



## ONE SHOT

A self-punching fastening system for structural components of fibre reinforced plastics

A project of

# BÖLLHOFF

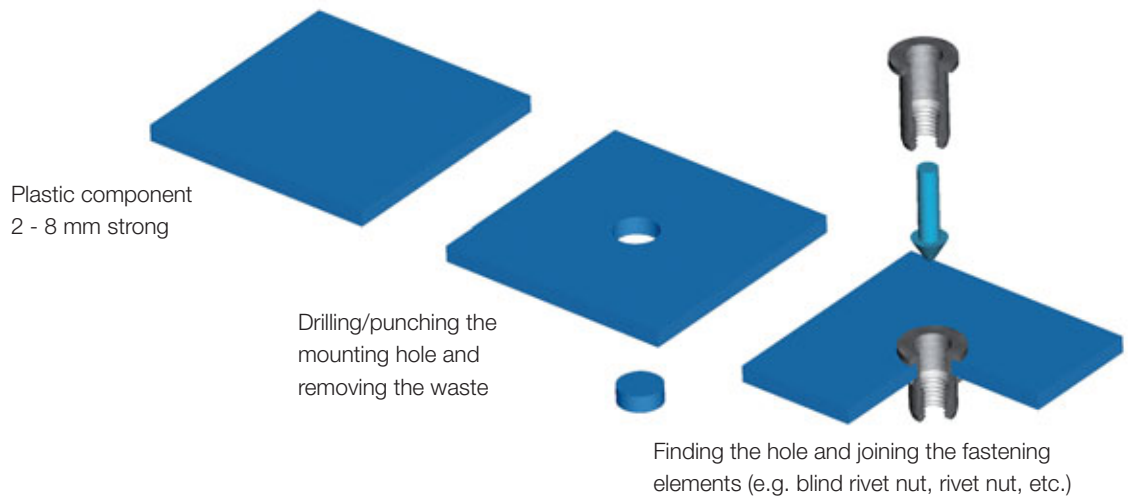


**An efficient know-how connection**

An ever increasing diversity of models and variants, new designs and materials as well as decreasing development times and product cycles lead to new and manifold tasks when connecting the most different materials. To meet these high requirements to the connection technology, fastening elements and processing systems must be perfectly designed and harmonised. Böllhoff, as a specialist for fastening and assembly technology, and FRIMO, as specialist for tooling and machinery, have jointly developed an integrated new process. The advantage for the customers: bundled fastening and processing know-how for faster and economical processes. Rely on it.

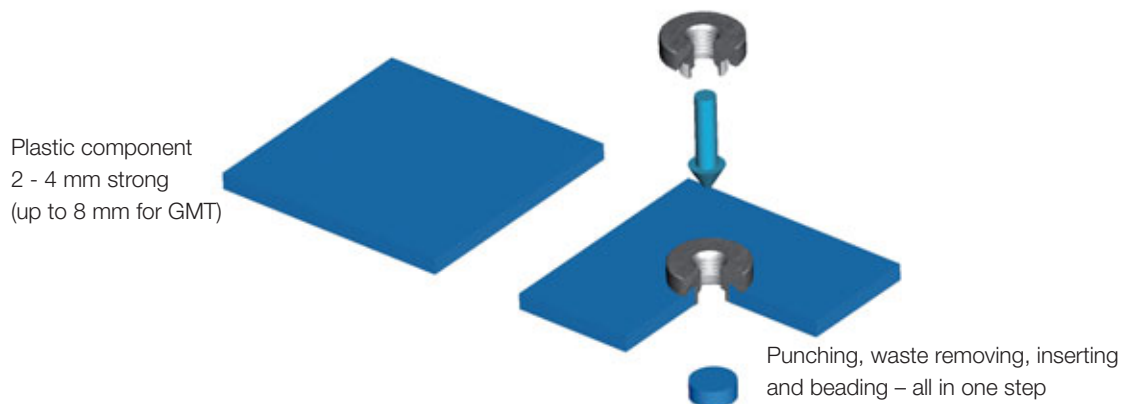
**State-of-the-art: "Two-shot process"**

The state-of-the-art technology for producing hole reinforcements and inserting threaded inserts or similar fastening elements is called "two-shot process". This process consists of two steps: punching including waste removal as a first step and inserting and beading over the fastening element as a second step. The problem is, that the exact position of the punched-out hole must be located again. Thus, the overall process is prolonged and complicated.



**Innovation: ONE SHOT process**

Böllhoff and FRIMO have considerably improved this punching and joining process! The result is called ONE SHOT process, a self-punching fastening system based on an innovative tooling technology in which newly developed fastening elements are utilised. This procedure is suitable for thin-walled structural components of fibre reinforced plastics, such as GMT, CFRP, SMC, PP long fibre.

