

RH2INE

Euregio-Forum

January 10, 2025

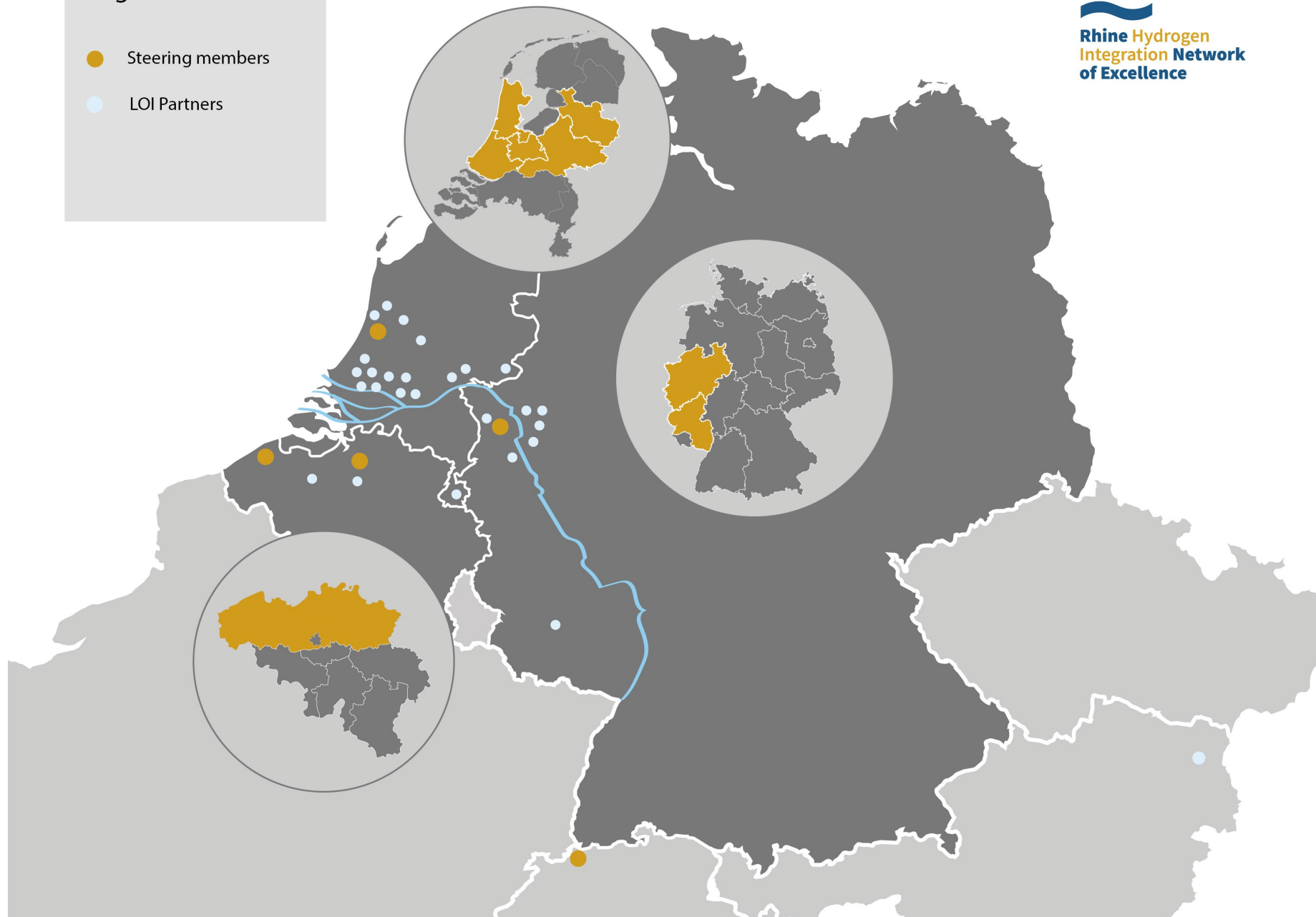
Mission and vision

The main aim of RH2INE is to **develop the use of hydrogen in inland shipping** and to **coordinate the activities** along the Rhine for the development of the use of hydrogen in inland shipping. The goal is to **establish a market ready hydrogen system** for inland shipping. This means that both the **shipping side** as well as the necessary **infrastructure** needs to be developed, including the value chain of the **supply** of hydrogen.

