



echeuch
TECHNOLOGY FOR CLEAN AIR

xmercury

SPLIT PREHEATER SYSTEM

BREAKING THE MERCURY CYCLE – EMISSION ABATEMENT TECHNOLOGY
FOR THE CEMENT INDUSTRY






TIME FOR A CHANGE

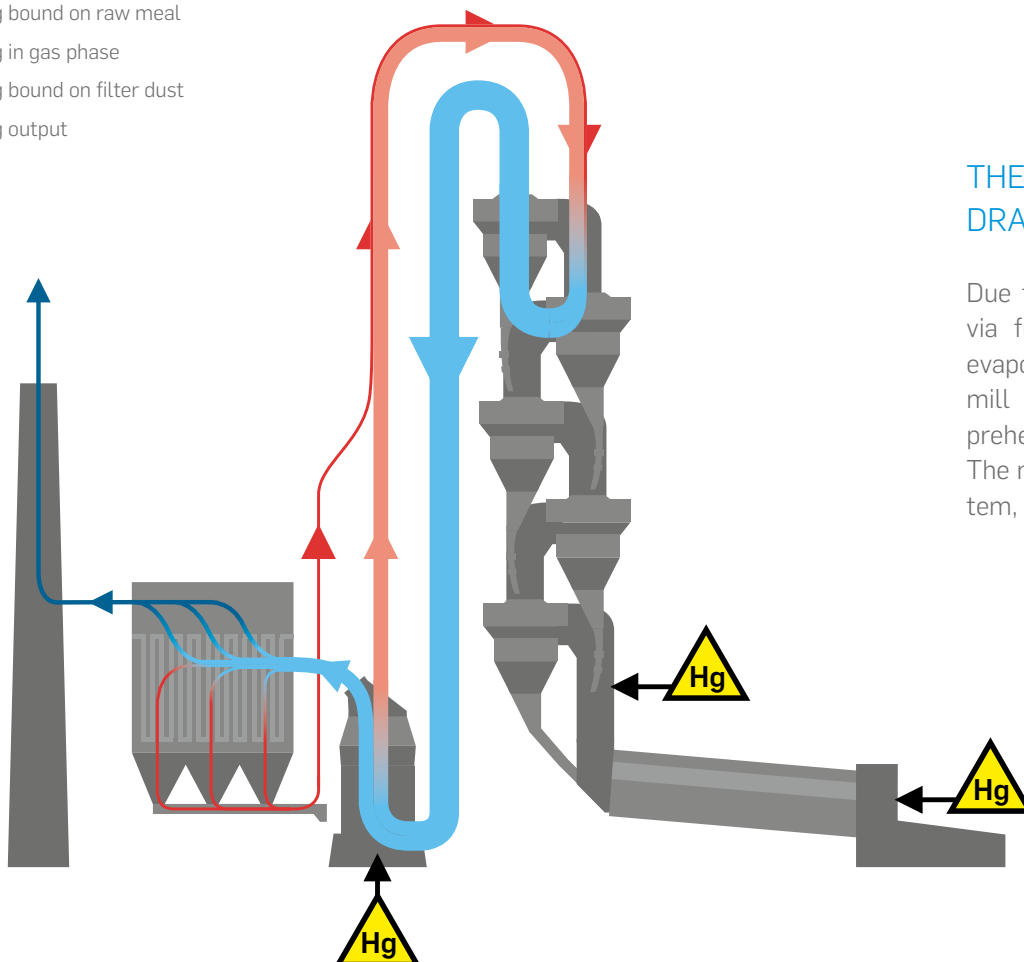
FACING THE EFFECTS OF MERCURY

The cement industry has been identified as second largest gaseous emission source of mercury just behind the conventional combustion of coal in thermal power and heating plants as well as in heating systems. Due to the health effects of mercury exposure, industrial and commercial uses are regulated in many countries worldwide. Mercury is treated as an occupational hazard: A challenge the cement industry is facing every single day – since mercury is present in raw materials and/or in the fuel used in the combustion process.

So Mercury enters the process by the raw materials and/or the fuels for cement production. Especially alternative fuels can be the source of increased amount of mercury. Mercury emissions are a complex topic due to the wide range of mercury compounds that can be formed in the process. Beside gaseous elemental mercury, it can be released from the combustion process as particle-bound mercury (adsorbed) or oxidized as Hg^{+2+} .

The objective of the industry is to minimize mercury releases to the environment from cement manufacturing as some cement kilns are facing mercury emissions close to actual limits. The limitation of mercury emissions in the cement industry is regulated nationally and therefore different limits are valid.

