

WEH H2 Presentation

**ARGENTINIEN /
URUGUAY / PARAGUAY**

Fuel Cell Assembly Vehicles



Fueling station



Hydrogen
Product information

Impressions H₂ refuelling



WEH – Your hydrogen refuelling specialist

- ▶ More than 20 years of experience with hydrogen refuelling
- ▶ Development, construction and manufacturing of products for hydrogen refuelling
- ▶ Wide range of refuelling components for car / bus / truck refuelling
- ▶ Highest flexibility in designing prototypes
- ▶ Reliable partner for the automotive industry (serial production of hydrogen vehicles)

National and international projects awards

- ▶ **Supplier for CUTE** (Clean Urban Transport for Europe – EC-funded project, supported by the 5th Frame Programme of the EC) Successor Programme: HyFLEET
- ▶ **NRW-Project:** Project partner for development of 700 bar technology for vehicles and portable fuel cell systems funded by NRW, Germany
- ▶ **StorHy-Project:** Task leader WP4 StorHy project funded by the EC – development of hydrogen components 700 bar
- ▶ **High Flow High Pressure DOE Project:** Develop 700 bar 10 kg/min system



References - Receptacles for H₂ FC cars and buses



Daimler
EVOBUS CITARO



Ford Focus



IRISBUS



Nissan



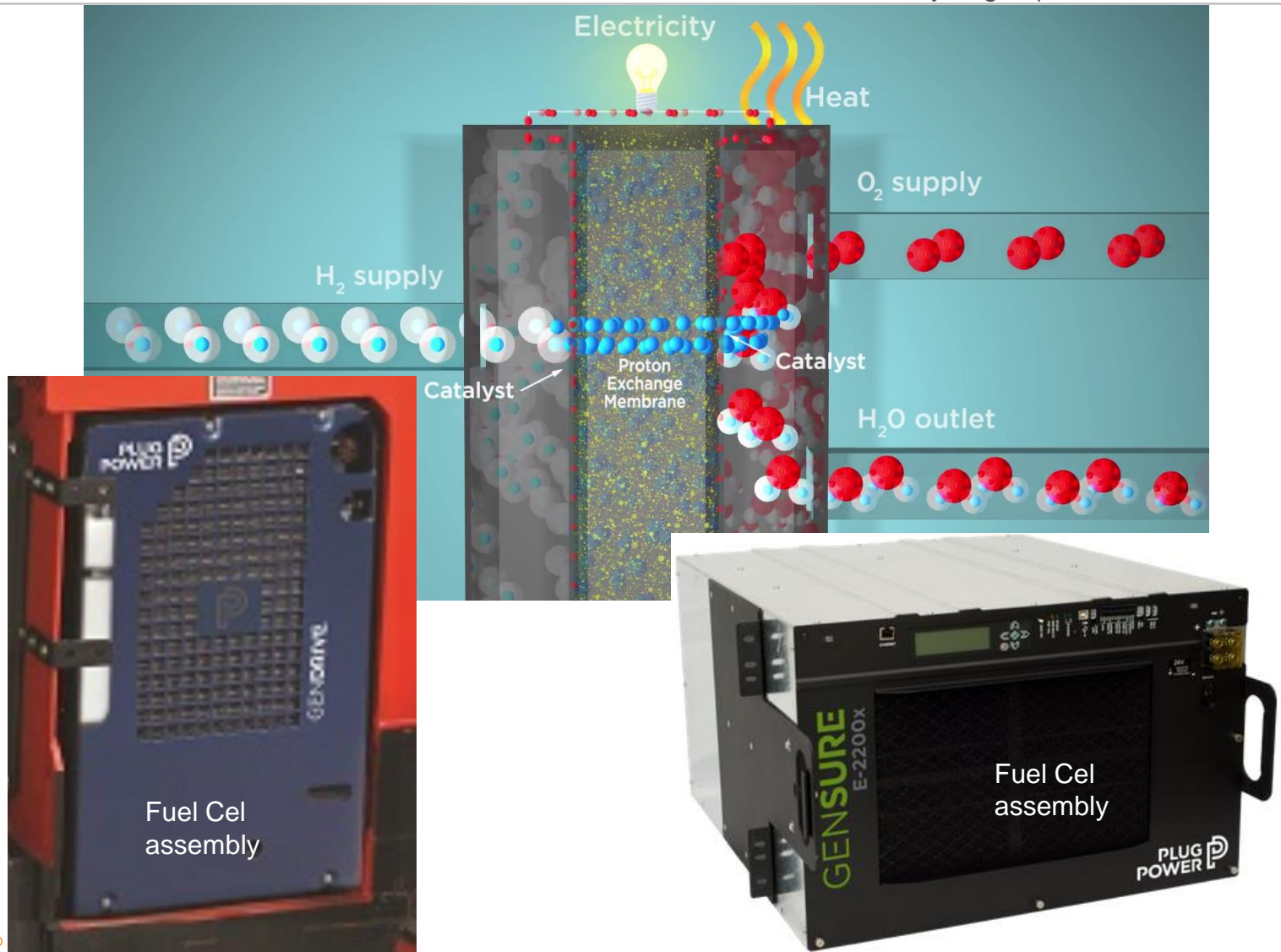
Honda



NEOMAN (MAN)

Hydrogen Function and Energy Source

