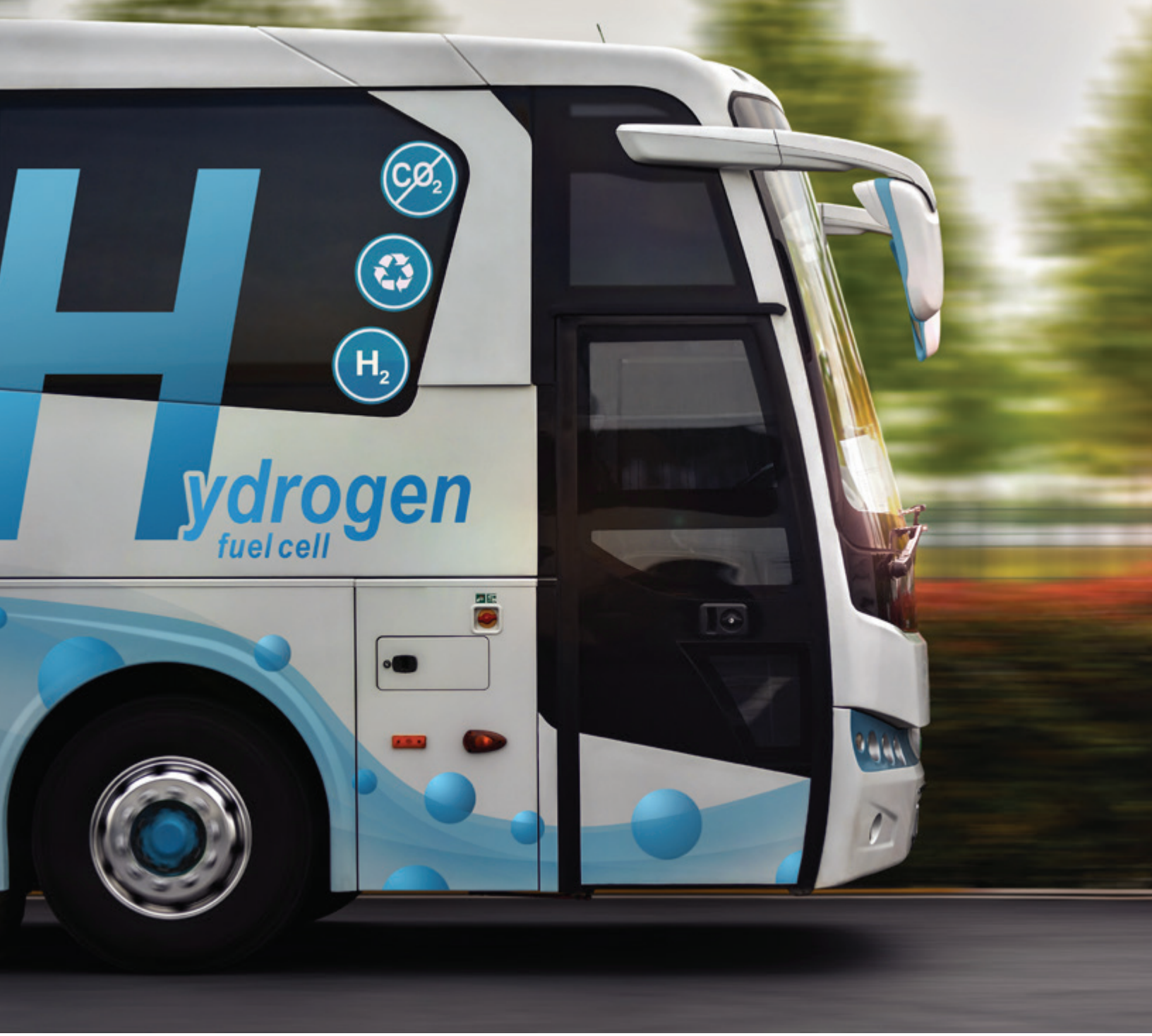


Instrumentation Solutions for Hydrogen Applications

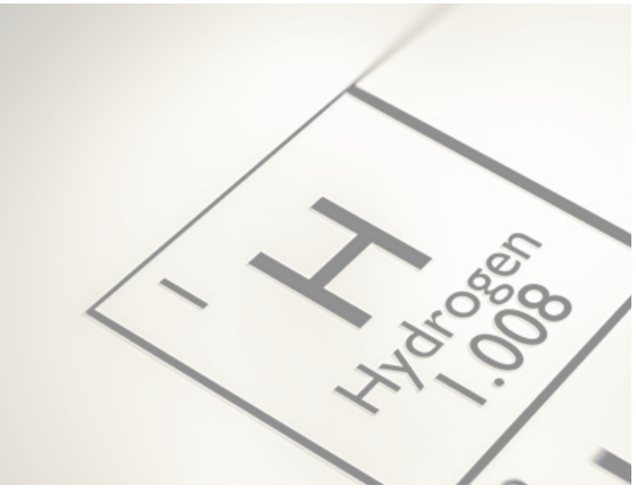
Associated Products for Hydrogen Service

Parker

ENGINEERING YOUR SUCCESS.

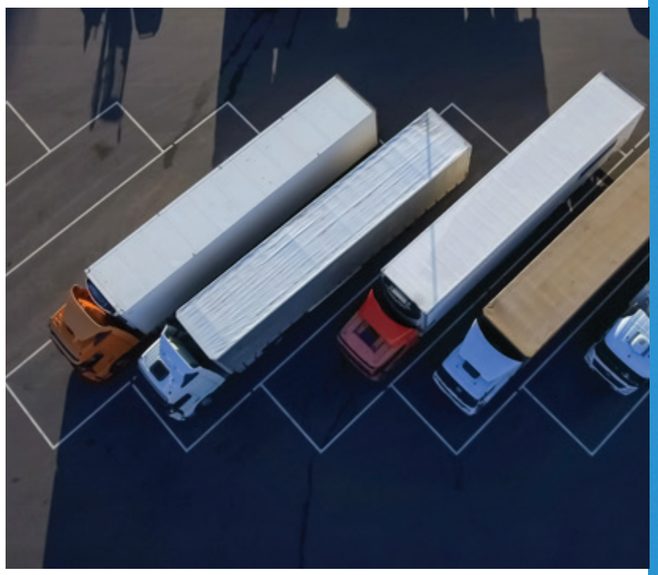
Parker at the Front End of Innovation for the Hydrogen Market

Parker Hannifin are committed to supporting the energy transition and safe deployment of Hydrogen as an environmentally friendly future fuel source.
And the hydrogen revolution is happening now.



As a leading manufacturer in motion and control technologies Parker offers a wide range of products orientated to the hydrogen markets, from fuel cell powered platforms for trucks and buses to hydrogen storage.

Our comprehensive product portfolio covers a wide variety of pressures to help our customers overcome some of the technical challenges of such critical and demanding application.



Material and equipment selection for hydrogen service

When it comes to handling hydrogen, material and equipment selection becomes more than ever, an essential ingredient for success. End users need to pay special attention to the materials of construction and the quality of the equipment that goes into their assets.

As a manufacturer of pressure containing equipment, Parker has decades of experience in serving hydrogen applications. Parker products are designed to minimise the risk associated with corrosion and hydrogen attack, and ultimately provide safe and reliable performance in the field.

The raw materials that we use are fully traceable and closely controlled from the melting stage to the finished product. Additionally, manufacturing processes are selected to ensure minimum operating risk in hydrogen environments.

As well as stainless steel, we can also offer a variety of nickel alloys.

We are here to help you. Our knowledge and expertise are at your doorstep.

On-site training

At Parker, we recognise that leak-free performance is at the top of your agenda. Anyone installing Parker products for hydrogen service will be offered Small Bore Expert (SBEx) training that includes the following topics:

- Instrumentation Safety
- Tube Fabrication and Bending Techniques
- Safe compression Fitting Make-up/Cone & Thread
- Industry Best Practices
- Product Selection
- Installation and Maintenance

Parker has an improved and optimised installation procedure for its A-LOK® parts when they are used in hydrogen service.

