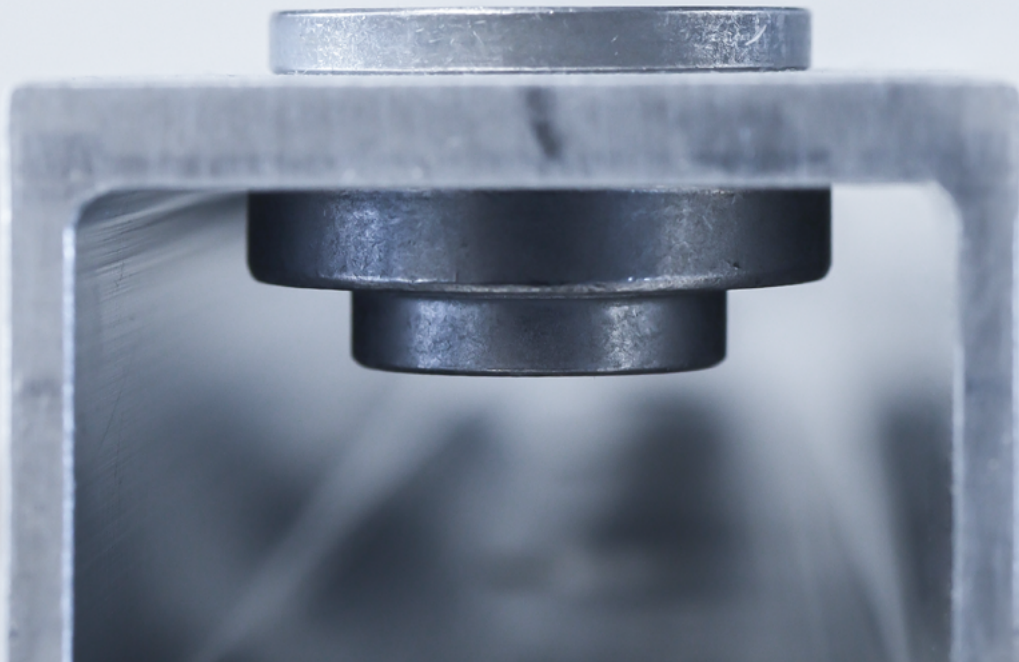


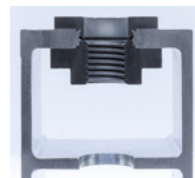


# Spin-Pull Process

- ▶ For one-sided accessible assembly positions
- ▶ Ultra-high-strength structural connection



- ▶ Patented process for installation in closed-shape profiles without opening
- ▶ Two work steps are combined into a single-step assembly
- ▶ High torque, high pull through and push out forces
- ▶ Custom dimensions of clinch nut and spacer according to requirements



## Comparison: Blind Rivet Nut vs. Self-Clinching Nut

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### State of the art

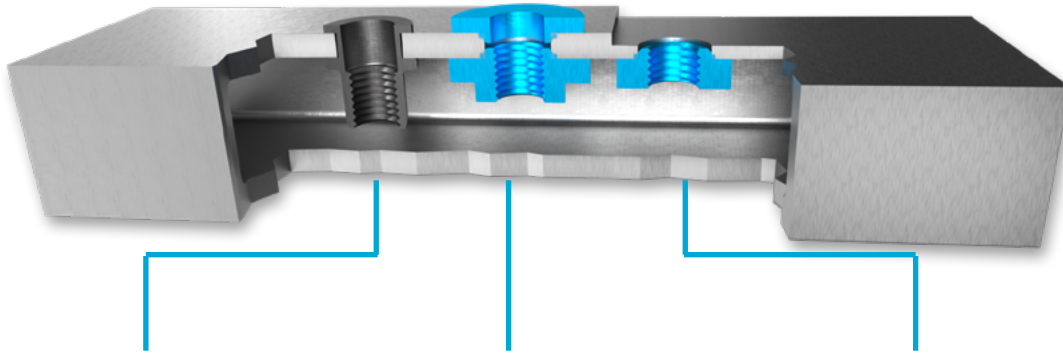
- ▶ In closed profiles with accessibility from one side, the use of blind rivet nuts appears as a common solution. However, blind rivet nuts with the highest property class do not necessarily meet the expected strength requirements for the subsequent screw joint.

