



**A TEC**

World Leader in Cement Pyroprocess Technology

## **New generation cyclone with high separation efficiency and low pressure drop**

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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 1<sup>st</sup> June 2005).

**PMT-Zyklontechnik**

**New generation cyclone with high separation efficiency and low pressure drop**

Stephen Lim and Gernot Lorber of PMT-Zyklontechnik Asia Sdn Bhd Malaysia, describing the new generation cyclone named HURRICLON® with HURRIVANE® and its benefits.

PMT-Zyklontechnik GmbH of Austria recently incorporated a subsidiary company named PMT-Zyklontechnik Asia Sdn Bhd in Malaysia. The purpose of this subsidiary company is to aggressively promote its range of products in energy saving technology with the ultimate aim of providing very professional and efficient aftersales service to the customers in Asia.

Today's cement plants are increasingly demanding good quality clinker production and at the same time low energy consumption. For such, a cyclone system with high separation efficiency and low pressure drop is the solution. Thus, the HURRICLON was invented and PMT-Zyklontechnik GmbH patented the invention worldwide.

The principles behind the design of the HURRICLON are discussed here and the potential of energy saving or increased clinker production by retrofitting the existing cyclone with the device named HURRIVANE.

Among our customers are reputable companies worldwide like Lafarge Group, Holcim, and Cemex. PMT's recent completed projects in the ASAEAN region are with reputable companies like Malayan Cement

Kanthan plant in Malaysia, Malayan Cement's Rawang plant in Malaysia, Morning Star Cement in Vietnam, Saraburi Cement in Thailand and Asia Cement in Taiwan.

**Technical principle of HURRICLON**

The principle of cyclone process is such that its rotational speeds increase towards the centre of a cyclone. With this understanding, large scale industrial applications

are implemented and improvement of cyclone, with regards to the separation behaviour and pressure loss, is heavily researched.

Today, with the breakthrough in HURRICLON technology, a new generation cyclone with combining high separation efficiency and low pressure drop is possible. Using HURRICLON, a breakthrough has been achieved by a combining this effect with the double submerged pipe principle. The rotational flow in the centre has been increased and this answers the demand for improved separation performance. A separation of up to 98 per cent is achievable with HURRICLON depending on application. The discovery of the HURRICLON submerged pipe control system has not only facilitated the achievement of the maximum economy, but has also reduced the energy consumption to a uniquely low level through the installation of the two units HURRIVANE between the double submerged pipe.



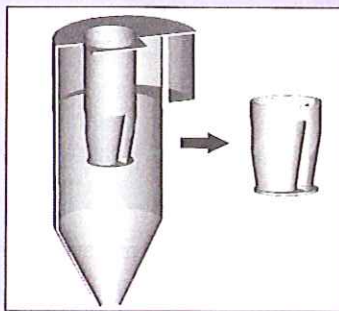
The principle of the HURRICLON with double dip tube and with two HURRIVANE installed

**Technical Principle of HURRIVANE**

HURRIVANE functions as a guide vane which is welded at the double submerged pipe of the HURRICLON or welded at the dip tube of an existing cyclone in case of retrofitting. The HURRIVANE is designed such that the guide vanes are directing the exhaust gas flow in a smooth directional vertical movement along the double submerged pipe in HURRICLON or dip tube in the existing cyclone. Pressure loss tends to be occurring along the circumference of the double submerged pipe in HURRICLON or dip tube in an existing cyclone because of the turbulence and friction effect. With the installation of HURRIVANE, such effects can be reduced due to the guide vanes. The principle of HURRIVANE is to reduce pressure drop by keeping separation efficiency at the same level.

The most important dimensional fac-

PMT panel continues



A HURRIVANE is simple welded onto the bottom end of the existing dip tube in the cyclone

include the quick fire, alkali resistant - Denscast 50A QF, Denscast 80 QF, Victor Korund ES QF (especially for the nose ring), Victor 75 and H 90 CA.

**Siemens AG**

Siemens Industrial Solution and Services Group is highlighting its industrial solutions and technical services for the cement industry at AFCM Booth 15. From new plant construction to extension, modification and modernisation of existing plants, the range of solutions specifically geared to the cement industry is comprehensive and helps operators get more out of their cement plant.

The cement segment encompasses experienced experts who provide added-value support and effective project management across all phases of a project - from initial planning and design through hardware and software engineering to construction and commissioning of the plant with integral plant maintenance and auxiliary process management.

Siemens is a solution provider with widespread technical project experience and in-depth knowledge of the cement production process. Solutions are geared both to the challenges faced today, and those that will come in the future.

The company incorporates modern, field-proven methods and technologies into its solutions, which are tailored to each customer's needs and significantly help enhance their competitiveness. Siemens leverages its combination of local knowledge and global strength through an interlocked network of some 300 locations - backed up by some of the best cement experts available anywhere.

Siemens solutions have also proven their worth, with a multitude of excellence references in the cement industry from all around the globe. This year Siemens celebrates 25 years of CEMAT™.

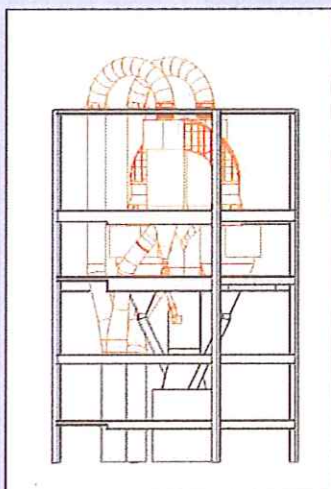
Since its first installation, Siemens has been continuously innovative by adapting it to changing industry needs. So, even after a quarter of a century, CEMAT continues to represent state-of-the-art technology for the cement industry that can be expanded and extended as customer needs change.

