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**Density Measurement
at Its Best**

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At the Novelis aluminum rolling plant in Lüdenscheid, high-precision density measurement helps prevent bearing damage

DENSITY MEASUREMENT AT ITS BEST

Aluminum foil producer Novelis does not make concessions when it comes to the quality of bearing lubricant for their back-up rolls. Coriolis mass flowmeters indicate even the slightest difference in density, thus preventing bearing damage and production downtimes. This is one of the first applications for a new device generation.

TEXT: Dr. Ulla Reutner, P&A PHOTOS: Novelis, ABB, P&A  www.PuA24.net/PDF/PA213501

“We have focused on space-saving design, high precision and especially low pressure loss.”

Cornelia Giebenhain-Wagner, ABB



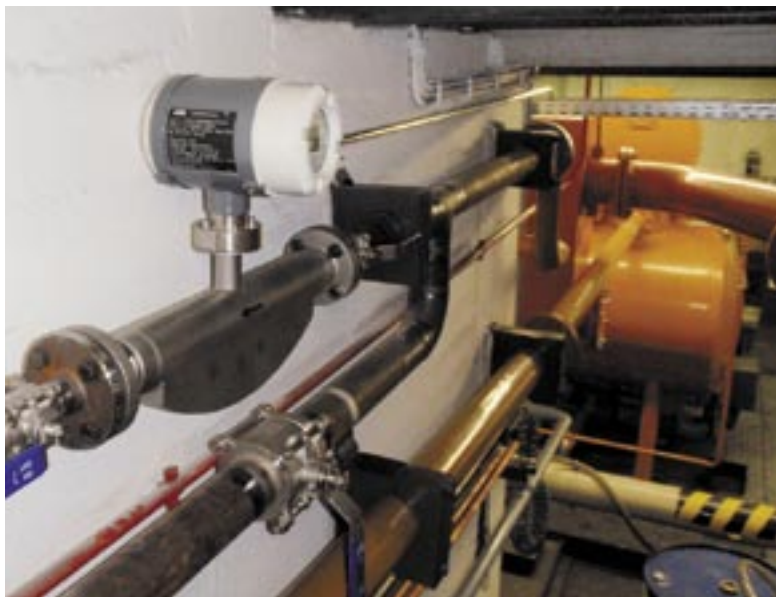
The heat is on in aluminum plants. There is hardly a better place for a new measurement device to pass its trial by fire. After all, users in the process industry will accept only those new measurement devices that have proven successful in field testing. “We had been looking for field test measurement applications all over the world for the Coriolis mass flowmeters CoriolisMaster FCB330 and FCB350 launched at Hannover Messe 2012”, explains Cornelia Giebenhain-Wagner, ABB’s Director of Measurement Product Sales, Central Region. “The new devices also determine density in addition to the flow rate, so we were especially interested in applications where density is critical, for example, when determining the dry matter content in dairy products.” The ability of CoriolisMaster FCB350 to measure density was a major prerequisite for its pilot operation at the Novelis aluminum rolling plant in Lüdenscheid that produces can sheet and foil. Novelis was looking for a technique to monitor the bearing oil quality. Giebenhain-Wagner: “This type of oil lubricates the bearings of the back-up rolls. Insufficient viscosity and lubrication performance cause damage to the bearings and, consequently, result in production downtimes and high repair costs.”

To prevent this from happening, the lubricant is exchanged at regular intervals – at exactly the right time, thanks to the ability of CoriolisMaster to determine the density with maximum accuracy. The degradation of the lubricant is caused by

an inevitable, process-related thinning of the oil resulting in about 0.8 g/l density deviation. For this reason, Novelis uses model FCB350 that measures density even more precisely than the standard system FCB330. The latter facilitates a density measurement accuracy of 10 g/l, compared to 2 g/l and even 0.5 g/l accuracy after field adjustment offered by FCB350.

The device indicates even slight density deviations in the bearing lubricant, advising the maintenance engineers at the Lüdenscheid aluminum rolling mill of the need to exchange the tank contents soon. Moreover, a particularly smooth density signal is provided allowing for unique trends to be identified explicitly. The ability of the device to also measure the flow rate and the fact that it is easy to handle, compact and features low levels of pressure loss are further advantages.

“The devices CoriolisMaster FCB330 and FCB350 are of much shorter design than the older model FCM2000”, explains Giebenhain-Wagner. “The new design covers about 95 percent of all applications in the process industry. The previous, longer variant is more suitable for certain applications, e.g. in case of gas cavity.” The new devices determine both mass and volume flow rate, density, temperature and – using the integrated software DensiMass – also concentration, thus reducing the capital cost in numerous applications. Moreover, due to the wear-



CoriolisMaster FCB350 provides a signal in case the bearing lubricant density changes by more than 0.5 g/l – at exactly the right time for an exchange of the tank contents.

free measurement technique, operating costs are lower compared to mechanical flowmeters with high maintenance effort caused by filter exchange requirements. CoriolisMaster is self draining, so that no measuring media residues remain inside.

With growth rates of about six to ten percent and a market volume of about one billion US\$, the market for Coriolis flowmeters is extremely attractive. The technique is maintenance-free and replaces previous measurement techniques as well as Coriolis devices of earlier design. “This is why we have focused on three criteria when developing new devices”, says Giebenhain-Wagner. “Space-saving design, high precision

and especially low pressure loss – to good effect. We offer the lowest pressure loss in the market.” Thanks to the compact device design, users of high-maintenance variable area flowmeters or Woltman flowmeters, which could not be replaced with a Coriolis device so far due to insufficient installation space, can now switch to the new technique. Fitting lengths are below NAMUR requirements; however, a connection adapter guarantees full compliance with the requirements of the chemical industry. With 0.1% mass flow measurement precision offered by FCB350 respectively 0.25% offered by FCB330, ABB moreover fulfills the respective measurement accuracy requirements.

COMPANY INFORMATION: NOVELIS

- Products & services: Rolled aluminum products, recycling;
- History: Founded in 2005 as a spin-off from aluminum producer Alcan;
- Applications: Novelis aluminum is used in packaging materials such as cans, in automotive, architecture, consumer electronics as well as industrial applications;
- Fab capacities: Rolling mills on four continents; manufacturing capacities in Germany in Göttingen, Nachterstedt, Neuss (Norf), Plettenberg-Ohle and Lüdenscheid.

The Lüdenscheid plant includes both a foil rolling mill and a conversion business. The foil plant supplies foil for the flexible packaging market and for pipe and cable applications, as well as metalized paper for bottle labeling.

According to Giebenhain-Wagner, installation is extremely easy – even easier than for electromagnetic flowmeters. “Moreover, the devices have to be calibrated only once and maintain a constant level of precision afterwards – other than mechanical devices that have to be recalibrated every few years”. Due to the specific design and bending strength of CoriolisMaster, ABB development engineers succeeded in further optimizing flow capacities within the individual nominal diameters: between 0 and 8,000 kg/h for DN15, up to 35,000 kg/h for DN25, up to 90,000 kg/h for DN50 and up to 860,000 kg/h for DN150. □

For further information: www.abb.com/flow



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