

Strong lightweight  
[www.havel-mf.de](http://www.havel-mf.de)



Innovative solutions made from  
aluminium foam for the railway  
and infrastructure sectors

Sandwiches | Panels | Foam filled profiles | 3D shaped elements

## Strong lightweight

The Havel metal foam has worked with the series Havel Lite® for the development and production of aluminum foam and aluminum foam sandwiches—highly innovative and lightweight materials.

In cooperation with the Fraunhofer Institute for machine tools and forming technology (IWU), a unique manufacturing technology for industrially producing this new material has been developed.

Innovative lightweight construction solutions can be realised for various sectors using the versatile Havel Lite® range of products.



### Sample applications:

Drive head of a high-speed train (made from formed and welded aluminium foam sandwiches)

*Project study:*  
Fraunhofer Institute for Machine Tools and Forming Technology IWU, BlueS, KUKA Systems GmbH, MFPA Leipzig GmbH, Voith Engineering Services GmbH Road & Rail.

- Basic structure: Self-supporting sandwiches
- Can be formed / welded
- Can be repaired
- Space savings / frames not necessary
- High crash absorption
- 18% weight savings



Individual designs



Can be welded



Various joining methods

## Benefits of aluminium foam



Low in weight

Our 2+1 benefits:



High in mechanical strength

### The product has a number of advantages

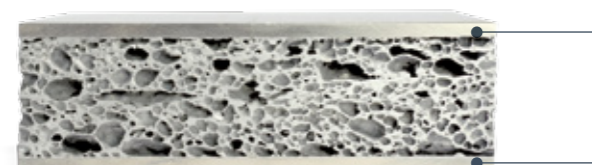
- Non-flammable (DIN EN 45545)
- Weldable
- 100% recyclable
- Excellent vibration-damping behaviour
- Noise-absorbing
- Good electromagnetic shielding
- Further processing is easy to carry out (drilling, sawing, milling, welding)
- Repairable
- Various alloys possible
- Foam-filling possible for components (SAS only)
- Noise protection and insulation
- Energy absorption / good crash behaviour
- Vibration reduction
- Metallic bonding

## Innovative solutions made from aluminium foam for the railway and infrastructure sectors

Aluminium foam has an excellent capacity for absorbing vibrations and impacts, and for this reason it is primarily predestined for use in areas where bending stiffness and crash behaviour are important. Aluminium foam has the potential to become a pioneering material in the rail industry, in particular.

### Sample application: Sandwich used as a floor plate

- Can be welded
- Rigid
- Metallic bonding



0.75 – 6 mm  
Cover sheets with various alloys



### Application areas

- Nose cones for railway vehicles, for example: Drive head (innovative structure made from aluminium foam sandwiches, combined with GRP components)
- Floor plates with included elements (components such as pipes, heating systems etc.)
- Ceiling and wall elements, dividing walls
- Door systems, seats, tables
- Toilet enclosures
- Decorative elements
- Interior fittings
- Access ramps for mobility scooters
- Aluminium foam sandwiches in bogies (noise reduction)
- Goods wagons

## Wide range of products

### Havel Lite® sandwiches

The low weight and high mechanical stability facilitate the development of innovative lightweight construction solutions. Pioneering cost-efficient solutions can be created for various sectors by taking advantage of at least one of aluminium foam's other unique advantages.

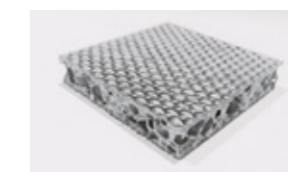
The aluminium foam is combined in composite structures with steel (Havel Lite® SAS) or aluminium (Havel Lite® AAS) in the form of sandwiches. The material joints consist solely of metal, with no adhesive bonding. As a result, these sandwiches can be classified as non-flammable according to DIN EN 45545.



SAS production technology: Direct inclusion of bolts and nuts



Manufacturing option: Curved sandwich



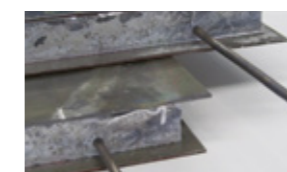
Foam plates with steel mesh



3D shaped element (aluminium foam crash absorbers in the cargo net partition of an Audi Q7)



Further processing: Drilling, welding, milling



Steel-aluminium foam sandwiches with integrated steel tubes



3D shaped element (door sill for a Bugatti)



3D shaped element (with integrated holes for screws)

### Havel Lite® pure foam and 3D shaped elements

Aluminium foam panels with steel mesh inserts have particularly good tensile strength and are less brittle. However, they are even lighter than sandwiches and are also less expensive than carbon, for example. In principle, almost any geometrical shape can be produced using the powder metallurgy process, just as with moulding processes.



Research & development



FEM calculations



Product solutions



Series production



Further processing

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