

Bypass Solution at Castle Cement

Wilfred Zieri, A TEC Advanced Process Technologies GmbH, Austria, provides details of the installation of a bypass REDUCHLOR® system for Castle Cement, UK.

Introduction

Earlier this year A TEC was awarded the turnkey contract for the installation of the new bypass system at kiln 8 of the Ketton Works belonging to Castle Cement, an affiliate company to the HeidelbergCement Group.

The complete bypass system has now been installed and commissioning has begun.

A TEC GmbH, formerly known as PMT-Zyklontechnik GmbH, together with the Heidelberg Technology Centre, has provided a solution for the company's specific bypass requirement.

To ensure sustainable development the new system is designed for only a minimum bypass dust quantity, and allows flexibility for reduction of sulfates.

Design features

With the combustion of alternative fuels, the chlorine and alkaline content increases, causing heavy coating in the lower section of the preheater. To avoid this problem, A TEC has developed a chlorine bypass system, REDUCHLOR®, which reduces the alkaline and chlorine content.

A gas quantity of 6000 Nm³/h is diverted from the kiln riser duct via a take off chamber. The hot gas is cooled to 445 °C in the first quenching chamber which, due to its A TEC patented design, does not require any lining. The necessary amount of fresh air (controlled by a thermocouple) is fed to the chamber with a frequency controlled fan via a fresh air pipe and a fresh air flap.

To reduce bypass dust, a cyclone installed after the first quenching chamber returns a portion of the bypass dust via a double pendulum flap to the furnace inlet chamber. If required, the dust separated by the cyclone can also be transferred back to the cyclone riser duct and used for reducing sulfates in the bypass

gas. After the cyclone, the bypass gas is cooled to 220 °C by a second quench chamber. This temperature is sufficient for the safe operation of the bypass filter.

The bag filter collects the dust with high salt concentration (up to 80%) and is installed directly above the bypass dust storage silo, which functions as a large drop out box. As the filter has no collection hopper, the dust from the filter bags falls directly into the silo. With this arrangement, the clogging of mechanical equipment is avoided and the life of the filter bags is extended, as a portion of the dust is dropped out into the silo due to the low gas velocity achieved at the filter/silo entrance.

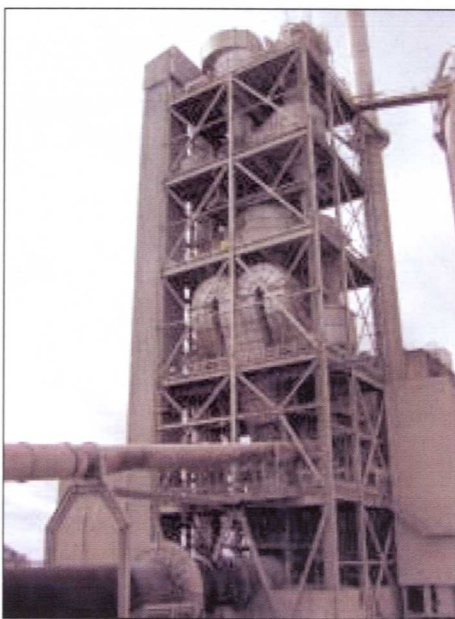
The cleaned gas is drawn in by the frequency controlled mixing gas fan, adjusted by a gas flow measurement and further pressed through a duct to the existing chimney. To avoid overheating of the bag filter due to insufficient cooling, an emergency fresh air flap is installed prior to the gas entering the bag filter.

In case of fresh air fan failure, all air flaps are fully opened to protect the bag filter. If, due to extended fresh air fan failure, the temperature in the hot gas duct increases, the bypass system will be closed down.

Alternatively, A TEC can install an emergency cooling system. This consists of a small fan (powered by an emergency set), flap and ducting.

The filling level of the silo is controlled via a continuous level indicator. A rotary screw conveyor is employed for discharging the bypass dust. At the silo outlet, a conditioning conveyor and truck filling spout is fitted with a maximum level control and a pipe connection to the filter inlet duct for dust extraction.

The design of the dust handling system allows for the later installation of a silo dust recirculation system. ♦



The preheater tower at Ketton Cement.