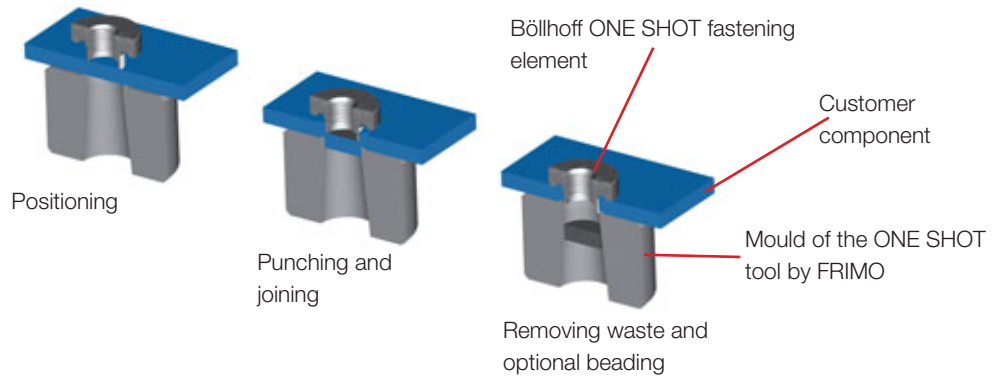


**The ONE SHOT process advantages:**

- Simple and safe production process – only one step
- Locating the hole afterwards is no longer necessary
- Clearance-free fit between fastening element and component
- High level of ejection and anti-rotation safety
- Clean cutting of anisotropic fibre structures
- Minimised excess length on the backside

**Process sequence**

**Schematic illustration of the joining process**



**Fastening technology**

As one of the world's leading companies in the field of connection and mounting technology, Böllhoff contributes know-how gained by experience throughout decades to all kinds of connection technology fields.

Böllhoff offers solutions for metallic materials as well as for plastics in the area of blind rivet technology, thread technology and plastics engineering.

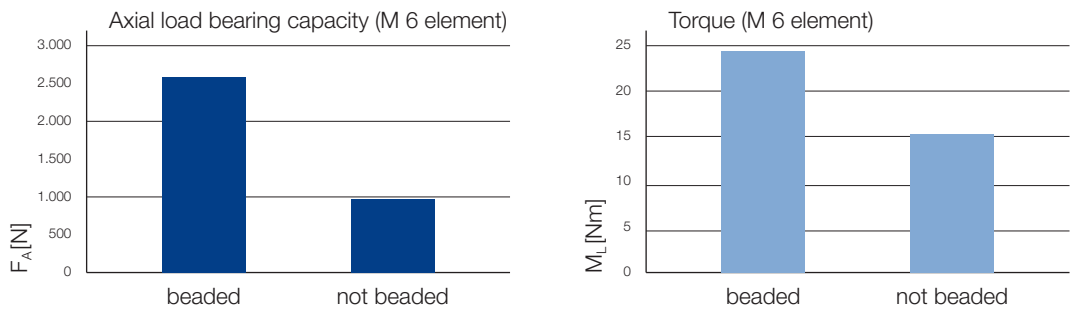
As a longtime partner of the automotive industry, Böllhoff products are known for their reliability. For the ONE SHOT process, developed in cooperation with FRIMO, Böllhoff supplies the customers with fastening elements that are perfectly designed for this process.

**Variations of the ONE SHOT fastening element**



Customer specific requirements can also be realised, e.g. threaded bolts, ball bolts, etc.

**Technical data**



ONE SHOT thread insert with knurl joined into a 7.5 GMT (30 % GF).  
 At room temperature, the axial load bearing capacity contrary to the setting direction  $F_A$  [N] and the torque  $M_L$  [Nm] depending on a bead have been measured.

