

Flammability Limits of Ammonia and Steam Mixtures at Temperatures from 373 K to 423 K

Wen Fu^S, Ke Zhang and Jiangtao Wu^C

*Key Laboratory of Thermo-Fluid Science and Engineering, Ministry of Education, Xi'an Jiaotong University,
Xi'an, Shaanxi Province, China
jtwu@mail.xjtu.edu.cn*

Ammonia solutions are not only important analytical reagents in the laboratory, but also an alkaline disinfectant. In wool spinning, silk, printing, and dyeing industries, they are mainly used for washing wool, wool fabrication, dissolution, and pH adjustment, and act as an assistant dye aid. Using ammonia solutions instead of urea as the nitrogen source of biochemical microorganisms has good economic and environmental benefits, which opens a new way for application of ammonia solutions as the by-product of refining oil. Because of the accidental explosion of ammonia+ steam, the explosion risk caused by industrial treatment of ammonia solutions should be considered. The main purpose of this study is to investigate the flammability limits and the diluent effect of inert media with steam (ammonia + steam mixtures). Flammability limits of ammonia + steam mixtures were measured by the ASHRAE method in a 12 L sphere in the temperature range from 373 K to 423 K at atmospheric pressure. And the ammonia+ steam mixtures under different ammonia concentration ratios were measured at different temperatures. In addition, the critical flammability ratios (CFR) of ammonia + steam mixtures and minimum oxygen concentration were obtained. This research provides the needed data for secure application of different ammonia concentrations of ammonia solutions.