

# DONALDSON DEVELOPS AIR FILTERS FOR MICROTURBINES

By Mike Brezonick

While it's fair to say that to some extent, the jury is still out on the concept of distributed generation in general and microturbine-based distributed power in particular, there have been some strong indications that things may finally be reaching a critical mass in that market. One sign is the growing acceptance of microturbines by regulatory agencies in large power-consuming states like New York, Texas and California.

But perhaps more significantly, you know there's something there when well-known, highly experienced and highly regarded global manufacturers go to the time, effort and expense of developing new products specifically for that market. One of the latest to do so is Donaldson Co., one of the world's foremost air filtration system suppliers for gas turbines and reciprocating engines, which has introduced a new filter targeting microturbines used in distributed power applications.

"We are currently supplying Capstone and GE Honeywell with filters for their microturbines," said Tom Gahr, account manager, gas turbine systems, at the Minneapolis, Minn.-headquartered manufacturer. "And we anticipate being able to supply other microturbine manufacturers as well.

"The challenge for us is that microturbines are really more 'energy appliances,' a mass producible kind of equipment that may be installed anywhere in the



**Donaldson Co. has developed a filter system for microturbines. The DZ2000 microturbine filter incorporates the company's Spider-Web media, which has been successfully applied in a range of gas turbine and mechanical filtration applications.**

world. Most gas turbine products are geared for a specific project site. You know the kind of environment and you can tailor your filtration product to those conditions."

To accommodate the widest range of operating environments, Donaldson opted to base the microturbine filter on its DZ2000 filter element. Introduced in 1996 for gas turbine inlet and mechanical drive filtration applications, the DZ2000 filter incorporates an innovative media

packaging technique engineered to provide higher dust loading capability and filtration efficiency without a corresponding increase in size or weight.

The filters utilize Donaldson's proprietary Spider-Web media, which consists of a matrix of submicron synthetic fibers designed to provide high permeability and negligible restriction with extremely close interstitial spacing. The small pore sizes, when combined with the large number of fibers, promote efficient capture of particles in the under 2 micron range.

The filter's efficiency is also enhanced by the way the media is packaged. Instead of the standard pleats, the DZ2000 media is formed into flutes, with one end open and the other sealed. Inlet and outlet flutes are arranged in adjacent rows in a corrugated pattern. In operation, air moves into the open flutes on the inlet side, then passes through the media and exits through the open flutes on the outlet side, essentially traveling in a Z-shaped path through the filter (hence the Z in the nomenclature).

"With a microturbine, the filter has to be able to work in all environments, because you don't know where that machine is going to go," said Gahr. "So we needed something that would give us the most flexibility in a variety of different environments.

"In the sizes you're dealing with, self-cleaning really isn't an option. It has to have high dust holding capacities and low initial pressure drop, which is key for machine efficiency. Plus, there isn't a lot of room to work with.

"The product we settled on, the DZ2000 media, addressed all of those issues. It offered the best flexibility in a static product and the media allowed us to put 20 percent more surface area in a given volume over a standard pleated filter, which is key in a small package like a microturbine."

Donaldson supplies a spun aluminum plenum, which fits into the intake section of the microturbine and serves as the filter frame. The media pack has a rubberized seal on the outside circumference for positive sealing and ease of replacement is enhanced by a plastic knob at the center of the filter pack that allows the filter to be pulled out and pushed in. In addition, the filter pack is incinerable, simplifying disposal.

The round DZ2000 filters can typically operate for one year between replacement, Gahr said. "We targeted at least a year," he noted. "Again, with filtration, it's really dependent on the concentration of contaminants in the atmosphere. There are environments where the filters could last much longer.



The DZ2000 microturbine filter.

"But we tried to come up with something that would target a year in a moderately dirty environment. In certain applications, we can also include a prefilter element that can be changed out on a more regular basis to extend the life of the final filter."

Filter monitoring systems can also be supplied that will signal when filter changeout is required. "One of the things with distributed generation is that there are companies coming out with different control scenarios," Gahr said. "In the age of the internet, with dial-in

modem access, you could conceivably run hundreds of these machines at sites around the country from remote locations and at your desktop p.c., receive a signal that tells you when it's time to send a technician out to a specific location to change a filter."

The microturbine filters are currently manufactured at Donaldson's pilot manufacturing site in Bloomington, Minn., but production is scheduled to move to the company's Dixon, Ill., manufacturing plant. ★

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