



News Release

Microstructured apparatus for the process industry

Novel, high-efficiency heat exchanger and reactor

Significantly greater heat transfer reduces apparatus and energy costs. Gentler on products

Leverkusen, September 4, 2008 - Ehrfeld Mikrotechnik BTS GmbH (EMB), a wholly-owned subsidiary of Bayer Technology Services GmbH, has concluded an exclusive world-wide license agreement with Mingatec GmbH for the marketing and manufacture of novel miniaturized heat exchangers and reactors. The heat exchangers based on patented Miprowa[®] technology have a substantially greater heat transfer capacity, are significantly less sensitive to fouling and are easier to clean than conventional apparatus. This field-proven technology supplements the EMB portfolio of microstructured apparatus and modules for laboratory and technical service center facilities, and in particular in the high throughput range of several tons of product per hour for production operations.

Miprowa[®] technology is based on flat, rectangular channels with easily removable, structured layers extending edge-to-edge on the inside. Several such layers are overlaid to form a fine, flat, flow-through matrix, which homogenizes the flow of fluid across the entire channel cross-section and along the channel's full length. It also quickly degrades temperature gradients. The intensive redirection of the product in the flat matrix and at the attempermentation surfaces increases heat transfer performance while simultaneously reducing contact times, which benefits temperature-sensitive products.

A cross-sectional geometry optimized for the process can allow foreign particles to pass without filtering them and thus prevents blockages. The compact design and resultant short attempermentation and residence times help to avoid thermal damage to the product and suppress undesired secondary reactions. The low volume of the product-side apparatus also reduces the plant's hazard potential. Flexible design of the layer geometries also enables the optimization of important process parameters such as pressure loss and

attemperation performance. The heat exchanger can easily be inspected and cleaned by simply withdrawing the layer package from the Miprowa® channels.

The new heat exchanger is available standard in CrNi (stainless steel) or Ni alloys and is extremely well suited for the challenging attemperation of sensitive chemical, pharmaceutical and food industry products.

Miprowa® technology offers users a new process engineering tool for process optimization, in particular for heat transfer and the continuous performance of exothermic reactions. With its good scalability, Miprowa technology is deployed preferably on the microscale in the lab or technical service centers as well as with high throughputs on the production level.

About Bayer Technology Services

Bayer Technology Services GmbH offers fully-integrated solutions along the life cycle of chemical/pharmaceutical plants – from development through engineering and construction to process optimization for existing plants. The Bayer subsidiary employs nearly 2,400 experts worldwide at its headquarters in Leverkusen and other German locations, as well as in regional offices in Baytown, Texas, USA; Antwerp, Belgium; Mexico City, Mexico; Mumbai, India; and Shanghai, People's Republic of China. 2007 sales totaled approximately EUR 400 million.

Additional information about Bayer Technology Services and Ehrfeld Mikrotechnik BTS is available at www.bayertechnology.com and www.ehrfeld.com

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