

- 1 + 2 Automated collar installation:  
Lockbolt stump (1), Hi-Lok/Hi-Lite (2).
- 3 C-frame riveting machine of  
Fraunhofer IFAM.

## AUTOMATED RIVET INSTALLATION

### Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM – Adhesive Bonding Technology and Surfaces –

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### Range of services offered

- Process development and optimization
- Qualification programs –  
certified and accredited test laboratory
- Materialography –  
microsection analysis
- FE simulation

### C-frame riveting machine

C-frame throat depth: 1500 mm  
Max. stack thickness: 32 mm  
Clamping force: 50 to 350 daN,  
mechanically locked  
lower tool for pin  
installation  
Max. upset force: 7000 daN  
Max. bending of  
C-frame: < 1 mm

### All-electric operation with continuous data acquisition

- Drilling process: Speed, torque,  
feed range
- Riveting process: Movement and force for  
drilling, inserting, clamping, and  
upset operation
- Torque measurement for installing  
Hi-Lite/Hi-Lok
- X-Y table of size 200 x 300 mm<sup>2</sup>
- Max. travel speed up to 100 mm/s

### Drill spindle

Speed range: Variable from  
500 to 18000 rpm  
Feed range: Variable from  
10 to 5000 mm/min  
Torque: S1 – 4.5 Nm  
S6 – 6.5 Nm from  
300 to 16500 rpm  
Concentricity  
precision: < 5 µm at 105 mm  
distance to drill chuck

Drill chuck: HSK E32  
| Tribos  
| Baby Chuck

Programmable drill spindle –  
relief stroke, pulse drilling

Drill lubrication

- External: Minimal lubricant
- Internal: With air or with lubricant via aerosol generator

In accordance with the following standards

- | EN
- | ASNA
- | DAN
- | PrEN
- | ABS

Suitable for fastener diameters of 4.0 mm and 4.8 mm, other diameters and other processes for fitting mechanical fasteners on request.

### Other equipment

- | X-Y table for rapid, precise, and reproducible specimen positioning.
- | High-speed camera system: Upper and lower process zones can be observed via a high-speed camera.

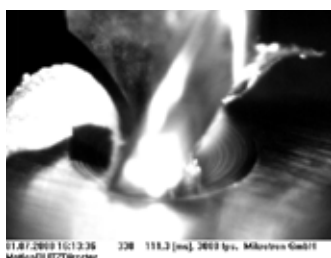
### Automated rivet installation

Fully automatic installing of

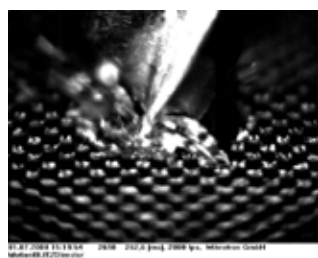
- | Solid rivets
- | Stump type lockbolts
- | Threaded fasteners (Hi-Lite)

Automatic sealant application and rivet/collar feed during the process cycle, adjustable process speed.

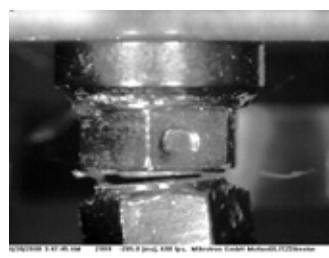
### Example applications of the use of the high-speed camera system



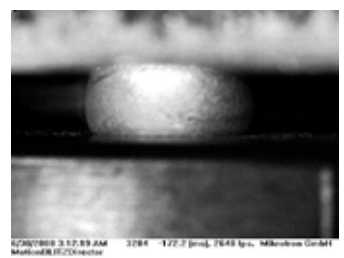
A Chip shape: Drilling Al.



B Chip shape: Drilling CFRP.



C Shearing of Hi-Lite threaded collar.



D Driving head formation for solid rivet.