FVS Workshop 2001

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Figure 1

Energy content and combustion heat of different fuels

Liquid Hydrogen Tank & Filling Systems for Vehicles

Note of the Editor: For this paper only transparencies were available. Please find enclosed the table of contents. a selection of figures and conclusions.

Table of Contents

Basic Figures

- why hydrogen? / why liquid hydrogen?
- · projects / experience

Liquid Hydrogen Tank Systems

- manufacturing
- · purpose design tanks / autonomy phase
- Liquid Hydrogen Filling Systems
 - coupling
 - logistic / concepts / filling stations

Conclusion, Status, Prospect



Hydrogen Technology



comparison of LH2 and CGH2 - energie content of Hydrogen -9 8 energy content [MJ / Itr] 8,49 7 6 5 4,93 4 3 2.95 2 1 0 0,1 MPa 0,35 MPa 70 MPa 35 MPa 24 MPa LH, CGH,



Energy content of hydrogen



Figure 3

LH₂ Tank – Improvement of autonomy

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Figure 4 Public LH₂ filling station at airport Munich

Conclusions:

Infrastructure and filling stations of a hydrogen technology for vehicles have to fulfil the following requirements:

· Competitive

The costs of the energy carrier hydrogen must be comparable to the costs of conventional fuels. The costs of a hydrogen infrastructure must be comparable to the investment for a conventional infrastructure.

• Compact & Capable of Being Integrated A hydrogen filling station must be capable of being integrated into an existing conventional fuel station. That means a hydrogen filling station must be compact and must be operable without additional professional personnel.

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· Universal

The hydrogen filling station must be able to deliver pressurised hydrogen (CGH_2) as well as deep cold liquefied hydrogen (LH_2) .

· Flexible

A hydrogen filling station must be flexibly reactive with respect to long-term trends as well as to daily fluctuations of the hydrogen consumption.

· Compatible

The logistic for hydrogen filling stations must fit to the concept of the gasoline companies.

· Forward looking

The initial overall concept must ensure a direct and cost saving transfer from fossil to regenerative generated hydrogen.