

Pollution Engineering

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MEETING THE ENVIRONMENTAL CONCERNS FOR AIR, WATER AND WASTE

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BUSCH
INTERNATIONAL

10431 Perry Highway
Wexford, PA 15090
Phone: 724.940.2326
Fax: 724.940.4140

Filters Keep Equipment Online

Nanoscale Iron

Fan Problems Solved

THEY WON'T GET FAR

Filter System is Steel Plant's Solution for Fugitive Emissions

Fugitive particulate emissions from the melt shop at the TXI Chaparral Steel mill near Dallas can't evade capture, thanks to a new, high-efficiency Fugitive Emission Filtration (FEF-50) system from Busch Intl. Augmenting the melt shop's primary 1.65 million ACFM baghouse collection systems, 20 packaged FEF collectors – each 50,000 CFM – were added to remove micron-sized particles from plant air previously vented through roof monitors. The packaged FEF collectors enabled the plant to add controls for over 30 percent less than the cost of a standard baghouse.

The plant, with 1.8 million tons of melting capacity and 1.9 million tons of rolling capacity, primarily produces structural I-beams, H-beams, and specialty-bar-quality products, using 100-percent recycled scrap steel. The plant's 800,000-ton/year shredder provides about 40 percent of the recycled steel with the balance supplied by outside vendors.

Dust from the electric arc furnaces is collected by a three-baghouse system installed in various stages since the plant was built in 1974. The conventionally designed baghouses use vertically mounted fabric filter tubes, and are capable of capturing from 400,000 to 650,000 ACFM each. Two of the baghouses combine to pull EAF emissions directly from canopy hoods over the furnaces, while the third provides direct evacuation.

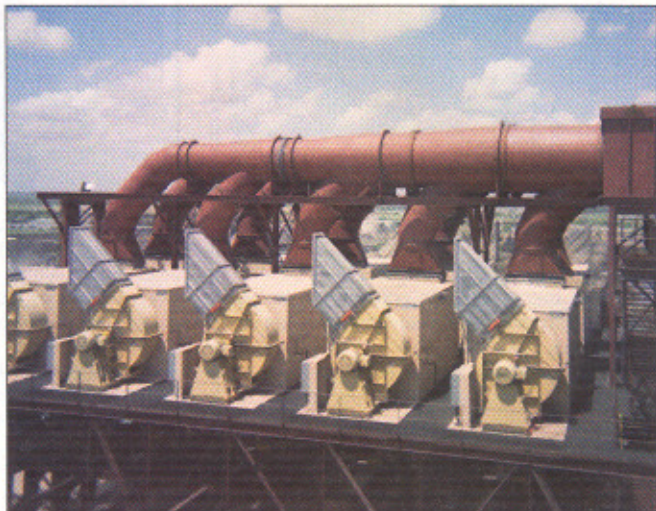
To supplement the primary collection system, Chaparral had committed to the state to capture the permitted fugitive emissions that were generated by natural draft convection through the shop. "The process of controlling, and ultimately eliminating, fugitive emissions from the shop has always been a goal for the company," said Jerry Balbo, senior manager of plant engineering at the Midlothian plant.

Finding the proper equipment to handle the light particulate loading of the fugitive emissions, which are typically less than 0.02 grains per ACFM of primarily micron-sized particles, was a requisite for the project. According to Balbo, several options were explored before a plant engineer suggested Busch Intl.

"We contacted Busch, ran a test against a cartridge filter, and decided that the FEF system was a better choice because of its modular design and suitability for our application. Another advantage was that the FEF units, including ductwork, support structures and the collection units, would save us about \$2.5 million, compared to adding conventional baghouse capacity," said Balbo.

Capturing a few million fugitives

The FEF-50 system is a new concept that utilizes horizontally mounted, high-efficiency polyester fabric filter tubes. "This



Steel structures were built next to the plant to support dust collectors and save roof space.

system is designed to be run with lighter dust loadings, compared to the primary collection system," said Bill Frank, president of Busch Intl.

Initial plans called for the system to be installed on the roof. However, as Balbo noted, "We found we simply didn't have enough structural support and roof area for the building to accommodate this."

The most cost-effective alternative was to build structural steel platforms at roof height next to the melt shop. Due to the systems modularity, two banks of ten 50,000-CFM units could be mounted on platforms on either side of the building.

The system uses a pulse-jet cleaning cycle to clear collected material from the filters, based on increased differential pressure. "The cleaning cycle dumps dust into a hopper, where it's collected with screw conveyors and deposited into supersacks," explained Balbo. "Then we recycle the sacks into the melt furnaces. Though the fugitive dust is very fine, it still contains iron units and metallic elements. So we place the supersacks back into the charge of scrap going into the furnaces."

Designed jointly by Busch Intl. and kbd/TECHNIC units of CECO Environmental, the system was installed in roughly 18 months, from placing the order to start-up.

"We're especially pleased, too, that the solution was significantly less costly than expanding our conventional baghouse systems," said Balbo.

For more information, contact Bill Frank of Busch Intl. at (800) 627-8321 or busch@cecoenviro.com.