

International Process Plants

Stock #600495

Sorbitan Esters Plant

9,500 MTPY



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Brief Overview

- Capacity: 9,500 metric tons/year
- Technology: Free and Clear to Practice Worldwide
- Utilities: Electricity, Steam, Water and Fuel Gas
- Year Built: 1980s
- Shutdown: 2009
- Product: Sorbitan Ester
- Raw Materials: Fatty Acids, Sorbitol
- Process control systems are Siemens PCS7 and Fisher-Provox systems, completely up-to-date and for sale with the facility
- Highly automated flexible batch plant

Process Overview

- The sorbitan ester (esterification) plant provides a process where fatty acid and sorbitol are heated to a temperature of 235°C where the reaction occurs, forming sorbitan. Carbon black is added to reduce color formation. Since the reaction is reversible, the water is vaporized and drawn off as soon as it is formed, leaving the sorbitan ester in the reaction vessel. After the water has been removed, the ester is refined by removing carbon black with a filter press. The product can be further refined to produce a different grade of sorbitan ester by “bleaching”. Trace catalyst is removed and the color improved by bleaching with hydrogen peroxide. The finished product is then cooled and filtered. The sorbitan esters plant is capable of producing bleached and unbleached sorbitan mono-oleate (SMO), sorbitan sesqui-oleate (SSO), sorbitan tri-oleate (STO), and sorbitan mono-laurate (SML).

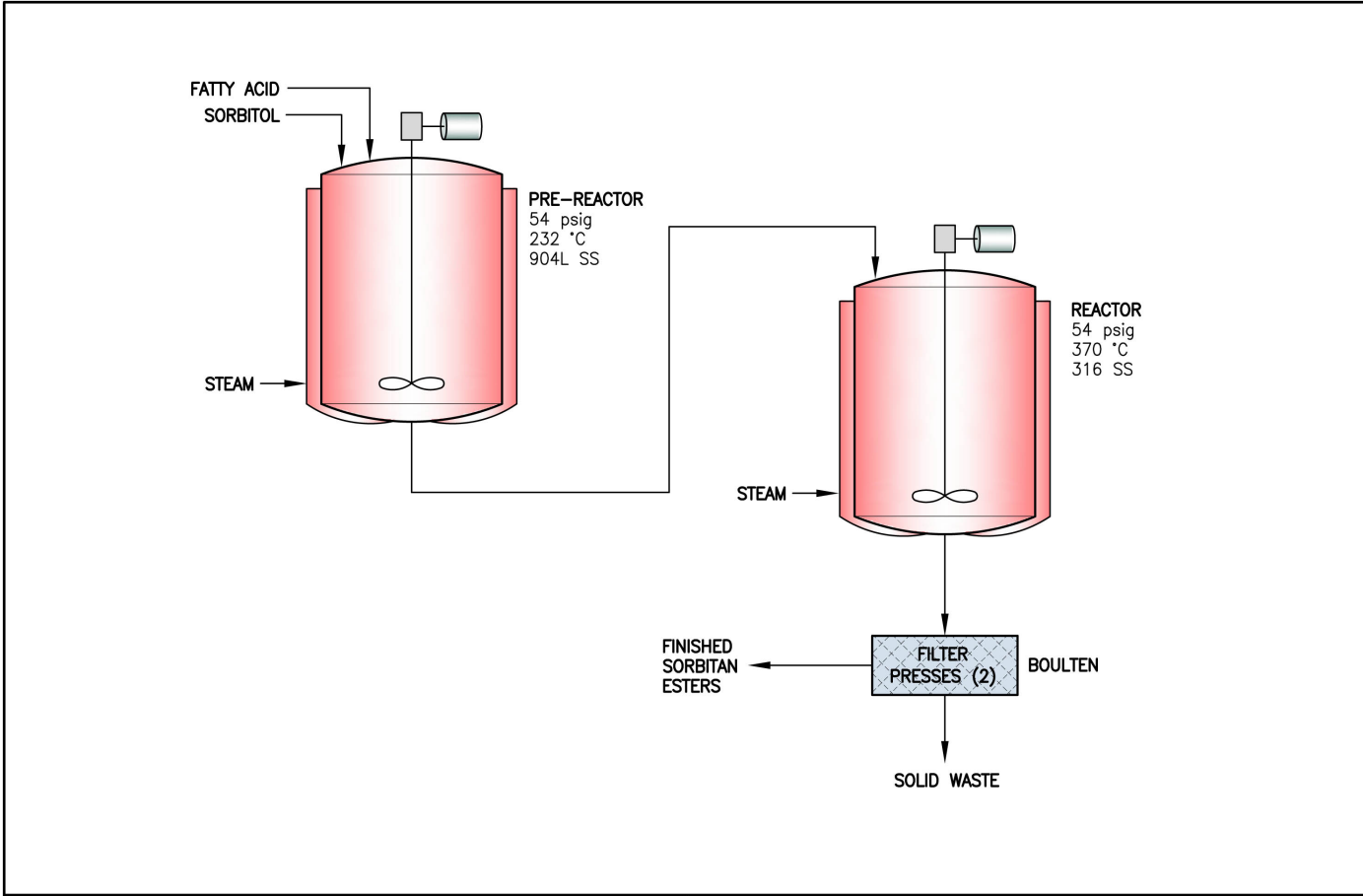
Process Overview (cont.)

