

A TEC

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Latin cyclones

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Please note:

In the following article A TEC GmbH could also be mentioned as A TEC Advances Process Technologies GmbH, PMT; PMT-Zyklontechnik GmbH, Zyklontechnik GmbH (= company name before 1st June 2005).

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Latin cyclones

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Clinker cooler efficiency can be vastly improved by applying PMT-Zyklontechnik's HURRICLON® cyclone which improves separation, provides a lower than conventional pressure drop and lowers dust emissions. Inside the HURRICLON is the so-called HURRIVANE® tube which also helps enable large energy savings. Two recent installations of this technology in Latin America have illustrated the kind of cost and energy savings that HURRICLON can bring. The performance of the HURRICLON is detailed along with reasons why customers decided to opt for this type of investment.

Cementos Rioclaro is a cement plant in the middle of Colombia in the large area of Medellin. The plant runs two dry kilns. One kiln with a capacity of 1700tpd and four-stage preheater tower, the second kiln with a capacity of 2100tpd and five-stage

preheater tower. Both kilns are equipped with clinker coolers of grate cooler type. The dedusting of the exhaust air of both clinker coolers was done with multicyclones. There was no additional dedusting after these multicyclones and the efficiency of these systems was very low.

Table 1: Hurriclon performance for dedusting of clinker cooler exhaust dust

	Before modification Multicyclone	After modification HURRICLON
Separation efficiency	50.3%	99%
Dust emission	550kg/h	45kg/h
Pressure drop	750Pa	580Pa
Production	2100tpd	2115tpd

Figure 3: the HURRICLON installation at Colclinker



Figure 1: The HURRIVANE

Because of the low efficiency of the systems, Cementos Rioclaro was facing a serious problem of dust emission from the clinker cooler dedusting. The situation eventually became so complicated that production personnel at the plant had to reduce the performance of the system to control the amount of emission from the clinker cooler. Additionally, very high wear was detected in the impeller of the exhaust air fans, as well as in the small tubes of the multicyclones themselves,

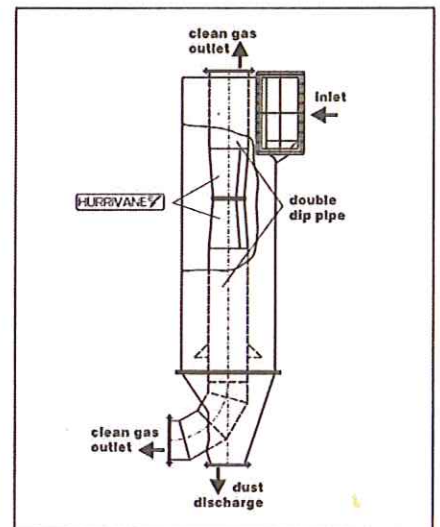


Figure 2: the HURRICLON

which resulted in very costly and regular maintenance and repair work.

Therefore, in early 2000 Rioclaro started to search for solutions for these operational and environmental problems.

Rioclaro found the solution in the HURRICLON, which has already proven its performance at several similar installations all over the world, including at Colclinker, which is one of the cement plants of the Argos Group.

In 1999, Colclinker, which is located in the Caribbean area of Colombia close to Cartagena Bay, had been facing a situation

very similar to Rioclaro. At Colclinker there were also multicyclones in operation to dedust the exhaust air of the clinker coolers and the same problems with high dust emissions and high wear had occurred. In 1999, Colclinker decided to replace the existing multicyclone of kiln three – the line with the highest emissions – with HURRICLON made by PMT-Zyklontechnik GmbH. PMT-Zyklontechnik GmbH installed a package of four HURRICLON units for a gas quantity of 90,000Am³/h at 250°C.

HURRICLON technology

The HURRICLON is a cyclone with two dip-tubes including Vortex Finder Vanes – so-called HURRIVANE.

The HURRICLON provides an improved separation efficiency and a lower pressure drop compared with common cyclones and therefore is the optimum installation for applications where common cyclones or multicyclones are at their limit, either in separation or pressure drop.

As part of the project at Colclinker, the installation of HURRICLON was evaluated and compared to solutions with electrostatic precipitator and baghouses.

The investment cost for HURRICLON was only 20 per cent of a baghouse installation and the HURRICLON provided significant additional advantages in maintenance costs.

The installation of an ESP would have been seven times more costly, and both ESP and baghouse would consume more energy and a lot more space in the plant. HURRICLON was found to be the most economic and fastest installation among all options. The results after the installation of HURRICLON proved that it was the right direction to go in: Dust emissions were reduced to 167mg/Nm³, which was a quarter of the previous value. Additionally, the energy consumption at the fan was reduced by 15 per cent because of the reduced pressure drop.

The installation at Cementos Rioclaro

In the summer of 2000 Cementos Rioclaro ordered PMT-Zyklontechnik's HURRICLON – firstly to replace the multicyclone of kiln two, the larger line.

In co-operation with PMT-Zyklontechnik GmbH a solution was worked out which uses as much of the existing equipment as possible, such as rotary valves, screw conveyors and the existing fan and stack. PMT-Zyklontechnik GmbH



Figure 4: the HURRICLON installation at Cementos Rioclaro

designed a package of six HURRICLON units for a gas quantity of 201,700Am³/h at 350°C. Due to the low space requirements the HURRICLON could be installed within the space of the former multicyclone.

The engineering of the ducting system to and from the HURRICLON was done by a Colombian engineering company with periodical checks by PMT-Zyklontechnik GmbH. The ducting manufacture and the housing of the HURRICLON was carried out locally.

The results

The results of the analysis in the inlet duct and stack discharge performed by Rioclaro are shown in Table 1.

Conclusion

Once again the HURRICLON with its separation efficiency of 99 per cent, has proven to be the most economic and most effective way to significantly reduce the dust emissions after a clinker cooler. But the HURRICLON not only provides a solution to protect the environment, it also protects it against wear.

Furthermore, the HURRICLON offers a reduction in energy consumption at the fan because of reduced pressure drop – a 22.6 per cent reduction at Rioclaro.

Considering the significantly improved separation efficiency, the installation of HURRICLON at Rioclaro even provides an increase of production by collecting 15tpd additional clinker dust.

In the meantime, the Argos group has ordered HURRICLON for clinker cooler dedusting in a further seven lines. The company has also approved projects with PMT-Zyklontechnik GmbH for other applications in its plants such as preheater towers, raw mills and cement mills.

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