Clean Energy

venair

Flexible silicone hoses for renewable energies

Fluid solutions. Solid performance.

At **Venair**, we design and create fluid transfer solutions that help top leading companies run all their operations with precision and reliability.

Today, we present more than 35 years of experience manufacturing custom high-quality product and delivering direct assistance to the most demanding industries across the world.

Together, we will achieve the maximum operability for your critical applications.

HEADQUARTERS (SPAIN)

+35 years of meaningful innovation

We’re involved in each part of the creation, design and engineering of the solution.

Material research and product development

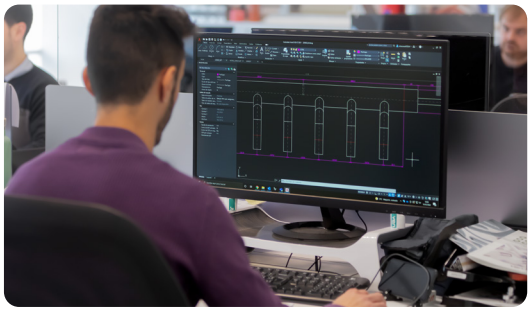
Research of new materials

Development of new products or improvement of existing ones

Design and engineering support

Design advice

Specialized in the design of customized parts



Quality assurance

Tailor-made testing for each application

Product certifications required for each market or customer

Custom manufacturing

Custom pieces

Process automation for series production

Clean Energy

Venair develops custom solutions for Clean Energy. We provide flexible hoses that adapt to the different requirements of the industry.

Our main subsectors are PEM Fuel Cells and electrolyzers, Green mobility, and renewable energy.





Content

1. Products

ANODE PEM FUEL CELLS

CATHODE PEM FUEL CELLS

DI WATER AND COOLING SYSTEMS

ANODE
CATHODE

Highly flexible fluorocarbon hose

VENA® PEM FUEL

Material
FKM fluorocarbon + Silicone VMQ (Vinyl Methyl Quality) + Polyester fabric

Temperature
-5°C / +180°C-200°C (23°F / +356°F)

CONSTRUCTION

FKM (fluorocarbon-based polymer) inner layer
+ Silicone VMQ (Vinyl Methyl Quality)
+ Polyester fabric embedded in the wall.

APPLICATIONS

Mostly used when there are strict minimum permeability requirements. Also recommended for the low level of critical pollutants it releases. So it is mostly always required for the anode subsystem, very often also required on the cathode and to a lesser extent in the coolant and DI Water subsystems due to the low conductivity it imparts to the medium.

CERTIFICATIONS

Railway standards, flammability. UL-94 V1

RoHS Directive 2002/95/EC and its subsequent amendments including the RoHS2 Directive 2011/65/EU and RoHS3 Directive 2015/863

Technical Table
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CONFIGURATIONS

→ Highly resistant to hardening with very good compression characteristics.

→ Aramid 200°C

→FKM-X Conductive FKM inner layer

Can be customized according to customer requirements. It can be modified to withstand high pressure, high temperature, change colour, vacuum resistance.

APPEARANCE

Smooth inner and outer appearance, red colour (normally used for Hydrogen conduction) and external green colour used for Cathode. But other colours available.

FEATURES

Low permeability, low electrical conductivity rate imparted to the medium, low level of leachables and high flexibility. We apply our maximum cleanliness protocol for all PEMFC products.

ANODE
CATHODE
DI WATER
COOLING

Highly Flexible EPDM hybrid hose

VENA® PEM CELL

Material
EPDM based composite + Polyester fabric

Temperature
-50°C / +130-150°C
(-4°F / +266-302°F)

CONSTRUCTION

This reference is manufactured with three polyester fabric reinforcements.

Different shapes can be manufactured to adapt the construction to any installation and geometry requirement.

APPLICATIONS

It has been specifically designed for PEMFC. Very interesting according to its very low permeability rate. Also recommended for the low level of critical pollutants it releases. So it is mostly always required for the anode and cathode subsystems, very often also required on the coolant and DI water systems due to very low conductivity it imparts to the medium.

CERTIFICATIONS

RoHS Directive 2002/95/EC and its subsequent amendments including the RoHS2 Directive 2011/65/EU and RoHS3 Directive 2015/863.

CONFIGURATIONS

Can be customized according to customer requirements. It can be modified to withstand high pressure, high temperature, change colour...

