

CASE STUDY



November 2015 - Horsham, West Sussex.

ERG supplied a £2.3m waste gas treatment plant. Over 2 years on and the plant continues to deliver emissions compliance for Saffil

Summer 2015 marked the completion of two years successful operation of an ERG (Air Pollution Control) Ltd designed, installed and commissioned waste gas treatment plant at the Saffil production facility in Widnes.

Background

Saffil Ltd, a wholly owned subsidiary of Unifrax, produces high temperature insulation products, for use in automotive catalytic convertors and other automotive and industrial applications. From a production facility in Widnes, Saffil produces alumina-silicate polycrystalline wool (PCW) fibres. In 2013 the facility was expanded to add a third line; and a new waste gas treatment system was required to comply with Environment Agency air pollution control limits. ERG had been involved in the waste gas treatment for the second line and built on this experience to win the contract to provide the whole of the waste gas treatment system for the new line.

Saffil Project Manager, Richard Nibbs, said “the design and installation of the waste gas treatment by ERG means we can comply with Environment Agency regulations. ERG used an innovative, integrated, approach, building on our operating experience of the previous lines. The gas cleaning package operates in an arduous environment and we are very pleased with the robust system design and after-sales service ERG provides”.

Operation

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

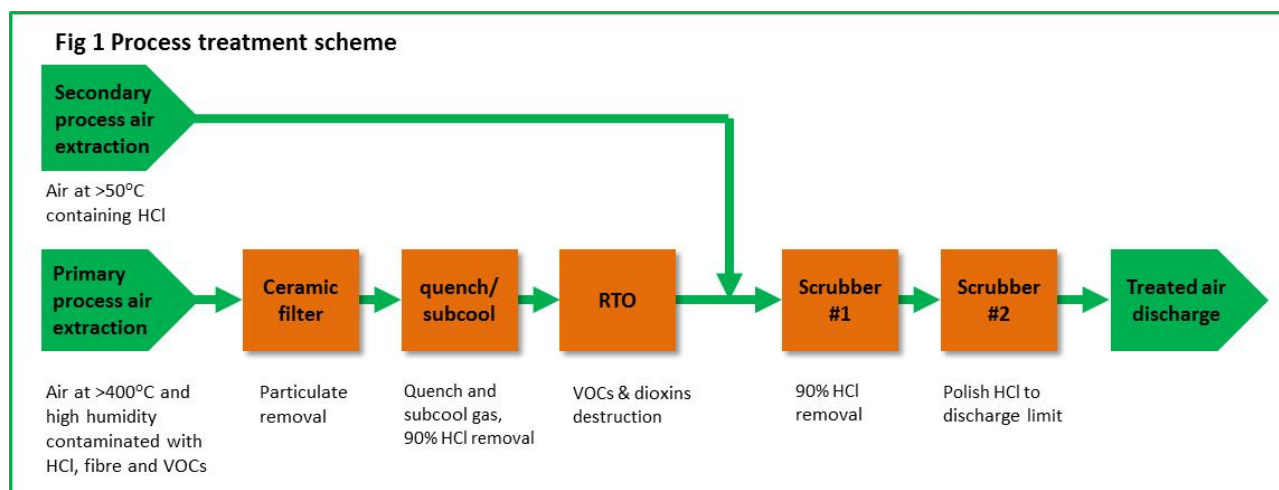
- Volatile Organic Compounds (VOCs)
- Hydrochloric Acid (HCl)
- Abrasive Fibres

In order to comply with The Environment Agency limits, ERG designed a waste gas treatment system with a number of steps to treat the combination of pollutants. The first stage passes the most highly concentrated process gases through a particulate filter, high temperature quench, subcooler and regenerative thermal oxidiser (RTO). This partially treated air stream is then mixed with secondary process extraction gases for further treatment in a 2-stage packed tower scrubber.

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The process flow diagram (fig 1.) illustrates the components of the treatment system.



The gas stream filtration stage removes entrained fibres from the extract gas stream. The high temperature of the gas means that a ceramic filter has to be used. The filter removes virtually all of the fibre content from the gas, protecting the downstream equipment from clogging. The collected fibres are cleaned down from the filters during routine shutdowns.

The gas is then quenched to rapidly reduce the temperature to 93°C. Rapid cooling through the “de-Novo window” is critical to prevent the formation of dioxins. The gas stream is then sub-cooled in a packed tower operating with a 2% - 4% acidic liquor to remove energy and water vapour from the gas to minimise the size and operating cost of the downstream RTO, and to reduce the HCl content by 90%, to protect the RTO from acidic corrosion. The acidic scrubbing liquor is supplied from the downstream scrubbing section to improve the system HCl removal efficiency and energy removal – a key part of the integrated design of the system.

The stream is then treated with a regenerative thermal oxidiser (RTO) to abate the VOCs and dioxins emissions to benchmark Environment Agency limits in line with the site EPR permit.

The final step is a two stage scrubbing system comprising 2 packed scrubbing towers. The first operates at a 2-4% hydrochloric acid solution and the second with pH2 acidic liquor to take the HCl levels down to the required limit of less than 3 mg/Nm³.

The final treated gas stream is then vented to the atmosphere via the site stack which is monitored in line with Environment Agency Regulation “Section 4.2A (1) (b) - production of inorganic chemicals resulting in the release of hydrogen halide” for VOCs, HCl and dioxins.

Effluent from the waste gas treatment plant is pumped to the onsite waste water treatment plant for further treatment.

Richard Hanson, ERG Director, said: “We brought our 35+ years’ experience of specialist gas cleaning contracting to bear on this challenging project. It’s been extremely encouraging to see the way our staff worked with Saffil’s team to build a robust and cost effective solution to this complicated problem. We are delighted to mark this 2-year anniversary of successful operation, completing the plant’s warranty period.”

The materials of construction for the treatment plant had to be considered very carefully due to the highly corrosive nature and temperature of the gas stream. The ceramic filter, sub cooler and RTO are constructed

in Hastelloy C22, a high grade stainless steel, in order to withstand the highly corrosive, acidic, high temperature gas and associated liquids.

The scrubbing towers were constructed from Derakane GRP, a corrosion- and temperature-resistant fibreglass reinforced plastic. They were constructed by ERG's subsidiary company BHP Plastics who specialise in bespoke plastic vessel construction for the process industries.

The plant has been operating successfully since the installation in 2013 supported by ERG's monthly inspection and monitoring visits.

The total cost of the waste gas treatment plant designed, installed and commissioned by ERG was £2.3 million.

For more information on how ERG can design and build waste gas treatment plant for the most challenging gas streams contact info@ergapc.co.uk

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814 words

Photos:

The regenerative thermal oxidiser (foreground)



HCl scrubbers



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About ERG (Air Pollution Control) Ltd.

ERG (Air Pollution Control) is a leading supplier of air pollution control systems and services with a 35 + year track record, providing turnkey tailor made solutions that are optimised to give the best technical solution for the lowest capital and running cost.

ERG is based in Horsham, West Sussex, near Gatwick airport with satellite offices around the UK, a branch office in the Middle East, and a global network of V-tex[®] technology licensees.

ERG specialises in odour control and gas conditioning systems; V-tex[®] scrubbing, stripping and condensing technology; soluble contamination capture and recovery; particulate removal systems; hazardous waste flue gas cleaning systems, and VOC contamination abatement.

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