



Name of the organization

Karlsruher Institut für Technologie (KIT)

Name of the infrastructure / laboratory

HYKA-PZ (a Hydrogen Test Chamber)

Address and country of the infrastructure / laboratory

Karlsruher Institut für Technologie (KIT), Campus Nord, Hermann-von-Helmholtz-Platz 1 - 76344 Eggenstein-Leopoldshafen, Germany

Person responsible of the access / Contact person

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Main field of activity of the infrastructure / laboratory

Hydrogen safety, transportation, refueling, hydrogen storages

Short description of the infrastructure / laboratory

The hydrogen test chamber consists of three floors (see figure 1) and is located in a larger building on the hydrogen test site HYKA of the KIT. The ground floor contains the concrete footing of the cell floor, the second storey is the test chamber itself and the third storey houses its venting system. The test chamber has an internal volume of approx. 160 m³ (8.53 m x 5.5 m x 3.3 m), so the powerful venting system that produces air flows of up to 24.000 m³/h allows exchanging its internal atmosphere two times within one minute. The air flow can be arranged to circulate around samples and both supply- and exhaust-air-system to the ambience are explosion proof. High pressure hydrogen jet release and hydrogen jet development, its ignition in a stagnant atmosphere or in presence of active ventilation is the main purpose of this facility. It is possible to test automotive hydrogen engines Inside the 160 m³ test chamber (KIT-PZ). The space inside the chamber is sufficient for even a complete hydrogen powered passenger car. Furthermore the powerful venting system allows creating air flows around samples comparable to a wind tunnel or even with a more complex flow structure. The integrity of the chamber was tested in detonation experiments with up to 16 g H₂, even larger amount of hydrogen (up to 64 g H₂) is possible in case of deflagration process. For all experiments in HYKA compressed hydrogen (CGH₂) or cryogenic liquid hydrogen (LH₂) are available.

Main research area(s) of the infrastructure / laboratory

Hydrogen combustion and detonation, high pressure hydrogen releases, cryogenic hydrogen releases, laminar flame velocity, flammability and self-ignition limits for hydrogen-air mixtures, structural response of piping structures to internal pressure loads, car testing to the effects of internal hydrogen explosion, ventilation system efficiency

