



Managing Resin Inventory

It takes one to know one.

Plastics molder Garner Industries is also manufacturer of the BinMaster line of level measurement sensors and inventory management systems. Garner's molding customers can manage their resin inventory remotely from a PC, tablet, or phone for real-time monitoring.



“Real-time management of expensive resins helps ensure a continuous supply of raw materials for our operation that runs 24/7,” according to Dan Hurtz, plastics manager for Garner Industries. “Our largest molding customers want visibility of their inventory so they can buy smart and reduce carrying costs of expensive resins. We found a solution right under our own roof with a BinMaster inventory management system.”

A lot has changed at Garner since the company started out as a local tool and die shop in 1953. BinMaster came a decade later when a local seed producer asked if the company could design and manufacture a high level alert for its seed bins. The level control business started with a simple mechanical switch that is still a workhorse today. Then in 1993 the company purchased a small, local injection molding operation that's grown to 29 molding presses. With press capacities ranging from 35 to 500 tons and a 75,000 square foot facility, Garner now serves the needs of companies and projects both large and small.

Late last year, Garner Industries invested significantly in their operation to accommodate the needs of several of their largest customers. The company had three smooth-walled steel silos constructed to eliminate the needs for storing large numbers of gaylords full of resin in their on- and off-site warehouses.



A standard vibrating rod is used in the cone of the surge bins to alert when resin levels are low.

The silos have a very deep cone to facilitate the free flow of resin pellets to the output of the silo. Resin is pneumatically conveyed from the silos to large surge bins inside the factory that feed the three new 500-ton molding presses. Eliminating gaylords benefits customers by allowing them to buy resin in bulk and having it delivered by truck. Buying in truck-load deliveries reduces costs and packaging waste. Using silos to store resins allows inventory to be monitored using automation versus using physical counts. It also increases efficiency by reducing the amount of handling in the plant that was done physically moving gaylords of material.

“BinMaster’s been making point level indicators for almost 60 years. We were also one of the first companies to introduce integrated inventory management sensors and software,” stated BinMaster Engineering manager Doug Hartzell.

“BinMaster has been installing inventory systems at plastics molders and resin manufacturers for decades.

It was time to take our own system for a spin.”

Point Level Indicators Prevent Resin Outages and Overfills

As the Hippocratic oath goes, “First do no harm.” Point level controls are basic measures to prevent running out of material or wasting material by overfilling a silo. The first step was to outfit each resin silo with a BinMaster VR-21 vibrating rod for low level control. They send an automated alert when the resin levels get low and inventory needs to be replenished. These point level controls are mounted roughly halfway up the 11.5’ hopper section of the silos.

For high level control, each silo has a BinMaster VR-41 extended vibrating rod roof mounted in a 1 ½” coupling. The rigid extension reaches 4 feet down into the silo to compensate for the angle of repose of the material and capacity of the silo as it is emptied and filled.

The vibrating rods are connected to a multi-input annunciator panel for high and low level indication. Dependent on the sensor’s location, the alert will be used to prevent outages for the low level indicators and prevent overfills for the high level indicators. The point level system also includes an external horn to alert a truck driver if a high level is detected during the filling process.

Each surge bin is also equipped with a VR-21 vibrating rod that is used to alert when the surge bin is nearing empty. The point level indicator alerts to the need to convey additional resin from the silos to the surge bins to ensure continuous production. This helps maximize cycle times and ensures the presses can run continuously with no downtime.



A 3DLevel-Scanner non-contact sensor mounted on the silo roof continuously measures the level of resins in the silo.





Three new 500-ton molding presses are robotically equipped.

Automated Inventory Management with Customer Visibility

For inventory management, each resin silo has a BinMaster 3DLevelScanner mounted on the top of the silo. Using acoustics-based technology, the 3DLevelScanner non-contact sensor measures and maps multiple points on the material surface of the resin in the silo, detecting cone up or cone down and other surface variations. It then processes the data to determine inventory volume that takes into account surface variations and reports a percentage full based upon a weighted average of the measurements.

As inventory information is proprietary to each individual customer, security parameters are entered into the system to provide visibility for only the silos and resins belonging to a particular customer. The customer also has the option to allow their resin vendor to monitor the silos using Vendor Managed Inventory. Garner has the ability to monitor all silos and work closely in tandem with each customer to ensure their inventory is optimized based upon upcoming demand.



The VR-21 vibrating rod alerts to low levels in surge bins.

Simple Inventory Management Software

One silo uses the 3DLevelScanner by connecting to a traditional 4 to 20 mA signal into an Ethernet gateway. The other two silos are also using an Ethernet Gateway for control, but are using the 3DLevelScanner in Modbus RTU mode and daisy-chained with RS-485 wiring. Both Ethernet gateways periodically sample the 4 to 20 mA signal or Modbus registers to record the resin levels each sensor is reading.

These resin level readings are then sent to a cloud-based database for inventory reporting using the BinView web application. Local and remote users then have the ability to log in to the BinView website, view current inventory levels, and generate historical reports on resin usage.



Plastics manager Dan Hurtz views inventory levels using BinView on a PC in his office.



Manufacturing engineer Shawn Sanburn programs the presses for maximum efficiency.



Wireless gateways eliminate long spans of wiring through the plant.

Access to the Bin-View web application is available from a Smartphone, tablet, or PC with a connection to the internet. Usage alarms can also be set to notify users of silo activity or high or low alert alerts via email or text message. As inventory data can be accessed anywhere, Garner and its customers can ensure a

continuous supply of resins to meet production needs.

Although not used by current Garner customers, the MV model 3DLevelScanner used on these silos also offers PC software with an optional visualization tool that creates an image that represents the topography of the material surface. By taking into account level variations in the silo, the advanced firmware used with the sensor can calculate a very accurate volume estimate. The software can be configured to calculate the number of pounds of resin contained in each silo, by entering a

bulk density for the resin and allowing for compaction as material get closer to the cone. For inventory monitoring, the software reports high, low, and average level and calculates inventory volume based upon the silo and material parameters entered into the software.

An Automated Tape Measure Eliminates Climbing

One silo is also outfitted with a SmartBob II level sensor. This is a traditional weight and cable-based sensor that works like an automated tape measure, but eliminates climbing the silo to take a measurement. This sensor is networked via a local area network (LAN) to BinMaster's BinInventory PC software installed on a centrally located PC that is connected to the sensor via an Ethernet to serial converter. BinInventory PC software has very similar features to the cloud-based application BinView. However, instead of being hosted in the cloud, BinInventory is installed locally on the Garner LAN and gives users the same ability to open the software, view inventory levels, generate reports, and usage alarms that can notify users of silo activity via email.

The inventory management system also uses a wireless Ethernet radio system that allows plant-wide access to the inventory management tools without having to the use an industrial PC or another data output device at the silo. This provides more flexibility for connectivity to various sensors and devices and allows the system to be scalable as more silos and sensors are added to the network.

"We talk to customers in the plastics industry every day about their operations and how we can make them more efficient, help them manage inventory, and keep their employees safer," commented BinMaster EVP of sales Scott Hudson. "Developing the right system configuration for our own company and then using it every day really drives home how essential BinMaster solutions can be to all of our customers."

A SmartBob cable-based level sensor performs as an automated tape measure. An extended vibrating rod is used for high level control to alert delivery drivers when the silo is full.