- The Sorbitan Plant is a highly automated and flexible batch plant. Sorbitol and fatty acids are prepared and heated in a pre-reactor before being transferred to the main reactor vessel. Carbon black is also added to the batch to control color. Both reactors are agitated and steam heated with jackets. Recirculation is used during the reaction step to achieve additional mixing. When the reaction is completed the batch is cooled through an external cooler before being transferred to filter tank. The batch is then filtered through two Boulton plate and frame filter presses prior to storage.
- Three types of fatty acid are used for sorbitan ester manufacture: captive tallow-based oleine, vegetable-based oleine, and coconut fatty acid. The poly-functional alcohol sorbitol is used to produce bleached and non-bleached sorbitan esters. The sorbitol is received in the form of sorbidex, a 70% solution of sorbitol in water. To assist in the reaction process, a homogeneous catalyst mixture is used. There are two types of catalysts: Standard Catalyst is 50% phosphoric acid and 28% sodium hydroxide and Lite Catalyst is 70% phosphorous acid and 28% sodium hydroxide. Carbon black is used to prevent color formation and hydrogen peroxide is used for bleaching.

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Process Flow Diagram



INTERNATIONAL PROCESS PLANTS
 17A Marlen Drive, Hamilton, NJ 08691
 Phone: +1 609 586 8004
 Fax: +1 609 586 0002
 www.ippe.com

Fatty Acids, Glycerine, & Esters Plant
Sorbitan Plant

DATE: 09/05/2009

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Major Equipment

- **Adamson and Hatchett Pre-weigh reactor** (item 730-V0470):
25 m³ 316L stainless steel vertical agitated pressure vessel with internal vertical coils, weld dished top and bottom, 2.4 m (dia.) x 5.4 m (straight side), internal design pressure 450 psig (31 bar) @ 450°F (232°C), coils 230 psig (15.9 bar) @ 500°F (260°C), seven sets of vertical internal coils, two 4-blade pitched paddles driven by 15 kw, 415 volt, 1,460 rpm motor via type SCF548 gearbox with mechanical seal.
- **Portobello Fabrications Ltd. Reactor** (item 730-V0200):
15 m³ 321 SS vertical agitated pressure vessel with internal 904LSS vertical coils, weld dished top and bottom, 2.3 m (dia.) x 3.5 m (straight side), design pressure internal 3.5 bar/FV @ 260°C, coils 41 bar @ 30°C, six sets of 904LSS vertical internal coils, Chemineer agitator drive, driven by 14.5 kw, 415 volt, 1,460/145 rpm motor, two 4-blade pitched paddles with mechanical seal.

Photos



Sorbitan Plant

Contact IPP Today!

MICHAEL JOACHIM

DIRECTOR, PLANTS DEPT.

Tele: 609-838-5930 (direct)

Mobile: 609-516-9107

MichaelJ@ippe.com

SANJEEV REGE

VP GLOBAL PLANT SALES

Tele: 609-838-5938 (direct)

Mobile: 609-510-2616

SanjeevR@ippe.com



**INTERNATIONAL
PROCESS PLANTS**

Your Partner for
Complete Plant Solutions

IPP World Headquarters

17A Marlen Drive ♦ Hamilton, NJ 08691 ♦ USA
Tele: +1 (609) 586 8004 ♦ Fax: +1 (609) 586 0002

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