

Ensuring the optimal dryness of plastic pellets



Entrepreneur Markus Wickholm from MaWi Automation Oy and Antti Heikkilä, Technical Manager from Eino Korhonen Oy, holding Vaisala's DMT143 dew point transmitter.

DMT143 Dew Point Transmitter

Vaisala's compact DMT143 transmitter accurately measures dew point in small compressed-air dryers, plastic dryers, additive manufacturing, and other OEM applications.

The DMT143's measurement accuracy is ± 2 °C (± 3.6 °F) and it withstands condensation. The device offers a fast response time and has a measurement range of -70 ... +60 °C (-94 ... +140 °F). It is easy to integrate and can be used with Vaisala DRYCAP® Handheld Dewpoint Meter DM70.

When manufacturing injection molded plastic products, correctly drying the raw material – plastic pellets – is crucial. This is done with the help of warm, dry air. The air used in the drying process is drier than the ambient air, so it is economical to recycle it back into the process using air dryers. Heating the air used in the drying process and regenerating the absorption dryers requires a lot of energy. Dew point measurement is key to optimizing energy consumption and drying quality.

Eino Korhonen Oy (EKOY) manufactures a variety of plastic products such as fixings, connectors, and casings. The company has used Vaisala DRYCAP® Dew Point Transmitters DMT143 to improve the monitoring of dry air quality when drying

plastic pellets. Thanks to the dew point measurements, the company has achieved better overall profitability, product quality, and customer satisfaction.

The production process starts with melting plastic pellets

at a high temperature into a thermoplastic mass, which is then injected into molds. If the plastic pellets are too moist, visual and mechanical quality problems can both easily arise. At high temperatures, excessive moisture induces chemical reactions that degrade the mechanical properties of the product. It is therefore very important to closely and continuously monitor the drying process.

To reach the correct level of dryness, plastic pellets are placed in a hopper and exposed to dry and warm supply air. The return air is cooled and dried during the

regeneration process. Dew point measurement is essential at this stage to ensure that the air is suitably dry before it is heated and resupplied into the drying process. The optimal dew point to ensure the plastic pellets are correctly dried is $-35\text{ }^{\circ}\text{C}$ ($-31\text{ }^{\circ}\text{F}$).

DMT143 Miniature Dew Point Transmitter

Vaisala's compact DMT143 transmitter accurately measures dew point in small compressed-air dryers, plastic dryers, additive manufacturing, and other OEM applications. It features Vaisala DRYCAP[®] technology with auto-calibration, is easy to integrate, and can be used with Vaisala DRYCAP[®] Handheld Dewpoint Meter DM70.

The key benefits include its convenient size, for example for small industrial dryer applications. The DMT143's stable measurements allow for long calibration intervals and lower maintenance costs; it also features analog output options, easy servicing, and data transfer.

The Vaisala DMT143 offers a fast response time and has a dew point measurement range of $-70\text{ }^{\circ}\text{C}$... $+60\text{ }^{\circ}\text{C}$ ($-94\text{ }^{\circ}\text{F}$... $+140\text{ }^{\circ}\text{F}$) with an accuracy of $\pm 2\text{ }^{\circ}\text{C}$ ($\pm 3.6\text{ }^{\circ}\text{F}$)

Continuous and reliable monitoring

The regeneration process of EKOY's absorption dryers was pre-scheduled with a time switch to take place at regular intervals. This method takes neither production variability nor the condition of the absorption dryers into account, meaning there was

constant uncertainty about the performance of the dryers. "Our experienced technicians noticed that the thermoplastic mass was too moist," says technical manager Antti Heikkilä.

The EKOY team was already familiar with the Vaisala DMT143 as it was included in their newest dryer, where the regeneration process had been optimized using dew point measurements. They decided to conduct a test with equipment loaned from Vaisala to measure the performance of their older, time-controlled plastic dryers.

"The test confirmed our suspicions that the performance of our older dryers was not even close to our target values. Based on the test, we decided to acquire Vaisala devices for all our dryers. The Vaisala DMT143 transmitters are now constantly monitoring conditions and providing really reliable data," explains Heikkilä. Previously, the dryers' performance had been monitored annually with a device borrowed from the dryer manufacturer; it became evident that this device had not been providing reliable data.

The DMT143 transmitters in the dryers are connected to EKOY's building automation system and all the measurement data is stored in one place, making it easy to follow. This is a significant step forward, as previously there was very limited data available about the performance of the dryers. Historical data and trend curves provide valuable information on the performance of the devices and any servicing needs. The transmitters were connected to the

Modbus channel and were taken into use fairly easily with the help of MaWi Automation and Vaisala technical support.

When the moisture level of the plastic pellets remains at its target value, the raw material is of a high quality and EKOY can utilize its entire production capacity.

Optimizing energy consumption

More effective and accurate data collection from the production process has also given EKOY an opportunity to increase its energy efficiency.

"We want to be an energy-efficient industrial enterprise. For instance, in the future we want to be able tell our customers how much energy is consumed in manufacturing each plastic product," says Antti Heikkilä.

Thanks to the accurate data, the EKOY team can adjust the regeneration cycles of the old plastic dryers to be as energy efficient as possible. While adjusting is still a manual operation, continuous measurements allow the adjustment settings to be optimized. In the future it will be possible to further optimize the process by converting the plastic dryers that use time switches for regeneration to dew point control.

Another environmental aspect of the collaboration with Vaisala relates to product lifecycle thinking: "We share the same values. For us, it is very important that Vaisala can guarantee the availability of spare parts for many years to come. We would rather repair and adjust than throw away and replace," says Heikkilä.

Eino Korhonen Oy

EKOY specializes in the contract manufacture of electrotechnical products as well as plastic and metal products. Its products are sold globally. EKOY works with companies such as Nordic Aluminium/Lival, Ensto Produal, and KONE. This family-owned company was founded in 1978 and has operations in Porvoo, Finland and Harju-Risti, Estonia.

DM70 Handheld Dew Point Meter

Vaisala DRYCAP® Handheld Dewpoint Meter DM70 for spot-checking applications and field calibration offers accurate and fast measurement for industrial dew point applications, such as compressed air, metal treatment,

additive manufacturing, and food and plastics drying.

The DM70 measures dew point temperature accurately over a wide measurement range. The probe can be inserted directly into pressurized processes, and it adjusts rapidly from ambient to process conditions. The DM70 can also be used as a tool for reading the output of fixed Vaisala dew point transmitters.

The DM70 has a fast response time that is enhanced by its sensor-purge function, which ensures quick and accurate data. The sensor withstands condensation and fully recovers from getting wet. Its interface is easy to use, with a clear graphical LCD display and data-logging capability.



DMT143 dew point transmitter



DM70 handheld dew point meter

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