Mr Klaus-Dieter Schreiter is manning the Siemens stand at the AFCM meeting. He has been with the company since 1972 and in the cement department since 1973. He is now general manager sales for Siemens worldwide operations.

**PMT continued**

tors in centrifugal separators are the throughput volume, pressure loss and degree of fraction separation. Of these, pressure loss increasingly constitutes the most significant economic element, both in existing plants and newly designed cyclones. In particular, the dip tube and the intake form have a decisive effect on gas flow behaviour. The measure of greatest importance is the use of low pressure drop dip tube designs in the intake zone, where pressure loss is by far the greatest.

The reason for the economic significance of this measure is because during the service life of the separator, around 90 per cent of total costs derive from the energy required to compensate for pressure losses. Flow guidance in the intake zone



A typical modification of a pre-heater with two HURRICLON in the top stage and two HURRIVANE inside the existing cyclones in the second stage

must ensure that a high degree of uniformity is achieved between the intake and rotational flows in the separation chamber. Under practical conditions, deviation of up to 200 per cent from optimum levels are to be found and these have an extreme effect on energy consumption and separation behaviour.

**Conclusion**

Due to the functional design of the HURRICLON, the benefits of its usage can substantially reduce the operational and production costs in a cement plant. The HURRICLON can achieve a separation efficiency of up to 98 per cent and a pressure drop of between 50-90mmWg in the HURRICLON depending on application.

Retrofitting an existing high separation efficiency and high pressure drop cyclone with HURRIVANE can reduce the pressure drop by a minimum 30 per cent by keeping separation efficiency at the same level.

**Siemens activities in the ASEAN region in the past 24 months**

- in Vietnam Siemens is working at **Vietnam National Cement Trading Corp, Hoang Thach** (under execution). For the central laboratory Siemens will supply the quality control system (CEMAT QCS) including spectrometer and ups. The project includes design, supply, installation and commissioning
- in the Philippines Siemens has completed a project at **FR Cement Corporation**. It supplied the gas analysis system (CEMAT Gas) including the design, supply and commissioning. At **Continental Cement Corporation** (completed project) Siemens has supplied another gas analysis system (CEMAT Gas), which included the design, supply and commissioning. Siemens also supplied the gas analysis system (CEMAT Gas) at **Union Cement Corporation** (completed project)
- in Thailand, Siemens currently has an order with **Saraburi Cement** (under execution). Siemens will supply the gas analysis system (CEMAT Gas). The project includes design, supply and commissioning.

**The Siam Refractory Industry Co, Ltd**

Established in 1953, The Siam Refractory Industry Co, Ltd (SRIC) is Thailand's leading manufacturer of a full range of refractory products for the cement, steel, ceramic, petrochemicals, glass and other industries. With five decades of experience in the refractory industry and continued dedication to research and development, refractory products from SRIC has earned a worldwide reputation for their top quality, cost-effectiveness and services.

For the cement industry, SRIC's products are used for the lining construction of cyclone preheater, rotary kiln and clinker cooler. The product line-up includes:

- MSN 80, magnesia-spinel brick; high purity synthetic magnesia and spinel, suitable for upper and lower transition zone
- MAGRO 80, magnesia-chrome brick; iron-rich magnesia and coarse grain chrome ore, suitable for all areas of burning zone
- MSD 90, magnesia-spinel brick, periclase magnesia and 'in-situ MA-spinel', suitable for all areas of burning zone especially coating area
- KB 70 PB, burned high alumina brick with phosphate bond, suitable for calcining zone where high alkali substances have been found and erode the kiln shell
- C 40 A, C-60-A and C 70 A, low cement-

**Table 1: Siam Refractory Industry Co projects reference list - Thailand cement projects**

Company and location	Description
<b>Siam Cement PCL</b>	
- Khaeng-Khoi Plant	NSP, 5 stages, 2 strings with SLC NSP, 5 stages, 2 strings with SLC
- Khao-Wong Plant	NSP, 5 stages, 3 strings with 2 SLC
- Lampang Plant	NSP, 5 stages, 2 strings with SLC
- Thung-Song Plant	NSP, 5 stages, 2 strings with SLC NSP, 5 stages, 2 strings with SLC NSP, 5 stages, 2 strings with SLC
<b>Siam City Cement PCL.</b>	
- Tab-Kwang Plant	NSP, 5 stages, 3 strings with 2 SLC NSP, 5 stages, 3 strings with 2 SLC
<b>Asia Cement PCL</b>	
- Pu-Klang Plant	NSP, 5 stages, 2 strings with SLC NSP, 5 stages, 2 strings with SLC
<b>Jalapratan Cement PCL</b>	
- Tah-Klee Plant Semi-Dry	NSP, 5 stages, 2 strings with SLC
<b>Saraburi Cement CO Ltd.</b>	
- Hua-Pa Whai Plant	NSP, 4 stages, 2 strings
NSP = New Suspension Preheater SLC = Separate Line Calciner	ILC = In-Line Calciner DDF = Dual Combustion and Denitration Furnace