Risk Management for Reactive Processes

Angela E. Summers, Ph.D., P.E.
President, SIS-TECH Solutions
Houston, Texas
281-922-8324 (phone) ♦ 281-922-4362 (fax)
asummers@sis-tech.com

Abstract

Industry standards from the American Petroleum Institute (API) and American Society of Mechanical Engineers (ASME) provide criteria for the design and protection of vessels from rupture or damage caused by excess pressure. In conventional design, pressure relief devices, such as pressure-relief or safety valves, are used as the primary means of pressure protection.

However, in many reactive applications, the use of a pressure relief valve (PRV) is impractical. Alternative methods of preventing overpressure must be utilized to achieve measurable risk reduction. Fortunately, API 521 and Code Case 2211 of ASME Section VIII, Division 1 and 2, provide an alternative to PRVs – the use of a safety instrumented system. Since these safety instrumented systems must achieve a high safety availability, they are often referred to as high integrity protection systems (HIPS). This paper will discuss how to assess, design, and implement HIPS to effectively manage potential overpressure of equipment used for reactive processes.