

## Defence Aluminium – Armour Solutions



## Comparison of aluminium to steel for vehicle door



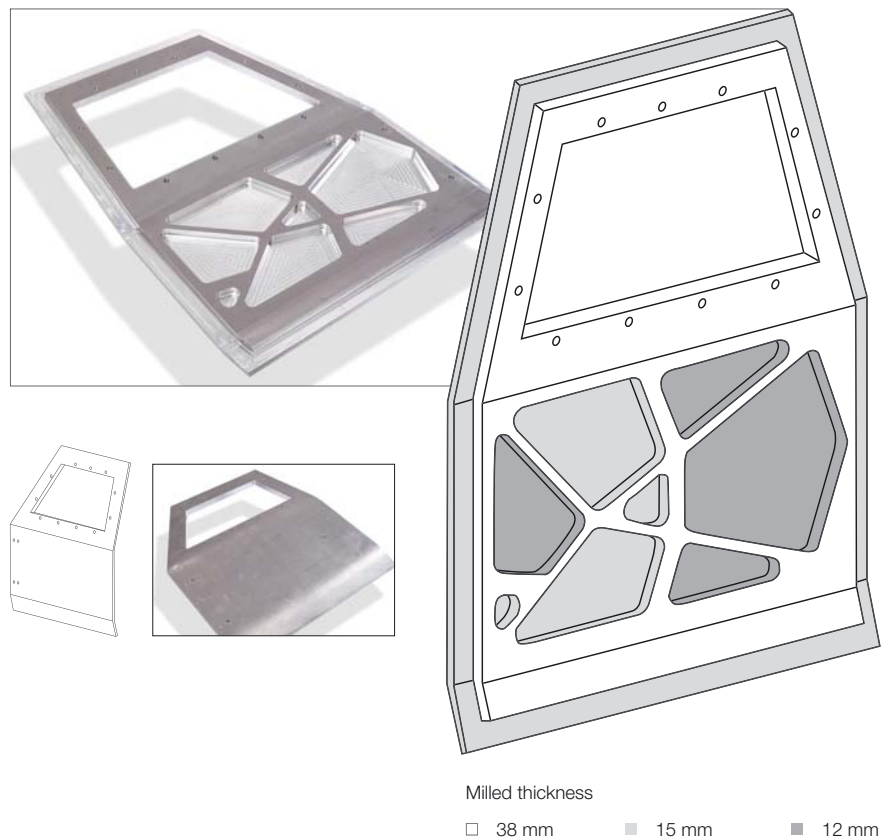
### Optimised aluminium door design

A generic, milled vehicle door from the cost efficient **Alustar®** material AA 5059 H136 with excellent ballistic and mine blast deflection characteristics, optimised to reduce the weight of the door and door closure behaviour.

This type of production (bending and milling of a **Alustar®** plate) allows the component elements, such as brackets, braces and armaments mounting points, to be incorporated into the door design during the construction phase.

#### Advantages when compared to welded steel construction:

- FEM optimised design
- Door manufacturing as a single-piece
- Homogeneous material and mechanical properties across the total plate
- No extensive welding equipment and welding sequences required
- Lower weight compared to steel doors
- No weld seam



### Comparison aluminium door vs. steel door

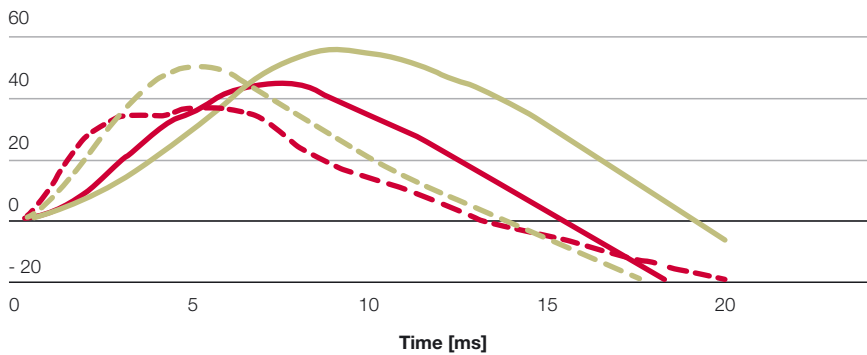
	Aluminium door (bent - milled)	Steel door (welded construction)
Material	<b>Alustar®</b> 5059 H136	Steel
Max. thickness	38 mm	12 mm
Weight	62 kg	89 kg
Density	2.64 g/cm <sup>3</sup>	7.85 g/cm <sup>3</sup>

Δ 27 kg  
Aluminium door is 30 % lighter



## Deflection

Deflection [mm]

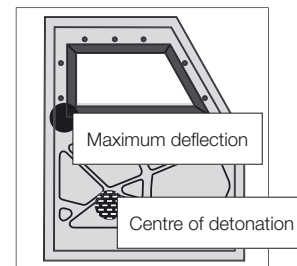


■ Alustar®  
■ Steel

--- Centre of detonation  
— Maximum deflection

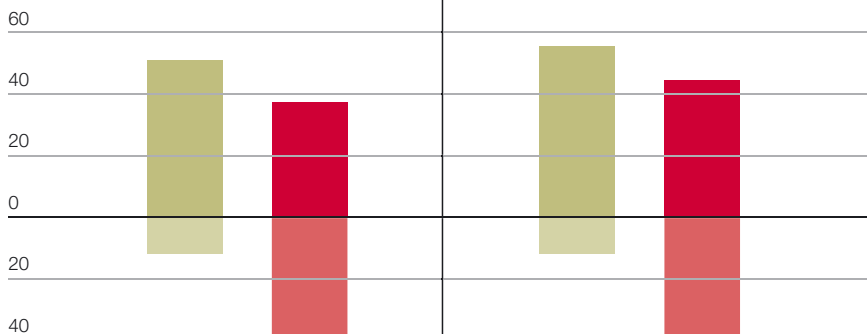
The following graphs show the mine blast performance and weight efficiency of the generic, milled aluminium door compared to a steel door.

The deflection in the centre of detonation of the **Alustar®** solution is remarkable better than that of the steel design.



## Centre of detonation

Deflection [mm]

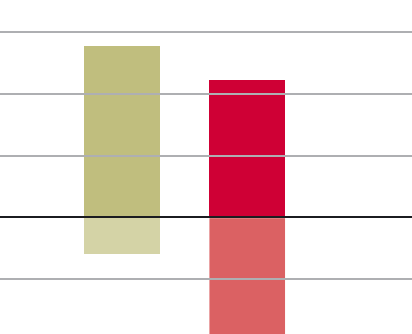


Material thickness [mm]

■ Alustar®  
■ Steel

## Maximum deflection

Deflection [mm]



Material thickness [mm]

Pictures used by courtesy of Krauss - Maffei Wegmann GmbH & Co. KG and BAE Systems.

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**www.aleris.com**


**Aleris**  
**Headquarter Europe & Asia**

Aleris Switzerland GmbH  
Balz Zimmermann-Straße 7  
8058 Zurich Airport · Switzerland  
T +41 (0) 44 828 1400

**Defence**  
**Rolled Product**

Aleris Aluminum Koblenz GmbH  
Carl-Spaeter-Straße 10  
56070 Koblenz · Germany  
T +49 (0) 261 891 7476

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