



## **IMTEC® HR**

High mechanical Resistance fastener  
for composite materials

# **BÖLLHOFF**

## IMTEC® HR – Cold forged fastener

BÖLLHOFF used its expertise in assembly technologies to combine the best of metals and plastics. This resulted in the development of the IMTEC® CO and IMTEC® CF in-moulding technology inserts. These inserts were specifically designed for threaded blind holes and threaded through holes, respectively, and they are particularly well suited for use with thermoset and thermoplastic materials.



The IMTEC® CO thread insert for in-moulding is an asymmetric rolled A2 stainless steel wire (A4 available as an option). The wire is coiled to form a fixed bushing with at least one flange-type extension. During the forming process, the fasteners are also sufficiently magnetised and can be placed on magnetic core pins.



The IMTEC® CF thread inserts with “double flange” are produced from steel, by cold forming. The deformation area on the IMTEC® CF inserts allows for accurate adjustment of the length of thread insert, depending on the dimensions of the mould. When closed, the parts of the mould compress the IMTEC® CF insert and accurately adjust the length of the component ( $L \pm 0.15$  mm).

## IMTEC® HR

To follow the trend towards lighter vehicles, Böllhoff designed the IMTEC® HR insert, a new in-moulding technology fastener for use in structural and semi-structural composite applications. IMTEC® HR means In-Moulding TEChnology High Resistance.

This innovative technology is the high-resistance version of the IMTEC® CF inserts for composite parts. Thanks to their special design, IMTEC® HR inserts provide a mechanical anchor point in composite materials and can replace the heaviest fasteners which are sometimes required to give the appropriate level of mechanical resistance. These inserts are compatible with most fibres and matrix materials used in composites. They are also compatible with thermoset and thermoplastic materials.

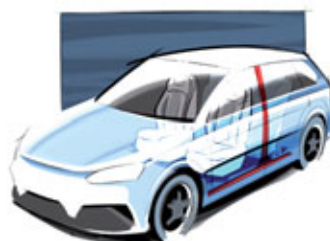
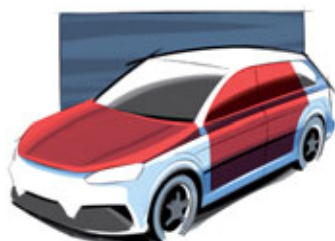


### Your benefits at a glance:

- High mechanical resistance
- Functional integration with only one fastener
- Assembly capacity to absorb energy during crash tests
- Optimized in-moulding processes
- No local reinforcement of the customers part needed

## Suitable for the automotive industry

IMTEC® HR inserts comply with the requirements of the automotive industry, as they are compatible with automated assembly systems (no orientation required for the inserts, possibility of supply by robots). The cold forging process is suitable for large production volumes. This lightweight solution is recommended for assembling semi-structural and structural parts such as opening items (door hinges, doors or tailgates), composite floors and seat structures.



## High mechanical resistance

With its smart design, the IMTEC® HR results in high-performance semi-structural and structural composite parts.

### Geometry and design

High mechanical resistance.  
Absorption of impacts by the insert, thereby allowing the elongation of the composite without fracture

### Eyelets

Mechanical anchoring in composites.



### Cylindrical shape

No required orientation of the insert in the mould.

### Balanced load distribution

Reduction of the risk of cracking or load peaks.

IMTEC® HR inserts do not require any local reinforcement and allow the integration of functions in one single operation (no additional steps such as drilling or installation of fasteners).

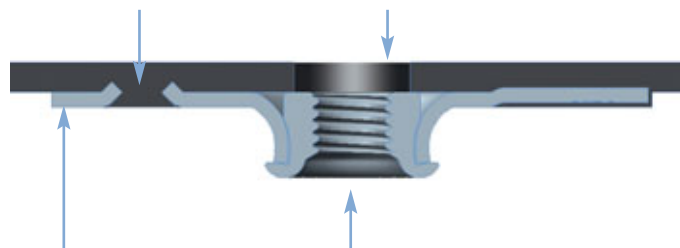
## Sectional view of the moulded-in part

### Eyelets

Securing of the system before screwing in and after assembly.  
Anti-rotation function in the composite material.

### Constant thickness of the composite material

Flush under and/or on the composite material.  
Complies with the general assembly requirements.



### Material of the part and coating

Compatibility with all kinds of fibres, such as carbon fibres, glass fibres, etc.  
Corrosion resistance.