Components for Hydrogen Applications

Parker Instrumentation offers a wide range of hydrogen-compatible components for on-vehicle and infrastructure applications (storage tanks, dispensers, compressors and pressure control devices).

TWO FERRULE COMPRESSION TUBE FITTINGS - A-LOK®

A-LOK® tube fittings have provided proven performance in hydrogen systems for many years and are available as an integral end connections on our extended product range, including all valve types. This will reduce the need for 'threaded' components and therefore reduce the number of potential leak points across your installations.

EC-79 Approved

A-LOK® tube fittings have been approved for use on-board hydrogen vehicles up to 350 barg pressures. The EC-79 regulation guarantees the safety and performance of H2 equipment under different pressures, electric, mechanical, thermal or chemical conditions.

For hydrogen applications which do not require on-board EC-79 certification, Parker Instrumentation offers a wide range of instrumentation and control products including:

- Ball Valves
- Check Valves
- Filters and Relief Valves
- Needle Valves
- Medium Pressure – MPI™ Fittings and Valves
- Medium Pressure Autoclave Engineers® Valves, Fittings and Tubing.

Hydrogen fuel cell vehicles

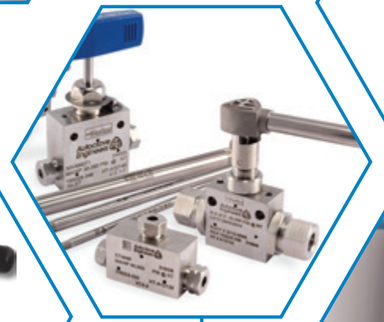
BALL VALVES B SERIES

Dispensers

Parker products are designed to minimise the risk associated with corrosion and hydrogen attack and provide safe and reliable performance in the field.

AUTOCLAVE ENGINEERS® NEEDLE VALVES 20SM AND CHECK VALVES

These specially modified needle and check valves are qualified for use in hydrogen fuelling stations per ISO 19880-3 specification. The hydrogen variation to the needle valves incorporates a unique STEM/SEAT and PACKING design that can withstand temperatures ranging between -73°C and 316°C and pressures of up to 20,000 psi (138 MPa) while increasing cycle life by as much as 40%. Both the needle and check valves are available with any Parker Instrumentation connection options including cone & thread fittings and MPI™ medium pressure fittings.

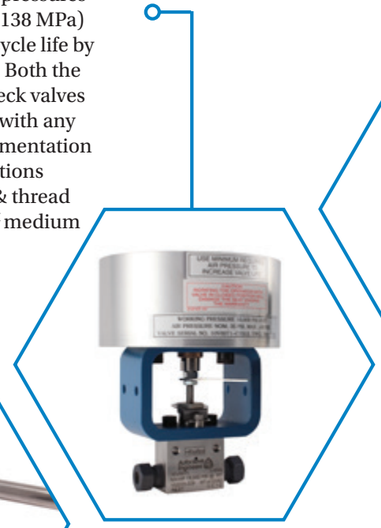


OTHER AUTOCLAVE ENGINEERS® PRODUCTS

- Fittings
- Tubing
- Check Valves
- Filters

These utilise a medium-pressure coned & threaded connection or MPI™ medium pressure for leak-tight reliable performance.

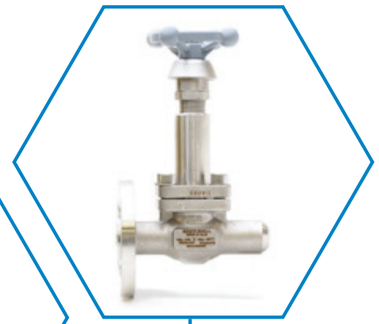
MEDIUM PRESSURE MPI™ FITTINGS AND VALVES



Hydrogen storage tanks, compressors and pressure control devices

Our comprehensive solutions for hydrogen-powered vehicles include:

- System Design
- EC-79 Approved Products
- E-Powertrain Expertise
- Alternative Fuel Expertise
- Complementary Technologies



BESTOBELL CRYOGENIC VALVES

Parker Bestobell range of cryogenic valves designed and engineered for use with Group 1 gases include:

- Globe Valves
- Gate Valves
- Safety & Pressure Relief Valves
- Pressure Regulators
- Manifold Fill Assemblies

These valves are compliant with Pressure Equipment Directive (EU PED 2016): 2014/68/EU.) and Transportation Pressure Equipment Directive (TPED).

