

Thermal Explosion Simulation of Methyl Ethyl Ketone Peroxide in Three Types of
Vessel Under the Same Volume by Explosion Models

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Abstract

Methyl ethyl ketone peroxide (MEKPO), which has highly reactive and exothermically unstable characteristics, has been extensively employed in the chemical industries. It has also caused many thermal explosions and runaway reaction accidents in manufacturing processes during the last three decades in Taiwan, Japan, Korea, and China. The goal of this study was to simulate thermal upset by MEKPO for an emergency response. Vent sizing package 2 (VSP2) was used to determine the thermokinetics of 20 mass% MEKPO. Data of thermokinetics and hazard behaviors were employed to simulate thermal explosion in three types of vessel containing 20 mass% MEKPO under various scenarios at the same volume. To compare and appraise the difference of important parameters, such as maximum temperature (T_{max}), maximum pressure (P_{max}), etc. This was necessary and useful for investigating the emergency response procedure associated with industrial applications.

Key words: Maximum temperature (T_{max}); Methyl ethyl ketone peroxide (MEKPO); Runaway reaction accidents; Thermal explosion; Vent sizing package 2 (VSP2)