


NPROXX

A world leader
in high pressure
hydrogen storage

FOR STATIONARY AND MOBILE APPLICATIONS



An aerial photograph of a winding asphalt road that curves through a dense, lush green forest. The road is dark and contrasts with the vibrant green of the trees. The perspective is from directly above, looking down at the road as it snakes through the woods.

NPROXX is in the business of innovating technology for a better, cleaner energy industry

Our products are at the heart of the rapidly
changing world of transport.

NPROXX

COMMERCIAL IN CONFIDENCE

03/05/2024

Company Background – Who we are?

INTRODUCING NPROXX

NPROXX origins are based upon decades of high-tech, precision engineering in the emission free energy sector

- We have more than 40 years experience in both sophisticated R&D and series manufacture of CFRP vessels and other products (HT and UHM fibers)
- NPROXX is a world-leading CFRP manufacturer in terms of precision quality and output
- High Pressure Hydrogen Solutions for stationary and mobile applications
- NPROXX is a 50/50 Joint Venture between ETC (Enrichment Technology Company) and CMI (Cummins Inc.)
- Core competence is the manufacturing of lightweight Carbon Fiber enforced H2 – pressure tanks and tank systems.
- Employees > 130 in 2023

NPROXX operates on two main sites

- Heerlen (Netherlands) – the Head Office
- Alsdorf (Germany) – the Production Site

