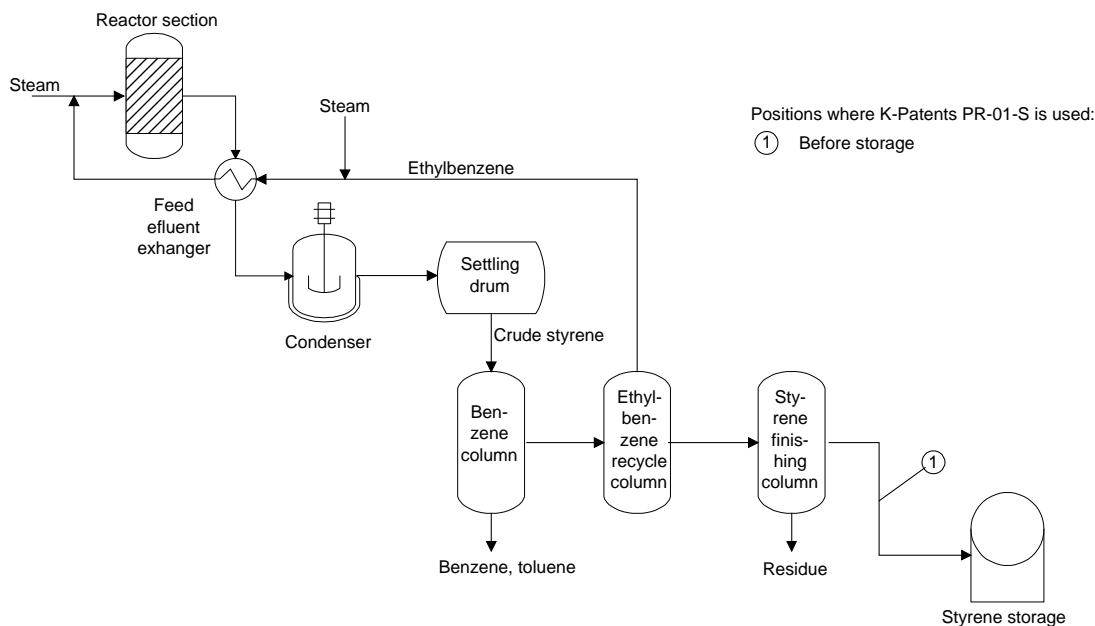


### Styrene in Ethylbenzene

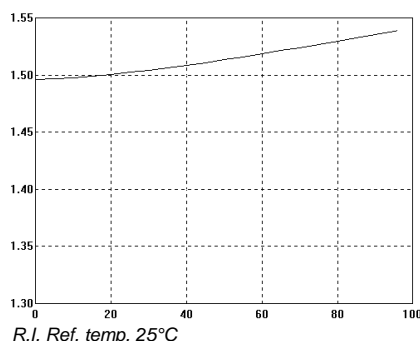


### Styrene C<sub>8</sub>H<sub>8</sub>

**Soluble in**  
 acetone, benzene, ether

**Typical end products**  
 Polystyrene, ABS plastics, styrenebutadiene rubber

**Chemical curve: R.I. per Conc% b.w.**



### Introduction

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

Two process routes are used for the manufacture of styrene: dehydrogenation and coproduction with propylene oxide. Nearly 90% of styrene production utilise dehydrogenation, mainly because of its simplicity and cost-effectiveness.

### Application

#### Dehydrogenation of ethylbenzene

In dehydrogenation process fresh and recycled ethylbenzene are mixed with steam and heat-exchanged with the reactor effluent. The vapor-mixture of ethylbenzene and steam is raised to the desired reaction temperature and fed to the reactors. The reactor effluent goes through heat exchangers to preheat the ethylbenzene-steam mixture and generate steam for use in distillation train. The condensed reactor effluent is separated in the settling drum into vent gas, condensate and crude styrene.

### Purification of styrene

Typically styrene purification is done in distillation train. 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. Ethylbenzene is recycled to the dehydrogenation section and the bottoms are pumped to the styrene finishing column, where the final styrene purification is made.

### Installation

K-Patents Process Refractometer, PR-01-S is used to measure the concentration of the final product. It is installed in the long pipe after styrene finishing column. The temperature right after the column is about 80-90°C (176-194°F) and decreases before the storage in the ambient temperature, which varies between 5-35°C (41-95°F) depending on the season. The measured concentration range is 95-96%.