APPEARANCE

Usually external green colour used for Cathode, external blue color for DI water and Coolant applications and red colour for Hydrogen conduction. However it can be customized under request.

FEATURES

Low permeability, low electrical conductivity rate imparted to the medium, low level of leachables and high flexibility. We apply our maximum cleanliness protocol for all PEMFC products.

Technical Table
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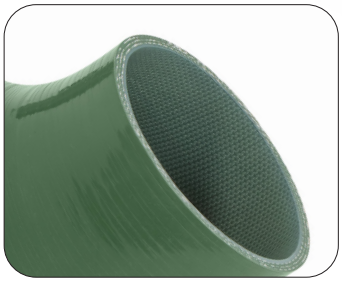


Material
Platinum cured silicone + Silicone VMQ (Vinyl Methyl Quality) + Polyester fabric

Temperature
-60°C / +180-200°C
(-75°F / +356-392°F)

Highly flexible platinum cured silicone hose

VENA® PEM PURE

CONSTRUCTION

Transparent platinum cured silicone (inner layer)
+ Silicone VMQ (Vinyl Methyl Quality)
+ Polyester fabric embedded in the wall.

APPLICATIONS

Mostly recommended for the low level of critical pollutants it releases. So it is mostly always required for the coolant and DI water subsystems, very often also required on the cathode.

CERTIFICATIONS

Railway standards, flammability. UL-94 V1
Pharma grade inner layer USP Class VI and FDA approved.
RoHS Directive 2002/95/EC and its subsequent amendments including the RoHS2 Directive 2011/65/EU and RoHS3 Directive 2015/863.

CONFIGURATIONS

Can be customized according to customer requirements. It can be modified to withstand high pressure, high temperature, change colour, vacuum resistance...

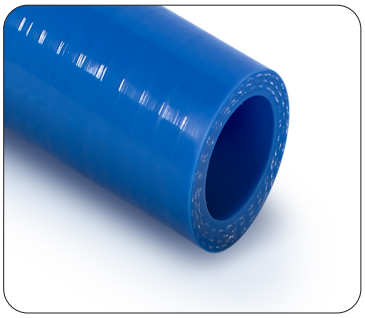
APPEARANCE

Usually external green color used for Cathode and external blue colour for DI water and Coolant applications, but colour can be customized under request.

FEATURES

Low level of leachables, low electrical conductivity rate imparted to the medium and high flexibility. We apply our maximum cleanliness protocol for all PEMFC products.

Technical Table
See on page: 16



Material
Blue Silicone VMQ
(Vinyl Methyl Quality)
+ Polyester fabric

Temperature
-60°C / +180-200°C
(-75°F / +356-392°F)

Highly flexible smooth silicone hose

VENA® PEM COOL

CONSTRUCTION

Blue Silicone VMQ (Vinyl Methyl Quality)
+ Polyester fabric embedded in the wall.

APPLICATIONS

Mostly recommended for coolant systems. It is the standard peroxide cured silicone used in a wide range of vehicles and industrial purposed but applying some precedures in the manufacturing process to reduce the level of leachables and increase the purity of the system.

CERTIFICATIONS

→ SAE J20 R1 Class A.

→ Material used in accordance with EU Directive 2015/863 for Restriction of the use of hazardous substances (RoHS 3).

CONFIGURATIONS

Can be customized according to customer requirements. It can be modified to withstand high pressure, high temperature, change colour, vacuum resistance...

We can manufacture specific shapes including lateral outs, reducers, elbows...