Founded in 2018



Spin-Off of **ETC**
enrichment technology company

> 130 Employees



Joint Venture of



High number of **completed** projects



and **references**

NPROXX

Rapid **Growth**



of Production
Capacity

State-of-the-Art
Quality Assurance



ISO 9001

Certified Products



for a wide variety of
applications

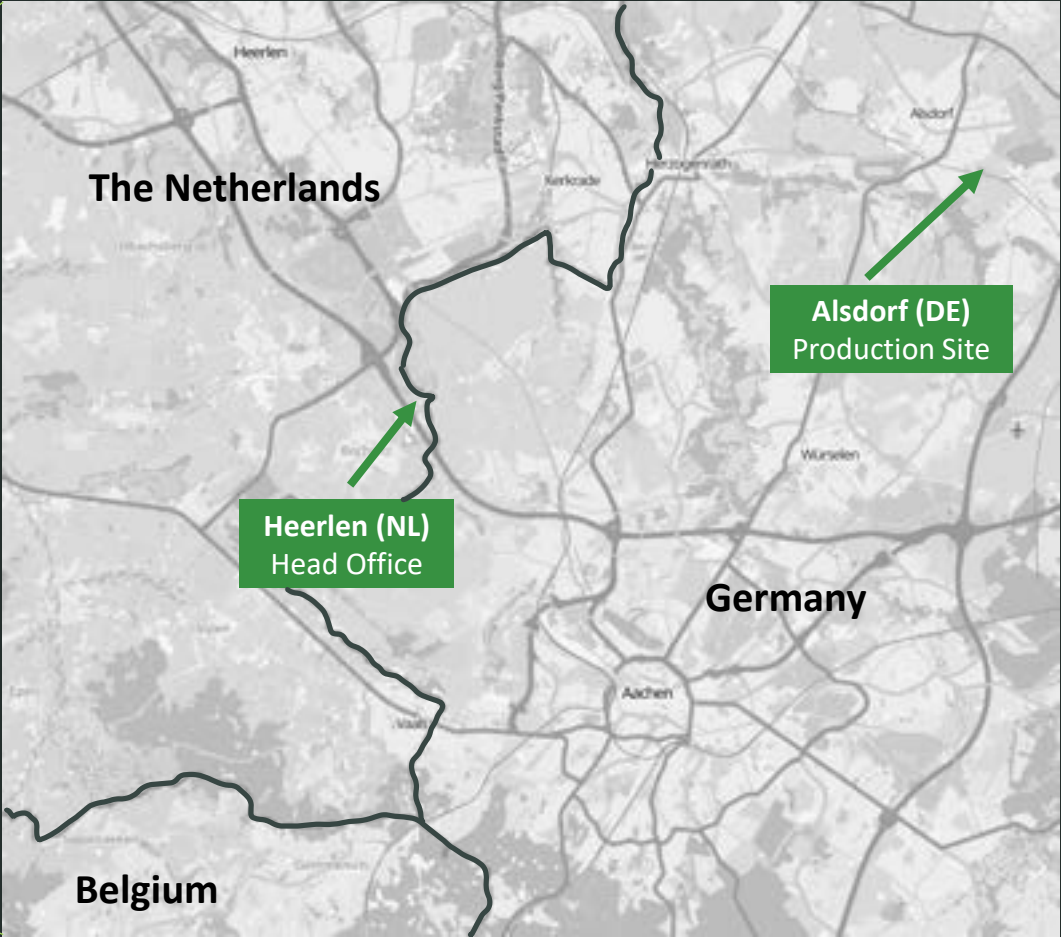
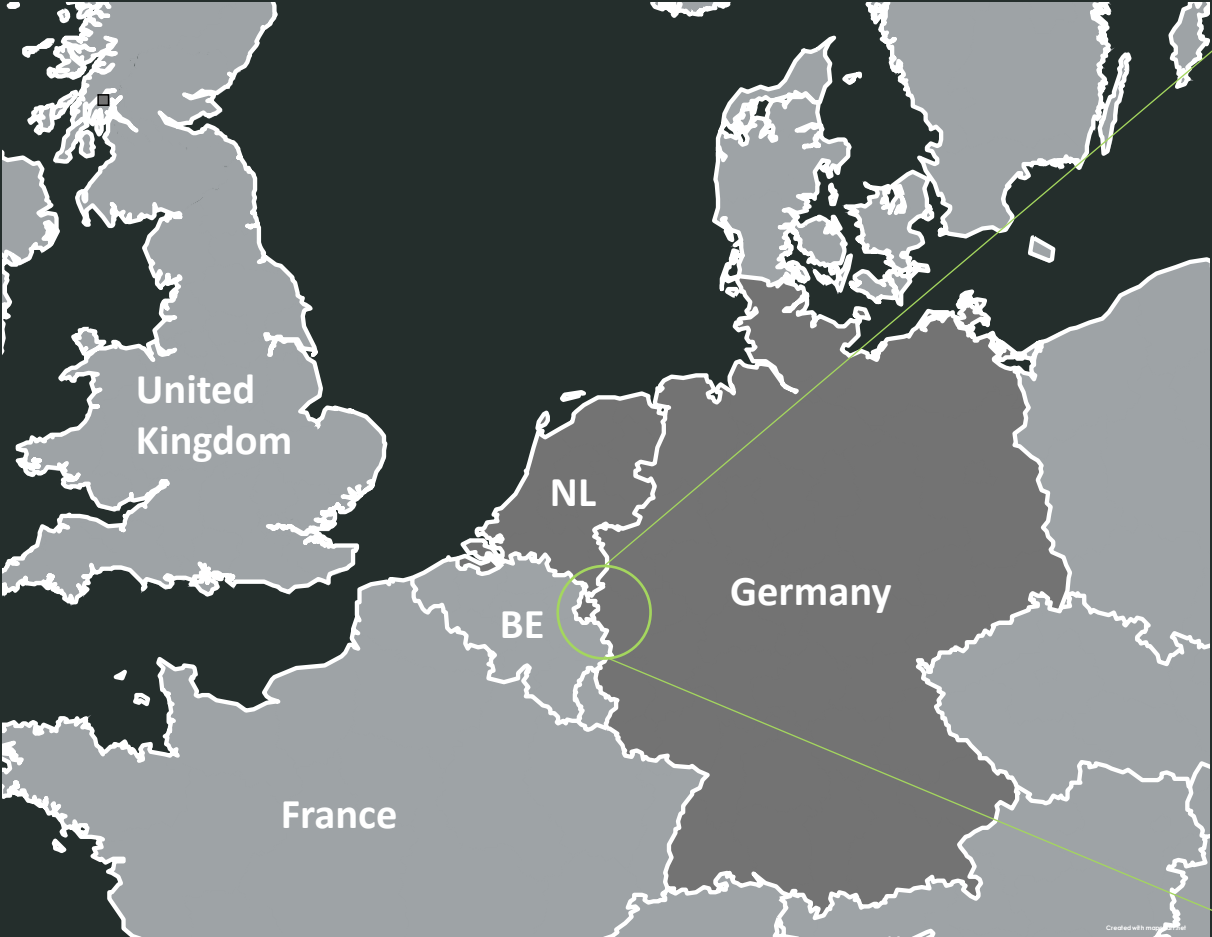
More than **40 years**
of experience



in carbon fiber filament
winding

NPROXX is located in the Heart of Europe

HEERLEN (Netherlands) & ALSDORF (Germany)



