

Chemical Process Industry - TiCl₄

THE PROBLEM:

Titanium tetrachloride (TiCl₄), often referred to as "TICKLE" (See Figure 1), is a dense, colorless organic compound with many uses in the chemical and metal industries. It is produced by using a reduction process of titanium oxide pores followed by distillation to improve purity (See Figure 2). The semiconductor industry uses a pure form of the compound as a chemical vapor deposition agent for making electronic components. Millions of pounds of titanium tetrachloride are made each year for the paint industry to make titanium dioxide, the white pigment in most household and industrial paints. The compound is also an essential element in the production of titanium metal. Titanium is a commonly used metal in the aerospace industry because of its high strength and light weight.

Figure 1 - TiCl₄

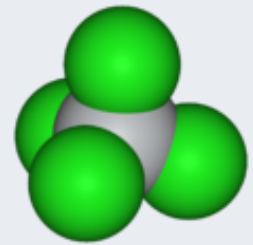
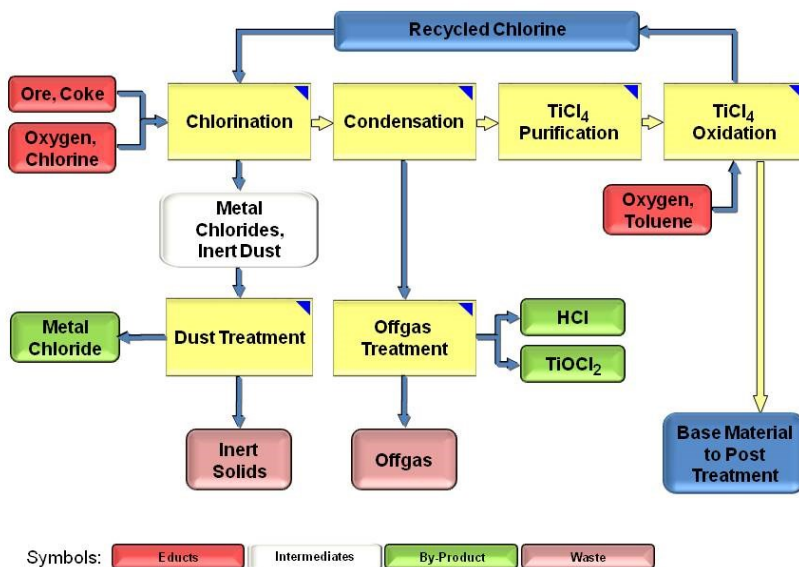


Figure 2 - Process Diagram



THE PROBLEM:

A major producer of titanium tetrachloride in Georgia had to replace their 10" 150# ANSI standard floating ball valves every 6 to 8 weeks due to wear and leakage. The valves were subjected to temperatures as high as 400°F and crystalline deposits of titanium tetrachloride were collecting in the valve body cavity. After time, the deposits caused scoring of the ball and seats which resulted in leakage and sometimes inoperability. The valves were not repairable on site so replacement several times a year was the normal course of action.

THE SOLUTION:

In June 2006, the customer installed a 10" ASME Class 150# QuadroSphere Ball Valve with carbon steel body, RTFE seats, and hard-chrome plated 316 stainless steel trim. After 36 weeks, the first valve was removed from service and examined. The valve was disassembled and

the QuadroSphere ball and seats were in excellent condition. This field test resulted in a six-fold improvement in valve life.

THE RESULT:

Over the next six months about twenty 8" and 10" QuadroSphere Ball Valves with self-cleaning seats and self-flushing body chambers were installed. They went on to perform without problems saving the customer hundreds of thousands of dollars by eliminating down time, avoiding replacement valve purchases and improving productivity of the maintenance staff.

WHAT TO LOOK FOR:

There are many similar application opportunities for our QuadroSphere Ball Valves in the Chemical Process Industry. Any process that involves compounds that wear valve seats or collect in the valves body can benefit from the QuadroSphere technology. Other successful applications include PVC reaction, potato slurry, fly ash and paper pulp. These processes are easy to identify by asking plant personnel where they are having high maintenance issues with their ball, plug and gate valves. Then, the benefits of the QuadroSphere technology can provide better performance and help contribute to their bottom line.