Hydrogen | Product information



Hydrogen coding for pressure range and gas type

- ▶ Diameter coding – different to other alternative energy sources (e.g. natural gas)
- ▶ Length coding – different when other connection pressures: 250 bar | 350 bar | 700 bar

BUS

		NOZZLE – pressure range/coding			
		250 bar	350 bar	350 bar HF*	700 bar
RECEPTACLE – pressure range/coding	250 bar	✓			
	350 bar	✓	✓		
	350 bar HF*	✓	✓	*HF = High Flow	
	700 bar	✓	✓		✓
	700 Bar MF & HF				✓

NEW Trucks

60 g/s 3mm | 90 g/s 5 mm | 120 g/s 10 mm

8 mm and 12 mm open flow → TK16 & TK 25 Nozzle

Only 8 mm flow → TK16 Nozzle

Gas Type Legend:
 H70 LD
 H70 MF
 H70 HF

Pistol-grip fuelling nozzle TK17 H₂

- ▶ For H₂ fast filling of cars at self-service fuelling stations
 - ➔ available for 350 bar or 700 bar
 - ➔ with or without data interface
- ▶ Nominal bore DN: 4 mm
- ▶ Temperature range: -40°C up to +85°C (-40°F up to +185°F)
- ▶ Sealing material: Hydrogen compatible
- ▶ Design: With plastic thermal protection and hand grip with magnet. Without gas recirculation
- ▶ Compatible with WEH[®] TN1 H₂ receptacle profile

Approvals

- | | |
|------------------------------|------------------|
| All TK17 H ₂ : | ▶ PED 2014/68/EU |
| | ▶ SAE J2600:2002 |
| TK17 H ₂ 700 bar: | ▶ SAE TIR J2799 |
| TK17 H ₂ with IR: | ▶ SAE J2601 |



