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## Containing Hydrogen Deflagrations

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### Abstract

Schroeder and Holtappels (2005) published data on the explosion characteristics of hydrogen-air mixtures, looking at the effect of pressure and temperature on upper and lower explosive limits and the effect of pressure, temperature, and composition on explosion ratio,  $P_{EX}/P_O$ . They showed that the effect of increasing pressure on UEL and LEL is negligible to slightly advantageous, while the effect of increasing temperature was disadvantageous. They also showed that the explosion ratio was largely independent of operating pressure, but very dependent on temperature and composition of hydrogen-air mixtures. However, they did not develop their data to the point that it could be used as the basis of design and risk assessment.

This paper uses the data published by Schroeder and Holtappels to develop equations that can be used to predict the extent of a hydrogen-air deflagration in a vessel and correlates those predictions to the nature of pressure vessel failures that are likely to be experienced as a result of such a deflagration.

### Keywords

Containment, Deflagration, Equipment design data

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