-  Hg input
-  Hg bound on raw meal
-  Hg in gas phase
-  Hg bound on filter dust
-  Hg output



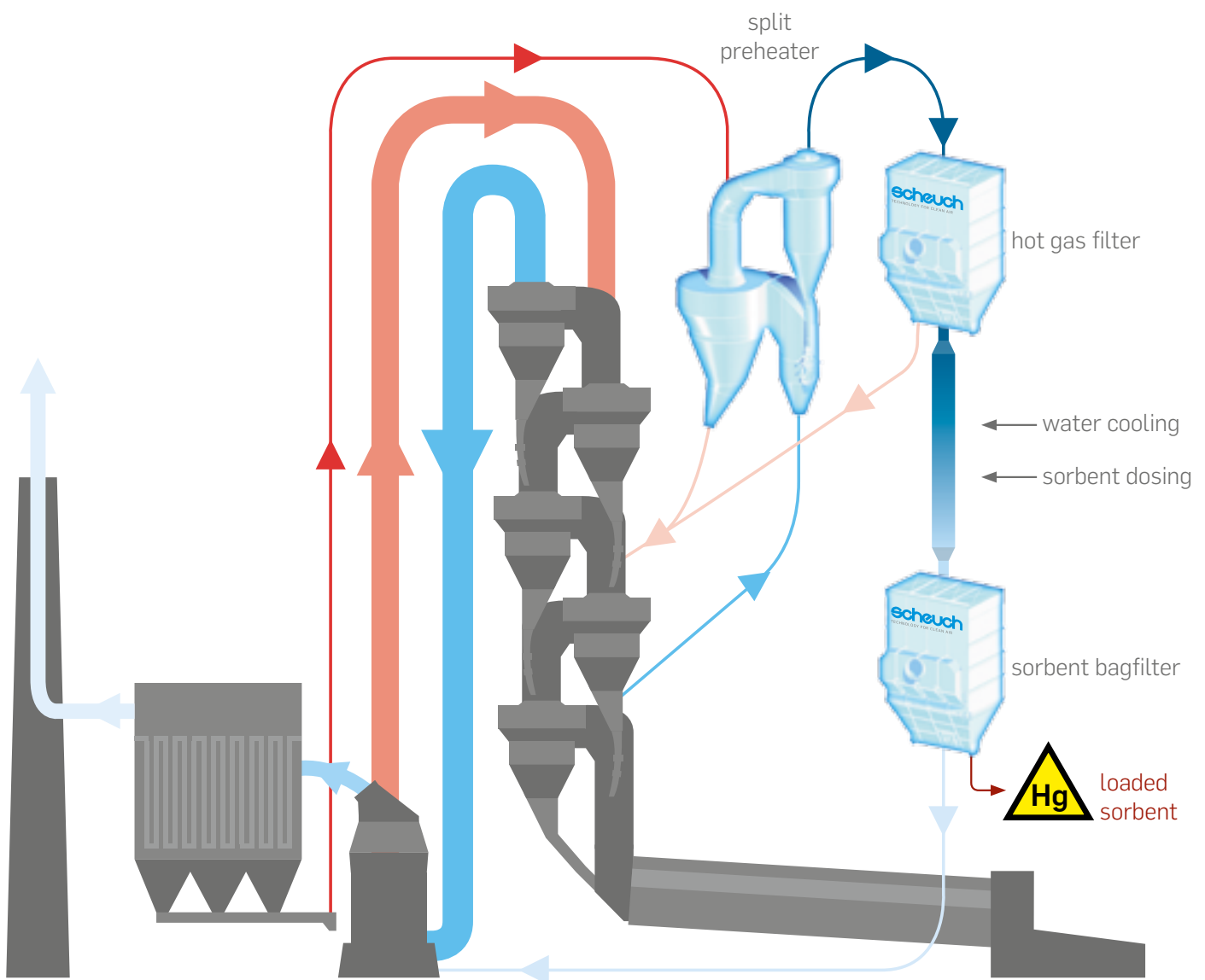
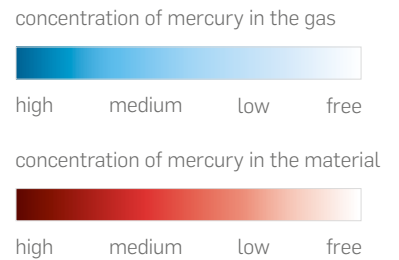
THE SCHEMATICALLY DRAWN HG-CYCLE:

Due to the constant mercury feed via fuels and raw materials, the evaporation of mercury in the raw mill and the condensation in the preheater, a Hg-cycle is formed. The mercury-cycle, in a closed system, only discharges through stack.

BREAKING THE MERCURY CIRCLE

XMERCURY – THE INNOVATIVE SPLIT PREHEATER TECHNOLOGY

As the reduction of mercury emissions in the cement industry is either linked to high operating costs for fuel and raw material cleaning, flue gas sorbents, or investment costs for flue gas treatment systems, it has been decided to propose a new system combining low investment costs as well as lowest operating costs and minimized ecological footprint.



The Xmercury split preheater system implemented in the existing system.