Ordering Information Examples

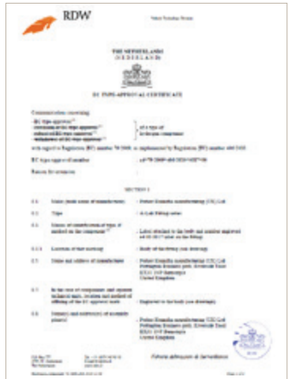
On-board hydrogen-powered vehicles

Two Ferrule Tube Fittings - A-LOK® (Metric and Imperial)

EC-79 Approved

Union

For metric tube



A-LOK® - EC-79 Approved	
Tube OD Size	**Example Part Number* (EC-79 Approved)**
6 mm	SCM6-316-EC79
8 mm	SCM8-316-EC79
10 mm	SCM10-316-EC79
12 mm	SCM12-316-EC79
16 mm	SCM16-316-EC79
18 mm	SCM18-316-EC79
20 mm	SCM20-316-EC79
25 mm	SCM25-316-EC79

* A-LOK® EC-79 combinations and materials are available in metric and imperial sizes up to 25mm (1”).
Refer to the fittings product catalogue ref. 4190-FMTG.
To order EC-79 components, simply add the code -EC79 at the end of your part number.

Hydrogen infrastructure applications

(NOT on-board hydrogen-powered vehicles)

Two Ferrule Tube Fittings - A-LOK® (Metric and Imperial)

Union

For metric tube

A-LOK®	
Tube OD Size	**Example Part Number***
6 mm	SCM6-316
8 mm	SCM8-316
10 mm	SCM10-316
12 mm	SCM12-316
16 mm	SCM16-316
18 mm	SCM18-316
20 mm	SCM20-316
25 mm	SCM25-316

* A-LOK® combinations and materials are available in metric and imperial sizes up to 25mm (1”).
Refer to the fittings product catalogue ref. 4190-FMTG.

A-LOK® Tube Fittings installation for hydrogen service

Parker has an improved and optimised installation procedure for its A-LOK® parts used in hydrogen service. Please follow the steps below for correct installation.

1. The tube should be fully inserted into the shoulder of the fitting until full tube abutment is achieved.
2. The nut should be advanced to the finger tight position and then be marked at the 6 o’clock position.
3. The nut should then be advanced **1 ½ turns** with the appropriate wrench making sure a back-up wrench is used to hold the fitting body during the tightening process.
4. The mark will now be at the 12 o’clock position.

Once this has been achieved, the assembly will be ready to use in your Hydrogen system.

For tube specifications, ordering information, preparation and pressure ratings, please refer to the Parker Fittings, Materials and Tubing Guide catalogue ref. 4190-FMTG.

Other Components for Hydrogen Applications

To order other Parker components for hydrogen service (not on-board hydrogen-powered vehicles), please refer to the product catalogues listed below.
For additional information, please contact your Parker Sales Company or authorised Parker Distributor.

Other Parker components for hydrogen service	
Item	**Catalogue Ref. Number**
Ball Valves	4121-BV
Bestobell Cryogenic Valves	5190-BBV
Check Valves, Filters and Relief Valves	4135-CV
Medium Pressure Autoclave Engineers Check Valves and Filters	02-0124SE
Medium Pressure Autoclave Engineers Cone and Thread Fittings and Tubing	02-0124SE
Medium Pressure Autoclave Engineers Needle Valves - 20SM Series	02-0112SE
Medium Pressure Fittings and Valves - MPI™	4234-MA
Needle Valves	4110-NV

⚠ WARNING

FAILURE, IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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Worldwide Division Headquarters

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