T hermische
R ückstands
V erwertung GmbH & Co. KG

TRV Thermische Rückstandsverwertung GmbH & Co. KG - Postfach 1616 - 50380 Wesseling

Introduction

TRV was founded on 18th October 1994 as a German company and is a subsidiary of Basell Polyolefine GmbH, Wesseling and REMONDIS Industrie Service GmbH, Mönchengladbach.

The company operates a thermal residue recovery plant in Wesseling with an average capacity of 60.000 tons per year. By thermal recovering of hazardous waste the plant makes a reliable contribution to the protection and conservation of natural resources and the environment.

In order to correspond completely to environmental requirements according to the 17th BImSchV (German clean air act), the plant was provided with further flue-gas cleaning components – a selective catalytic reduction (SCR) system and a flue gas adsorber. In total an capital expenditure of 31 Mio. € was necessary. With this new equipment the plant corresponds to the modern environmental protection and safety requirements.

Due to its original function TRV treats waste coming from chemical and mineral oil industries. Comparable waste coming from other industrial fields as well from local sectors, e.g. varnishes, paints and sludges can be recovered, too. Since many years, we have provided an environmentally sound disposal for hospital wastes.

Thermal residue recovery plant

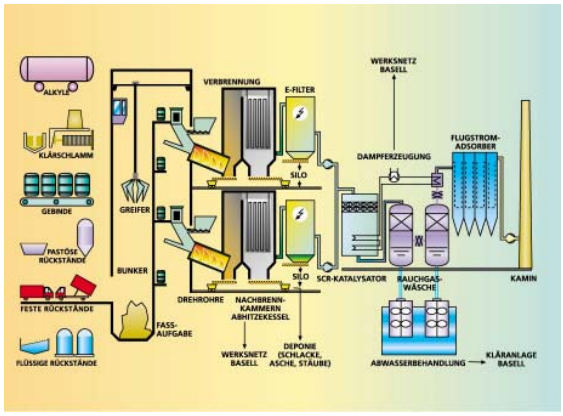
Location

The company is located in the industrial area of Wesseling in the south-west of the Basell site. This site has junctions to the major regional and supraregional traffic connections. The nearest motorway (BAB 555, Köln Godorf) is approximately 2 km away from the site. The harbour “Rheinhafen Godorf” is located in the north-east. A rail connection is nearby.

View on the northern part of the industrial area of Wesseling

Plant structure

The plant is divided into the following sections: Acceptance region, common intermediate storage, conveying and feeding facilities, incineration, steam production and flue-gas cleaning (see the simplified flow diagram). The solid material bunker is adjoined by two rotary kilns, each with one secondary combustion chamber, one boiler and one electrostatic precipitator. Afterwards the flue gases of both incineration lines are combined and passed through a selective catalytic reduction (SCR) system, a two-stage flue gas scrubber and a flue gas adsorber. Finally the cleaned flue gases are released through a chimney.



Simplified flow diagram

Residue acceptance

The simplified flow diagram demonstrates the flexibility and ability to accept a wide range of residue qualities. The process of dealing with the residues depends on their content and consistency and on the safety and environmental requirements.

- The sludge delivered from Basell’s sewage plant is pressed, drained and, if required, incinerated after an intermediate storage.

- Barrels with chemicals or hospital wastes are stored temporarily and conveyed at regular intervals into the rotary kiln by means of a barrel lift.

- Pasty or viscous materials can be stored separately and fed into the rotary kiln with an industrial solid pump.

- Solid residues are tipped down into the solid material bunker (approx. capacity of 850 m^3) and reduced with shears into small pieces, if necessary. By means of a grab, they are conveyed by way of a feeding hopper through a sluice into the rotary kiln.

- The liquid residues, e.g. hydrocarbons, are stored temporarily in tanks (volume of 900 m^3). Pumps convey these residues via a ring pipe to the burners in the rotary kilns and in the secondary combustion chamber.

- Liquids that may react with other substances are fed to the incineration process from special tanks by means of nitrogen through a special pipeline.

Thermal treatment

In order to achieve an optimum incineration and emission reduction, the solid, liquid and pasty or viscous residues are fed to the rotary kiln in a certain proportion depending on their composition and calorific value. In the fireproofed rotary kilns the organic contents are incinerated for approximately 60 minutes at 800 –1.000 ^{0}C, i.e. the residues are mineralised and the volume is reduced considerably. In the secondary combustion chamber a temperature of 900 – 1.100 ^{0} C is achieved by the addition of liquid materials with a high calorific value for a duration of 2 seconds in order to reduce the remaining organic contents. If the residues' calorific value is not sufficient for the independent combustion, fuel oil is added.

The combustion air is mostly sucked out of the solid material bunker. By this method a slight vacuum is maintained.

Rotary kiln

Heat use

The flue-gases heated up in the secondary combustion chamber are cooled down in the boiler to approx. 310 ^{0} C. Later, in a second step, they are cooled down to 180 ^{0} C. With this method approx. 250.000 t of steam are produced per year and fed into the steam network of the Basell site.

This represents a saving of approx. 25.000 tonnes of fuel oil, sufficient to heat about 6.000 detached houses for a year.

Secondary combustion chamber and boiler

Safety and environmental protection

The flue gases are only allowed to leave the chimney with the adherence of most stringent requirements. By combining several cleaning components, we achieve the observance of the 17th BImSchV-limit values, falling well below of them. The newly developed high-temperature catalyst within the SCR system converts nitrogen oxides and organic trace materials into harmless substances. Mainly sulphur oxides, hydrochloric acids and heavy metals are held back in both scrubbing columns. At the end of the flue gas cleaning installation a fabric filter with a lime coal dosage is installed as an additional barrier to emissions. This so-called flue gas adsorber serves as an observing filter.

SCR system