Hexagon business areas

- **LOW-PRESSURE LPG**
  - LPG CYLINDERS

- **HIGH-PRESSURE CNG & H2**
  - MOBILE PIPELINE®
  - HYDROGEN PRODUCTS
  - LIGHT-DUTY VEHICLES

- **AGILITY FUEL SOLUTIONS (50%)**
  - HEAVY-DUTY VEHICLES
Global geographical footprint

The extended Hexagon Composites Group totalling 820 employees

- Aalesund, Norway
  - Headquarters
- Raufoss, Norway
  - Low-pressure cylinders
  - High-pressure cylinders
  - Agility Fuel Solutions
- Kassel, Germany
  - Sales office
- Nizhny Novgorod, Russia
  - Sales office
- Bangalore, India
  - Sales office
- Barcelona, Spain
  - Sales representative
- Klagenfurt, Austria
  - Sales representative
- Copenhagen, Denmark
  - Sales office

- Sao Paolo, Brazil
  - Agility Fuel Solutions
- Lincoln, Nebraska
  - High-pressure cylinders
  - Agility Fuel Solutions
- Taneytown, Maryland
  - MasterWorks
- Nashville, TN
  - Agility Fuel Solutions
- Salisbury, NC
  - Agility Fuel Solutions
- Anniston, AL
  - Agility Fuel Solutions
- Nashville, TN
  - Agility Fuel Solutions
- Santa Ana, CA
  - Fontana, CA
  - Agility Fuel Solutions
- Kelowna, BC, Canada
  - Agility Fuel Solutions

- MasterWorks
- Agility Fuel Solutions (50% JV)

Hexagon Group administration and production sites
Sales offices and representatives
Agility Fuel Solutions

(As of November 2017)
Leading since 1963

In 1963 Lincoln Composites begins with filament-wound rocket motor cases for NASA.


In the early 1990s AIK (AEG Isolier-Kunststoffe) started supplying carbon fibre roller tubes. xperion E&E is founded in 2001.

The Flakk Group became the largest owner of the publicly listed Norwegian Applied Technology ASA.

CNG Automotive Products Division was merged with Agility Fuel Systems to create Agility Fuel Solutions (50/50).


Ragasco is established and the decision to invest in a highly automated and high production volume factory for LPG cylinders was made.

Norwegian Applied Technology ASA was merged with Devold AMT AS. The Group changed its name to Hexagon Composites ASA.

Hexagon Composites streamlined as a Type 4 composites cylinder manufacturer
Our value proposition

Why hydrogen?

• Plentiful and efficient by-product of excess renewable energy
• Fast refuel
• Transportable outside the grid

Why Type 4 cylinders?

• Light, strong and long lasting
• All OEMs prefer Type 4 – Toyota developed & deployed their own
• Plastic materials resist cyclic fatigue = great under pressure vs. metal

Why Hexagon?

• Decades of Type 4 production and technical leadership
  – Tiny H2 molecule requires technical excellence
  – Best in class winding rate = lower capex
• Lowest material cost input
  – Fiber by the ton
  – Resin by the barrel
  – Plastic pellets by the tote
Composite Cylinder Type 4 – Safe and proven track record

• Storing hydrogen at high pressure requires sophisticated technology and experience
  – Hexagon has manufactured nearly 0.5 million high pressure tanks and more than 11 million Type 4 propane tanks

• Hexagon’s proprietary software and approach to tank design meet the highest industry standards, e.g., at global car manufacturers
  – Made of lightweight plastic materials that do not corrode
  – Passed extreme temperature testing
  – Patented “metal to plastic” interface surpasses regulatory requirements
  – The only Type 4 tank producer that combines technical success with significant manufacturing capacity
Hexagon is well positioned across the Hydrogen value chain

- Hexagon is currently offering composite Hydrogen tanks for a wide range of applications
DELIVERING ENERGY SOLUTIONS

Hexagon Composites delivers safe and innovative solutions for a cleaner energy future

We are adapting our leading composite pressure vessel technology for a wide range of mobility and storage applications
gas distribution products

• High-capacity, cost-effective transportation and storage solutions

• TITAN™ ideal for businesses that require a large consumption of gas at a high flow rate, but are not currently served by pipeline

• SMARTSTORE™ ideal for areas where large containers are not permitted, storage space is limited, and surrounding roads have restricted load conditions

• TUFFSHELL® Ground Storage ideal for natural gas filling stations with small footprint or weight restrictions
X-STORE®

The flexible DOT solution for US/CAN
- 20ft ISO container
- Capacity adjustable to customer demands
- Full capacity on 25 MPa = 415 kg Hydrogen

The ADR solution for Europe
- Fast exchange of container modules
- Capacity adjustable to customer demands – range from 10ft to 45ft
- Different options on pressure – 25MPa – 30MPa – 50MPa.
- Full capacity range from 160 kg to 1085 kg.
Hydrogen Bus cylinder – @35MPa – roof top mounting

- Allows rooftop assembly
-
Heavy Duty Vehicles

• Toyota truck project
  – Deliveries made

• Asko/Scania – Grocery Wholesaler truck. Norway
  – Expected to start operation in 2018
TITAN® XL  The Heaviest of Heavy Duty

The bulk transportation solution for US/CAN
• Our Mobile Pipeline® also for use with Hydrogen
• DOT approval already in place

40ft TITAN® module with full capacity at 25 MPa = 875 kg Hydrogen
Tare weight 19 280 kg
TITAN® h2 tanks suitable in boats and cruise vessels

- Hydrogen electric ship
  - Flexible solutions
  - Suitable for short-sea
H2 Storage Challenge

EFFICIENCY VERSUS PRESSURE

- H2Kg/H2Ovol
- H2Kg/Mass
- Linear (H2Kg/Mass)

CNG Template
Carbon Fiber
Pressure
350 to 950 bar
Codes & Standards
Cycle life, Stress ratio, cooling
Power to Gas
Thank you for your attention!

Rick Rashilla
Vice President
Hydrogen Automotive Business Unit
Hexagon Lincoln

Phone: 402 470 5000
Mail: rick.rashilla@hexagonlincoln.com
www.hexagon.no
www.hexagonlincoln.com