Legends:

● Steering members

● LOI Partners



Steering members

- Province of South Holland
- Province of North Holland
- Province of Utrecht
- Province of Gelderland
- Province of Overijssel
- Rhineland-Palatinate
- North Rhine Westfalia
- De Vlaamse Waterweg
- Port of Rotterdam
- Duisport
- Port of Basel
- Port of Antwerp-Bruges

Steering members

(LOI-)partners

Program office (PO): WaterstofNet

standardisation

insetting

Roadbook for
inland
terminals

Subsidies

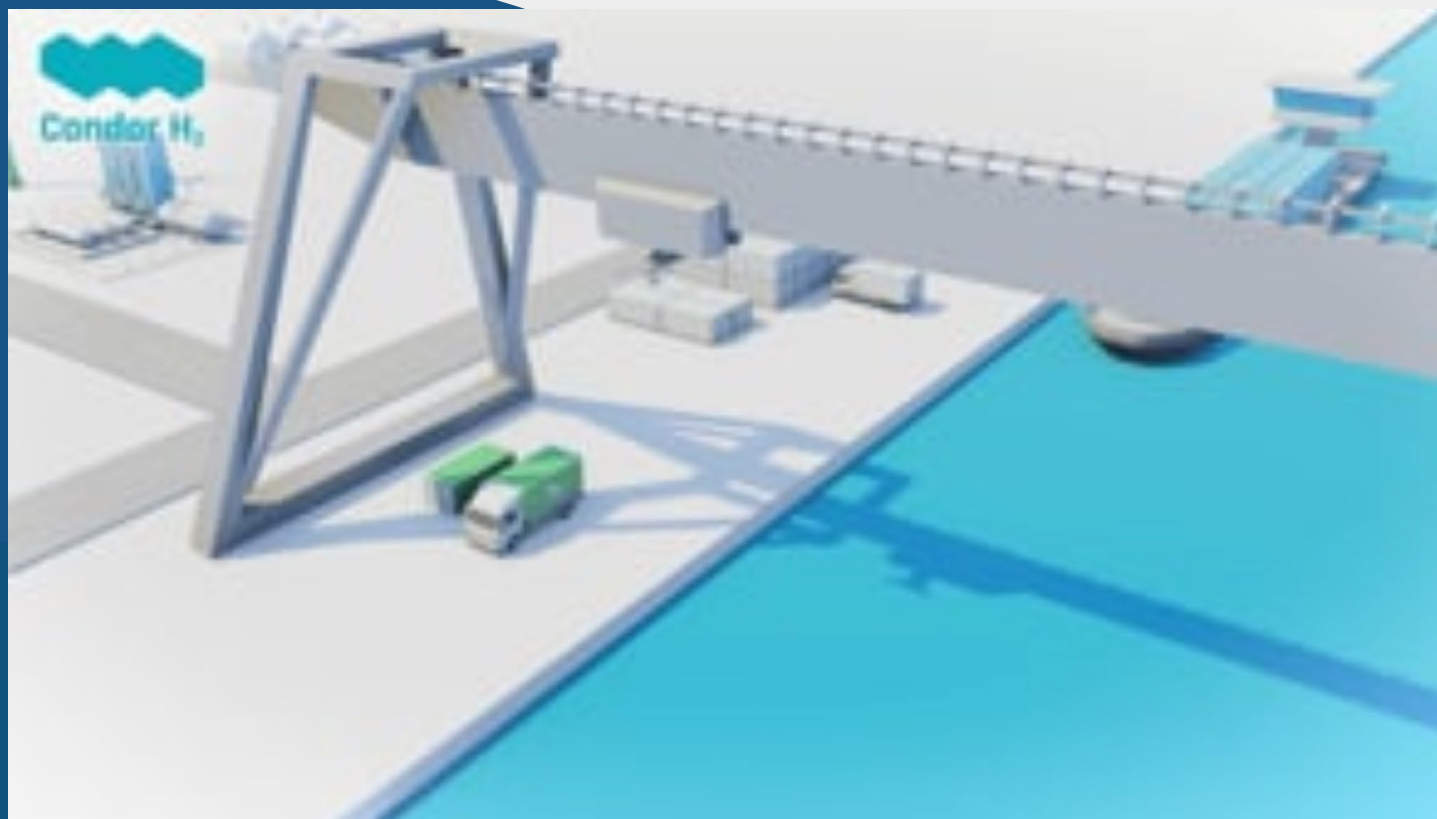
Tanktainer pool
company

policy

Condor working groups

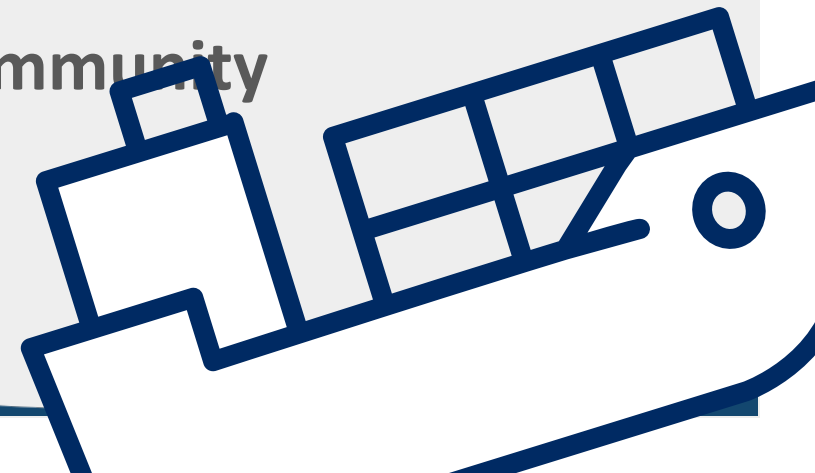
TSB

