Customized Filtration Solutions for Metal Processing

www.burkert.com/cut
Various mechanical shaping and machining treatment stages such as cutting, milling, turning, drilling or grinding are used during metal processing as well as downstream part cleaning and surface finishing processes. Adhered abrasive dust and swarf must be sluiced away, oil from the coolant emulsions must be removed and the surfaces must be free of any oxide coatings before another treatment (e.g. painting) can be started. Pickling solutions or washing liquids used for cleaning parts contain chemicals that have been especially matched for use with the alloys that have to be treated and the relevant sub-applications.

The preparation of these processing liquids is an essential cost saving stage with regard to the disposal of chemicals, fresh water and waste water and this also makes a significant contribution to environmental and resource protection during metal processing. Crossflow micro-filtration has proven its worth for this type of application. It removes suspended metal particles and oil droplets from the pickling fluids. The filtrate can be fed back into the process and this will considerably increase the service lives of the treatment baths.

However, the demands placed on the membranes being used with regard to resistance against acids and caustics and the abrasive effects of the metal particles are very high. Our symmetrical polypropylene tubular membranes are distinguished by their perfect resistance to abrasion as well as their high mechanical and chemical stabilities.

* Test modules on request
Recycling of Pickling Acid in a Steel Rolling Mill

The challenge

A huge quantity of pickling acid is accumulated every year in an internationally operating association of steel rolling mills, and it has to be disposed of after being used, which is both time-consuming and cost intensive. In particular, the high disposal costs arise from neutralising and conditioning the acids accordingly as they have to be transported to a clarification plant. Other costs arise from disposing of the sludge that is formed as a result of this process. Typically, depending on the type of treated steels (e.g. alloyed / non-alloyed), hydrochloric or sulphuric acid is used in weight concentrations of 10 - 20% for non-alloyed steels as well mixtures with a low percentage weight of nitric acid. The acid treatment is combined with mechanical cleaning methods (e.g. brushes) for an optimum result, whereby a particularly polluted acid mixture is produced as a „waste product“.

The solution

Microfiltration using T-CUT PP tubular modules here enables efficient filtration of particular pollutants to be realised in a crossflow process, which results in the cleaned acid becoming a valuable working material that can be returned to the system, even if it has to undergo other cleaning stages as necessary. This method ensures that not only are resources and costs saved, but the contaminated load (retentate) is concentrated up to 5-times and the quantity of waste water that has to be disposed of is significantly reduced. The process produces nominal solid content of up to 35 - 40% from the concentration phase, where the operating temperatures are up to 40°C and some of the critical pH values are less than pH 0.

If T-CUT PP modules are used, then a stable permeate flow of approx. 80 l/m²h can be guaranteed and the backflushing capability of the symmetrical polypropylene membranes, which runs for just a few seconds once every 30 minutes, ensures a consistently high performance.

Despite massive chemical and mechanical demands being placed on it, the service life of the T-CUT PP module is clearly more than 2 years and it also provides an economically and ecologically-sound alternative.
CUT Membrane Technology GmbH
Part of the Bürkert Group
Feldheider Str. 42
D-40699 Erkrath/Düsseldorf
Germany
Tel.: +49 (0) 2104 17632-0
Fax: +49 (0) 2104 17632-22
filtration@burkert.com
www.burkert.com/cut

Bürkert Fluid Control Systems
Christian-Bürkert-Straße 13-17
D-74653 Ingelfingen
Germany
Tel.: +49 (0) 7940 10-0
Fax: +49 (0) 7940 10-91 204
info@burkert.com
www.burkert.com

CUT Membrane Technology, a subsidiary of the Bürkert-Group, produces a variety of innovative tubular and hollow fiber micro- and ultra filtration membrane modules at their facility in Erkrath, near Düsseldorf, Germany.

Bürkert is one of the world’s leading providers of fluid control systems with more than 2600 employees and 36 representative offices throughout the world.