NPE2024
The Plastics Show

‘Smart,’ Moisture-Based Drying Technology Enhanced at NPE2024

Novatec relaunches DryerGenie with a goal to putting an end to drying based on time.

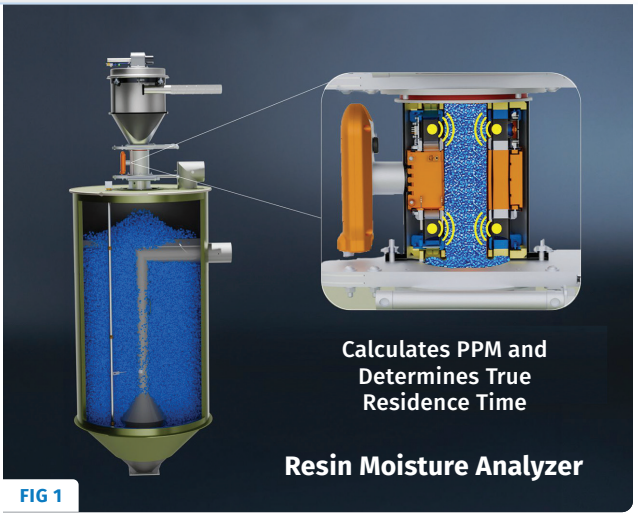


FIG 1

DryerGenie’s calculates the starting moisture level of the resin to more accurately determine the time it will take the material to dry. Source: Novatec

By Jim Callari
Editorial Director

Novatec has reengineered its DryerGenie, a system that used sensors to measure resin moisture, and coupled it with new features in its drying hopper to make the process of drying hygroscopic materials more efficient and less dependent on time-based recipes. Novatec took the wraps off the product this month at NPE2024.

Novatec’s first iteration of the DryerGenie was shown about a year ago, during *Plastics Technology*’s PTXPO 2023 trade show in Rosemont, Illinois. At the time, the technology utilized sensors placed at the top and bottom of the suction probe or lance that’s typically used by molders to pull resin from gaylords to the dryer to prepare the material for processing. But feedback from processors at that show and thereafter resulted in Novatec rethinking the placement of these delicate sensors, as material handlers generally tend to leave these lances in harm’s way on the plant floor when done with them.

Now, the resin-moisture analyzer is situated below the receiver and directly above the drying hopper (Figure 1). There, explains Mark Haynie, Novatec’s vice president of moisture and trying technology, it measures incoming moisture level of the material and depending on that reading suggests the drying time (residence time) based on the dryer/drying hopper being used.

He notes, “The capacitance of water (moisture) is many times that for plastics. By knowing the dielectric constant of the base plastic, the resin with moisture can be accurately determined by the changes that occur with moisture present. This, along with knowing the ambient temperature and relative humidity, allows you to determine the possibility of moisture gain over time.”

But because drying parameters are also based on conditions beyond the initial moisture content of the material, Novatec has taken the DryerGenie a step further by placing a drying process scanner within the hopper (Figure 2). The scanner measures temperature and intergranular humidity within the hopper, which is the moisture released through the drying proces. This helps pinpoint the efficiency of the dryer attached to the device. Says Haynie, “The system defines the hopper profile, and the data is used to adjust parameters that are critical to efficient drying. The temperature and dewpoint profile of the drying hopper helps determine the moisture profile throughout the drying hopper. In combination with a known inlet moisture in the resin from the resin moisture analyzer, the moisture profile allows you to accurately know the resin moisture exiting the hopper.”

