

CSN Cimentos opted for Redecam dust suppression systems for the second line at its Arcos plant, Brazil





# Dust suppression for CSN

When CSN Cimentos added a second line to its Arcos cement works in Brazil, the company called on Redecam for its air pollution control needs. With over 100 filters to be installed, CSN required dust suppression technology that reduced maintenance and replacement costs, as well as improving health and safety and environmental protection practices across the plant.

■ by *Giuliamaria Meriggi, Redecam Group, Italy*

When Companhia Siderúrgica Nacional (CSN) entered the cement industry by establishing its CSN Cimentos division, it made the strategic decision to increase clinker capacity instead of importing volumes from third parties. The company therefore added a second line with a capacity of 6500tpd at its Arcos plant located in Minas Gerais, Brazil. By installing state-of-the-art technology, CSN's goal was to produce high-quality cement at a lower operating cost, while improving health and safety and environmental protection.

## Satisfying air pollution control requirements

For its air pollution control needs, CSN contracted Redecam of Italy to supply bag filters for the two mill lines, as well as for its kiln and clinker cooler. The scope of supply also included all secondary dust nuisance filters, along with handling equipment.

When completed, the Arcos plant would have 98 nuisance filters installed, ranging from 2500-120,000m<sup>3</sup> – all of which would include Redecam's proprietary SPS bag fixation system, Bi-Jet Bag Cleaning system and specially-designed filter bag cages. As CSN was to have so many filtration pieces on site, the cement producer adopted a strategy of purchasing reliable filters that would guarantee a longer lifetime, thereby reducing maintenance and replacement costs. The project also met with CSN's aim of improving health and safety and environmental protection.

## Integration with existing in-house designs

When Redecam was awarded the contract in 2013, plans for the Arcos plant expansion had already been drawn up using standard Brazilian air filtration equipment sizes. Redecam therefore customised its product sizes to adapt to the existing plans, which would reduce project costs. The customer



All nuisance filters at CSN Cimentos' Arcos plant have Redecam's proprietary SPS bag fixation system, guaranteeing casing tightness

had requested that most equipment be manufactured in Brazil due to high import taxes and custom fees associated with equipment shipped from abroad. Redecam therefore modified its equipment engineering (such as the support structure, thickness of the plates and shape of its steel beams) to fit with the existing design. Ultimately, 90 per cent of materials were fabricated locally. Only certain key pieces were made in Italy such as the tube sheets, the simple pressure system and the Bi-Jet Bag Cleaning System.

## Different requirements, different solutions

The Redecam filters installed cover a range of models. For instance, some have hoppers while others, such as silo filters, do not.

"In one location, there was a rooftop blocking a filter's proper positioning, so we supplied a horizontal filter, still allowing a flow of 5000-7000m<sup>3</sup>/h," commented Felipe Abraham, Redecam's country manager for Brazil.

## Dual-Input Integrated System

Among the bag filters supplied at Arcos is a large Dual-Input Integrated System designed for a flow rate of 1,900,000m<sup>3</sup>. This system uses one bag filter to dedust both the kiln and raw mill as well as the clinker cooler exhaust gases. Considered a space saver, it has proven an effective solution for many Redecam customers.

## Filter features SPS bag fixation system

The SPS bag fixation system guarantees that the tightness of the casing between the dusty and clean sides is 100 per cent effective. It prevents dust leakage at weak points with punched and drawn tube sheet holes, increasing the contact surface area of the bag against the tube sheet. This is achieved by extending and contouring the tube sheet opening. The surface contact is therefore not limited to the pure thickness (typically an eight gauge plate/ 3/16" or 4mm) of the plate but is extended to the entire internal surface of the drawn hole (≈3/4" or 18mm). The pressure of the bag



The dedusting filters also include the Bi-Jet Bag Cleaning System

collar on the drawn edge of the tube sheet hole is also increased, firmly securing the bag's cloth.

The collar is designed to take advantage of the temperature: the tube sheet is carbon steel and the collar is aluminium, resulting in higher useful pressure being generated on the sealing surface.

#### Filter bag cages

Redecam filter bag cages are designed to maximise the life span of the filter bags. Depending on the application at the Arcos plant, the filter bags are either made from polyester, acrylic or meta-aramide. The filter bag must fit perfectly around the support cage, otherwise it will rub on the cage during cleaning if it is too large, causing premature wear and tear.

#### Bi-Jet Bag Cleaning System

The Bi-Jet Bag Cleaning System has a dual Venturi arrangement, minimising the dispersion of compressed air during the injection phase, thus increasing the volume of air forced into the bag. In turn, this reduces the quantity of air needed to pulsate the bag and achieves a higher flow velocity than in systems equipped with one Venturi.

The dual Venturi arrangement also assures more accurate air pulses, resulting in less wear on the bags due to misaligned equipment.

#### Installation and training

The contract between Redecam and CSN Cimentos included mechanical supervision and installation, as well as training and installation guidance. "We gave CSN's team a lot of support in the installation phase," explained Mr Abraham. For example, as Redecam's gasket and collar systems are more complex than the norm and are therefore not standard to install, the

cement producer was offered 3-5 different installation training sessions in addition to support in erecting the equipment and maintenance training. "Once the teams understood how to install the equipment properly, there were no problems," Mr Abraham notes.

#### Air filtration benefits

The first mill line was completed in July 2015. The other mill line, with its air filtration equipment, was finished last autumn. At present, the kiln line is being installed.

The decision to choose one supplier for all dust suppression equipment meant there was just one point of contact, simplifying any follow-ups and operating questions.

Operating costs have been considerably reduced with an extended lifetime

(expected to be more than three years) resulting in lower replacement and maintenance costs. At the Arcos works, the savings extend to over 1000 bags and on over 100 pieces of equipment.

Nuisance dusts can also create operational issues. Redecam's nuisance filters with SPS and Bi-Jet Bag Cleaning System have nearly eradicated these potential issues with proven and highly-effective results.

Although regulatory bodies have not yet turned their attention towards emissions reduction with secondary dust collectors, many case studies have proven that employees working in close proximity to dust suffer more acutely from a variety of health problems. CSN's decision to install air filtration equipment at the Arcos plant not only supports the company's commitment to employee health and safety but also environmental protection. Every filter reduces emissions to under 10mg/Nm<sup>3</sup> – something few plants in the world can claim. ■



Over 100 Redecam filters have been installed at the Arcos plant, covering a range of models