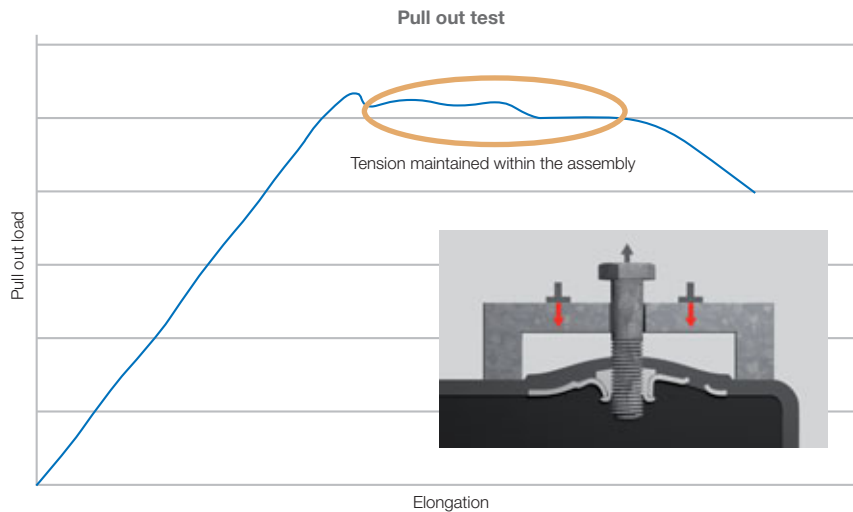
### Fuse area

Adaptation of the insert to the height of the closed mould. This eliminates any potential risks of resin leakage during the manufacturing process.

## IMTEC® HR – High performances

### Energy absorption capacity

IMTEC® HR inserts are strongly anchored in composite materials. In fact, under high mechanical stresses, the insert will follow the deformation of the composite material but will not perforate it, owing to its high mechanical resistance and its energy absorption capacity. The risks of cracking are eliminated thanks to the balanced load distribution allowed by the insert (circular shape).



## IMTEC® HR – Design flexibility

### One fastener, three configurations

Three versions of IMTEC® HR have been developed to provide greater flexibility when designing composite structures.

- Nut version
- Stud version
- Spacer version



### Options and other configurations available

Plastic pins (nut version or stud version) are available for drilling of the composite materials. They move the fibres without cutting them, and seal the internal threads at the same time (to prevent the material from spreading onto the threads).



## IMTEC® HR – Suitable for in-moulding

### Optimised in-moulding process

The insert features a geometry which makes it compatible with a wide range of processes and composite materials.

■ Processes:

- Thermosets: SMC compression, CRTM, Fast RTM, RTM, LCM wet compression
- Thermoplastics: injection, hybrid moulding, forming

■ Composite:

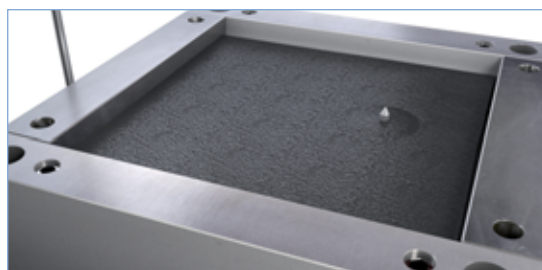
- Fibers: short & long fibers, mat & woven fibers glass & carbon fibers
- Matrix: epoxy, vinylester, polyester, polyamide, polypropylene

IMTEC® HR inserts can be placed in the mould without specific orientation. They can be moulded-in with a pre-assembled plastic pin in order to simplify the process. In such a case, the inserts will be supplied with the plastic pins which will drill the composite and seal the internal threads.

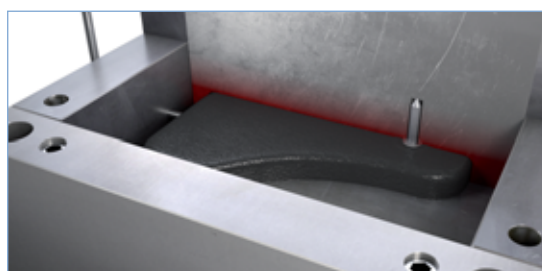
### Example of in-moulding with the RTM process and IMTEC® HR



In its nut version for flush applications, the IMTEC® HR insert, is placed without specific orientation in the mould, the latter being fitted with a pin in its bottom part.



The preimpregnated material is introduced in the mould. The fibres remain continuous.



The mould closes over the system to be assembled, so as to ensure perfect sealing. An epoxy resin is then injected and cured. The composite is hardened, and the insert is then moulded-in.



The assembly is removed from the mould.

Video of  
IMTEC® HR



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Czech Republic  
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Hungary  
India  
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Russia  
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