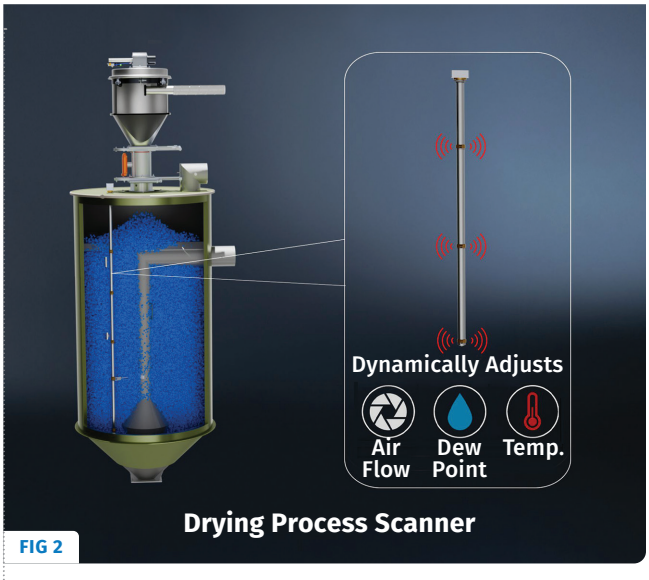
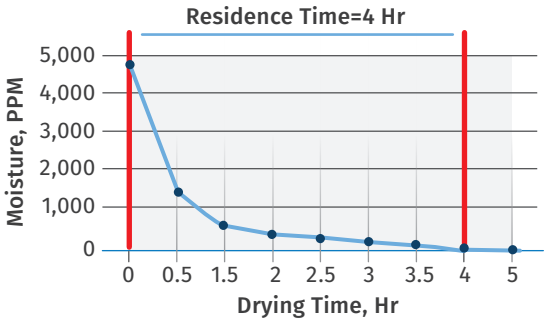


FIG 2

A process scanner inside the drying hopper constantly monitors the process and makes adjustments as needed to air flow, dewpoint and temperature.

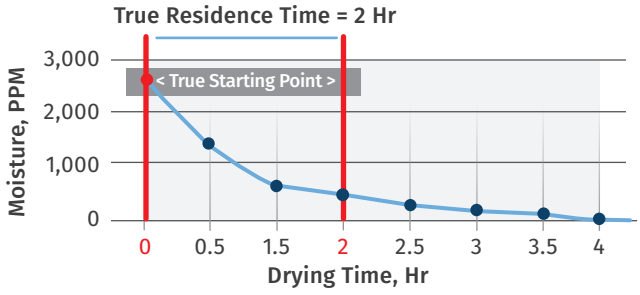
The DryerGenie, which is the subject of three patents, takes aim at long-held industry “cookbook” practices of drying resin based on

FIG 3 Drying Curve (PC/ABS) Based on Supplier's Recommendation of 4 Hr Drying Time for 200 PPM with Unknown Starting Point



With no information on the starting moisture level of the material, following the supplier's recommendation to dry 4 hours to reach 200 ppm resulted in drying 2 hours longer than necessary.

FIG 4 Same PC/ABS Showing DryerGenie's True Residence Time & True Starting Point (PPM)



0 = 2520 Starting PPM 2 = 200 Ending PPM

DryerGenie's target-based drying determined the true residence time need to reach 200 ppm suggested by the resin supplier, cutting the drying time recommended in half to unlock 2 hours of extra production time.

time. Novatec CEO Conrad Bessemer, "The first standard we are challenging is drying to the resin supplier's recommendations that appear on the data sheet. These recommendations are usually very wide: 2-4 hours or 4-6 hours. That's because by the time the resin reaches the processor, the moisture levels in it may have changed dramatically from when it was shipped and is highly dependent on seasonality and the ambient conditions in the plant."

Adds Haynie, "Most drying times from resin data sheets include significant safety factors, which result in overdrying, wasted time and wasted power. In most cases, the starting moisture point is unknown. Even two gaylords received the same day can have dramatically different starting moisture points."

Drying to dewpoint levels is another time-honored drying tradition this technology is challenging. "Most processors think drying performance is all about dewpoint. That's a fallacy," Haynie says. "Dewpoint is a measurement of the moisture in the air, not pellet moisture. Low dewpoint air is useful in drying plastics, but has nothing to do with the inherit moisture in the pellet. Dewpoint measurements indicate the dryer's performance, not pellet moisture result. PPM or moisture percentage of the pellet is the only real way to measure dryness of the resin."

Throwing away the resin company cookbook and instead relying on real-time moisture readings and dryer adjustments could very well result in increased capacity utilization of molding machines, Novatec argues. At its lab in Baltimore, Novatec ran the same PC/ABS blend with and without the DryerGenie. The drying time recommended by the supplier to reach 200 ppm, from an unknown starting moisture level, was 4 hours (Figure 3).

However, with a known starting moisture level recognized by the DryerGenie at 2,520 ppm, reaching the target of 200 rpm took only two hours (Figure 4). In addition to overdrying the material in the first scenario, which can result in brittle parts that fail over time, drying the material without a known starting moisture level at the start resulted in a machine that would be making parts to otherwise sit idle for two hours. Novatec notes that cutting drying times can slash energy usage, saving a processor money while making its operation more sustainable. PT