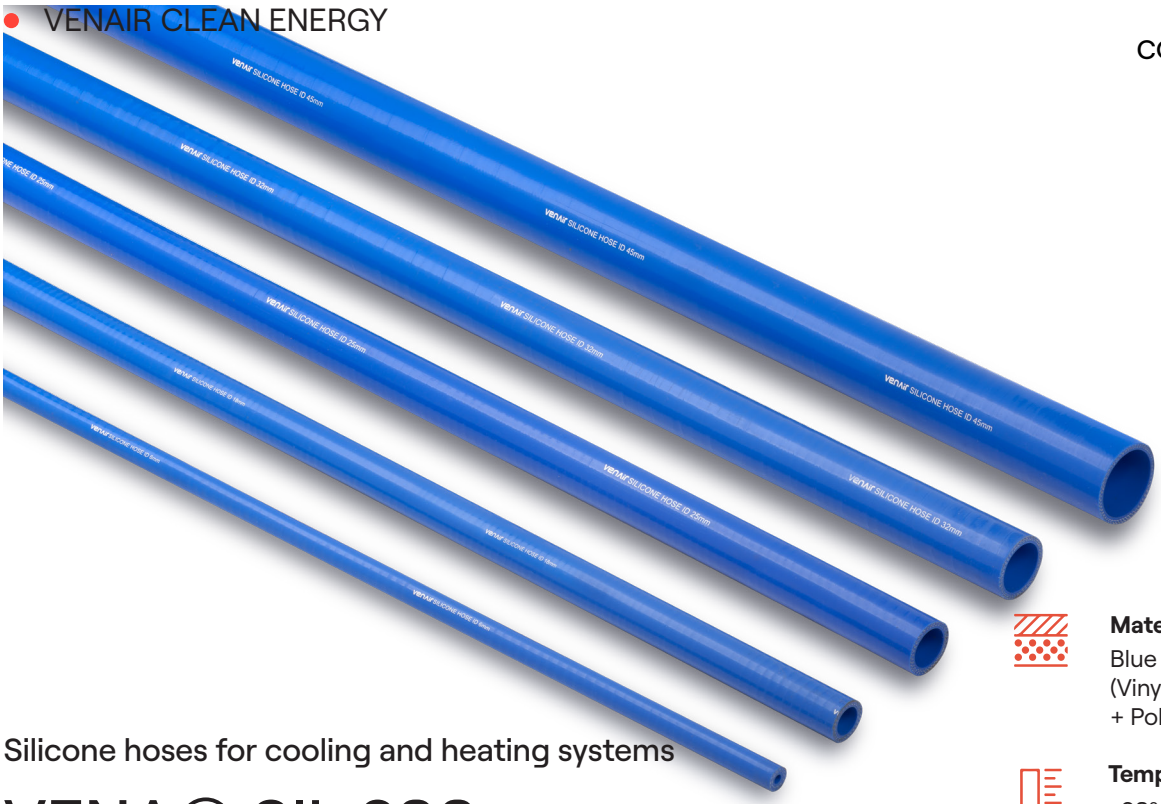
APPEARANCE

Usually external blue colour is used for DI water and coolant applications, but colour could be customized under request.

FEATURES

Low electrical conductivity rate and high flexibility. We apply our maximum cleanliness protocol for all PEMFC products.

Technical Table
See on page: 16



Silicone hoses for cooling and heating systems

VENA® SIL 200

Material
Blue Silicone VMQ
(Vinyl Methyl Quality)
+ Polyester fabric

Temperature
-60°C / +180°C-200°C
(-75°F / +356°F)

CONSTRUCTION

→ SIL 200: 3 plies of polyester fabric

→ It can also be supplied with another type of textile reinforcement (Aramid, fiberglass).

APPLICATIONS

For use in water cooling and heating systems in buses, coaches, trucks, industrial vehicles, railway, marine, aerospace, cogeneration units, and transport of high temperature fluids in general industry.

CERTIFICATIONS

→ SAE J20 R1 Class A.

→ Material used in accordance with EU Directive 2015/863 for Restriction of the use of hazardous substances (RoHS 3).

CONFIGURATIONS

→ SIL MRLN: Special construction for high pressure resistance.

→ SIL 200/240-X: Conductive silicone material.

STANDARD WALL THICKNESS

→ SIL 200: 4,3mm (+1/-0,5mm) / 0,17" (+0,04/-0,02")

→ SIL 240: 5,3mm (+1/-0,5mm) / 0,20" (+0,04/-0,02")