H2 Fuel panel of a large Port Forklift

Hydrogen | Product information



H2 Fuel panel of a large Port Forklift

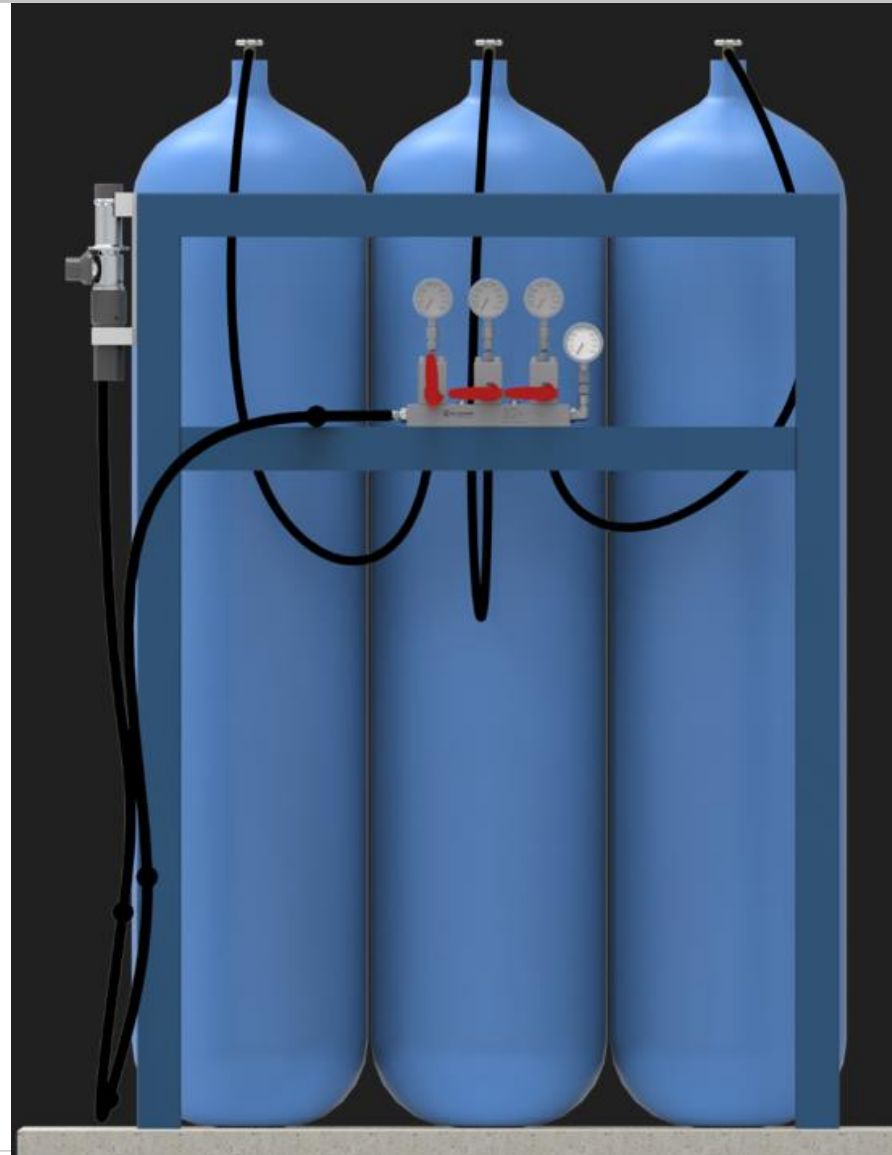
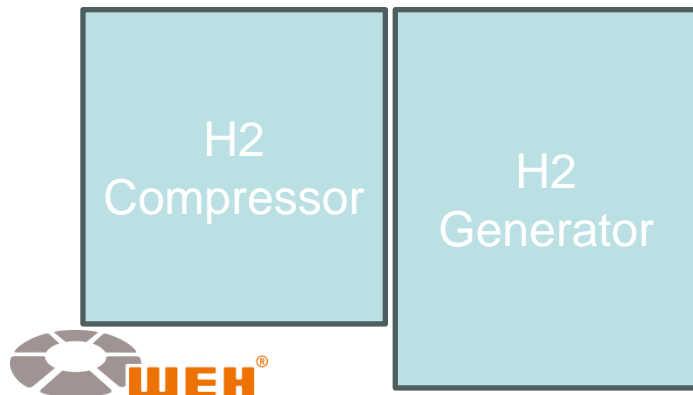
Hydrogen | Product information



H2 WEH simple manual Hydrogen dispenser

Hydrogen | [Product information](#)

