



- 1 *Detail of sintered non-woven textile with hollow copper fibers.*
- 2 *Flat tube with partly graded copper hollow fiber fabric.*

HOLLOW METAL FIBER FABRICS

Manufacturing, structure and properties

Metal-plated textiles like e. g. non-wovens or woven fabrics can be used for the production of purely metallic hollow fiber structures. A plurality of textiles can be metal coated by means of electroplating. Using specific thermal treatments the textile's polymer can be removed afterwards, leaving a purely metallic textile structure which is characterized by hollow fibers. Such structures, made e. g. from copper, feature very high specific surfaces, high thermal conductivity and can easily be combined with massive components like round and flat tubes or foils. Several sheets of such textiles can be sintered to obtain porous metal blocks. The typically very thin-walled hollow metal fibers (wall thickness in the range of few microns) and the flexibility of the hollow metal fibers facilitate the bonding of the textile sheets among each other and also to other massive components.

Graded structures with strongly anisotropic thermal conductivities can be produced.

Application areas

The Fraunhofer IFAM has developed metal hollow fiber fabrics in cooperation with the company Statex Bremen. The main application fields can be seen in thermal components for which a high porosity, a high surface-to-volume ratio and a good thermal conductivity is required. Typical examples are like evaporators or supports for thermally active materials adsorbents (e. g. zeolites or metal-organic frameworks MOF) or phase-changing materials PCM. Further potential applications can be found in chemical installations, e. g. for the evaporation or condensation of specific chemicals.

Fraunhofer IFAM offers to conduct feasibility studies, material development, customized development of (graded) structures and preparation of prototypes.

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