

Effect of flame speed and explosion pressure on flame quenching performance for in-line crimped-ribbon flame arresters

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March 30, 2022

Abstract

An experimental system consisting of gas mixing equipment, a sensor detection system, a data acquisition device, and an electric spark ignition device was set up to investigate the effect of flame speed and explosion pressure on flame quenching performance of propane, ethylene and hydrogen/air mixtures in the in-line crimped-ribbon flame arresters. The results indicated that under the conditions of the same size of experimental pipe configuration and the same ignition distance but different pipe lengths, or the same pipe length but different ignition distances, the flame arrester successfully stopped the flames at high flame speed and low explosion pressure, but failed at low flame speed and high explosion pressure. Then the relationship between flameproof speed and explosion pressure was derived base on the physical model of heat conduction, which is proved by experiment and provide more accurate reference for design and selection of crimped-ribbon flame arrester

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