Regardless of the tightening torque, the joint only holds on the blind rivet bulge, as the additional metal sheet is screwed against the blind rivet nut head. Thus, there is no preload between the metal sheets. The blind rivet bulge has a small diameter and is not very thick. With lever loads from the side or axial loads, the blind rivet nut reaches its limits quite fast.

The weakness of the blind rivet nut joint is the formed bulge. If the joint is highly stressed, metal sheet deformation, rivet collar deformation, tear-out of the rivet collar or pulling through the metal sheet may occur.

### Innovative Spin-Pull Process

- ▶ The spin-pull process enables automated assembly of clinch nuts and rivet nuts in one-sided joining positions, such as closed profiles. The diameter and height of the clinch nut and rivet nut is significantly larger than the formed bulge of a blind rivet nut. Hence, this fastener type handles much higher forces from any load direction. Thus, for applications with high side loads (90-degree angle to the screw axis), we have suitable solutions that are used in series production.
- ▶ With a clinch nut or rivet nut, a regular preload builds up between connected metal sheets at the later screw joint. Also when a spacer is used, there is a regular preload between the connection of the nut, metal sheet, spacer and the additional metal sheet. The built-up preload ensures a highly durable structural connection.
- ▶ The thread of a clinch nut is shorter than one of a blind rivet nut with same property class. This allows the use of a shorter screw, with cost reduction advantages regarding screws and screwing time. Due to the fact that our connection handles a much higher load capacity than the blind rivet nut, less screw joints may be required. Accordingly, here is also an additional potential for cost reduction.



Blind rivet nut

Clinch nut and spacer

Clinch nut without spacer

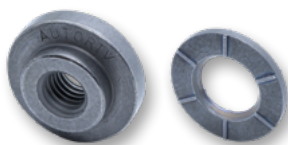
Limited strength and low pull-through  
 -due to lower material hardness of a blind rivet nut  
 -due to less loadable small rivet bulge  
 -because there is no preload between the metal sheets  
 -as there is a risk of setting behavior within the connection

High strength and high pull-through  
 -due to highly tempered nut  
 -due to larger and higher nut dimensions  
 -because regular preload is built up between the metal sheets  
 -because of higher dimensions, no setting behavior within the connection

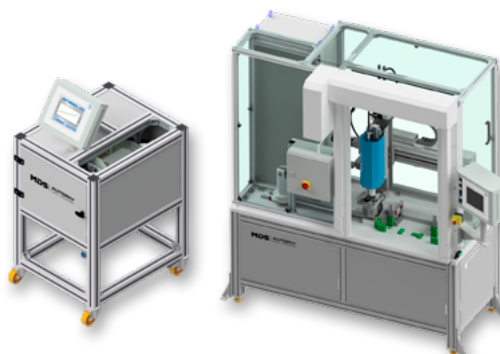
Also used as standalone fastener with the same strength advantages

## Summary

- ▶ In general, the choice of an adequate fastener is made taking requirements into consideration. Therefore, the blind rivet nut is not losing its importance, we keep blind rivet fasteners in our portfolio. In many applications blind rivet nuts are absolutely adequate, for example serving as a screw joint in a plastic holder.
- ▶ Our method is clearly superior when it comes to higher loads and is the only way to achieve a structural connection with one-sided accessibility.
- ▶ This solution creates new possibilities for handling closed profiles without opening them and affecting the stability of the part.



