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A Catalyst For Growth

Advanced manufacturing system key to Aristo's aims as a supplier of diesel engine catalysts for the OE markets



Aristo Catalyst Technology has developed a highly automated catalyst manufacturing system that is one of the lynchpins to the company's efforts to become a supplier to the original equipment marketplace. The new system brings a high degree of robotics and process control to the catalyst coating process and can be monitored through touchscreen controls.



BY MIKE BREZONICK

For many manufacturers that start out as a supplier to the aftermarket, there can be an amount of catching up to do when it makes the move toward serving original equipment manufacturers.

Yet that certainly wouldn't seem to be the case for Aristo Catalyst Technology.

The Hobart, Ind.-based company, which has its roots in the automotive aftermarket, is positioning itself to play a more significant role as a catalyst supplier to the diesel engine markets — manufacturing highly engineered catalyst technologies for

a wide range of engines in applications as varied as heavy-duty trucks and off-road equipment, to large stationary power generation and marine applications.

But rather than having to raise its game to meet the specifications of the OE market, Aristo goes in with a technical expertise that would appear to put it in a very competitive position with many of the more established players right from the start.

That capability is highlighted by a new, highly automated catalyst manufacturing system that went online in

the spring and is engineered to bring a new level of speed and efficiency to the precious metal washcoat process. The new system, which during the ramp-up period has been used to process more than 360 catalysts per hour, was designed in-house to Aristo's specific requirements.

"We want to compete on quality and we want to compete on technology," said Andreas Proimos, president and co-founder of the family-owned manufacturer. "If a customer is comparing Aristo to a competitor, we want him to be making his decision based



The new catalyst manufacturing system combines 20 different steps, including five weight checks, applications of the precious metal washcoat, flow checking, automated laser 2-D matrix bar code labeling and furnace drying into one continuous flow.

on the strength of our high quality and catalyst technology and not simply on price alone.

"We've been known for a long time in the aftermarket, and we think our process and our way of doing business is better than most, so it's time for us to go at the original equipment business. While we're very competitive on price, we don't think that anybody in the industry has a better handle on the technology and manufacturing. That's what's driving us."

It's been an interesting evolution for the company, whose roots date back to the early 1990s, when the Proimos family sold its interests in a national muffler chain and went into manufacturing catalytic converter systems and components for the aftermarket. "We started manufacturing converters here and we had another company provide the catalysts," explained Proimos. "We then purchased a company in North Carolina that produced complete automotive exhaust systems, which gave us the capability of manufacturing the entire exhaust system."

The final piece was catalyst production. In 1998, the company built the Hobart coating facility, encompassing a total of 40,000 sq.ft. It was shortly thereafter, while looking at growth opportunities, specifically

serving the diesel engine OE market, that Aristo began to envision a whole different process technology for catalyst coating.

"It was about five years from the time when the company first started thinking about this process to when the machine was actually in place," said Doug Kowalski, Aristo technology director. "In fact, it has been a central focus of my energies since coming onboard at Aristo.

"One of the biggest challenges was coming up with the specs. We couldn't just go to our machine supplier and say 'Go make me a catalyst machine.' They needed to know what we wanted it to do.

"We had several months of design

review meetings before one component was purchased. We spent probably three months just describing to the machine builder what we wanted to accomplish."

As part of the development process, Aristo created a small test machine that would, on a reduced scale, provide a model for what it was trying to accomplish. From that, the machine supplier was able to create a process system that brought robotics, automated weighing and high-speed drying to the catalyst coating process. "From when we had the machine conception down, it was probably three years until it was running in the plant," said Kowalski. "It took a good four months to do all of the PLC programming alone. But we knew from experience if we built it in up front, it would be better.

"The beauty of it is that when you don't have to force it into an existing engineering system, you can really do something special."

Using the new machine, only two people — a loader and unloader — are routinely required. The loader removes the ceramic catalyst substrate from its packaging and performs a detailed visual inspection before loading it onto the coating machine. From there, it moves into the machine where it undergoes 20 different treatments — including five weight checks, applications of the precious metal washcoat, flow checking, automated laser 2-D matrix bar code labeling on each piece — be-



Each catalyst undergoes a series of automatic quality checks, along with a final visual inspection prior to packaging and shipping.

fore it is dried in a furnace section.

At the other end, the unloader removes the catalyst, does another visual inspection and repackages the unit for shipping. All told, the process takes about an hour, and 15 different quality control checks are done automatically to make sure each catalyst is up to spec. The status and activities of the machine can also be monitored and controlled through touch-screen control stations that also provide information on process tolerances, etc.

"The process control is significantly better than older-style types of manufacturing," Kowalski said. "This machine runs about half of the production rate, but we're combining multiple process steps in one coating path.

"We've essentially merged two coatings into one with the precious metals involved. When you put two steps into one, it can be half as fast and you can still be very effective and efficient with it.

"One of the last items we do is another flow check and another weight check. So when the process is done, we know our contribution to the weight of the product, our contribution to the backpressure characteristics of the product. This is all done in a completely automated process."

Through its process, the washcoat is so precisely applied that there is very little waste and none reused. "The washcoat as it is used has never been seen before by any substrate," said Kowalski. "There is no excess removed, no recycled stream. We meter into the substrate the exact amount of material that we want in that part, and it stays there."

At the end of a production run, he added, "we can capture what's left over in a five-gallon bucket," Kowalski added. "In our previous process, we might have a couple of hundred gallons left. We can run the tank down to empty and that represents a real minimization of the material with significant cost savings to our customers."

Supporting the new manufacturing system is a dry lab in which finished

product can be randomly checked using sophisticated x-ray technology. A wet lab incorporates an inductively coupled plasma instrument that is capable of identifying a range of precious metals at very low concentrations. A wide range of R&D activities are ongoing.

The development of the new process technology represented a multimillion-dollar investment, Proimos said, and interestingly, Aristo will be up and running with another similar machine within the next six months. That unit will manufacture flow-through diesel oxidation catalysts and diesel partic-

ulate filters for a broad range of mobile and stationary diesel engine applications. "It's an offshoot of this machine with the same kind of coating, drying, marking and flow checking," Kowalski said.

"The coatings are similar, it's just the physical size that is different," added Proimos. "Our system allows us to look at a very wide range of sizes, which gets us into a lot of areas in the diesel market. And we think this process puts us in a position to do diesel better than anyone in the industry right now." **dp**

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