Hydrogen Containment Systems for FCEV’s and Gas Transport
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market leader in value-added steel processing, pressure cylinders and heavy equipment manufacturing

- 95 million cylinders / yr.
- FY2017 sales $3 billion
- 85 facilities in 11 countries
- +11,500 employees
- global customer service and technical support teams
Green hydrogen or other primary energy sources
AVAILABLE CYLINDER TYPES

- Type I: All Steel - available
- Type II: Fiberglass Hoop Wrap Steel Liner - available
- Type III: All Carbon Full Wrap Metallic Liner - available
- Type IV: Fiberglass/Carbon Full Wrap, Plastic Liner - In preparation
Cylinder production since 1924
1998 acquired by Worthington Cylinders
Today – technology market leader
ISO/TS 16949 certified
High pressure composite cylinders
   IATF 16949:2009
   TR TS 032 (CIS countries)
   Today, up to 700 BAR working pressure

Application:
   Automotive, Bulk Gas Transport, SCBA, Paintball
FOCUSED │ INNOVATIVE │ COMMITTED

SAFETY
QUALITY
RELIABILITY
LOW RISK SUPPLIER
SAFETY
QUALITY
RELIABILITY

Seamless aluminium liner
TYPE III CYLINDER DESIGN

**Seamless, thin walled aluminum liner**
- No permeation
- High corrosion resistance
- High impact resistance
- High thermal conductivity
  - Real fast fill capabilities
  - Better heat flux in case of a fire
- Proven “leak before break” behavior
- Millions of Type III cylinders in service
- Al Alloy standardized in ISO and CEN

**carbon composite shell**
- Light weight, high strength
- Corrosion resistant
- Proven in Aerospace & Aviation applications
- Extremely high fatigue life
- No loss of strength over product lifetime
WE ARE READY!
Our offer includes hydrogen cylinders dedicated for transport, storage and fueling systems.

SAFE
- **EC 79/2009** - 350 BAR (automotive)

RELIABLE
- **EN 12245** – 300 BAR / 500 BAR (BGT)

EFFICIENT
BULK GAS TRANSPORT
MEGC approved for **all Class 2 Gases**

~ 430 kg H2
- Easy to purge
- Vacuuming possible
- 100% hydrogen available
- Drainage system
- Fast fill/decanting

~ 1.000 kg H2
~ 1,000 kg H2

- Easy to purge
- Vacuuming possible
- 100% hydrogen available
- Drainage system
- Fast fill/descanting
500 BAR BUNDLE

Hydrogen storage
- 500bar working pressure
- 600L capacity
- fully assembled
- ADR approved
- handling by fork lift and crane
- extra fixing points for safety shipment

- each piping and valve parts integrated and protected
- light weight solution
- discharging with 200bar equipment
- grounding cable

~ 18 kg H2
HYDROGEN FUELING SYSTEMS
Custom made
Type III and Type IV (soon)
Ready to offer best possible, safe, reliable and efficient solution!
CONCLUSION

CNG and Hydrogen Fueling Systems

Own R&D and Engineering Center

Skilled employees

Cooperation with market leading valve producers

Short supply chain

Short time to market
- IATF 16949 certified manufacturer
- Global OEM System Supplier
- Own Liner and Cylinders Manufacturing
- Own Fueling Systems Assembly

- Strong customer service and highly skilled service partner
- Highest Product Quality
- Corrosion, leakage and permeation free cylinders
- Products certified to all relevant standards
- Strong brand and financially strong partner
- 99% On Time delivery
A low-risk, skilled, strategic partner for your safety-critical business
Full cylinder range supplier – CNG, HYDROGEN, LNG.
Global network of sales, technical and customer service specialists.
Commitment to technology development.

At your disposal for any additional question!

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