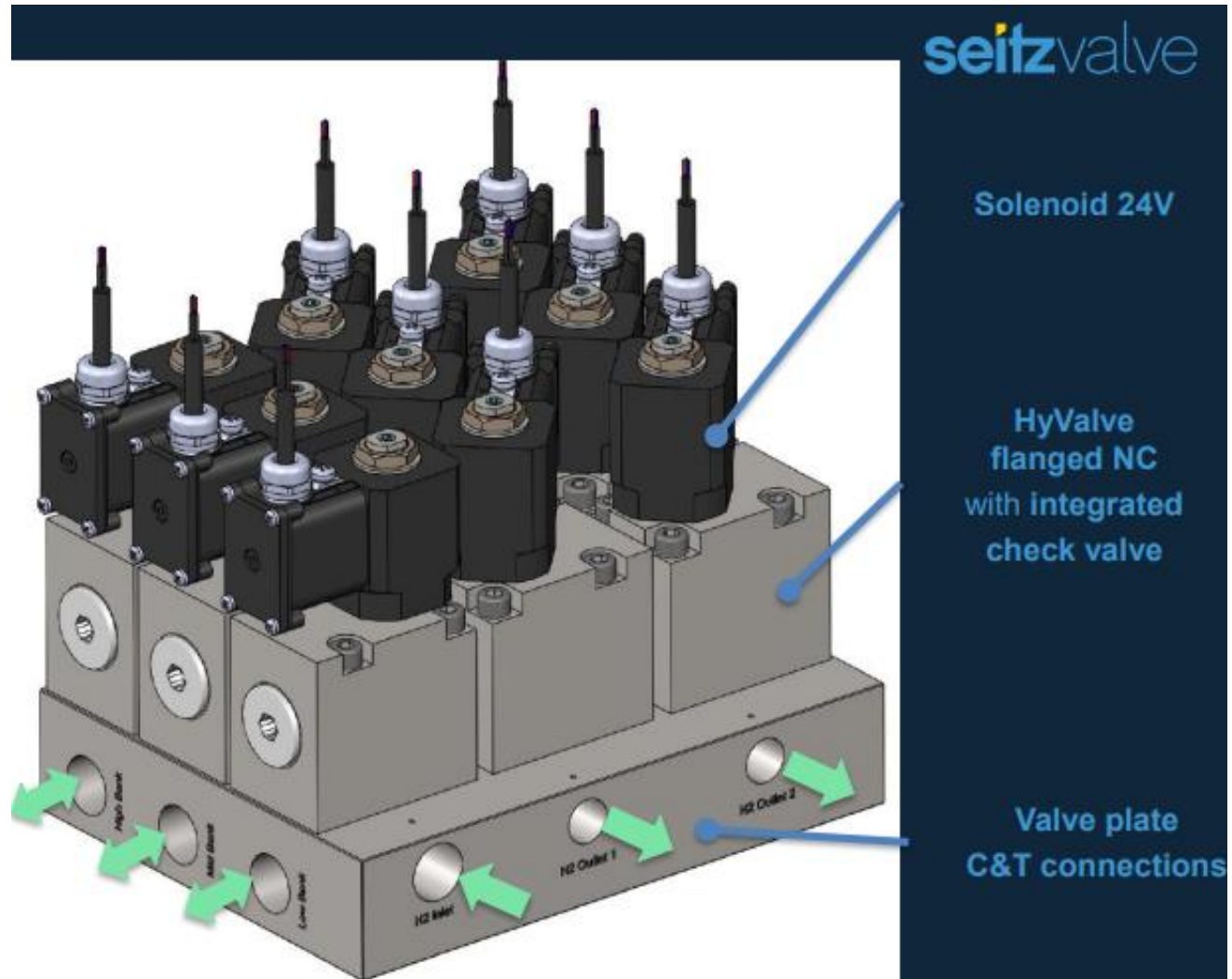
- 3 pressure stages manifold
 - Simple ball valves 250 bar rated
 - complete manual cascading dispenser
-
- Low cost: less than 10'000\$ (not including cylinders)



H2 optimized cascade filling

Hydrogen | [Product information](#)