New Location in Alsdorf, Germany

THE NEW PRODUCTION SITE



1. Air-conditioned vessel production

- Sufficient inbound storage & buffer space for liners and raw-materials
- Three multi-spindle winding lines

2. Hydraulic pressure test

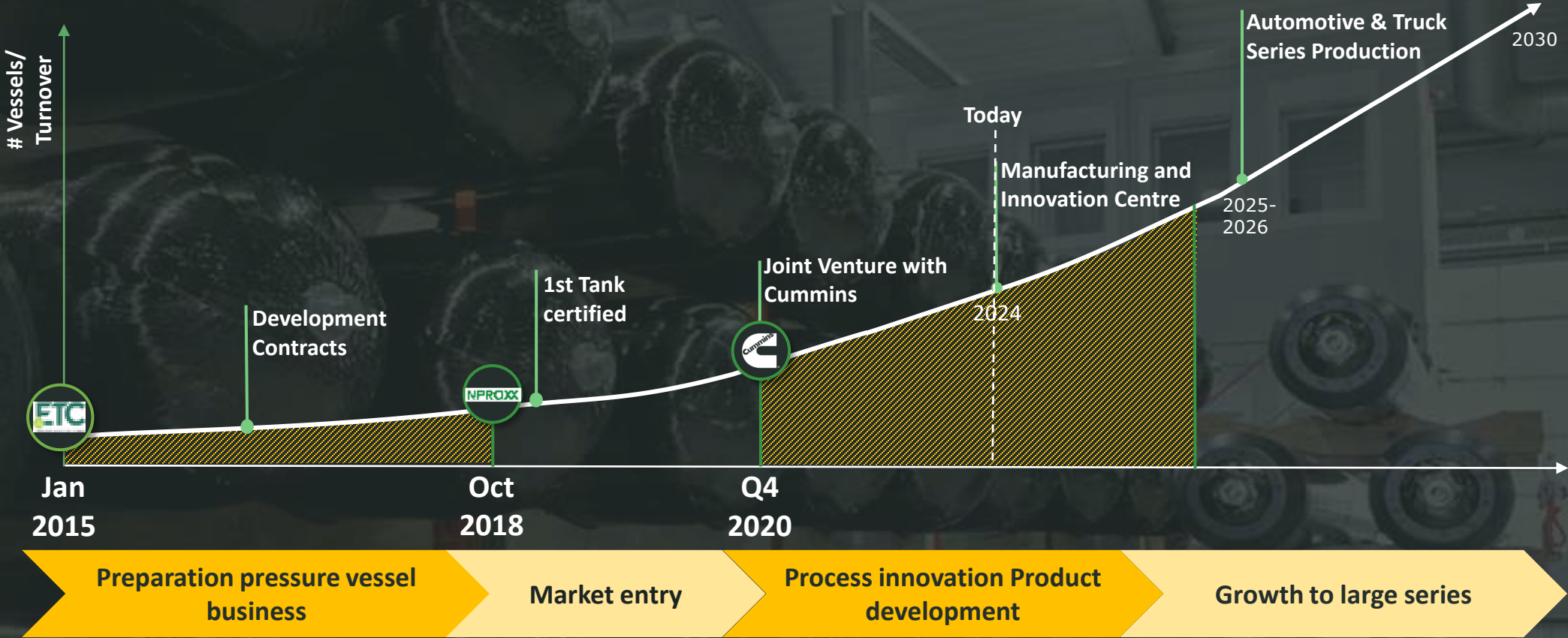
3. Inspection Area

4. Clean Room for module and system assembly & functional testing (under construction)

5. Sufficient space for later capacity extension

History and Ambition

COMPANY TIMELINE



History and Ambition

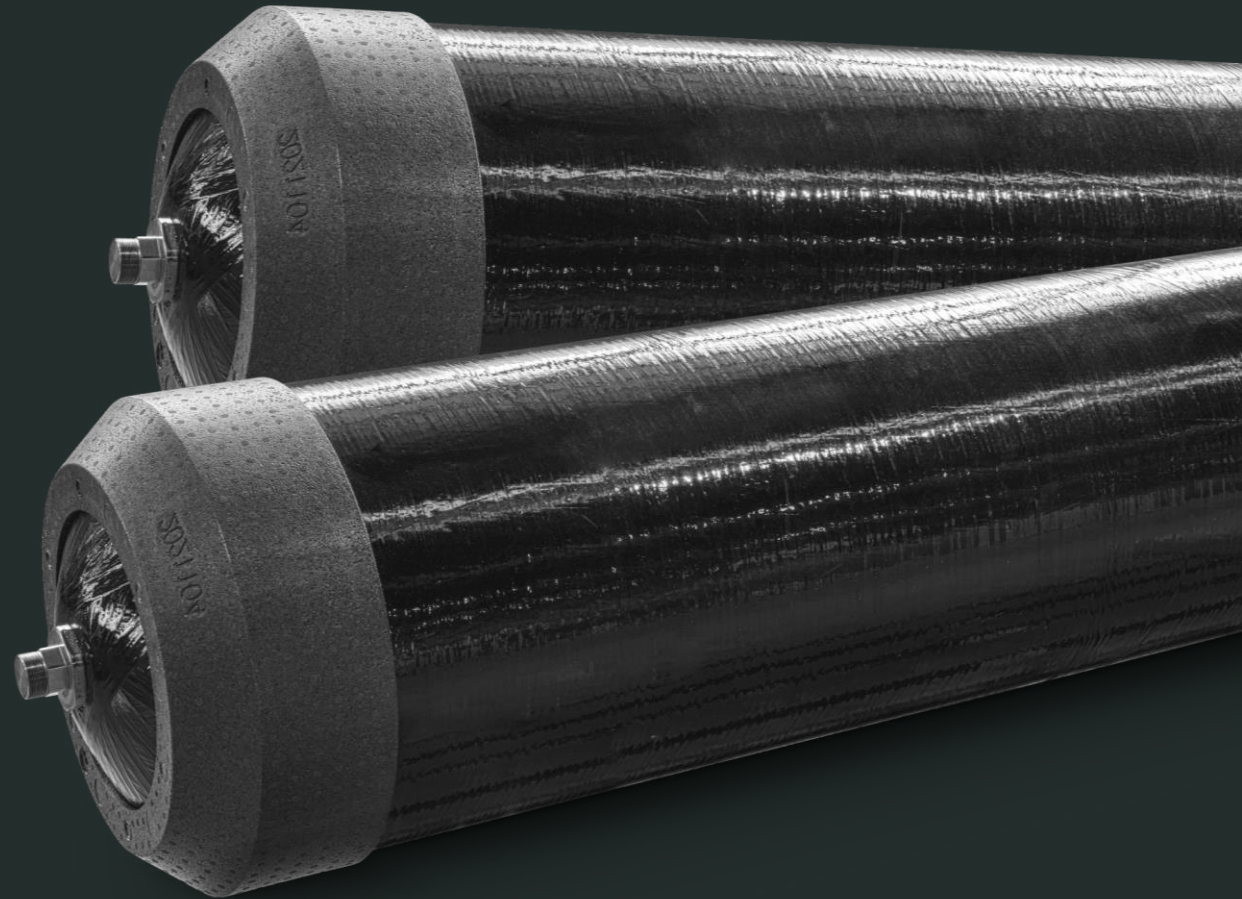
INVESTMENTS

Investment in:

- Training of employees
- Fundamental process development
- Products and certifications
- Machinery
- Marketing & Sales
- Scaling of workforce
- Product- & process innovation
- Manufacturing sites
- Capacity expansion & machinery
- Internationalisation and export
- Workforce
- Capacity expansion
- Automatization
- Markets

Our engineers developed the first certified **Type 4 pressure vessel**

We produce **composite pressure vessels** for hydrogen storage infrastructure, refueling stations and hydrogen-powered vehicles.