**Tooling and machinery**

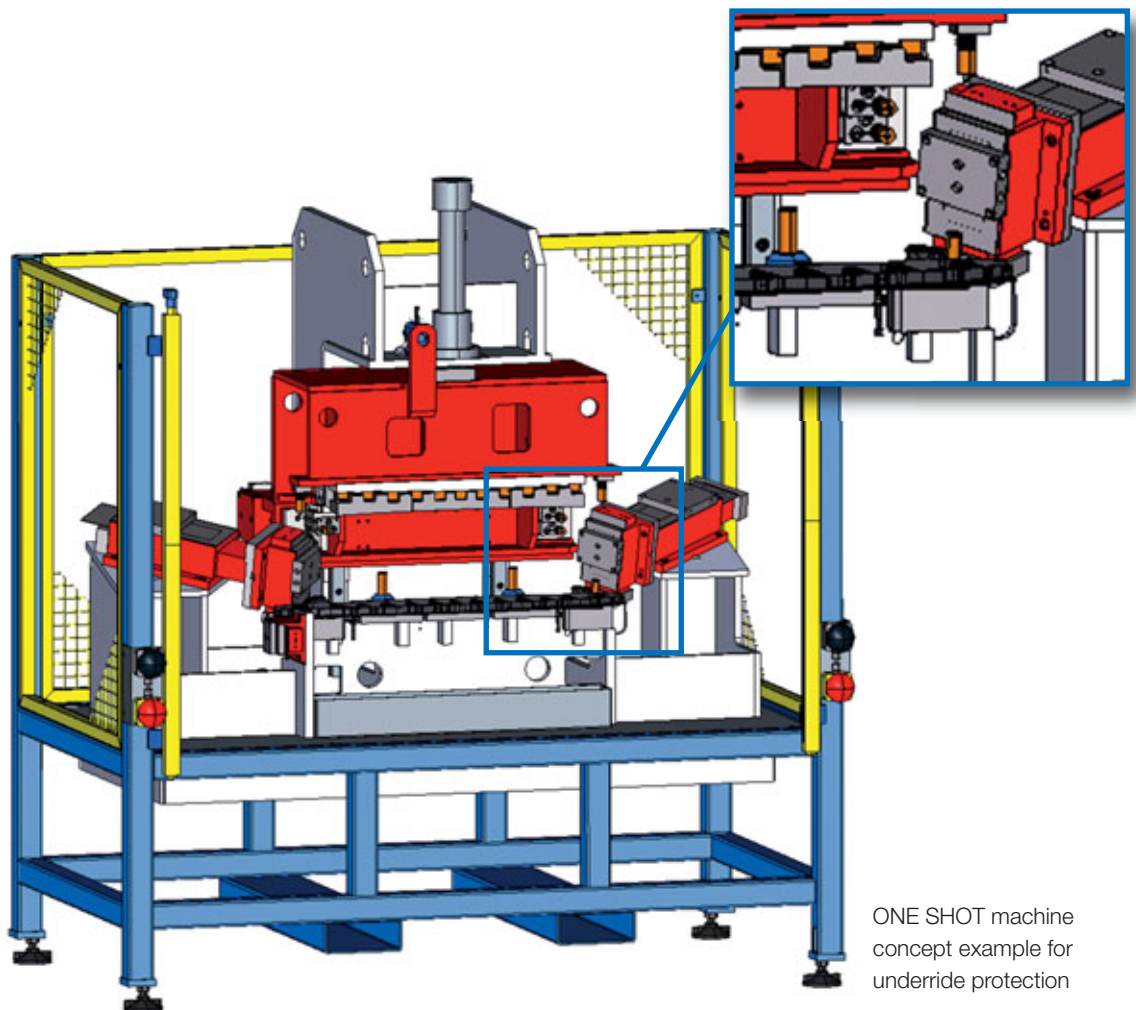
FRIMO is one of the world's leading providers of system solutions for the production of high-quality plastic components and supplies its customers with project specific tooling and machinery for punching and other technologies. These are e.g. flexible trimming, PU processing, thermoforming, laminating, edgelifolding, and joining. Applications for the automotive industry are the main focus. For the ONE SHOT process FRIMO supplies its customers with perfectly designed tools and machinery.



**The FRIMO ONE SHOT tooling technology advantages:**

- Suitable for large series production due to high process-reliability
- Standardised tool modules, individually configurable
- Development of customer specific tools for processing individual or several ONE SHOT fastening elements
- ONE SHOT tool modules can also be integrated in other production systems, such as punching, welding and assembly machines
- Automated or manual feed of fastening elements
- Automatic waste removal

ONE SHOT tool module (example)



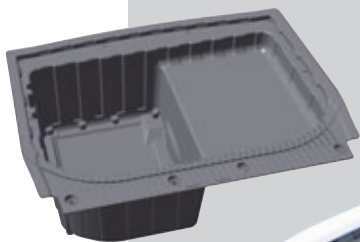
ONE SHOT machine concept example for underride protection

