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# SULPHUR

**Controlling acid gas mists**

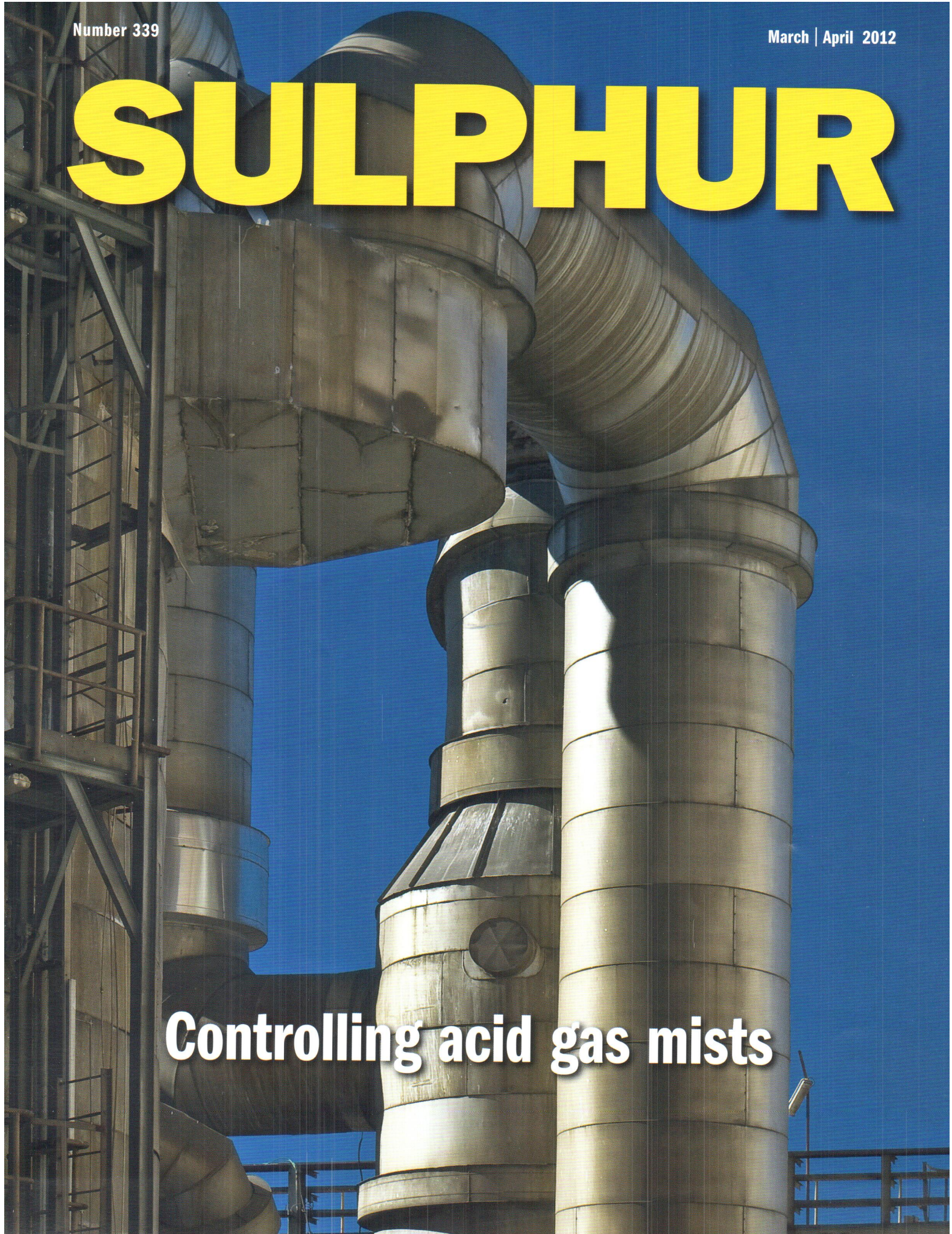




PHOTO: BELTRAN

Hindustan Zinc, Udaipur, India uses Beltran WESPs to control submicron size particulate emissions from their smelter operations.

