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FRAUNHOFER INSTITUTE FOR MANUFACTURING TECHNOLOGY AND ADVANCED MATERIALS IFAM

1 *2D and 3D water jet cutting systems with 6000 bar technology.*

2 *3D cutting head with pneumatic high power drilling unit.*

HIGH-PRESSURE ABRASIVE AND PURE WATER-JET CUTTING OF FRP AND OTHER LIGHTWEIGHT

Status quo

New fiber reinforced plastics (FRPs) and other lightweight components present special challenges regarding component quality as well as the productivity and efficiency of processing technologies. Water-jet cutting technology allows these materials and components to be processed with high precision and with assured quality.

Key advantages of water-jet technology

- ➔ It is a cold cutting process and so avoids thermal damage to cut surfaces
- ➔ Avoidance of delamination at cut edges
- ➔ Vibration-free cutting of fragile shell components due to the low cutting force
- ➔ Cutting of very thick materials is possible (e. g. up to 400 mm thickness)
- ➔ Cutting of extremely soft or hard materials as well as combinations of materials with contrasting mechanical properties

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The Automation and Production Technology department of the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM in Stade possesses a **high-pressure water-jet cutting system** with the following features:

- Abrasive and pure water-jet cutting at high pressure (maximum 6000 bar)
- 5-axis cutting head (suitable for high pressure of 6000 bar; +/- 90 ° swivel; 540 ° rotation)
- Rigid, thermally stable machine system, machining accuracy < 0.04 mm
- Process monitoring regarding pump pressure, abrasive grit feed, collision
- Introduction of star-drilled holes optionally possible via a drilling unit
- Machine-integrated positional measurement
- Complete CAD/CAM chain including cutting parameter selection

Range of services offered

- ➔ Design of water-jet cutting processes for new processing tasks
- ➔ Design and evaluation of plants for water-jet cutting
- ➔ Resource-efficient cutting processes, e. g. low usage of abrasive grit
- ➔ Optimization of system components, e. g. water collection systems
- ➔ Comparison of the economics of water-jet technology compared to machining and the use of lasers
- ➔ Quality improvement by monitoring the water-jet cut components