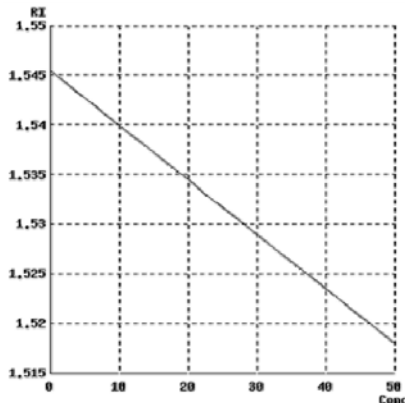


STYRENE C₈H₈

Typical end products

Polystyrene, ABS plastics, styrene butadiene, rubber

Chemical curve: Ethylbenzene in Styrene R.I. per Conc% b.w. at Ref. Temp. of 20°C



Introduction

Styrene is a colorless, aromatic liquid. Nearly all of the commercial styrene is consumed in polymerization and copolymerization.

The two process routes that are used for styrene manufacturing are dehydrogenation and coproduction with propylene oxide. Nearly 90% of styrene production utilises dehydrogenation, mainly because of its simplicity and cost-effectiveness.

Application

Dehydrogenation of Ethylbenzene

In the dehydrogenation process, fresh and recycled ethylbenzene is mixed with steam. This vapour-mixture of ethylbenzene and steam is heated to the required reaction temperature through heat-exchangers by the reactor effluent, and is then fed into the reactors. The reactor effluent passes through heat exchangers to preheat the ethylbenzene-steam mixture. It is also utilized to generate steam for the distillation train. Then, the condensed reactor effluent is separated into vent gas, condensate and crude styrene, in a settling drum.

Purification of Styrene

Typically, a distillation train is used for styrene purification. Crude styrene is brought to a benzene-toluene column, where benzene and toluene by-products are recovered. The rest is distilled in the ethylbenzene recycle column, where ethylbenzene and styrene are separated. Following this, the ethylbenzene is recycled to the dehydrogenation section and the residue is then pumped into the styrene finishing column, where the final styrene purification is achieved.

CHEMICALS AND ALLIED	
APPLICATION NOTE	4.03.03
STYRENE PRODUCTION PROCESS	

Installation

The K-Patents Process Refractometer PR-23-GP is used to measure the final product concentrations. It is installed in the long pipe, after the styrene finishing column. The process temperature directly after the

column is about 80-90°C (176-194°F). It decreases at ambient temperatures of 5-35°C (41-95°F), according to seasonal fluctuations, when it is ready for storage. The measured concentration range is 95-96%. Appropriate equipment hazardous and intrinsic safety approvals are available for hazardous area installations.

Instrumentation



Description

K-Patents Process Refractometer PR-23-GP is an industrial refractometer for large pipe sizes and tanks, cookers, crystallizers and kettles. Installation through a flange or clamp connection.

Area classification:

Intrinsic safety and hazardous area approvals available.

Measurement range:

Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.