



APPLICATION NOTE

Chemical

Level measurement in a steam condensate tank

- Reliable, continuous level monitoring in a condensate collection tank
- Automated recirculation process using a magnetic level indicator with an FMCW radar
- Drift-free measurement, no repeated calibrations, no clogged impulse lines

1. Background

A French chemical company operates a steam/condensate system to provide various consumers (e.g. heat exchangers, heating coils) with thermal energy. In case of boiler water carry-over or if steam condensate accumulates on the bottom of the pipe, the steam distribution system can be severely damaged by water hammer and corrosion. The production of steam is also less efficient in the presence of residual liquids. The condensate is therefore consistently removed from the steam lines by a draining system.

2. Measurement requirements

The hot condensate is collected at various locations of the distribution system and finally stored in a pressurized and insulated tank of 1.5 m / 5 ft height. However, if the tank is full, the condensate from the various collectors cannot be removed – with all its implications. Therefore, the tank level must be continuously monitored.

Level measurement of hot condensate involving vapour is quite challenging for most level technologies. The company had previously used a differential pressure transmitter that couldn't keep up with the measurement requirements.

The chemical plant required a more reliable solution to control condensate recovery. For maximum energy efficiency and safety of the plant, the readings need to be transferred to a DCS (distributed control system) to ensure that a right balance between the collection and the return of the condensate to the boiler can be established automatically.

KROHNE

3. KROHNE solution

KROHNE replaced the pressure transmitter by the BM 26 W1010. The level device combines a magnetic level indicator (MLI) with a 6 GHz FMCW radar. The MLI functions as a bypass chamber. It is installed near the bottom of the tank where it is close to the liquid level. In this way, it acts as a wave guide for the FMCW radar mounted on its top.

The KROHNE device enables continuous redundant measurement using two measurement principles in one device. Unaffected by steam or condensation, the radar of the BM 26 W1010 continuously measures the condensate level and transfers the readings to the DCS of the steam distribution system. In addition, the IP68 rated indicator rail with flappers offers a highly visible local level indication.

The level gauge has been installed on the existing process connections using isolation valves so as to prevent disturbance of the process. The converter of the radar also features a dual process seal system made of Metaglas® that allows it to be safely removed under process conditions. In addition, a distance piece between the converter and the indicator allows for higher process temperatures up to +150°C / +302°F.



Bypass level measurement with the BM 26 W1010 connected to the steam condensate tank

4. Customer benefits

Using the cost-effective MLI with radar helps the customer run an automated process for condensate recovery. In this way, the company is able to permanently reduce feed water demands, saving costs in the long run.

The boiler feed water line is effectively regulated. The readings are continuously transmitted to the DCS of the steam distribution system which controls a pump to feed the condensate back as necessary. Tank overflow is prevented and a consistent drainage of the steam line is ensured. This allows the company to properly maintain the integrity and safety of their steam distribution system. There are no impulse lines, where clogging effects may occur, this increases reliability and reduces maintenance effort. The system is drift-free and does not require repeated calibrations.

5. Product used

BM 26 W1010

- Magnetic bypass level indicator with radar (FMCW) for liquid applications
- Continuous redundant measurement using two measurement principles in one device
- For bypass measurement in tanks with internal obstructions or agitated product surfaces
- With dual process seal system made of Metaglas® or Metapeek for maximum safety
- Converter housing material made of aluminium or stainless steel
- Removal of the converter under process conditions
- Measuring range: 0.3...8 m / 0.8...26.24 ft
- -40...+150°C / -40...+302°F; -1...40 barg / -14.5...580 psig



Contact

Would you like further information about these or other applications?

Do you require technical advice for your application?

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