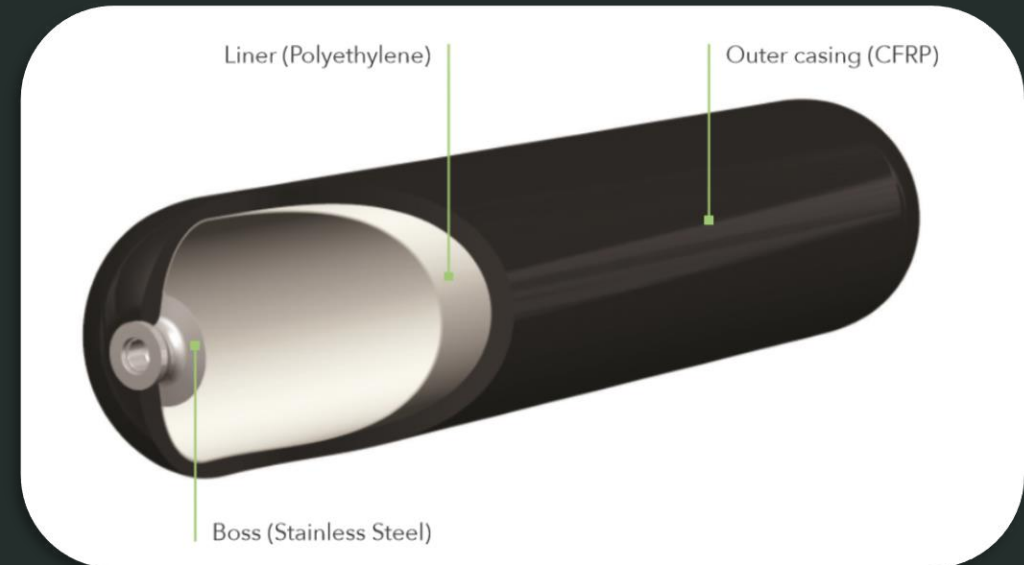
What does NPROXX do?

TECHNOLOGY AND APPLICATIONS

NPROXX is a global leader in designing, developing and manufacturing **Type 4 pressure vessel** for the storage of hydrogen under high pressure.

Based on 40 years' experience of producing carbon fibre-reinforced polymer (CFRP) products and systems in various industries, **NPROXX provides composite tank systems and tailor-made solutions for a range of hydrogen storage applications:**

- On-board tanks for hydrogen-powered vehicles, such as hydrogen trucks, rail vehicles, buses and heavy-duty vehicles (350 bar)
- Hydrogen transport & stationary hydrogen storage (500 bar, 1000 bar)
- On-board tanks for automotive applications (700 bar)



Are NPROXX Products safe?