Fasteners



Assembly Systems



**AUTORIV**

## Many Applications

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### Materials

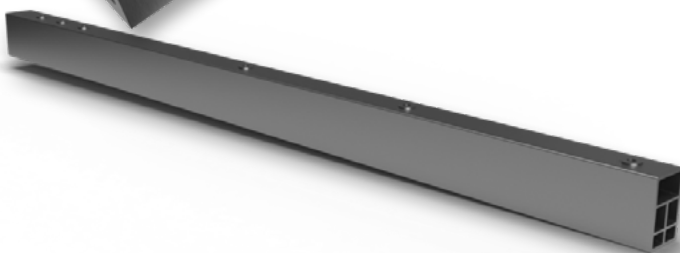
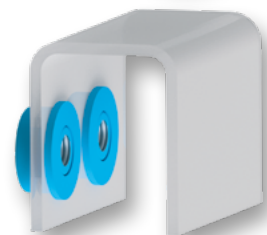
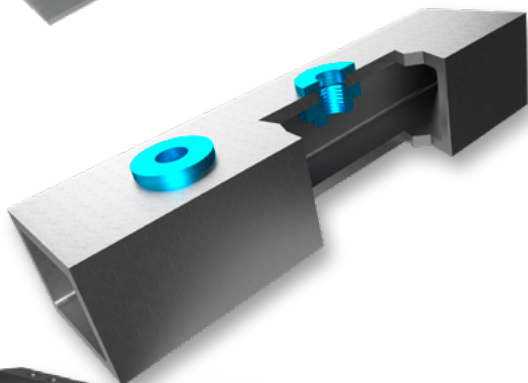
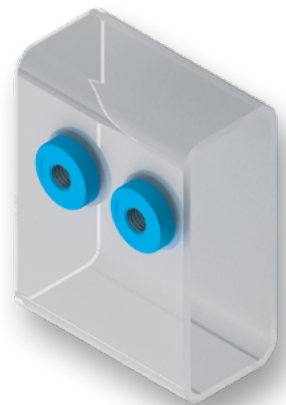
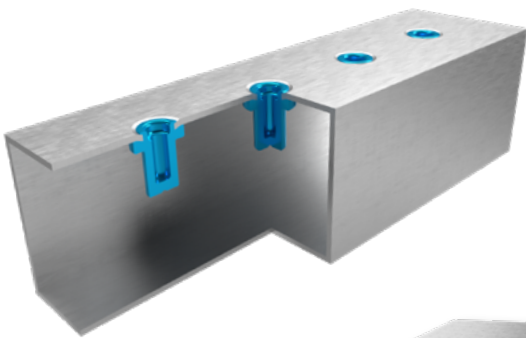
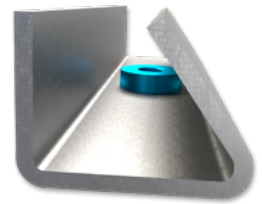
- ▶ Hydroformed parts
- ▶ Aluminum profiles
- ▶ Extruded profiles
- ▶ Carbon fibre materials

### Various parts

- ▶ Crash boxes
- ▶ Front-end modules and carriers
- ▶ Battery trays in electric cars