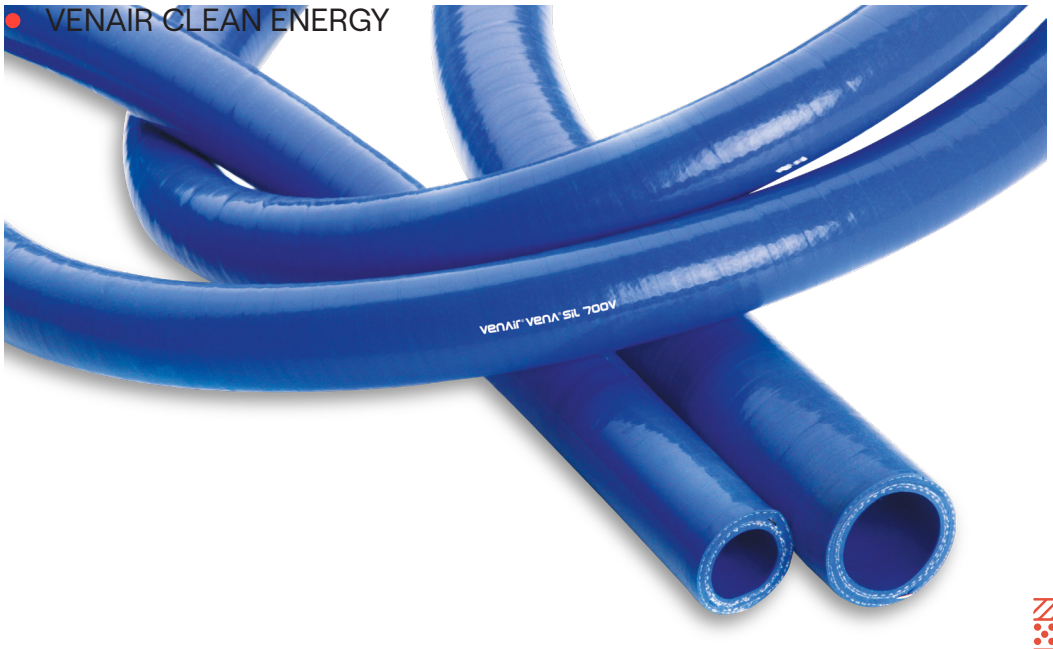
STANDARD LENGTH

From 1m to 4m (3,28 to 13,12ft).
Can be cut to smaller lengths upon customer request.

APPEARANCE

Smooth outer and inner appearance.

Technical Table
See on page: 17



Material
Blue Silicone VMQ
(Vinyl Methyl Quality)
+ Polyester fabric
+ Steel wire spring

Temperature
-50°C / +180°C-200°C
(-122°F / +356°F)

Highly flexible smooth silicone hose

VENA® SIL 700V

CONSTRUCTION

Spiral steel wire between two plies of polyester fabric covered in blue silicone.

APPLICATIONS

For use in water cooling and heating systems. Suitable for use where a small bending radius is required. It is capable for vacuuming applications thanks to its wire spiral.

CERTIFICATIONS

→ SAE J20R2 Class A.

→ Material used in accordance with EU Directive 2015/863 for Restriction of the use of hazardous substances (RoHS 3).

CONFIGURATIONS

SIL 700V-X: Conductive silicone material.

STANDARD WALL THICKNESS

Depending on diameter.

STANDARD LENGTH

From 1m to 4m (3,28 to 13,12ft).
Can be cut to smaller lengths upon customer request.

APPEARANCE

Smooth outer and inner appearance.

Technical Table
See on page: 17

Material
Silicone VMQ
(Vinyl Methyl Quality) + fabric

Temperature
-50°C / +200-220°C
(-122°F / +392-428°F)

Flame resistant hoses for cooling systems

VENA® SIL FR-V0

CONSTRUCTION

Special silicone formulation built with several textile reinforcements, specially designed to comply with the most demanding Flammability Standards. Can be manufactured with steel wire spiral. Class. V0 (UL-94).

APPLICATIONS

For cooling systems and other liquid or air conduction systems in any kind of engine or vehicle subjected to special Flammability Regulations.

CERTIFICATIONS

UL-94 V0.