Seitz is WEH Technologies Partner for H2 solutions

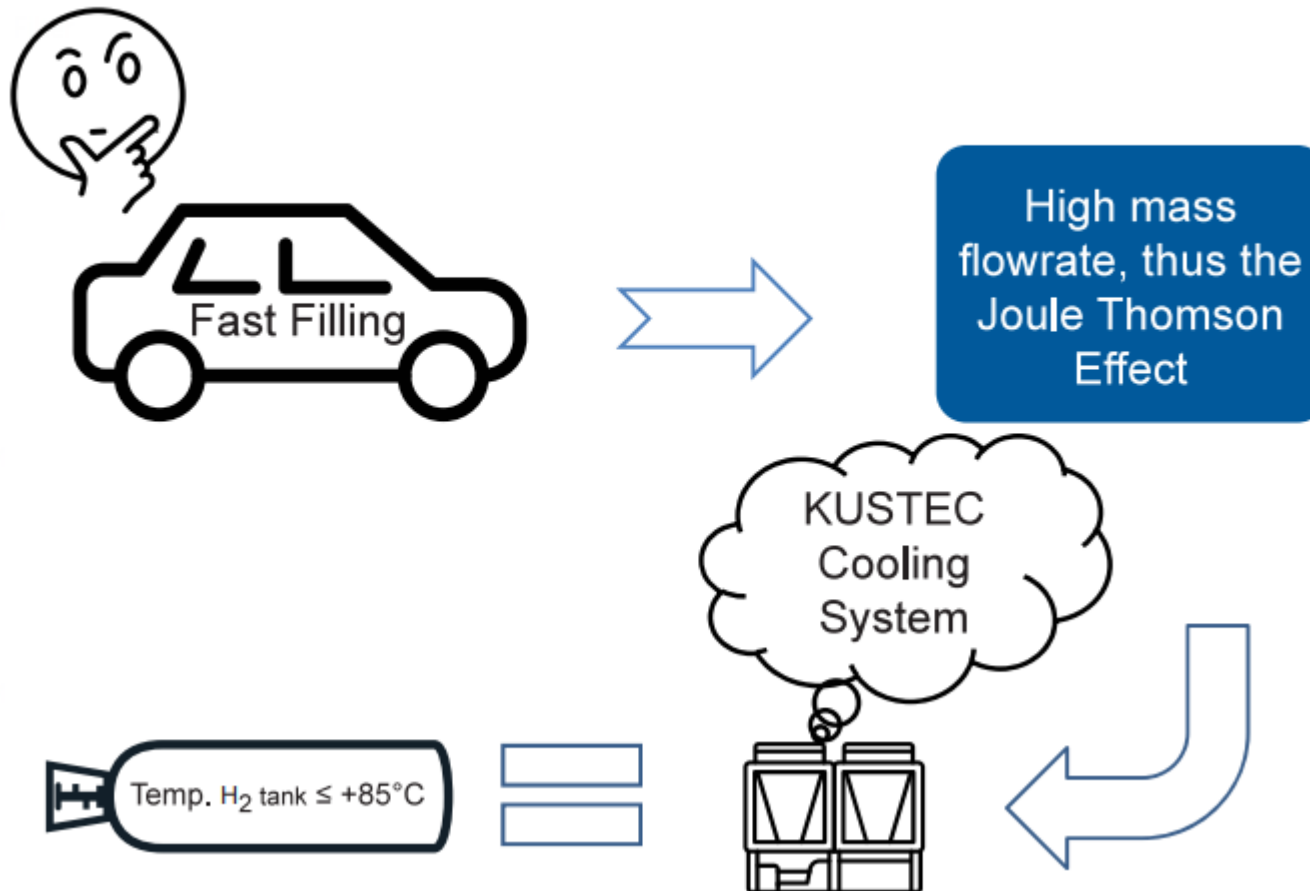


H2 optimized fill by Chilling to -40 Deg C

Hydrogen | [Product information](#)

