FACTORY SULPHATE OF POTASH (K₂SO₄) BY MANNHEIM PROCESS

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Abstract

Potassium sulfate fertilizer production capacity is still a little, while the demand increases. To meet the demand, it requires production capacity addition. Plant site in Paciran (East Java), is selected based on raw materials and ease of transportation.

The process of making potassium sulfate fertilizer includes four stages. In stage 1, the main raw material 99.5% KCl and 98% H₂SO₄ are reacted in Mannheim furnace at 550°C, 0.2 atm and time residence of 20 minutes. In stage 2, K₂SO₄ as main product is cooled with ejector cooler from 90°C to 50°C while the HCl from the top stream of reactor as byproduct can be sold. In stage 3, the main product is separated between the on size of 20 mesh from over size on the screening conveyor. The over size products should be reduced in Crusher at a temperature of 40°C. In stage 4 products are neutralized by adding Na₂CO₃ on the mixing conveyor at 40°C, to obtain H₂SO₄ free of 0.5%.

Potassium sulfate fertilizer plant operates 24 hours/day and 330 days/year. Production capacity of potassium sulfate fertilizer plant of 10,000 tons/year, requires the main raw materials H₂SO₄ of 6700 tons/year, and KCl of 3400 tons/year, as well as the supporting materials Na₂CO₃ of 2300 tons/year. Total water demand is 67.5 m³/day including 20.22 m³/hr of water sanitation, and water coolers of 47.28 m³/hr.

Key word : Potassium sulfate, Mannheim furnace, H₂SO₄, KCl.