(new) RH2INE working groups



Objectives 2025

1. Establishing structural cooperation and knowledge exchange with existing initiatives
2. Initialising tanktainer pool
3. One voice towards European and national authorities
4. Creating visibility towards barge community



Overview

Objective 1

1. Standardisation
2. Insetting
3. Roadbook for inland terminals

Objective 2

4. *Tanktainer* pool company
5. Subsidies

Objective 3

6. Policy

Standard / Format / Design specification / Type

AA battery &

Dedicated location in appliance

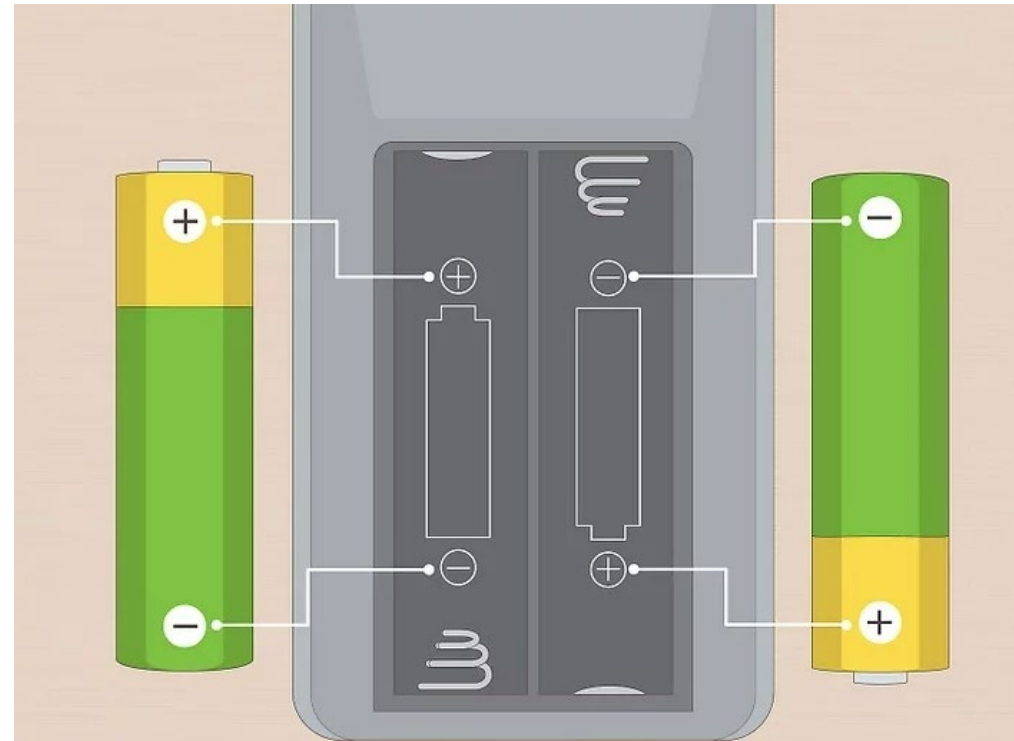
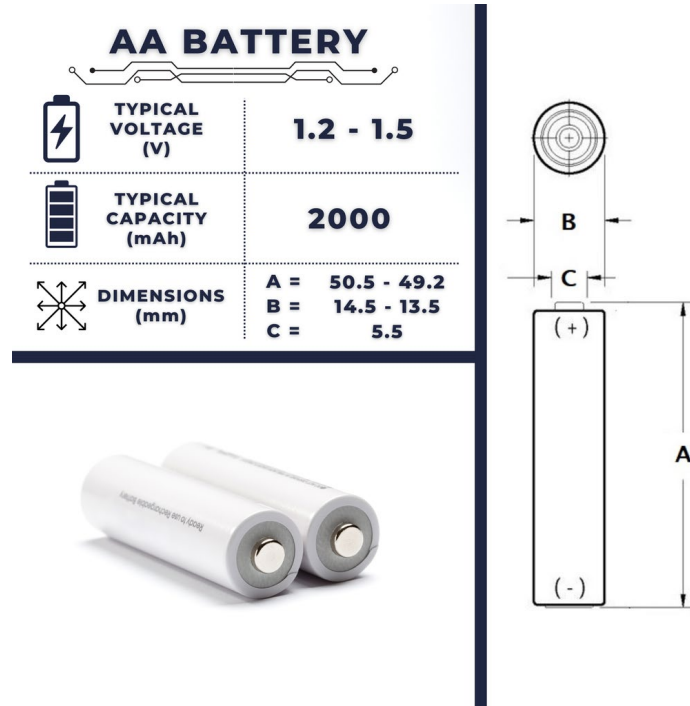
Types of AA Batteries:

Primary Battery

- alkaline battery
- lithium metal battery
- zinc-carbon battery
- zinc-chloride battery

Secondary Battery

- NiMH battery
- NiCd battery



Certification Process

Tanktainer 'category' certified
&
Ship certified for 'category' of tanktainers



Standardisation document : content

1. Pressure levels
2. Container sizes
3. Transport modes
4. Location of pressure regulation
5. Physical interface
6. Data communication
7. Communication protocol

Standardisation document : pressure levels

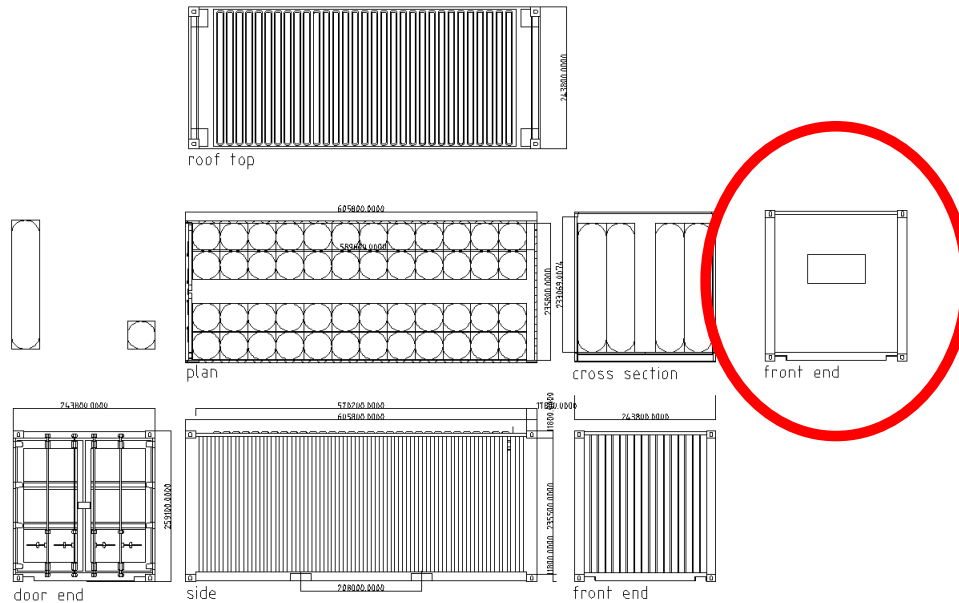
- 300 bar
- 500 bar
- 700 bar

= maximum pressure level

Standardisation document : container sizes

- All standard container sizes possible :
 - 10", 20", 30" and 40" (+high cube)
- Standard fixing system : ISO blocks (twist locks on board)
- Connections on front side