Kustec is WEH Technologies Partner for H2 solutions

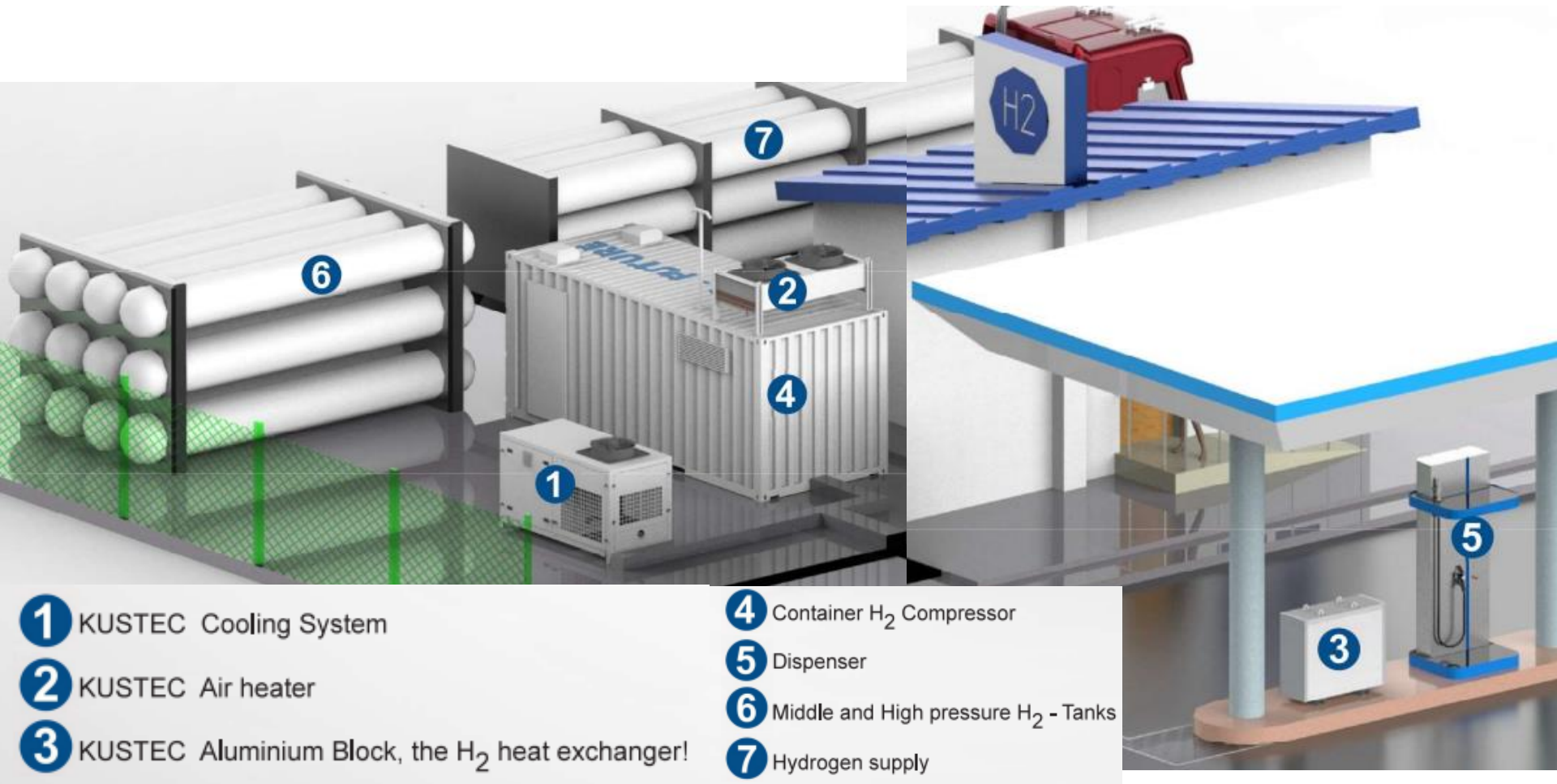
Why H₂ Cooling?!