### Further application possibilities

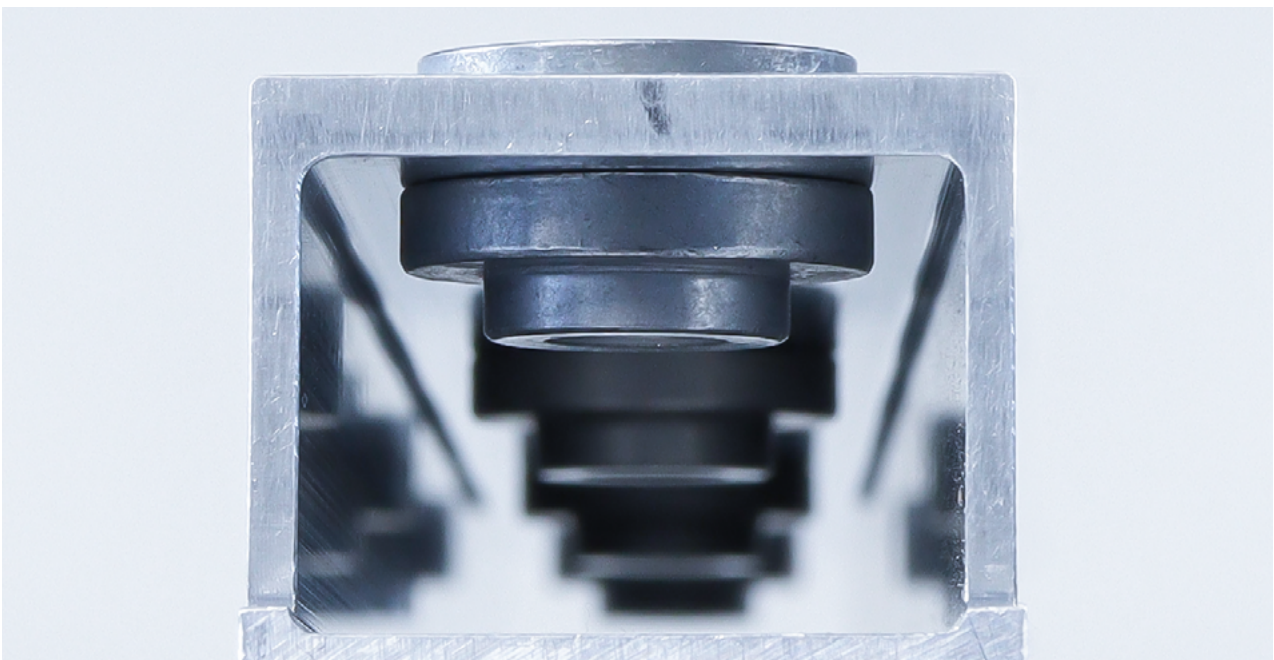
- ▶ Parts with undercut or overlap
- ▶ Limited space or difficult-to-reach positions
- ▶ Chemical isolation of aluminum and steel
- ▶ High-strength and high-load screw joints with one-sided accessibility
- ▶ Water and gas sealing can be realized according to customer requirements



## Advantages of the Nut-Spacer-Combination

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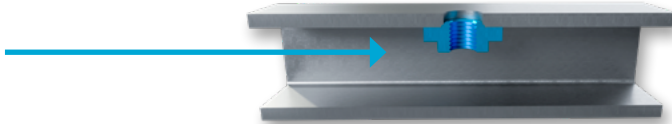
- ▶ Installation in closed-shape extrusion profiles and difficult-to-reach positions
- ▶ No need for opening the profile (the integrity of the part is not affected)
- ▶ One-sided access to assembly position
- ▶ High-strength structural connection contrary to blind rivet nuts
- ▶ Series-proven and patented installation process
- ▶ Two work steps are combined into a single step
- ▶ Cost and time reduction due to a single-step assembly
- ▶ Fully automatic process-safe operation
- ▶ Automatic tolerance compensation (+/-0,5mm)
- ▶ Fast cycle time and high availability
- ▶ High torque, high pull through and push out forces
- ▶ Custom dimensions of clinch nut and spacer according to requirements
- ▶ In combination with a spacer also used as a chemical insulator



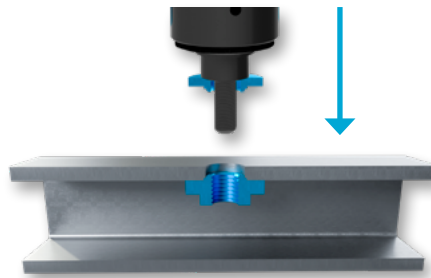
## Patented Installation Process

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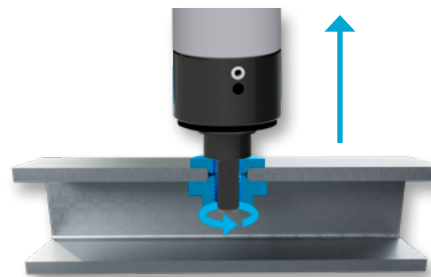
A sliding unit carries the clinch nut to the pilot hole inside the profile. The nut is positioned under the pilot hole.



