A TEC BYPASS DUST TREATMENT SYSTEM

AN ECONOMIC PROCESS FOR A “WASTE FREE“ REWORKING OF BYPASS DUST

REDUDUST

A TEC

World Leader in Cement Pyroprocess Technology

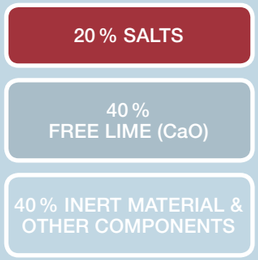
INTRODUCTION

Currently, large amounts of bypass dust are produced as an intermediate product by cement clinker production systems, especially those using alternative fuels. As this dust is highly loaded with chlorine and alkaline compounds, the utilization of this dust in the cement mills is limited. Furthermore, the disposal of this dust is quite expensive as due to the high chlorine content it is often categorized as hazardous waste.

The A TEC bypass dust treatment process (ReduDust) solves this problem since the contaminated bypass dust is used as a resource for the production of pure NaCl and KCl salts. The residual dust is free of these undesired components and can be recycled completely to the cement production, without enrichment of the undesired components. So not only the costs for disposal can be saved, also the lost amount of material by the bypass system can be recovered effectfully.

BASIC PRINCIPLE

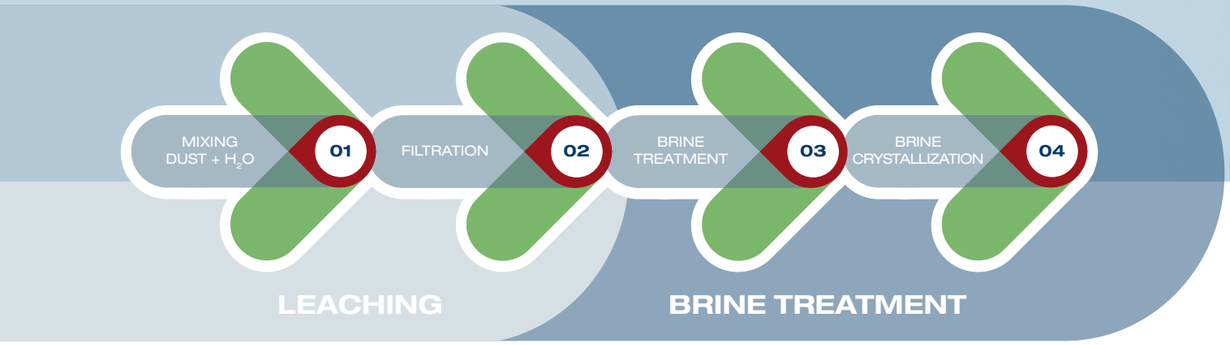
Typically, bypass dust from cement clinker production is rich in chlorine, and alkalis (potassium, sodium). These components are present on the dust surface as salts which are removed from the particles by the ReduDust bypass dust treatment process, developed in cooperation with HOLCIM group. The products of this process are cleaned bypass dust and pure or mixed of salt fractions (NaCl, KCl).



Distribution of salts which can be recovered, free lime and inert material of a typical bypass dust sample

The process consists of a leaching step, where the dust is mixed with water to create a salt bine, and a crystallization step. Those two overall steps are divided into the following four steps which are processed subsequently:

- **Mixing of bypass dust with water:** creation of a suspension of brine and dust particles
- **Filtration of the suspension:** separation of the salt brine and the particles (cleaned bypass dust)
- **Brine conditioning:** preparation of the brine for crystallization (depending on the requirements)
- **Crystallization:** salt production



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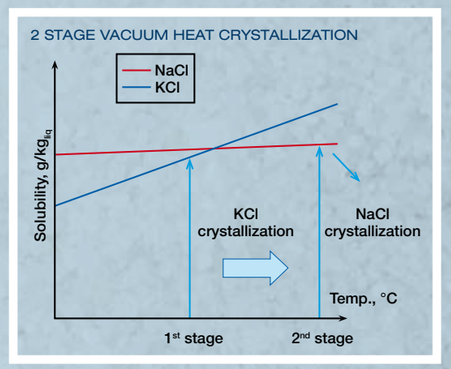
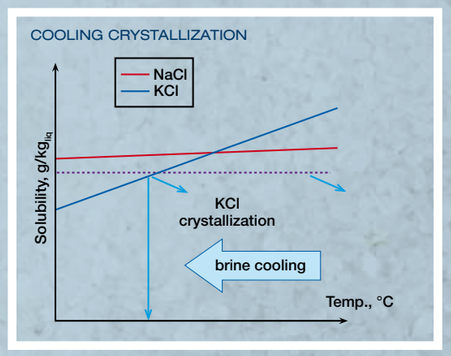
PROCESS OPTIONS

The process is tailored to the specific requirements of each installation. As this process is modular, for example, mixing and filtration can be done at a different place than crystallization, if crystallization is needed.

Options for crystallization

- One stage vacuum heat crystallization: production of a mix of KCl and NaCL
- Two stage vacuum heat crystallization: separate production of KCl and NaCl
- Cooling crystallization: mostly KCl crystallization, Na is leaving the process in the filter cake





2 stage vacuum heat crystallization and cooling crystallization use the effect of the changing solubility of KCl and almost unchanging solubility of NaCl as shown in the graphs.

PRELIMINARY SERVICES BY A TEC

Performance tests for bypass dust samples in the A TEC small scale pilot plant to gain knowledge about the bypass dust's expected

- Performance
- Salt composition
- Salt production
- Chlorine extraction

A TEC PROVIDES SUPPORT IN FINDING THE SUITABLE SOLUTION FOR THE TREATMENT OF SPECIFIC BYPASS DUST TYPES AND THE REQUIRED PRODUCT FEATURES.

Head Office
A TEC Holding GmbH
A TEC Production & Services GmbH
Kasernstrasse 16-18
3500 Krems, Austria
Phone: +43 2732 75680 0
Fax: +43 2732 75680 201
sales@atec-ltd.com
www.atec-ltd.com

Technical Center
A TEC Production & Services GmbH
Finkensteinerstrasse 9
(Gewerbepark Zufahrt A)
9585 Gödersdorf, Austria
Phone: +43 4257 3600
Fax: +43 4257 3600 101
office@atec-ltd.com

The ReduDust plant at Holcim Rohocnik with an annual capacity to treat 20,000 tons of bypass dust (August 2014)

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