H2 optimized fill by Chilling to -40 Deg C

Hydrogen | [Product information](#)

Kustec is WEH Technologies Partner for H2 solutions



Pistol-grip fuelling nozzle TK17 | TK20 H70 H₂



H₂ Receptacle for vehicles

- ▶ Receptacle for refuelling of cars, buses and trucks with hydrogen
 - ➔ Available for 250 bar, 350 bar or 700 bar
- ▶ Nominal bore DN: 3 – 12 mm, depending on design
- ▶ Temperature range: -40°C up to +85°C
- ▶ Material: Corrosion resistant
- ▶ Sealing material: Hydrogen compatible
- ▶ Design: with protection cap, with or without integrated particle filter and integrated check valve

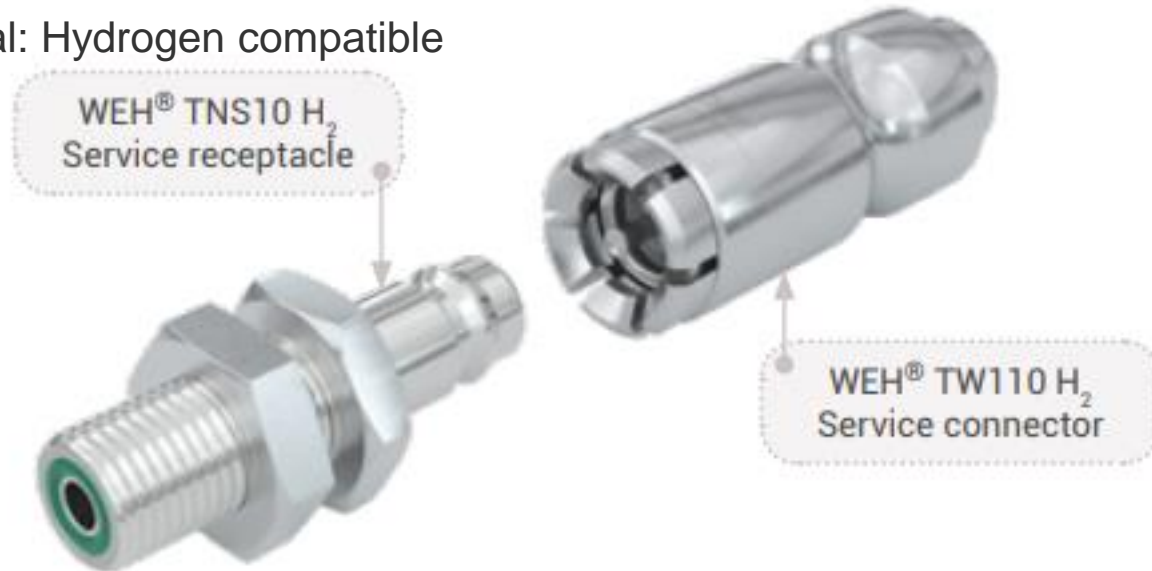


Approvals

- All TN1 H₂: ▶ SAE J2600:2002
- TN1 H₂ 70 MPa: ▶ e1 00 0010 (Regulation [EC] No. 79/2009)
 - ▶ SAE TIR J2799
- TN1 H₂: ▶ e1 00 0010 (Regulation [EC] No. 79/2009)
 - ▶ PED 2014/68/EU
- TN1 H₂ HF: ▶ e1 00 0003 (Regulation [EC] No. 79/2009)
- TN5 H₂: ▶ PED 2014/68/EU

Service and Defueling - SAFETY

- ▶ Service nozzle for discharging of hydrogen fuel tanks at the low pressure side of the vehicle
 - pressure max 16 bar
 - ➔ With check valve (schrader type concept)
- ▶ Nominal bore DN: 3 mm
- ▶ Temperature range: -40°C up to +85°C
- ▶ Material: Corrosion resistant
- ▶ Sealing material: Hydrogen compatible



High flow, High pressure Nozzle & Dispenser development

TODAY CARS 1 KG/MIN



TOMORROW TRUCKS 10 KG/MIN

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D-2009-06-00715-8-3 | Date: 09/2016
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