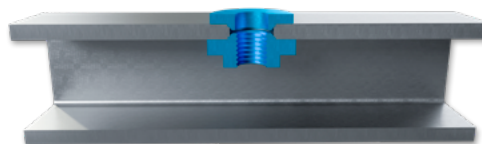
The assembly unit moves into the pilot hole and is spinning into the nut underneath. The unit is carrying the spacer (optional).



Axial pulling force is applied to the joint. The result is a form-fit connection between nut, metal sheet and spacer.



Finally, the pulling mandrel is spinning out.



## AUTORIV A220: Workstation for the Spin-Pull Method

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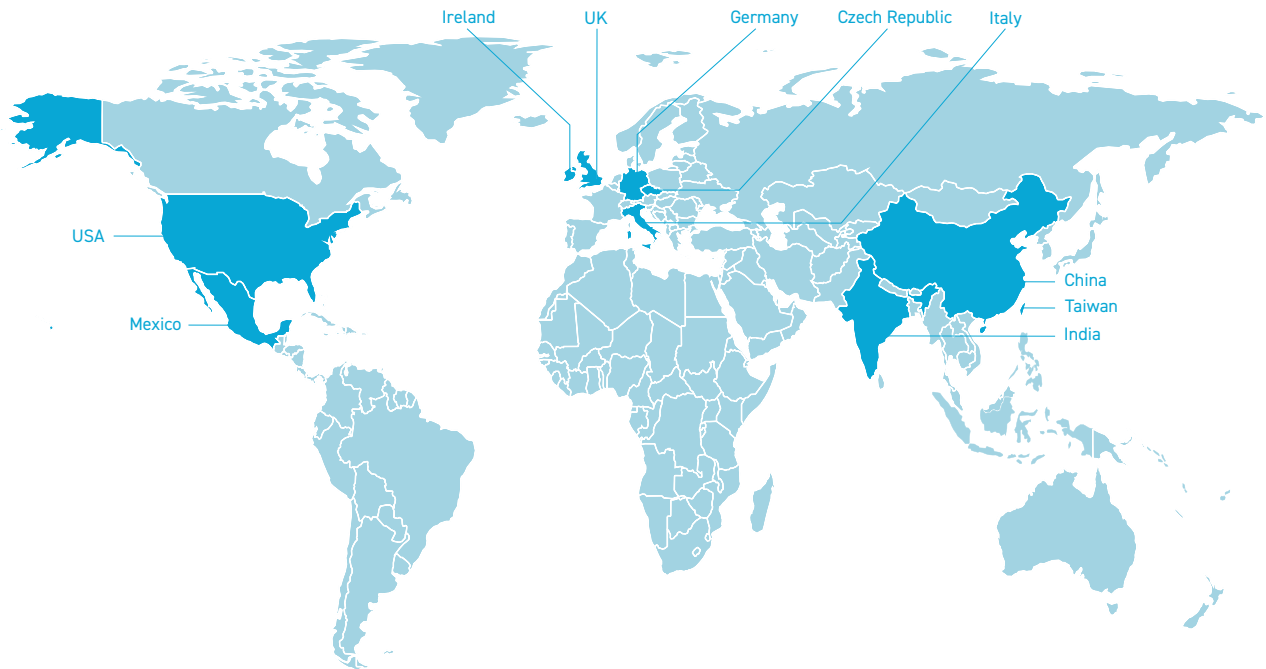
## AUTORIV: About Our Company

MDS Maschinen- und Werkzeugbau GmbH & Co. KG has now become MDS Germany GmbH and joined the PennEngineering® Group.

This acquisition represents a key milestone in our long-term global growth strategy, enabling us to expand our product portfolio and offer an even wider range of tailored solutions and services.

Our customers are from the sheet metal processing industry, mostly from the automotive sector. We supply automotive manufacturers (OEMs), Tier1, smaller tiers and suppliers.

We are also present with our production automation systems in the industries of trucks, white goods, heating, ventilation and air conditioning systems (HVAC), electronics, and agricultural machinery. Our main markets are Europe, North and Central America.



## AUTORIV: A Brand of the MDS Fastening Systems

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