

Process description of the rotary kiln at the REMONDIS QR site in Dorsten

In Dorsten a rotary kiln system is operating for the treatment of various metal-containing wastes also mercury. The main purpose of treating waste containing mercury in the rotary distillation is the removal of contaminants such as mercury and hydrocarbons and / or the recovery of mercury and generation of nonferrous metal concentrates.

Nonferrous metals and mercury containing wastes are recovered by means of distillation which is subsequently separating mercury and other substances, by heating up the waste and transforming them into a gas phase. Main objective of the treatment in the rotary kiln is the removal and recovery of the hazardous substances like mercury contained in the waste and, if possible, a further use of a mercury-free metal residue. If re-use or recycling of the residue is not possible, it can be disposed of as waste.

After treatment in the rotary kiln the recovered metallic mercury does not meet the requirements for the technical quality. In order to achieve highest purities that meet technical quality to be commercialized the mercury is further purified to mercury up to 99.99999 % in a high purity distillation unit under vacuum atmosphere.

On customer or legal request mercury recovered from the internal treatment processes can be stabilised to mercury sulphide, in order to ensure safe disposal of liquid mercury. Afterwards the generated mercury sulphide is disposed of in German salt mines.

Process description:

Material feeding of the rotary kiln is located in a separated area. The materials in drums or big-bags will be unloaded into a screen from which the substances will reach a conveyor belt. The input material is then transported by a scraper chain conveyor directly into the feeding screw of the rotary kiln. Both input and output devices of the rotary kiln are constantly sucked off and filtered through a dust and a fine dust filter. Afterwards the cleaned exhaust gas stream is directed to a active carbon filter.

Technical data:

- The rotary kiln is directly heated and operated with natural gas.
- length: 8 m
- diameter: 1.80 m
- max. throughput: 2 t/h

PROCESS DESCRIPTION OF THE ROTARY KILN



Figure: Rotary kiln for treatment metal containing bulk goods

The rotating kiln is operating in under-pressure atmosphere in order to prevent dust emissions. To minimize the unwanted intrusion of atmospheric oxygen in the rotary kiln, a few mill bar of pressure difference can be set.

Input materials such as active carbons, catalysts, soils, batteries, conditioned sludges are continuously treated at a temperature up to about 800° C. As a result, water, hydrocarbons and mercury are transformed into the gas phase and can be removed as exhaust vapor from the rotary kiln. Remaining solid residues from the process are discharged into a scraper chain conveyer at the end of the kiln and can be re-used or disposed of.

The exhaust gas stream from the rotary kiln is then transported by a cyclone into the post-combustion chamber. Dust particles are separated in the cyclone before the exhaust stream enters the combustion. Under controlled oxygen atmosphere in the post-combustion chamber, the combustion of hydrocarbons and CO takes place. Mercury treated under these conditions is almost completely released in gaseous form; consequently only elemental mercury is left in the vapor.

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After combustion, the remaining exhaust gas stream reaches the 3-stage exhaust gas treatment, in which the exhaust stream is cooled down to achieve a condensation of mercury and water. Afterwards the remaining gas stream, predominantly consisting of non-air polluting substances, passes an electro filter achieving the deposition of aerosols. The electro filter is operated as wet system. Finally the exhaust gas stream is further transported through an activated carbon filter system to remove residual mercury, contained.

Disposal code:

D9*: Physico chemical treatment

* The rotary kiln is to be classified as D9 operation only in combination with subsequent stabilisation of the recovered mercury in the HgS-plant (D12); furthermore if the disposal operation has been demanded by the notifier in accordance to waste movements/TFS.

For further informationen please contact:

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