

**Name of the organization**

Karlsruher Institut für Technologie (KIT)

Name of the infrastructure / laboratory

HYKA-A6 Facility (a Large Safety Vessel)

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, refueling, hydrogen storages

Short description of the infrastructure / laboratory

The safety vessel A6 has main dimensions of 3.3 m id and 3.1 m height with a volume of 21.5 m³. It was certified at maximum static pressure of 40 bar. The vessel may be used as a safety vessel for high pressure installations and explosion experiments. It has two doors of 800 mm id. Different installations and specimens as pipelines, valves and high-pressure hydrogen tanks can be put inside the vessel for testing. The vessel is equipped with measuring ports and windows for visual observations. The existing gas-filling system allows creating hydrogen-air mixtures at different concentrations and pressures. The measuring system consists of thermocouples array (gas temperature, flame arrival time), piezoelectric and piezoresistive gauges (initial pressure, explosion pressure), gas analyzer and mass spectrometer (to control mixture composition), photodiodes (flame arrival time, flame speed), strain gauges (deformations). The data acquisition system is based on multi-channel (64) ADC with a sampling rate of 1 MHz. The vessel was successfully tested for pipeline rupture at 1500 bar of explosion pressure. Experiments on integrity of pipelines under internal pressure loads up to 1500 bar have been performed there.

Main research area(s) of the infrastructure / laboratory

Flame acceleration and detonation experiments in confined geometries, high pressure hydrogen releases, experiments on hydrogen distribution, structural response of piping structures to internal pressure loads, integrity of high pressure tanks under external and internal pressure loads, to use as a safety vessel for small hydrogen inventory facilities (as explosion tubes and chambers).

Instruments and tools available for the above mentioned research

Gas filling system, high speed imaging system combined with BOS technique.