# Controlling acid gas mists

## Gas cleaning

New and strict pollution regulations in metallurgical plants worldwide are restricting particulate and acid gas emissions to extremely low levels. Because of that, sulphuric acid plants

are being installed to remove and utilise SO<sub>2</sub> in gases resulting from the roasting of sulphide ores, smelting of ores, and burning or regeneration of spent acid or acid sludge from petroleum refining. To prevent the formation of “black” or contaminated acid and to protect the cata-

lyst beds from fouling and plugging, wet electrostatic precipitators are utilised to clean the off-gases before entry into the acid plant. The acid plants that must handle impure sulphur dioxide gases such as those emitted from metallurgical processes like ore roasters, flash smelters, and spent acid regeneration, require the removal of acid mist and residual dust and fume before the gases enter the drying tower.

Conventional scrubbing systems (wet or dry) are generally not effective in controlling submicron emissions, consisting primarily of acid gas mists, submicron particulates and condensed organics. Wet electrostatic precipitators (ESPs), because of their abil-

ity to generate multi-staged charging and strong electrical fields in a wet, cooled atmosphere, have proven effective in cleaning the flue gas.

### The Beltran wet ESP

As a result of considerable research and development, Beltran Technologies, Inc. custom designs and engineers a unique wet electrostatic tubular precipitator. The Beltran Wet ESP in most cases is a vertical-flow hexagonal or rectangular tube type precipitator.

Typically the flue gases enter at the bottom and flow upward through the precipitator. There are generally two sets of spray headers, whereby the first set continually

cools and saturates the flue gases, if necessary. The second set of spray headers are at the top and directly below the collector, which wash the collector and electrodes. These are operated on a periodic, as needed basis.

The multi-stage tubular precipitator consists of a series of ionising sections and a collection section. The discharge electrode is in the form of a rod or tube with a number of sharp corona generating discharge points. Various collecting tube geometries have been utilised over the years, the most common being the round. The square configuration and/or the hexagonal shape is chosen because these geometries are much more space efficient than the round shape, and pro-

duce a greater collection efficiency in a given volume.

The Beltran wet electrostatic precipitator uses solid ionising rods instead of wires. Also, the unique electrode design allows for generation of a corona field 4 to 5 times more intense than standard wet or dry ESPs. This higher current and field strength results in higher particle migration velocities that translate into a higher efficiency or reduced collector area.

Solid particulate matter and mist droplets that enter the electrostatic section are charged by the high voltage and current produced by the electrode and collected on the grounded plates. Most of the particulates are flushed down into the bottom of the housing.

## ACID MIST WET ELECTROSTATIC PRECIPITATORS



Remove submicron PM, acid mist and heavy metals from:

- Roasters
- Smelters, Furnaces
- Incinerators
- Boilers
- Tail gas FGD Scrubbers



**Beltran Acid Mist WESP, the proven design worldwide for:**

- Ultralow emission for submicron particulate and acid mist
- Modular design – minimized field assembly, flexible configuration
- Available in corrosion-resistant alloys or FRP construction

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**50 YEARS EXPERIENCE. MORE THAN 1000 INSTALLATIONS WORLDWIDE.**



# High-Performance Gas Cleaning, Emission Control and Gasification Solutions from Beltran Technologies



**Hindustan Zinc Acid Plant, India:** Beltran Wet ESPs virtually eliminate particulate re-entrainment, achieving 99.9% collection efficiency and faster throughput.



**Rockwood Pigments, USA:** WESPs save energy with aqueous flushing of collectors instead of mechanical rappers



**Anglo-Gold Ashanti, Brazil:** Beltran WESPs effectively clean refinery gas of submicron-scale impurities, acid mists.

Beltran's full range of capabilities includes basic and applied research; project design; multidisciplinary engineering; equipment manufacturing and fabrication; installation and testing of precipitators, scrubbers and other systems; training of plant personnel; and follow-up maintenance support.

Our current installed base of more than 1,000 gas-cleaning systems worldwide spans a wide range of industries, including mining and metallurgical operations. In each case, the proven design and superior performance of Beltran WESPs has resulted in more effective cleaning, reduced energy and capital demands, plus lower operating costs.

Beltran has also integrated its advanced WESP design into a proprietary biomass gasification system, producing high-quality synthesis gas for diverse bio-energy/biofuel applications.

No matter how or where your company operates, Beltran is fully prepared to design and implement a site-specific, cost-efficient solution to meet your needs. ■

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