



GORE® Filtration Products

Metals Industry

Case History 4

Electric Arc Furnace

OPTIMIZATION POTENTIAL

High differential pressure across the twelve compartment baghouse equipped with polyester bags restricted gas flow from the melt shop. Spark carryover from the furnace caused damage to the polyester bags especially in the last two compartments. Bags had to be spot changed or patched on a regular basis to maintain environmental compliance. A complete set of new bags had to be installed about every two years.

In order to increase the gas flow by 20%, the plant considered adding two compartments fitted with polyester bags to the existing baghouse at a cost of well over one million dollars. However, this modification would not stop the spark damage and would not lengthen the bag life. In addition to these problems, the plant could not maintain sufficient draft on the furnace through the Direct Evacuation Control (DEC) system. The temperature at the end of the water cooled duct would be too hot for the steel ductwork to withstand. A tempering air damper would open to protect the ductwork and keep the baghouse inlet temperature under the limit for polyester material.

SOLUTION

Optimized system settings and replaced the existing polyester bags with GORE® membrane filter bags with fiberglass backing material at a cost of less than half the cost of the two compartment additions. Since the GORE® membrane bags are not subject to hydrolysis, the plant added “peak shaver” water sprays at the end of the water cooled duct to protect the steel duct from high temperature.

RESULT

The baghouse differential pressure decreased due to more effective bag cleaning. As a result, the melt shop gas flow increased by 20% without adding more baghouse compartments. Bag strength and permeability continues to be good after two years in service and no spark damage has occurred. Gas flows are still maintained at the increased level.



Application:	Steel Electric Arc Furnace
Baghouse:	Reverse Air Cleaning 1,200,000 Am ³ /h (700,000 acfm)
Number of bags:	2160
Filter area:	21,100 m ² (227,000 ft ²)
Temperature:	Up to 150°C (300°F)
Filter material:	GORE® membrane filter bags with 339 g/m ² (10 oz./ yd ²) acid resistant fiberglass backing material.

Adding the water sprays has eliminated the need to open the tempering air duct in the DEC system, resulting in improved furnace evacuation. The maximum baghouse inlet temperature now reaches about 150°C.

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