IS 4105 : 2023

Styrene (vinyl benzene) — Specification (Third Revision)

This standard prescribes the requirements, the methods of sampling and testing for the material commercially known as styrene (vinyl benzene).

Styrene is an organic compound with the chemical formula $C_6H_5—CH=CH_2$. Its structure consists of a vinyl group as substituent on benzene.

Styrene is used for the manufacture of styrene-butadiene rubber (SBR) polystyrene and for copolymerization products with other monomers to obtain synthetic resin binders and adhesives. It is also used in the packaging industry and in the production of toys, housewares and appliances. Styrene-divinyl benzene copolymer is used in the preparation of both anion and cation exchange resins. It is also known as phenyl ethylene or vinyl benzene.

The material undergoes polymerization during shipment or in storage due to the catalytic effect of heat and light. The commercial material is, therefore, stabilized with sulphur or other inhibitors like p-tertiary butyl catechol in small concentrations (see IS 14631 ‘Styrene — Code of safety’)

This standard was first published in 1967 and subsequently revised in 1988, 2020 and 2023. First revision was done in view of the improved quality of the material being made available in the country. In the first revision, the requirement of refractive index and relative density have been included, limits of impurity stipulated and the methods of test for colour and aldehyde content modified. The second revision was undertaken mainly to update cross referred standards.

In the third revision, grade 2 has been deleted as mostly only one grade is manufactured across the world and the requirements of styrene of the existing grade is modified to 99.7, percent by mass. The test method for determination of colour, assay and sulphur have been modified. Further, alternate test method for determination of relative density, refractive index, freezing point, aldehyde, chloride, inhibitor content, polymer content and peroxides have been incorporated. Benzene being carcinogenic in nature and found as an impurity in styrene, the committee decided to incorporate benzene as characteristic with limit of 1 ppm. Requirement of solubility of polymer has been deleted as it is already calculated in the form of impurities.