Fibre and textile manufacture

Manufacture of semi-finished products

Moulding

Machine tools/precision tools

Robotics, automation/measurement and testing

Relevant machine groups

Machines for the production and treatment of fibre

- Machines for the production of carbon fibres
- Machines for the production of glass fibres
- Machines for the production of asbestos fibres
- Shaping devices for filaments and tapes
- Cutting convertors, stretch-breaking machines
- Preparatory machines for natural fibres

Accessories

Machines for the production of textile structures

- Machines for the production of yarn
- Machines for the production of nonwovens
- Filament winding machines
- Braiding machines
- Fibre placement lines
- Flat knitting machines
- Warp knitting machines
- Multiaxial warp knitting machines
- Weaving machines
- Accessories

Machines for the production of nonwovens

- Machines for the production of yarn
- Machines for the production of staple fibres
- Laminating machines
- Accessories

Product chain for the manufacture of fibre-reinforced thermosetting resins involves the production of precursor fibres from polymeric precursors (PPMs). The precursors are converted into filament bundles (spinnable) and directly cut for further processing or else impregnated with the resin as endless fibres in unidirectional, bi-axial and multiaxial structures.

The next stage is to process the textile reinforcement structures into semi-finished products. Fibres and spinnables are added to the resin to obtain particular properties.

Thermosetting semi-finished products are processed by hot press moulding or else under pressure at high temperature in an autoclave. The high temperatures create an irreversible cross-linking of the material, which cannot be reversed again.

The good flow behaviour of semi-finished products made from cut fibres also means that highly complex geometries can be achieved. Prepregs on the other hand allow significantly higher fibre contents.

For finishing with high-precision machine tools, a distinction is made between the introduction of functional geometries and fine surface finishing. For functional geometries, methods such as drilling, milling or laser beam and waterjet cutting are used, whereas fine surface finishing is normally done by grinding and polishing.

The machining of fibres composites presents engineering challenges typical of developing stages, where the familiar laws of metallurgy cannot simply be transferred.

Unlike metallic materials, the properties of composites are determined chiefly by the direction of the fibres in the component. This means that fibre composites must be machined equally well in all directions.

If the composite consists of layers with the fibres in different directions or composite layers are combined with layers of metal, the machining process is even more complex.

Sourcing service: www.composite-arena.com

MC and BMC (Bulk Moulding Compound) can be used to produce fibre-reinforced thermosets.

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