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Running on (Good Quality) Compressed Air

Compressed air of good quality is indispensable for the reliability and safety of railway operations. Contamination increases operating and maintenance chores and costs in numerous ways.

The quality of compressed air has a tremendous effect on the reliability of tens of rolling stock applications in modern trains. For example, the braking system, coupling of trains, air conditioning and pneumatic doors all are powered by compressed air. Therefore the quality of the compressed air has a direct effect on the safety of the entire train.

To put it simply, compressed air of rolling stock applications needs to be very clean and dry, no matter what the conditions. The most common contaminants in compressed air are water, oil and dust – no wonder, as most of the applications are partly outdoors, exposed to heavily varying conditions, temperature and humidity, rain and snow.

Monitoring Dew Point the Key

Norwegian company Nordisk Tog Teknikk ANS (NTT) has helped rolling stock operators with their compressed air challenges for over 10 years. Located in Oslo, the company specializes in rolling stock management, component overhauls and repair, modifications, and product development and implementation.

"NTT is the only company on the Nordic market with advanced test equipment for compressor modules, making it able to measure compressor performance against all relevant parameters. One of our strongholds is the implementation of fully automatic and continuous dew point measurement for trains", says Einar Hageskal, owner of the company.

Dew point is one of the most important parameters to monitor to ensure the quality of compressed air at all times. Any excess moisture in the compressed air line may freeze, which causes obstructions or even fractured air lines and damaged pneumatic cylinders, resulting in malfunction of doors and brakes, for example. Even if not freezing, water corrodes metal surfaces, and water, oil and rust together increase wearing.

Benefits from Continuous Monitoring

Additional benefits can be achieved by taking advantage of continuous monitoring instead of point-checking dew point values in intervals.

"An online dew point monitoring system gives operators the possibility to locate and correct failures on time. The moisture might originate from filters or ambient air temperature variation around the drier, or the saturated silica gel in the tower dryer, which might make it difficult to detect without online monitoring", Hageskal describes.

Whatever the source of the moisture, discovering the problem early on means that corrective actions can be implemented faster. It helps avoid major problems that could lead to long and costly service breaks and lack of capacity. According to Einar Hageskal, the train needs to be taken out of service for a full week if the compressed air system gets wet – that's how long it takes for the system to dry out.

As an additional benefit, continuous monitoring also means that regular maintenance actions can be performed less frequently without compromising the operation of the rolling stock applications.

Wanted: Stable, Precise and Cost-effective Solution

To tackle the issue of continuous monitoring, Nordisk Tog Teknikk helped one of its customers to wade through a variety of dew point transmitters to identify the right kind of instrument. They came up with three possible alternatives, one of which was the Vaisala DRYCAP® Dew point Transmitter DMT348. All three were tested extensively both in laboratory conditions and in actual trains to see which one would deliver the most reliable measurements even in changing and harsh climatic conditions.

"The customer requirement was that the instrument would need to perform reliably at -30 ºC dew point. The meter would also need to be adaptable to different train models and its materials should be guaranteed to last at least for 10 years", Hageskal describes, adding:

"In the end, the customer chose the DMT348. The final decision was made based on cost-effectiveness, and the fact that Vaisala was willing and able to modify the product to meet the specific needs of the customer."

The transmitter now includes a display alarm, which alerts the personnel on the train if a pre-set dew point alarm level has been exceeded. The same measurement signal can also be fed to the train's control system. The DMT348 also has a data logging capability, which is essential to be able to easily see the dew point history trend and, if needed, to track problems afterwards at the depot.

Ultimate Test: Harsh Winter

Last winter was exceptionally cold and snowy in most parts of Europe, which gave the dew point instruments a chance to prove their functionality in harsh and challenging conditions. Monitoring the moisture in compressed air systems has helped train operators overcome various challenges.

Further information:
www.vaisala.com/dewpoint

Installation of the DMT348 probe through a ball valve allows the user to remove the proble from a compressed air pipeline without the need to depressurize the system. The probe depth is adjustable.