Abstract

An external fire can often be the defining case when sizing a relief device for chemical reactive hazards. Batch reaction systems can have multiple reactions or have reactions with multiple steps. Analyzing every possibility is impractical, so relief device sizing is often performed by conducting only one test or simulation per scenario. However, this simplification can obscure potentially significant effects which might then be overlooked in the analysis. For example, a fire that is started while the main reaction is underway could result in an overpressure (due to an exotherm or decomposition reaction) less severe than one that starts once the final product has completely formed. This can be due to reactants for the main reaction being boiled off before the conditions for the worse case are reached. Other factors that should likewise be considered when performing transient analysis for external fire on reactive systems will be further discussed within the paper.