

INNOVATIVE ENGINEERING

Tecnologias e Serviços do Grupo Loesche

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More than 100 years Loesche







More than 100 years Loesche

1998	2000	2001		
DIN EN ISO 9001 certificate of approval was handed over by the certification auditor of Lloyd's Register Quality Assurance (LRQA).	Until August 2000 a total of 20 mills of the Loesche vertical roller mill Type LM 2+2 C/S for clinker and slag grinding are in operation or will be started up within the next months.	Successful with orders world-wide in Cyprus, India, Taiwan, Croatia, China, Italy, Greece, Turkey as well as Chile for in total eleven mills of different types.		
2002	2005	2006		
Development of hydro- pneumatic spring system.	First 4-roller coal grinding mill of type LM 43.4 D with product rates up to 120 t/h.	Loesche celebrates its 100. anniversary.		
	First 6-roller raw material grinding mill of type LM 60.6.			
2008		2012		
After the acquisition of ETIG – Elektronische Industrie Automatisierungs GmbH, Loesche GmbH, Düsseldorf, founded Loesche Automation GmbH (Now Loesche Automatisierungstechnik GmbH)		Loesche GmbH, Düsseldorf, founded Loesche ThermoProzess GmbH. Acquisition and participation		
,	,	of A TEC Production & Services GmbH and Aixprocess GmbH.		





~ 800 employees at 15 Loesche subsidiaries worldwide







31 representative offices worldwide







~ 100 employees at 11 Loesche stakes worldwide







Loesche vertical roller mills

- position in an integrated cement plant (1)







Loesche vertical roller mills - position in an integrated cement plant (2)







6 CONGRESSO BRASILEIRO DO CIMENTO

Loesche is able to offer the following services:



14



Loesche is able to offer the following additional services:

Assessment	Auditing	Maintenance	Fluid Dynamics	Spare Parts
Plant Assessment	General Audit	Mechanical Inspection	Computational Fluid Dynamics Modeling and Software	Common Parts Policy and redundancy concept
Machinery Assessment	Coal Mill Audit	Mechanical Repairs	Training	Tailored Services
Material Assessment	Raw Mill Audit	Electrical Inspection		
	Clinker Mill Audit	Electrical Repairs	Staff Training	Service Packages
	Emergency Audit	Troubleshooting	eLearning	Contracts and Commisons















Mills for Cement Raw Meal



Latest developments:

- Exchangeable assemblies for building 2-, 3-, 4- and 6 roller mills.
- Modular construction.
- Hydropneumatic spring assembly.

Advantages:

 The use of large mills reduces investment costs.





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Mills for Cement and Granulated Blast Furnace Slag



Latest developments:

- Significantly higher grinding pressure
- Variable grinding pressure during grinding.
- Hardfacing with mobile welding equipment possible.
- Very low differential speed between roller and grinding track.
- Low specific wear during superfine grinding.





Mills for Solid Fuels



Advantages:

- No metallic contact between the grinding parts, even when the mill is empty; thus no sparking.
- Individual guidance of the grinding rollers ensures mill operation with lowvibration.
- Grinding of different fuels possible; hard and soft.
- 2-, 3-, 4-, or 6 roller mill with throughputs up to 350 t/h.







Latest developments:

- LDC = Loesche Dynamic Classifier
 - Upper housings with rectangular horizontal outlet and a round sloping outlet are available.
 - Brings more homogeneous dust and gas distribution in the filter.





Automation Technology



Latest developments:

- Customised engineering services for process, hardware and software development.
- Open-loop and closed-loop control engineering.
- Full on-site supply of electrical equipment, service, maintanance and customer training.





Loesche Automation GmbH

Our Priorities in Process Automation:

Basic- und Detail-Engineering

Software Development

Visualisation of Automation Systems

Installation & Commissioning

Consulting & Process Optimisation

Customer Trainings

Automation department of Loesche GmbH in Düsseldorf: 19 employees

Loesche Automation GmbH in Lünen: 32 employees

51 employees









Loesche Automation GmbH

Common Controllers used by Loesche Automation GmbH

Standard Controllers

SIEMENS

S7-xxx Series

alternatively:



ControlLogix Series

Safety based Controllers

SIEMENS

S7-xxx-F Series

alternatively:



HIMatrix Series





Loesche Automation GmbH

Scope of supply





Loesche Automation GmbH

Loesche Automation Products

LM control The complete and open Automation Solution, based on standardized software modules for controlling and monitoring the Loesche Grinding Systems.
LM master The ,Stand Alone' Master System for process optimized operation of the Loesche Grinding System with the focus on power efficiency, throughput and availability.
LM remote The optional Service-Module for worldwide Online-Monitoring and Support complete plants in the frame of individual service agreements.
LOMA control The highly standardized Automation Solution for the Loesche Hot Gas Generators and Burner Technology in a ,fail-safe' and ,multi-fuel' - Design.



LM <u>como</u> The optional <u>Condition</u> <u>Monitoring</u> module for Loesche Mills with individual service agreements. A system for data acquisition, machine diagnosis and data remote transmission. Carry out of measurements: vibrations, torque, force, temperature, pressure, etc.







Main Features:

- Hot-gas generator with steel combustion Chamber (LOMA Heater)
 - No refractory linings.
 - Energy-efficient process.
 - Alternative fuels.
- Burner systems (MLB):
 - Outputs from 0.1 to 60 MW.
 - More than 600 reference plants in cement, power generation, steel, minerals, ore, timber, animal feed and chemical industry.