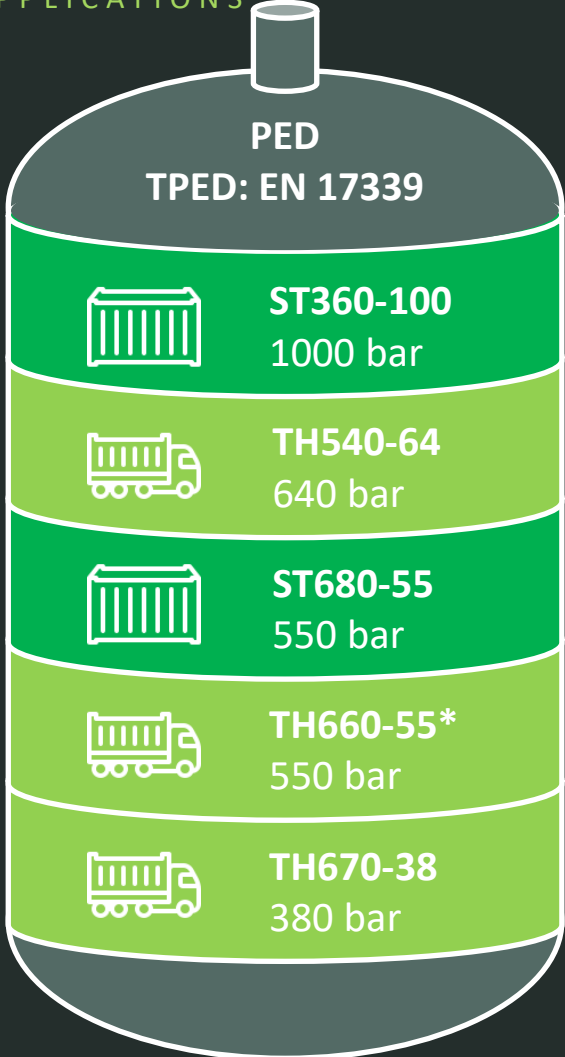
TECHNOLOGY AND SAFETY

- NPROXX carbon fibre pressure vessels undergo a wide range of stringent certification tests before they are approved for distribution. These tests ensure that the pressure vessels can be reliably and repeatedly used without risk of the tank failing under pressure.
- These tests include burst tests, durability tests, fire tests, crash tests and even gunfire/explosion tests. In all tests, the key performance indicator is the pressure vessel system's ability to maintain its structural integrity or release its pressurised gas without rupture, in the safest way possible.

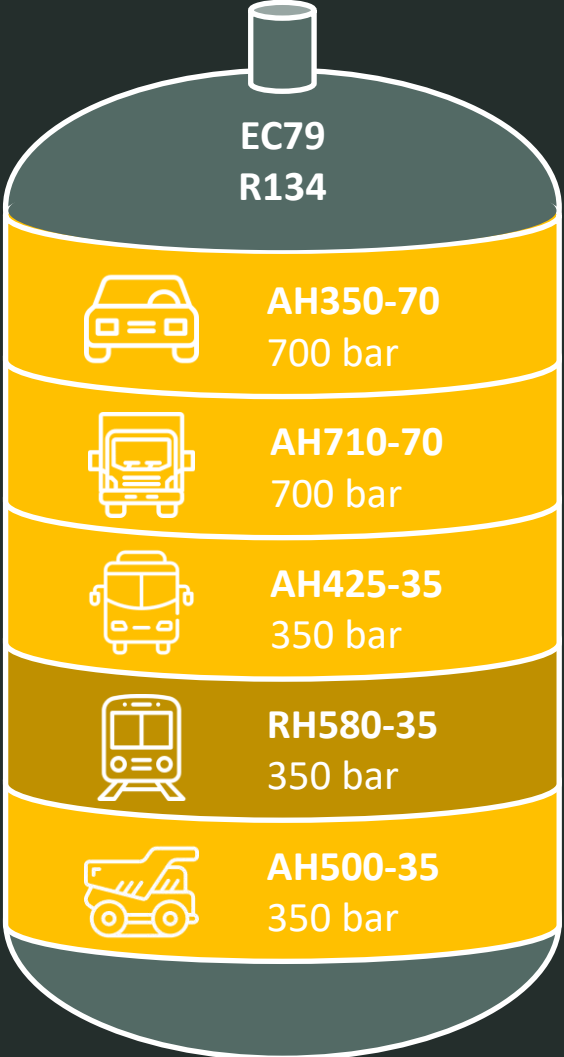


NPROXX Hydrogen Product Overview

PRESSURE LEVELS & APPLICATIONS



Transport & Stationary



Automotive & Rail

* under development



Our Vision

- We focus on development, precision design & engineering, manufacturing, testing & documentation of pressurized gas systems
- We believe in emission free and/or emission reducing technology
- We aim for applications with high quality standards and documentation requirements
- We are a series manufacturing company (in K units)

What makes NPROXX products industry-leading?

- **NPROXX** provides its composite tank systems and tailor-made hydrogen storage solutions based on 40 years' experience in carbon fibre products. NPROXX has a unique history in carbon fibre expertise, beginning in 2001 when our engineers created the first certified 300 bar Type 4 pressure vessel.
- When **NPROXX became a joint venture and joined the Cummins family in 2020**, it joined a group of complementary hydrogen businesses who, together, are able to offer innovative solutions and manufacturing at scale for end-to-end hydrogen solutions. NPROXX is able to leverage Cummins' global reach and market access, while upholding and enhancing Cummins' hard-earned reputation for quality.

