Dorninger Hytronics

Hydraulic
Pressure resistance-test bench

End-of-line testing of Typ IV-hydrogen tanks
with nominal pressures up to 700 bar

Fast and reliable end-of-line testing
H_2-tanks in series production

ECE R134 - European Standard or DIN EN 17339:2020
End-of-line testing according to the European ECE R134
directive or other Standards required by our clients as DIN EN 17339:2020

Optional - additional Standards
f.e. North American Standard, Chinese Standard
CSA / ANSI HGV2 with CGA C1, GB/T 42612 with TSG 07 and TSG 23

www.hytronics.at

Dorninger Hytronics development

DI Karl Fischereder, CTO
Dorninger Hytronics GmbH

„The hydrogen industry needs fast, effective and innovative solutions for the testing of hydrogen tanks. We are ideally positioned to meet these challenges."

Our test benches for pressure resistance tests impressively demonstrate our know-how and expertise in hydraulics, electrics and mechatronics. TypeIV-H_2-tanks with nominal pressure up to 700 bar are tested **at 1.5 times the nominal pressure**.

With our expertise in components and testing processes, we develop **highly professional test benches** for the hydrogen tank production. Through continuous dialogue we ensure that we precisely meet your requirements.

From an **innovative test setup** to detailed data acquisition and data presentation we provide you with an unbeatable and technically perfect **package**.

An oil-water double-stroke pressure intensifier is the heart of our test bench. By operating at 1050 bar and a dimensioning of 4000 bar pressure, we achieve a correspondingly long service life for the high-pressure intensifier and the high-pressure seals used.

To comply with the standard DIN EN 12245:2022-08 and the standard DIN EN 17339:2020 for transportable gas cylinders made of composite materials or carbon fiber composite materials for hydrogen, two alternating pressure intensifiers with a position measuring system are used for exact volume measurement during high pressure build-up.

The tank expansion can be calculated by taking into account the compressibility of water.

Basic equipment

Testing according to ECE R 134 standard

Test chamber including swivel device and energy absorber in case of tank failure

Test bench control unit:

- HP-pressure generation including oil hydraulic unit
- Test bench control (IP54 housing)
- HMI
- Test medium reservoir including pre-pressure pump and filter system
- Filling and draining control
- Pressure build-up rate from 0,1 to ~2,5bar/s for a 350l tank

Optional

- Measurement system analysis for pressure sensors according to VDA Volume 5 or MSA AIAG
- QR/DMC code identification and evaluation
- Data logging
- Provision of data via OPC-UA
- Test report in CSV and PDF format saved locally on the test bench
- DAkkS – calibration report for pressure sensors
- Spare parts package for commissioning or ongoing operation

Dimensions of test chamber:

L x W X H = 1000 x 1500 x 4700 mm

Dimensions of test bench central control:

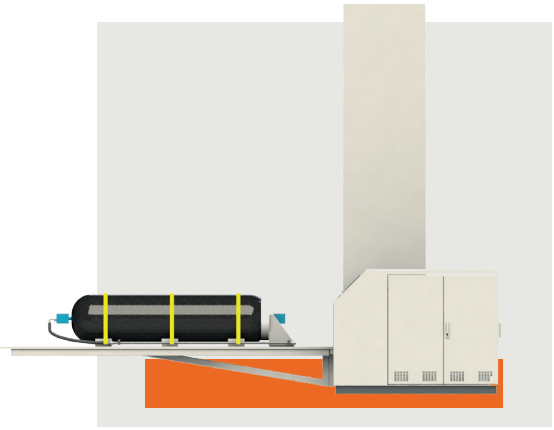
L x W X H = 2750 x 2000 x 1500 mm

Process flow

The fully timed testing process for one tank can be completed in f.e. 25 minutes - depending on the tanks to be tested – with just one operator.

Preparation

Manual work



- The H_2-tank is placed horzontally into the test bench using a forklift/crane
- Test adapters are attached to the front and rear bosses
- Pneumatic, water, and high-pressure lines are connected
- Recipe selection/QR code scanning for loading predefined test parameters takes place
- The test process begins when the test chamber is swiveled in and closed

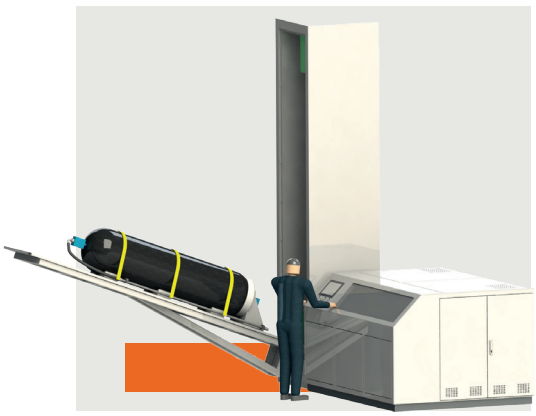
Testing process

Automated without operator intervention

- The H_2-tank is now in a vertical position
- The automatic filling process with a water pre-pressure pump starts as well as the venting process to vent the undercut
- Followed by a linear high-pressure build-up to the test pressure, the pressure hold at the test pressure and a two-stage decompression
- Now the test fluid is emptied using compressed air

Completion

Manual work

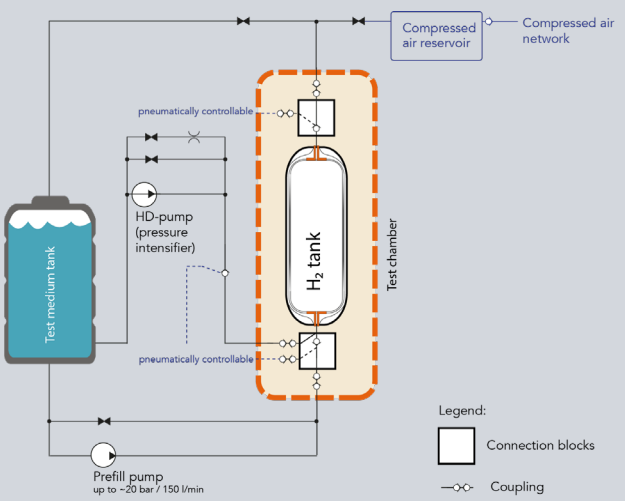


- The H_2-tank is returned into the horizontal position and the test adapters are removed
- Then the holding device is swiveled further to a position with an opening angle of over 90°
- Remaining amounts of the test medium are extracted with a vacuum lance, and the container is swiveled back to the horizontal position
- Finally, the H_2-tank is removed using a forklift/crane

Option: Doubling capacity

- Capacity enlargement of the test fluid tank
- Valve technology for all processes included twice (filling, venting, high-pressure testing, and emptying)
- Extended safety concept for two test chambers
- Software preparation for operation with two test chambers

Double testing capacity
➡ ~4 H_2-tanks per hour



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