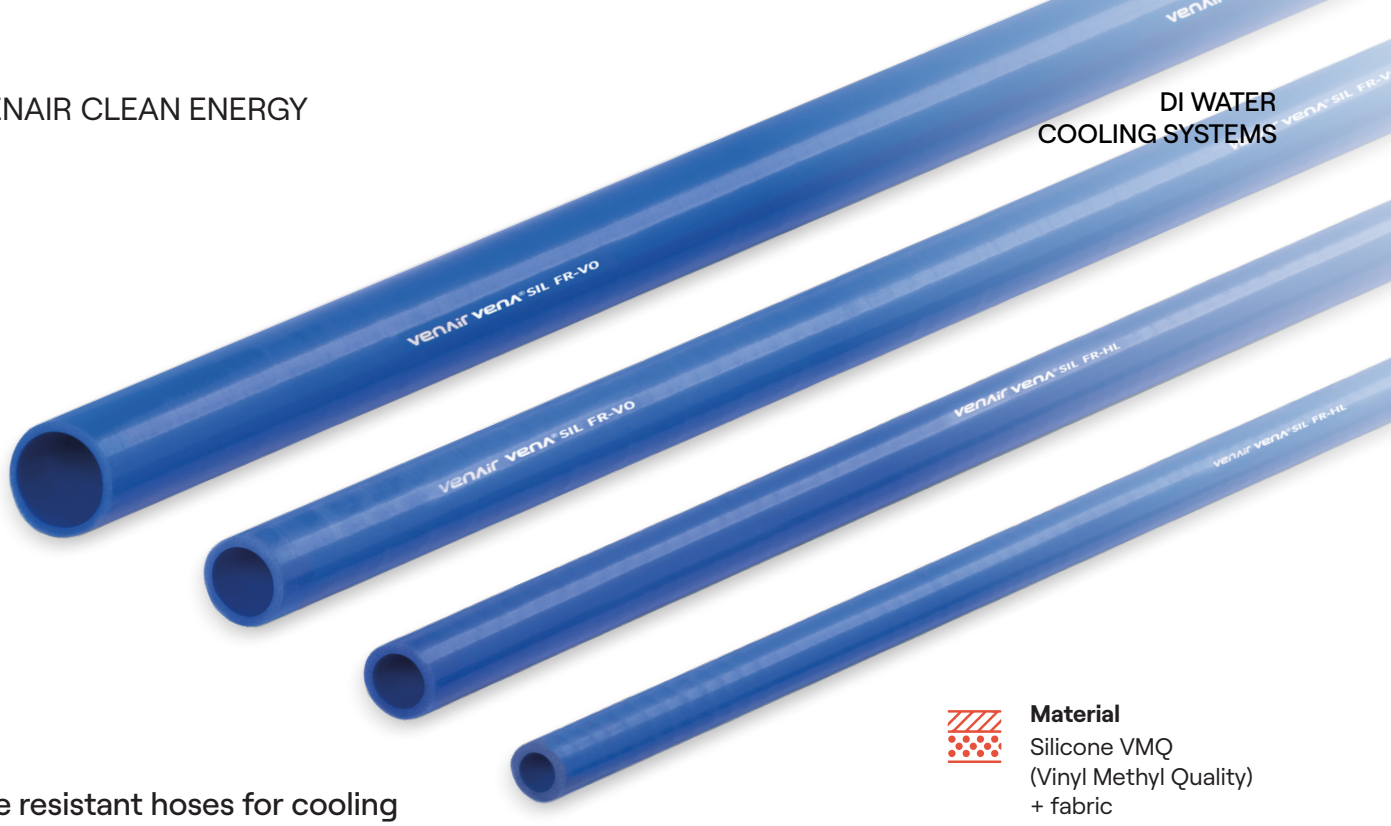
STANDARD WALL THICKNESS

Vena®Sil 200 FR-V0 - 3.7mm (+1.0/-0.5mm)
Vena®Sil 240 FR-V0 - 4.5mm (+1.0/-0.5mm)
Vena®Sil 700V FR-V0 - 5.5mm (+1.5/- 0.7mm) with wire.

STANDARD LENGTH

From 1m to 4m (3,28 to 13,12ft). All our standard or customized products can be produced with this option.

Technical Table
See on page: 18



Material
Silicone VMQ
(Vinyl Methyl Quality)
+ fabric

Temperature
-55°C / +200-220°C
(-67°F / +392-428°F)

Flame resistant hoses for cooling and turbo systems in railway industry

VENA® SIL FR-HL

CONSTRUCTION

Special silicone formulation built with several textile reinforcements, specially designed to comply with the most demanding Flammability Standards. Can be manufactured with steel wire spiral. Class. HL2 R22 & R23(EN-45545-2).

APPLICATIONS

For cooling systems and other liquid or air conduction systems in any kind of engine or vehicle subjected to special Flammability Regulations.

CERTIFICATIONS

Meets or exceeds the EN-45545-2 HL2 (R22 & R23) rating.

STANDARD WALL THICKNESS

Vena® Sil 200 FR-HL - 3.7mm (+1.0/-0.5mm)
Vena® Sil 240 FR-HL - 4.5mm (+1.0/-0.5mm)
Vena® Sil 700V - 5.5mm (+1.5/- 0.7mm) with wire.

