

Project Information



Subject: 700 Bar Hydrogen Fuel Tank for Passenger Cars

Applicant: Dynetek Europe GmbH
Breitscheider Weg 117a
40885 Ratingen

Project Duration: 01.07.2002 - 30.06.2005

Project Partners: Isatec GmbH Aachen
VTI GmbH Menden
WEH GmbH Illertissen
Ford Forschungszentrum
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Description of Project:

Current developments demonstrate growing international interest in the use of fuel cells for advanced vehicle drives. An important reason for this is the need to further lower the specific energy consumption and to meet CO₂-emission targets.

A vital factor for the success of these activities is parallel development of high-performance hydrogen storage systems, which (taking into consideration the current efficiency rating of fuel cell drives and the space available in the vehicle for installation of storage tanks), allow storage of approx. 4 kg. hydrogen, which allows the driver a satisfactory driving range of about 500 km.

Based on the knowledge and experience gained to date with the various storage technologies, the automotive industry increasingly favours high-pressure storage as the preferred technical solution, which, because of the low physical density of hydrogen, requires gas compression to 700 bar.

The aim of the project is therefore to develop a 700 bar pressurised hydrogen tank along with the necessary peripheral equipment. Knowledge gained from past experience confirm that such high operating pressures can be basically realised in practice and that therefore ranges of 400 - 500 km per filling are possible with future fuel cell vehicles.

The desired pressure level requires use of carbon-fibre composite materials with extremely high tear resistance. In this project a cryogenically plastified stainless steel liner is used, which despite its high mechanical strength fulfils requirements both as regards hydrogen and fatigue resistance. This means that the requirement for carbon-fibre-reinforced plastics is reduced and the product becomes considerably more attractive from the point of view of manufacturing costs.

Valves, safety equipment, pressure reducers, sensors and fueling nozzles are also included in the immediate periphery of the tank and likewise have to be developed. Control and regulation fittings for pressurised gases with operating pressures of 700 bar are not currently available and also have to be specifically developed for this application.

Funded by the State of Nordrhein-Westfalen

NRW.