*Application examples from the automotive industry*

Underride protection



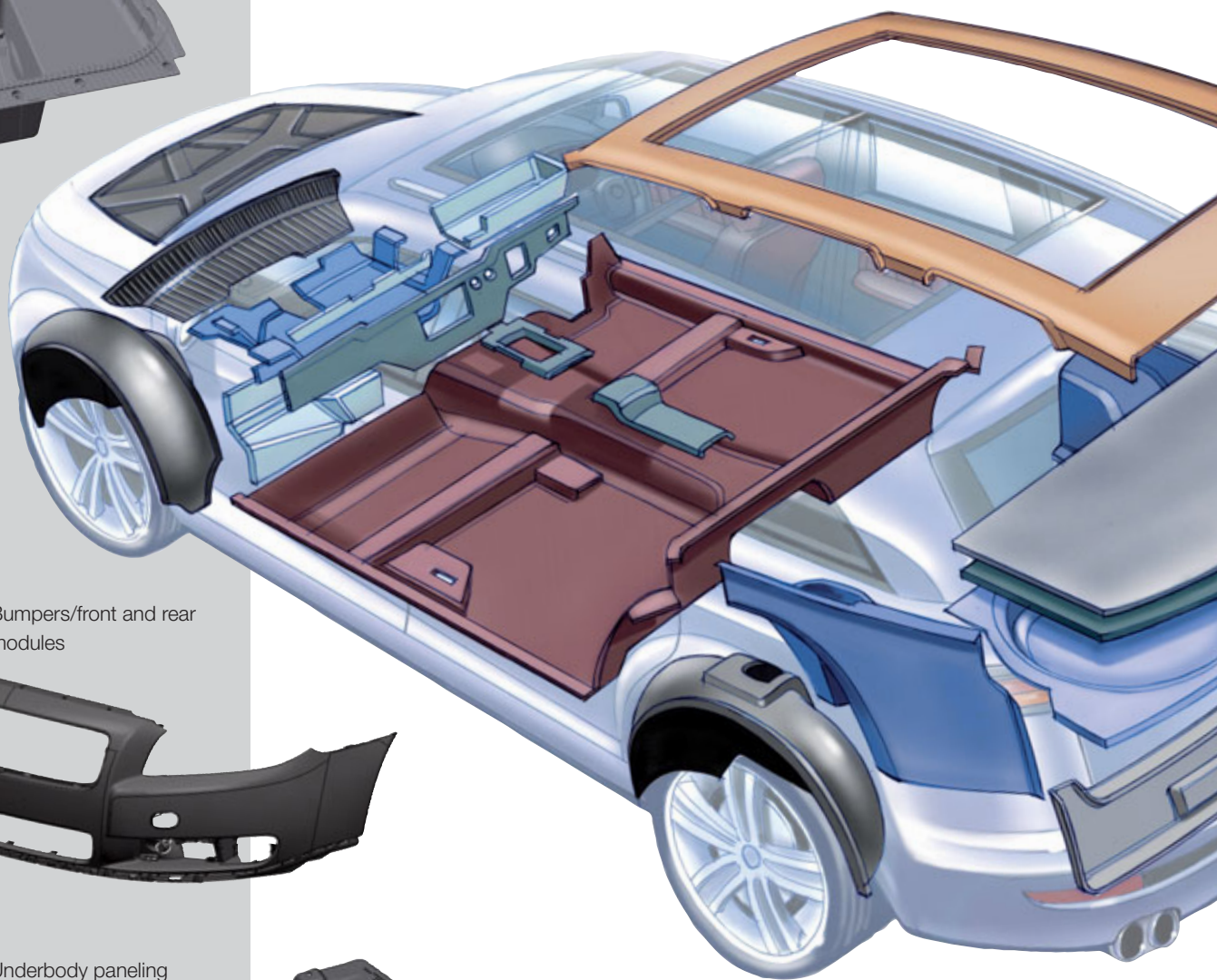
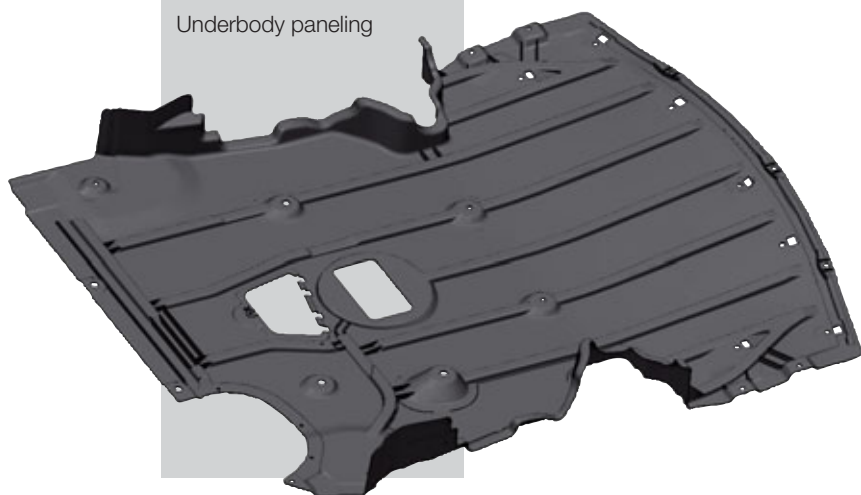
Multifunctional trays



Bumpers/front and rear modules



Underbody paneling





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