

3. The Production Process

Historically, sulfuric acid production was based on the Lead Chamber Process, involving the oxidation of sulfur dioxide by nitric acid and nitrogen oxides in the presence of water. This has been replaced by the Contact Process in which sulfur dioxide is oxidized by atmospheric air at high temperatures and in the presence of a vanadium pentoxide catalyst.

Specifics will vary from one plant to another, but this description is provided as an overview of a typical Contact Process.

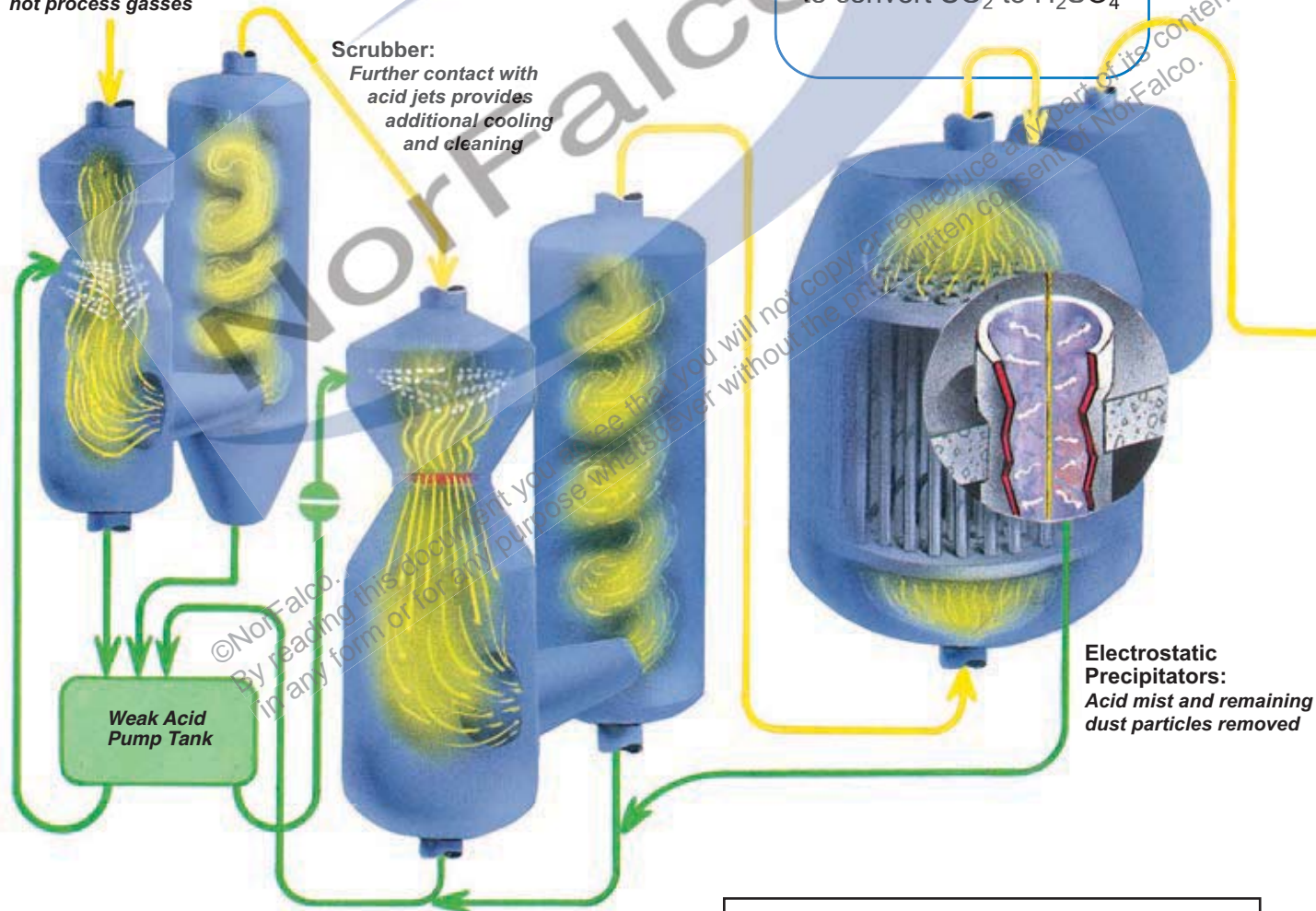
The process begins with cleaning of the gas. The sulfur dioxide from smelting and roasting operations passes through a series of gas cleaning steps that

The Production Process

The criteria of purity and accuracy of grade are the primary goals of sulfuric acid production. The Contact Process, described here, is almost universally used to convert SO_2 to H_2SO_4

Quench Tower:
Weak acid jets remove particulate matter from hot process gasses

Scrubber:
Further contact with acid jets provides additional cooling and cleaning



■ Weak Acid Solution	■ 98% Acid Stream
■ 93% Acid Stream	■ SO_3 Gas Stream
■ SO_2 Gas Stream	Acid Pumps

cool and remove almost all metallurgical dusts. The gas is then drawn through electrostatic precipitators where acid mist and any remaining dust particles are removed. The wet gas is dried in a tower by direct contact with 93% sulfuric acid and a blower then forces the gas through a series of heat exchangers and converter beds, where, in the presence of vanadium pentoxide, the sulfur dioxide is oxidized to sulfur trioxide.

Depending on the required product strength, acid from the absorption or drying towers can be stripped of SO_2 , cooled, and pumped to storage. Some acid is exchanged between the absorption and drying circuits to maintain acid strength.

The purpose of the heat exchangers is to utilize the heat of reaction in the converter beds to heat the incoming cool gas to the reaction temperature. The SO_3 gas then passes through an absorption tower where it combines with the water in 98% sulfuric acid to make additional sulfuric acid.

