% Typical</b>	<b>90% Typical</b>
Plant Cost	<b>Low</b>	<b>Low</b>	Medium	<b>Medium / High</b>	<b>High</b>
Cover Gas Management	<b>Difficult</b>	<b>Difficult</b>	Easy	<b>Difficult</b>	<b>Easy</b>

# *The Future*



T-Mag is a participant in the USCAR/ HIMAC project ...and will produce a permanent-mould lower control arm.