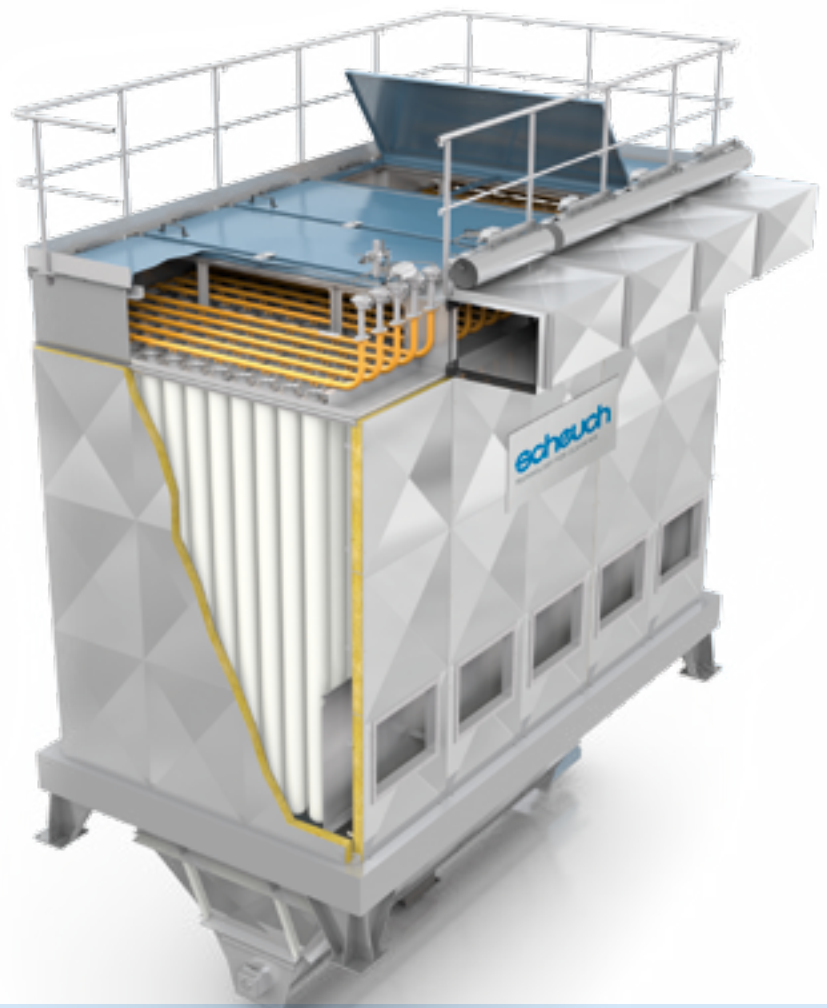
REDUCING EMISSIONS

HOW XMERCURY WORKS

The Xmercury system is designed as a second preheater line with the following basic principle: A small amount of hot gases is extracted from the lower part of the main preheater. The kiln filter dust (CKD) which is rich in Hg is mixed with the hot gases in the split preheater whereby the Hg evaporates.

The hot dust – free of Hg – is separated by high efficiency cyclones and by the special designed hot gas filter. So finally the dust is directly returned to the main preheater and remains in the process without heat losses.

Afterwards the dust free gas stream, which contains the Hg, is rapidly quenched by water injection to a final temperature of 100-120°C and the sorbent (e.g. activated carbon or any other adequate sorbent) is added to capture the mercury. A bag filter separates the sorbent from the cleaned gas stream. By re-circulating the sorbent it can be loaded to an extraordinary high level with Hg. This allows maximum utilization and leads to minimized sorbent consumption and consequently reduced amount for disposal. Finally the Hg-free gas is returned to the main gas stream prior to the raw mill.



SCHEUCH HOT GAS FILTER –

The core component of the Xmercury system scores with high efficiency for significant low disposal.

IMPRESSING RESULTS:

In the case of the first Xmercury installation worldwide the input of filter dust into the Xmercury is about 5 tonnes per hour, which is heated up to a temperature of 350-400°C. The required volume of hot gas from preheater stage five (temperature ~800-850°C) represent only 3-5% of the total gas flow of the kiln.

UNITED STRENGTH

POWERFUL COOPERATION
FOR STRONG SYNERGIES

In order to reduce mercury emissions, the Austrian companies Scheuch GmbH as well as A TEC Production & Services GmbH developed a new technical innovation: the Xmercury split preheater system.

SUCCESS STORY

The first installation at W&P Zement's cement plant in Wietersdorf Austria, which is in operation since the beginning of 2015, shows impressively the effectiveness of Xmercury.



The Xmercury split preheater system implemented at W&P Zement's production facility in Wietersdorf, Austria.



Partly visible cyclones for separation of the heated dust particles after the thermal treatment in the second preheater line



Sorbent extraction system

Plug & Play: From the first operation hour the Xmercury system showed excellent performance. All required separation degrees have been reached and even exceeded right from the start. The extreme low operating costs and the simple mode of operation across all processes are also two of the solution's unbeatable advantages. Last but not least the technology was originated by two companies, that obtain everything from a single source – consultancy, engineering, comprehensive solutions and service.



BENEFITS:

- Up to 80% emissions reduction
- Energy saving system (no additional thermal losses)
- Low additive consumption – low costs for additives
- Low disposal costs
- Process integrated installation – easy to operate
- Low gas quantities (3-10% of total gas flow)
- No dust shuttling necessary

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