Type 4 Pressure Vessels

APPLICATIONS

Markets

- Transport & Storage Systems
- Heavy Duty Vehicle Systems
- Automotive Systems
- Aviation & Special Applications

Relationship & Collaboration

- Via development projects
- To series manufacturing

We improve total cost of ownership

- Know-how in PV Type 4 applications
- Increase volume and save weight. Increase output and save waste
- Innovative series manufacturing solutions and scale effects



Applications & Markets

FUELING THE FUTURE OF TRANSPORTATION



Transport & Infrastructure

NPROXX developed & certified numerous H₂-Storage solutions specifically targeted at infrastructure and transportation applications.



Heavy Vehicles

NPROXX is working with manufacturers of heavy duty vehicles to develop hydrogen powered systems and storage for use in heavy plant and heavy-duty applications.



Buses

Modern inner city and regional bus transport is one of the biggest areas where the hydrogen economy is set to change the lives of citizens for the better.



Rail Vehicles

NPROXX is helping the rail industry to deliver its target to achieve lower emission transport.

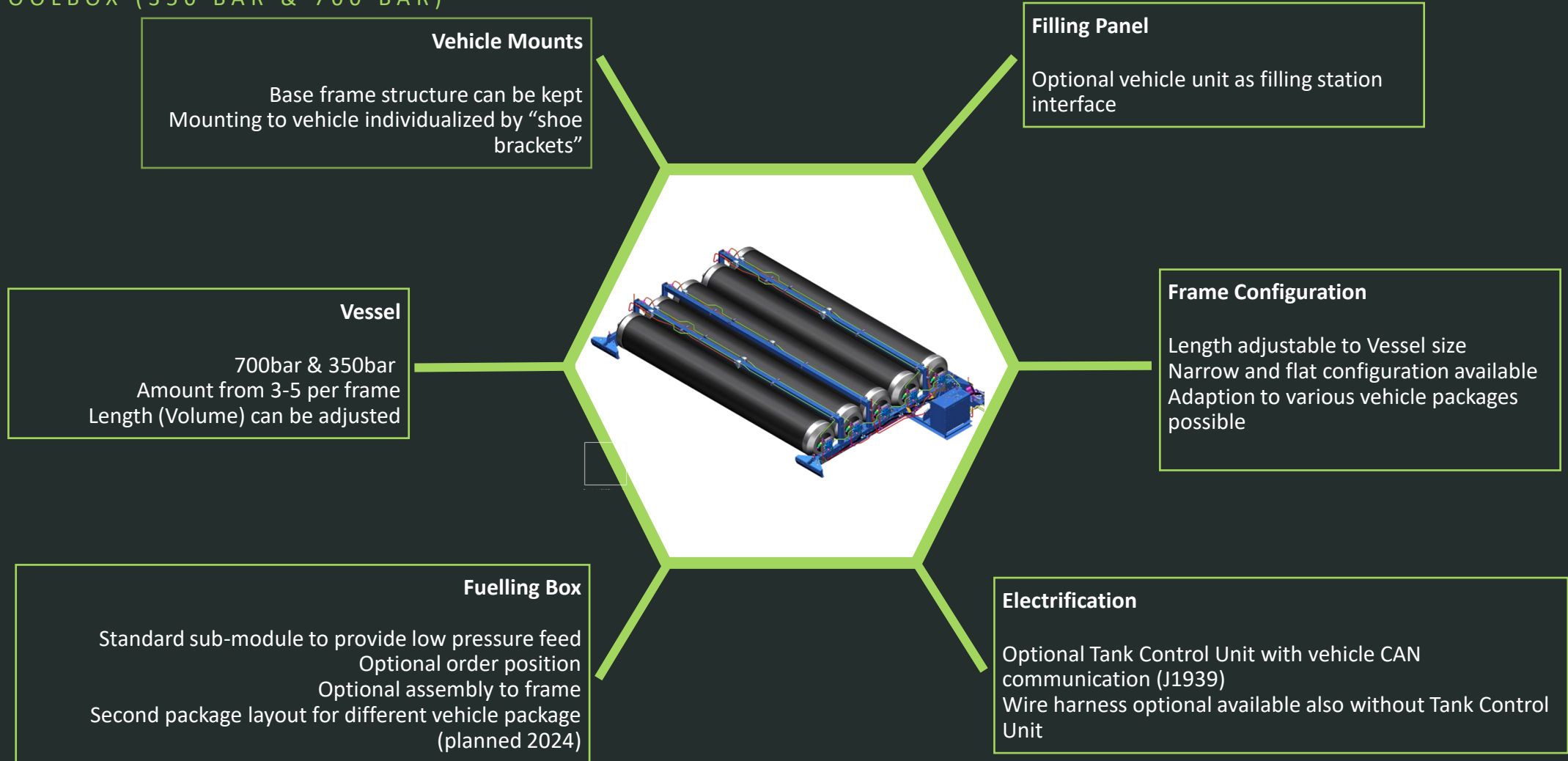


Lorries & Trucks

NPROXX is pioneering the use of hydrogen as a clean alternative fuel for these vehicles.

Product Presentation: Single Source System

THE TOOLBOX (350 BAR & 700 BAR)



Product Presentation

System Delivery: PLUG & PLAY

Delivery

Assembly

Commissioning

- Delivered under
 - standard >20 bar forming gas 95/5
 - optional prefilled with low pressure hydrogen
- Transport and storage
 - for low amount in wooden box
 - higher amount in reusable frame
 - 2 systems stackable

- Systems 100% End of Line tested
 - according R134 or HGV
 - additional NPROXX standards
- System lifting
 - via crane points on system
 - or transport frame as crane tool

- Full System Certification possible

Heavy Duty Vehicles

NPROXX is working with partners across the globe to develop and produce high pressure hydrogen storage for use in heavy vehicles, from mining trucks to passenger trains.

Hydrogen can be used to fuel large heavy-duty vehicles, from mine trucks to trains and even the large delivery vehicles on our roads. With zero emissions except water, Hydrogen power can make a major contribution to reducing emissions and fossil fuel usage.



