



Chemeca2026
Innovate. Integrate. Impact.

28 – 30 September 2026
Melbourne, Australia



*Chemeca 2026 and Hazards Australasia
28 – 30 September, Melbourne, Australia*

Are We Over-Zoning Hydrogen? A Review of Hazardous Area Classification in Australia and New Zealand

Simon Reveley

R4Risk

Simon.Reveley@R4Risk.com.au

ABSTRACT

Write your abstract of 400 words

Hydrogen can form explosive mixtures with air, posing a significant risk of injury or fatality. Mitigation of this risk relies on measures that include the safe selection, design, installation and operation of electrical equipment in hazardous areas where hydrogen releases may occur. In Australia and New Zealand, hazardous area definitions and extents are specified in AS/NZS IEC 60079.10.1 and its associated supplement. The supplement provides prescriptive hazardous area classifications for a range of common industrial gases and liquids. In the supplement, hydrogen installations are grouped with liquefied and compressed natural gas, with a single hazardous zone extent prescribed for valves and pipework for all three based solely on operating pressure, without explicit consideration of leak size.

While this prescriptive approach enables rapid zoning, the underlying simplifications and groupings tend to produce conservative (i.e., large) hazardous area extents. These conservative classifications can significantly increase project cost and complexity, often outweighing any time savings achieved during the initial zoning process.

This presentation evaluates the hydrogen zoning requirements specified in the supplement by comparison with three alternative approaches: zoning using AS/NZS IEC 60079.10.1, dispersion modelling, and published hydrogen zoning data from the Energy Institute's Model Code of Safe Practice Part 15 (EI 15). Four pressure thresholds defined in the supplement (200, 700, 2,000, and 5,000 kPa) and two representative leak geometries specified in the standard (small-bore pipework connections and valves) are assessed for outdoor releases.

The methodology comprises of estimating leak rates for the selected hole sizes, deriving hazardous zone extents using AS/NZS IEC 60079.10.1 Figures C.1 and D.1, and extracting explosive atmosphere cloud dimensions from modelling and published data.

Attention is given to the criteria for a zone of negligible extent, defined as an explosive atmosphere of sufficiently small size that ignition would result in negligible consequences and therefore not require ignition source exclusion. The supplement defines any hydrogen pipework leak below 200 kPa as having an explosive atmosphere of negligible extent and therefore non-hazardous. By comparison, the standard and the supplement specify generic negligible-extent criteria of 0.1 m³ and 0.2 m, respectively. The implications of these

differing definitions for hydrogen installations are examined.

The results show that direct application of AS/NZS IEC 60079.10.1 results in zones of negligible extent for a range of conditions where the supplement would require zoning, thereby avoiding additional project cost and complexity.

KEY WORDS

Hydrogen, Hazardous Area Classification, Flammable release modelling

BIOGRAPHY

Include a short biographical (100 words) for the presenting author

Simon is a Chemical and Process Engineer with over 25 years of experience in the mining, pharmaceutical, FMCG, and nuclear industries in New Zealand (4 years), Australia (2 years), Ireland (5 years) and the UK (15 years). Simon has carried out hazardous area classifications for a wide range of industries, including pharmaceuticals, smelters, mines, and paint factories.

His experience also includes working with radioactive hydrogen (tritium) at the Joint European Torus fusion research facility.

Simon has a BE(Hons) in Chemical and Process Engineering from the University of Canterbury (NZ). He is a Chartered Engineer with the IoMMM and IChemE. Simon is also an RPEQ and is certified to AS/NZS 4761.1.

CONFERENCE PROGRAM

Please indicate which conference program your abstract relates to:

Hazards Australasia

Chemeca