

# Finishing Processes

A decorative graphic consisting of two overlapping circles, one light blue and one light green, positioned behind the letter 'P' in the title. A horizontal dashed line passes through the center of the circles and the text.

# Introduction

2

- Secondary refining process
- Make petroleum products suitable for use
- Various finishing processes are
  - ✦ Hydrogen Sulphide removal processes
  - ✦ Sulphur recovery processes
  - ✦ Sweetening processes
  - ✦ Solvent extraction process
  - ✦ Hydrotreating processes

# Hydrogen Sulphide Removal Process

3

Hydrogen Sulphide is removed by following methods

1. Absorption by regenerative solvent
2. Adsorption on solid bed

# Absorption by Regenerative Solvents

4

Various types of solvents are:

**Chemical Solvent:** Used for H<sub>2</sub>S removal at lower operating pressure.

Two common solvents are **Amines** and **Hot Carbonates**.

Two primary amines used are monoethanolamine (MEA) and diglycolamine (DGA).

Potassium carbonate is used as hot carbonate to absorb CO<sub>2</sub> and fair amount of H<sub>2</sub>S.

**Physical Solvents:** Used at higher operating pressure ( $>345$  kPa)

These solvents are regenerated by multistage flashing to low pressures.

Several physical solvents include dimethyl ether of polyethylene glycol, methanol, N-methyl-2-pyrrolidone (NMP) and propylene carbonate.

**Hybrid Solvents:**

# Process Description

6

- Process is based on countercurrent contact of the gas stream with a solvent.
- $H_2S$  rich solution from absorber is stripped.
- Regenerated lean solution is cooled and recycled back to the top of the absorber.
- Stripped acid gas is fed to Claus-type Sulphur recovery unit.

# Adsorption on Solid Bed

7

- Based on the adsorptive properties of certain porous solid materials
- This process is used for gases containing low to medium concentrations of  $H_2S$

Adsorption on Solid beds is classified as:

1. **Non-regenerative Adsorbents:** Includes zinc and iron oxides.  
Operated at elevated temp.
2. **Regenerative Adsorbents:** Include molecular sieves and zinc titanate. Remove  $H_2S$  at high temp.

# Claus Process

8

- Developed by C.F. Claus in 1883 and was modified by I.G. Farben
- Consists of thermal stage followed by 2 or 3 catalytic reactor stages
- Thermal stage consists of reaction furnace, waste heat boiler and condenser
- Catalytic stage consists of feed heater, catalyst bed and Sulphur condenser
- For maximum recovery  $\text{H}_2\text{S} : \text{SO}_2 = 2:1$



# Process Description

9

- Acid gas is fed to reaction furnace
- Reaction is exothermic, heat generated is recovered in form of HPS
- From WHB steam is sent to condenser
- Gases are reheated to 200-600 °C
- After reactor gases are passed over condenser, heater and reactor before being sent to final condenser



Thanks