Transport & Stationary Storage

NPROXX has developed a range of solutions for the safe storage of hydrogen under high pressure.

Our storage solutions have been designed as modular systems, enabling large volumes of hydrogen to be stored safely and conveniently, either at the source of production or at refueling stations and similar facilities.



Automotive

NPROXX is constantly looking to the future – the high-tech solutions we have today will develop further through successive generations to provide greater opportunities for reducing or eliminating carbon emissions in transport applications.



Capabilities

IN 2001 OUR ENGINEERS AT JÜLICH DEVELOPED THE FIRST CERTIFIED TYPE 4 PRESSURE VESSEL



Research & Development

NPROXX can call on significant resources and expertise within our immediate resources, and this includes access to a modern, highly advanced research and development function.



Capacity, skills, experience

Our company's heritage necessitates a comprehensive understanding of the importance of traceability to the industry.



Type 4 Pressure Vessels

Our CFRP Type 4 pressure vessels can be used for up to 30 years without needing to be replaced.



Our pressure vessels fulfil the following industrial standards:

- 2014/68/EU Pressure equipment directive (PED)
- 2010/35/EU Transportable pressure equipment directive (TPED)
- ADR: International regulation for transport of dangerous goods
- ISO 11119-3: Transportable Gas Cylinder
- GB/T 35544: China Standard Type III Cylinder
- EC 79: Hydrogen-powered motor vehicles
- UN ECE R134: Hydrogen fuel cell vehicle safety

H₂ Systems – Stationary & Transport

TECHNICAL SPECIFICATION

	Stationary	Transport
Max. Dimensions (L x W x H)	up to 45ft: 13600 x 2550 x 2750 mm	
Certification	PED (2014/68/EU) CE and UK CA marking	ADR (Road); RID (Train); CSC (Terminal Lifting)
Temperature Range	-40 °C to +85 °C	-40 °C to +65 °C
Full Load Cycles	10.000 (MWP ↔ MAWP)	unlimited
Periodic Inspection	according to national legislation (e.g. 10 years for Germany)	every 10 years (visual inspection, strength test)
Lifetime	20 years	unlimited
Mounting concept	ISO Corners (DIN ISO 1161)	
Standard Delivery Conditions	6 bar Nitrogen	

Thank you very much for your attention!



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