STANDARD LENGTH

From 1m to 4m (3,28 to 13,12ft). All our standard or customized products can be produced with this option.

Technical Table
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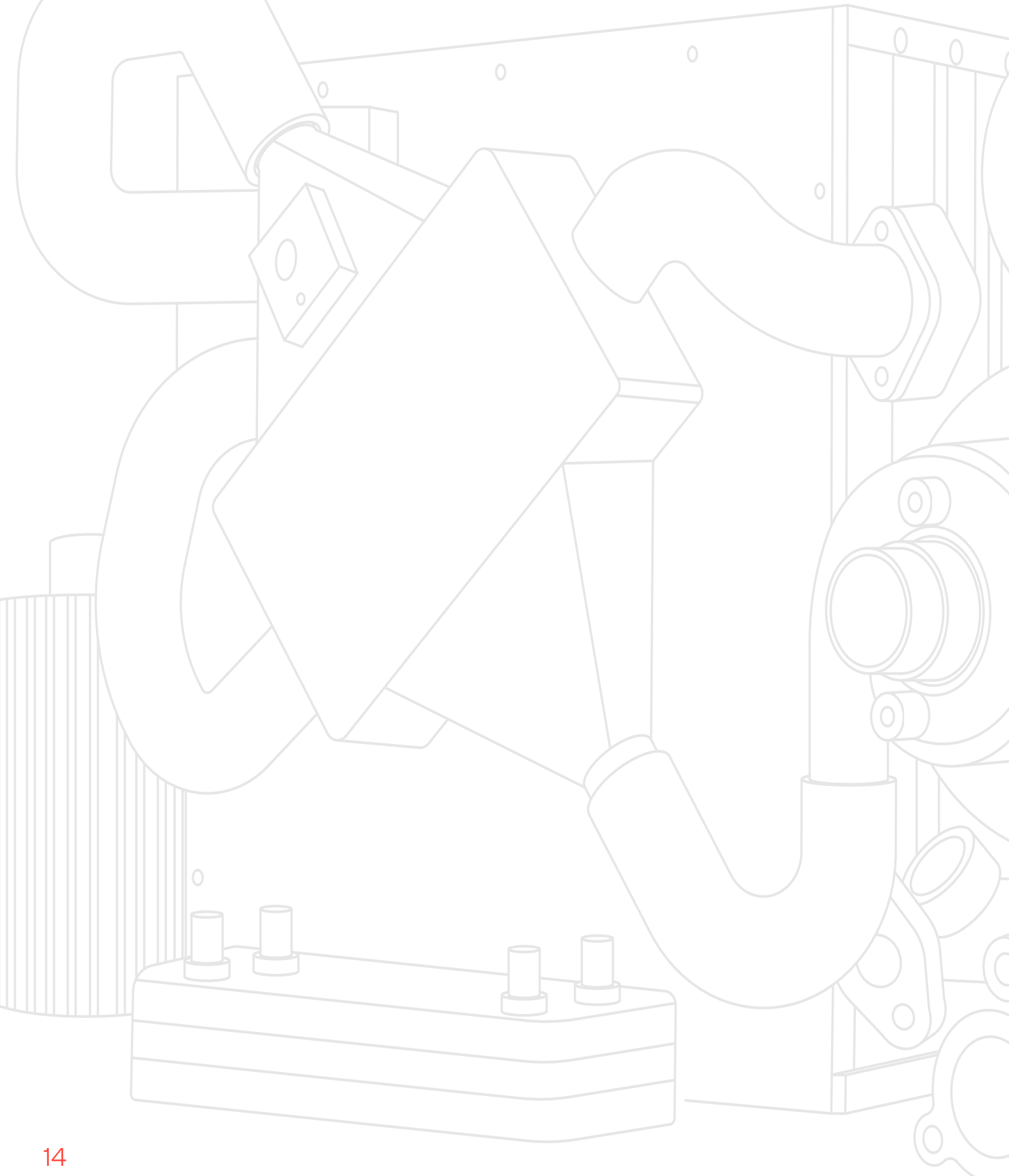
2. Specification Charts



