Custom-built dual-head FSW machine

ESAB SuperStir™ gantry dual-head friction stir welding (FSW) machine

Purpose-built, fully instrumented FSW research, development and production machine, featuring both high-speed and high-torque heads.

Features and benefits

- Stiffened gantry design, minimising deflection during welding
- Range of flexible clamping systems available for securing varying workpiece geometries, including cylindrical parts
- Operates in either 'force' or 'position' control modes
- Fully instrumented to record input parameters and resultant forces and temperatures
- Independently operated pressure wheel or sliding shoe ahead of FSW tool
- Large, flexible working envelope (8x5m)

Some applications

- Welding of large and/or complex, non-flat components, such as wing ribs, rolling stock extrusions, EV battery trays, canisters and encapsulated products
- Joining the following materials (generally t = ≤25mm for Al alloys):
  - Aluminium
  - Titanium
  - Copper
  - Magnesium
  - Zinc
  - Polymers

  Development of welding procedures and machine procurement specifications
- Pre- and post-weld machining operations

Technical specification

- Working envelope: 8000 x 5000mm
- Welding head 1 (high torque)
  - Spindle speed: 0–3000RPM
  - Max. traverse loading: 20kN
  - Spindle torque: 340Nm at 100–500RPM/ 100Nm at 2000RPM/50Nm at 3000RPM
  - Max. vertical loading: 100kN
  - Tool holder: ISO BT50
  - Head tilt angle: 2.5° (X axis) and 5° (Y axis)

- Welding head 2 (high speed)
  - Spindle speed: 3000–5000RPM
  - Max. traverse loading: 5kN
  - Spindle torque: 60Nm at 3000RPM/ 30Nm at 5000RPM/50Nm at 1500 RPM
  - Max. vertical load: 60kN
  - Tool holder: ISO BT40
  - Head tilt angle: 2.5° (X axis) and 5° (Y axis)

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