Shipping Container 20' iso



Standardisation document : transport modes

- Suitable for all transport modes
 - Truck
 - Barge
 - Train
- As a result it has to comply to with the existing transport mode rules :
ADN, ADR, RID, Es-Trin, IMO

Standardisation document : location of pressure regulation

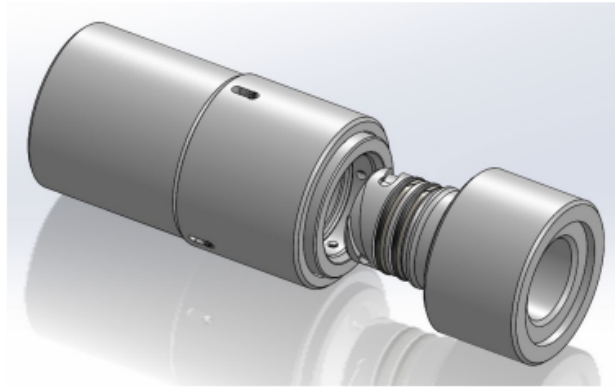
- The pressure regulator will be put **OUTSIDE** the tanktainer
 - Economical reasons
 - Technical reasons
 - Safety reasons

Standardisation document : physical interface

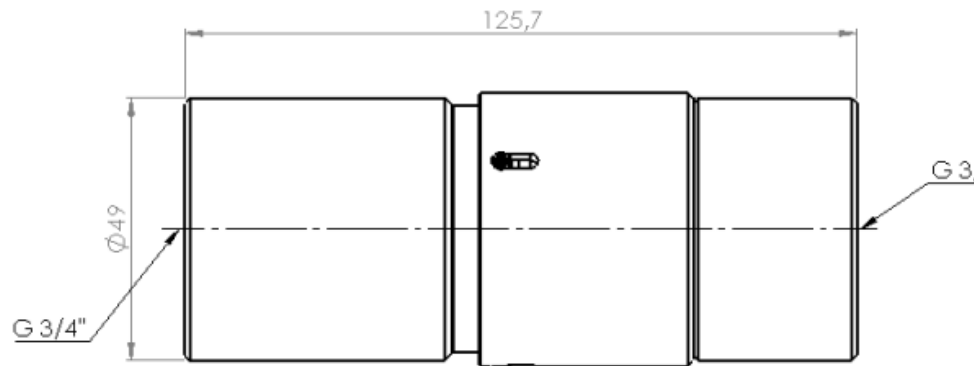
Mechanical interfaces :

- Main H₂ hose connection
- Vent hose connection
- Compressed air pressure hose connection(s)

Quick Coupling



The H2-Quick-Coupling is a fitting designed for fast coupling of two pipe systems. Pipe systems that ended with one of them (male or female) could connect with each other system with same quick-coupling end (male or female). H₂ will be vent during discoupling.

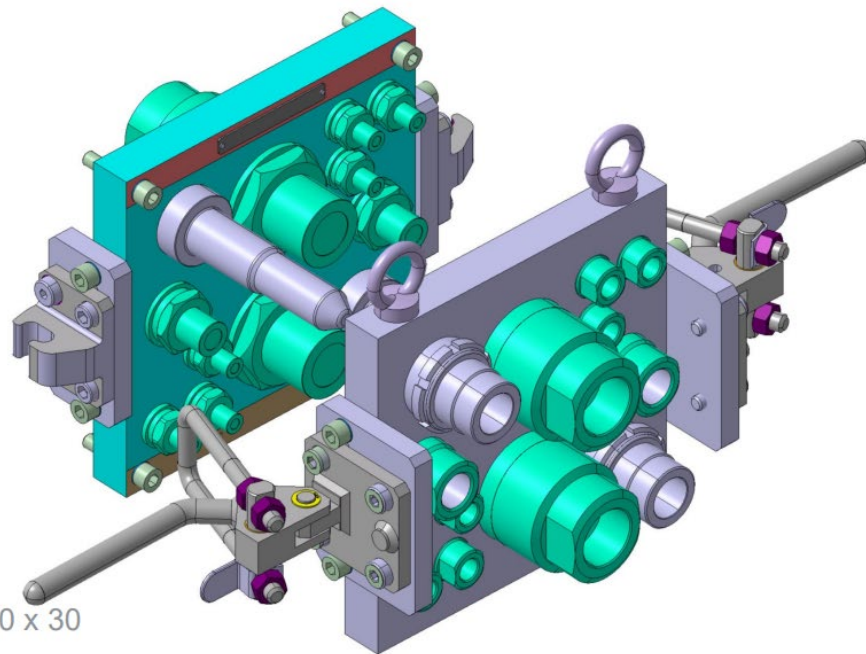


Options:

