



# Hydrogen Europe: European Hydrogen & Fuel cell Project Database

## Project HySEA

Improving Hydrogen Safety for Energy Applications (HySEA) through pre-normative research on vented deflagrations

The aim of the HySEA project is to conduct pre-normative research on vented deflagrations in enclosures and containers for hydrogen energy applications. The ambition is to facilitate the safe and successful introduction of hydrogen energy systems by introducing harmonized standard vent sizing requirements. The partners in the HySEA consortium have extensive experience from experimental and numerical investigations of hydrogen explosions. The experimental program features full-scale vented deflagration experiments in standard ISO containers, and includes the effect of obstacles simulating levels of congestion representative of industrial systems. The project also entails the development of a hierarchy of predictive models, ranging from empirical engineering models to sophisticated computational fluid dynamics (CFD) and finite element (FE) tools. The specific objectives of HySEA are: - To generate experimental data of high quality for vented deflagrations in real-life enclosures and containers with congestion levels representative of industrial practice; - To characterize different strategies for explosion venting, including hinged doors, natural vent openings, and commercial vent panels; - To invite the larger scientific and industrial safety community to submit blind-predictions for the reduced explosion pressure in selected well-defined explosion scenarios; - To develop, verify and validate engineering models and CFD-based tools for reliable predictions of pressure loads in vented explosions; - To develop and validate predictive tools for overpressure (P) and impulse (I), and produce P-I diagrams for typical structures with relevance for hydrogen energy applications; - To use validated CFD codes to explore explosion hazards and mitigating measures in larger enclosures, such as warehouses; and - To formulate recommendations for improvements to European (EN-14994), American (NFPA 68), and other relevant standards for vented explosions.

## Project Information

**Type of project :** Research

**Timing :** 01/09/2015 > 31/08/2018

**Project website:** <http://www.hysea.eu>

**Project Budget :** 1.511.780 €

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## Funding

European Union through FCH JU: Grant agreement 671461 - [CORDIS link](#)

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## Project partners

**Coordinator :**

GEXCON AS  
THE UNIVERSITY OF WARWICK  
UNIVERSITA DI PISA  
FIKE EUROPE BVBA  
IMPETUS ADVANCED FINITE ELEMENT ANALYSES AS  
University of Science and Technology of China  
HEFEI UNIVERSITY OF TECHNOLOGY

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**Sub project(s)**

**Sub project 1**

**Country:** Norway

**Address:**

FANTOFTVEGEN 38 5072 BERGEN

**Sub project categories**

Research

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Project Id: 1012

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