

Halogen and VOC Abatement requires an Integrated Solution

Advanced Scrubber Technology and a Regenerative Thermal Oxidiser

Technology
for a
Sustainable Future

Application

ERG supplied a waste gas treatment plant and over 4 years on the plant continues to deliver emissions compliance for Saffil.

Saffil Ltd, a wholly owned subsidiary of Unifrax, produces high temperature insulation products, for use in automotive catalytic converters and other automotive and industrial applications.

From their production facility in Widnes, Saffil produces alumina-silicate polycrystalline wool (PCW) fibres. For this project, the facility was to be expanded to add a third line; and a new waste gas treatment system was required to comply with Environment Agency air pollution control limits.

Saffil recognised that working with ERG on the second line allowed both parties to build on the experience and develop "the design and installation of the waste gas treatment" for the third and subsequent lines to ensure compliance with Environment Agency regulations.

System Description

The manufacturing process produced a highly challenging waste gas stream at high temperature and humidity including the following contaminants:

- Volatile Organic Compounds (VOCs)
- Hydrochloric Acid (HCl)
- Abrasive Fibres

In order to comply with The Environment Agency limits, ERG designed an integrated waste gas treatment system with a number of steps to treat the combination of pollutants.

The first stage passes the most highly contaminated (low volume) process gases through a particulate filter, high temperature quench, sub-cooler and regenerative thermal oxidiser (RTO). This partially treated air stream is then mixed with secondary (less contaminated) process gases for further treatment in a 2-stage packed tower scrubber.

The process flow diagram (over) illustrates the components of the treatment system.



The high temperature of the gas meant that only a ceramic filter would be able to remove the majority of the entrained fibre content - protecting the downstream equipment from clogging.

As rapid cooling through the "de-Novo window" was critical to prevent the formation of dioxins, the gas was then quenched to 93°C, then sub-cooled in a packed tower operating with a 2% - 4% acidic liquor to remove energy (and water vapour) from the gas. This reduced the required size of the next stage, the oxidisation of the gas to remove VOCs and Dioxins in the RTO.



The materials of construction for the treatment plant had to be considered very carefully due to the highly corrosive (HCl) nature and temperature of the gas stream. The ceramic filter, the sub cooler and the RTO were constructed in Hastelloy C22, a high grade steel.

The highly contaminated (but cleaned) stream then mixes with a higher volume low contaminant stream to pass through two acid scrubbers to first clean and then polish the stream to meet the required emission levels for HCl.

The scrubbing towers were constructed (by ERG) from Derakane GRP, a corrosion- and temperature-resistant fibreglass reinforced plastic.

Benefits

The ERG Vent Abatement System commissioned in 2013 continues to meet the following performance and environmental criteria through the ongoing support of ERG's maintenance team:

- VOC: 99.5% destruction or better
- HCl: less than 3mg/m³ ex scrubber
- Dioxin: 0.1 ng/m³ ex thermal oxidiser
- RTO thermal efficiency: 95% or better
- Reliability of RTO: 99.5% or better
- Reliability of Plant: 99% or better

ENVIRONMENTAL COMPLIANCE TREATMENT OF HALOGEN & VOC CONTAMINATED GASES

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