Hot Gas Generator Design - LOMA



Burner
Muffle
Spiral Housing
Ring Slots
Protective Sheath
Perforated Jacket
Hot Gas Outlet





LOMA - Spiral Casing, Burning Chamber



- Tubarao 3 (Brazil)
- LF 25, Stainless Steel
- Blast Furnace Gas



















- Founded in 1966 Uni. Prof. Clemento Greco
- Since more than 10 years around 300pc. installed burners
- Since 2010 part of the A TEC Group
- Since 2012 integrated in
- 8 worldwide offices

Kiln Burners





NEW: Solid Alternative Fuel Handling System



Hot Gas Generators

Fuel Systems





























TECHNICAL DATA:

- Thermal HGG power: 3 60 MW
- > HGG outlet temperature: 150-1000 C
- Vertical design
- Ash removal system
- FUELS:
- Coal / Petcoke
- り Oil
- 🧿 Gas
- Alternative Fuels (wood, animal meal...)



Loesche ThermoProzess GmbH



WÄRMETECHNIK

- Establishment in April 2012 in Düsseldorf, out of the company Küppersbusch, founded in 1875
- 41 employees
- In July 2012: move into the new office and production facilities
 - (in Gelsenkirchen)
- Certified to DIN EN ISO 9001 and ISO 14001





production and office space: 1.492 m² production 400 m² office





Loesche ThermoProzess GmbH



WÄRMETECHNIK

Special burner systems for low calorific gases until 3 MJ/Nm³











Loesche ThermoProzess GmbH



WÄRMETECHNIK

Multilance burners for special applications

e.g. Syngas

High-impulse selfcooling burners









Process optimization (ATEC + Aixergee)



Motivation:

- Cost pressure and ever changing requirements force cement plants to continuously modify & optimize their production process.
- Specific optimization is necessary for:
 - Process
 - Equipment
 - Operation



ENGINEERING











Energy saving, more Efficiency



Dip tube add on **URRIVANE** HURRIVANE HURRIVANE HURRICLON most economic pressure drop reduction for existing cyclone

30% guaranteed pressure drop reduction between cyclone inlet and cyclone outlet



the world's most economic cyclone

best efficiency for low loaded gases

most economic combination of pressure drop reduction and separation efficiency

Iess space requirement





Combustion Chamber for AF



- State of the art pre-combustion chambers for difficult to burn fuels
- Combustion takes place in a high oxygen atmosphere
- Reliable operation







Feeding and Dosing for AF



Reliable feeding devices for secondary fuels









LEUBE ZEMENTWERK GMBH



Actual Situation

- Operation with two kiln lines
- Both kilns without tertiary air duct, both kilns four stage Preheater
- Limited in alternative fuel usage & both kilns are more than 40 years in operation

Targets of the project

- Usage of 80 % alternative fuels
- Improvement of Clinker quality
- Reduction of dust emissions, NOx and SO2
- Flexibility of product arrangement
- Reduction of energy consumption
- Modernization without long stops
- Arrangements for CO2 reductions
- Best econcomic solution







The Aixergee Approach





Data collection from control system



Operator interviews









The Aixergee Approach









The Aixergee Approach















Capacity:	2850 t/d
Preheater: 2 st	ring, 4 stages without calciner
Kiln:	KHD , Ø 5.3 m x 80 m (Year of commissioning 1972)
Cooler: of Construction	rotary cooler, Ø 6.0/6.5 m x 52 m (Year 1985)
Secondary fuel rate: 65 – 75 %	

Initial situation:

• Formation of brown clinker granules under high RDF feeding rates





Case 1 – Brown Clinker – **Burner details**





Pneumoswirler in RDF channel





Case 1 – Brown Clinker – Evaluation of flame position









Case 1 – Brown Clinker – Impact of Pneumoswirl on coarse fraction of the RDF









Case 2 – High Bypass dust load





Capacity:	4000 t/d
Preheater:	1 string, 2 stages
Calciner: Kiln:	Polysius with Double Deflector and Combustion chamber Polysius , Ø 4.3 m x 62 m (Year of commissioning 1999)
Cooler:	Polysius Repol-RS with crusher
Calciner:	Polysius 2-stage preheater with Combustion Chamber
Kiln Bypass System: For alkali reduction	

Initial situation:

- Very high dust load in bypass gas
- Low chlorine concentration in bypass dust
- LOI in bypass dust indicates meal fall-though into kiln inlet chamber as root cause for dust extraction from kiln inlet chamber





Case 2 – High Bypass dust load





blue: meal from the open leg red: meal from the blocked leg green: coal





Case 2 – High Bypass dust load



Most of the material is flowing on the bottom of the sloped pipe between the CC and the calciner and is falling into the orifice as a massive streak. It is recommended to install a kind of jump at the connection in order to have a splash effect.











Case 2 – High Bypass dust load







- Meal from the blocked leg
- Coal
 - Climafuel







Case 3 – SNCR Optimization





Capacity:	2850 t/d
Preheater: 2 st	ring, 4 stages without calciner
(iln:	KHD , Ø 5.3 m x 80 m (Year of commissioning 1972)
Cooler: Construction 19	rotary cooler, Ø 6.0/6.5 m x 52 m (Year of 85)

Secondary fuel rate: 75 – 95 %

Initial situation:

- Frequent exception of the NO_x limit value (68 exception in daily limit values and 217 exceptions in half hour limit values in 2008)
- High consumption of reduction agent (700 k€ in 2008)





Case 3 – SNCR Optimization





- Approach:CFD-based engineering of optimal number, positions and orientations of the SNCR lances
- **Result:** Implementation of 4 lances on two different levels with adapted flow rates





Case 3 – SNCR Optimization



Consumption of reducing agent



Implementation of 4 nozzles per string

Flow rate reducing agent

Emission limit exceptions





Loesche Group in the Cement Industry





LOESCHE

INNOVATIVE ENGINEERING



Thank you for your attention!