- Venting Version with DN 30 with
- 3/2 way valve with needle valve
- Customised solutions

Q _{max} :	8 g/s [28 kg/h] @ 15 °C, P ₁ = 35 bar, 16g/sec, or special
Inlet pressure P ₁ :	0...630 bar
Inlet pressure min:	20 bar
Nominal size:	DN 10, DN 15, DN 25, DN 30
Fluid temperature:	-40 °C...+85 °C
Valve housing material:	1.4404 (X2CrNiMo17-12-2)
Sealing material:	FKM
Internal leakage:	< 10 ppm
External leakage:	< 10 ppm
Weight:	~1,60 kg
Deadroom:	~600 mm ³
Connection:	2x G3/4" female / IG

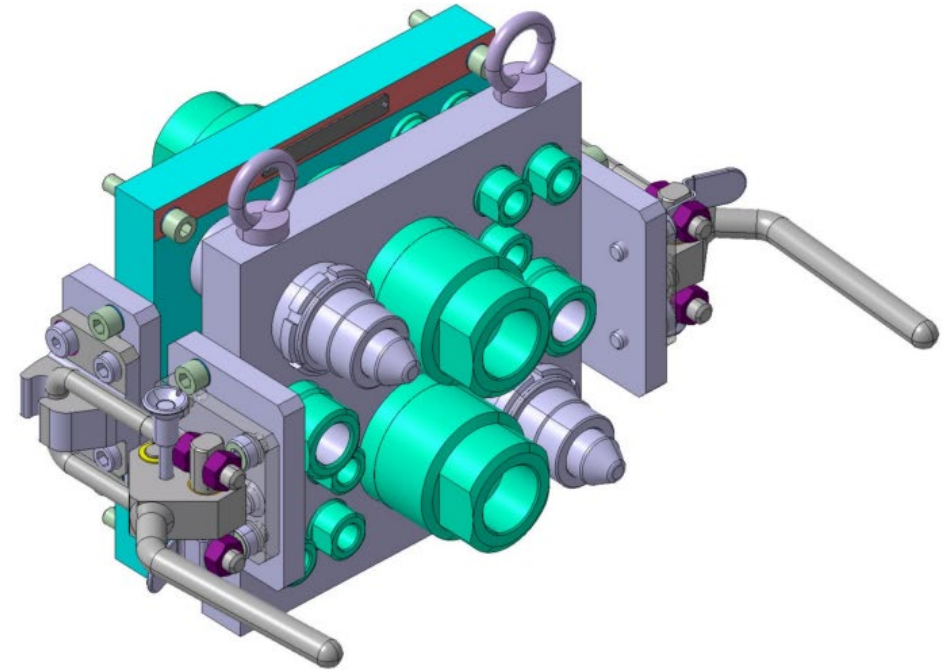
Multiconnector



Dimensions :

Mobile plate : 245 x 240 x 30
Weight : 27 Kg

Fixed plate : 245 x 240 x 30
Weight : 24 Kg



Standardisation document : physical interface

Multiconnector and 1 quick coupling combined on 1 tanktainer

- Multiconnector
 - Chosen as preferable option due to fool proof necessity
 - Backward compatibility should be possible
 - 300 bar : 2 conical pins
 - 500 bar : 3 conical pins
 - 700 bar : 4 conical pins
 - Weight should be lowered
- For inland navigation
 - Multiconnector with 4 connections = preferred option. (Main H₂, Vent line, two air pressure lines)
- For land based applications
 - Only 1 connector needed (H₂ supply)
 - Quick coupling = preferred option
- Multi-use should be possible !
 - Higher turnaround of tanktainers : will lower the cost
 - Use for inland navigation and land based applications should be combined

Standardisation document : data communication

- Required data (available at all times, foreseen in a digital way) :
 - Pressure in each section
 - Temperature in each section
 - Identification of design pressure

Each section has an own Pressure Relief Valve and an own thermal pressure relief device.

- Optional data :
 - Number of filling cycles
 - Acceleration data (occurred G-forces)
 - GPS position
 - Safety check
 - ...

Standardisation document : communication protocol

Communication protocol J2799

Let's stay in touch!



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