VENA® PEM FUEL

INNER DIAMETER*		WALL THICKNESS		WORKING PRESSURE** ISO 1402/2009		BURSTING PRESSURE** ISO 1402/2009	
mm	inch	+1/-0,5 mm	+0,04/-0,02 inch	bar at 20°C	psi at 68°F	bar at 20°C	psi at 68°F
6	1/4	4.3	0.17	16.2	234.4	48.5	703.3
13	1/2	4.3	0.17	9.7	140.6	29.1	421.7
19	3/4	4.3	0.17	7.3	105.4	21.8	316.1
25	1	4.3	0.17	5.9	85.6	17.7	256.7
32	1 1/4	4.3	0.17	4.9	70.8	14.7	212.5
38	1 1/2	4.3	0.17	4.3	62.2	12.9	186.5
45	1 3/4	4.3	0.17	3.8	54.7	11.3	164.0
51	2	4.3	0.17	3.4	49.7	10.3	149.1
57	2 1/4	4.3	0.17	3.2	45.7	9.5	137.0
63	2 1/2	4.3	0.17	2.9	42.3	8.8	127.0

*Other diameters can also be manufactured. Please consult.
** Pressure data is noted at ambient temperature. Pressure values should be reduced by 20% for each increase of 100°C (21°F).

VENA® PEM CELL

INNER DIAMETER*		WALL THICKNESS		WORKING PRESSURE** ISO 1402/2009		BURSTING PRESSURE** ISO 1402/2009	
mm	inch	+1/-0,5 mm	+0,04/-0,02 inch	bar at 20°C	psi at 68°F	bar at 20°C	psi at 68°F
6	1/4	4.3	0.17	25.3	366.4	75.8	1099.1
13	1/2	4.3	0.17	12.9	186.4	38.6	559.2
19	3/4	4.3	0.17	9.2	133.8	27.7	401.3
25	1	4.3	0.17	7.3	105.2	21.8	315.7
32	1 1/4	4.3	0.17	5.8	84.8	17.5	254.2
38	1 1/2	4.3	0.17	5.0	73.0	15.1	219.0
45	1 3/4	4.3	0.17	4.3	63.0	13.0	188.8
51	2	4.3	0.17	3.9	56.4	11.7	169.3
57	2 1/4	4.3	0.17	3.5	51.2	10.6	153.6
63	2 1/2	4.3	0.17	3.2	46.9	9.7	140.8

*Other diameters can also be manufactured. Please consult.
** Pressure data is noted at ambient temperature. Pressure values should be reduced by 20% for each increase of 100°C (21°F).

VENA® PEM PURE

INNER DIAMETER*		WALL THICKNESS		WORKING PRESSURE**		BURSTING PRESSURE**	
				ISO 1402/2009		ISO 1402/2009	
mm	inch	+1/-0,5 mm	+0,04/-0,02 inch	bar at 20°C	psi at 68°F	bar at 20°C	psi at 68°F
6	1/4	4.3	0.17	16.2	234.4	48.5	703.3
13	1/2	4.3	0.17	9.7	140.6	29.1	421.7
19	3/4	4.3	0.17	7.3	105.4	21.8	316.1
25	1	4.3	0.17	5.9	85.6	17.7	256.7
32	1 1/4	4.3	0.17	4.9	70.8	14.7	212.5
38	1 1/2	4.3	0.17	4.3	62.2	12.9	186.5
45	1 3/4	4.3	0.17	3.4	54.7	11.3	164.0
51	2	4.3	0.17	3.4	49.7	10.3	149.1
57	2 1/4	4.3	0.17	3.2	45.7	9.5	137.0
63	2 1/2	4.3	0.17	2.9	42.3	8.8	127.0

*Other diameters can also be manufactured. Please consult.
** Pressure data is noted at ambient temperature. Pressure values should be reduced by 20% for each increase of 100°C (21°F).

VENA® PEM COOL

INNER DIAMETER*		WALL THICKNESS		WORKING PRESSURE**		BURSTING PRESSURE**	
				ISO 1402/2009		ISO 1402/2009	
mm	inch	+1/-0,5 mm	+0,04/-0,02 inch	bar at 20°C	psi Aat 68°F	bar at 20°C	psi at 68°F
6	1/4	4.3	0.17	16.2	234.4	48.5	703.3
13	1/2	4.3	0.17	9.7	140.6	29.1	421.7
19	3/4	4.3	0.17	7.3	105.4	21.8	316.1
25	1	4.3	0.17	5.9	85.6	17.7	256.7
32	1 1/4	4.3	0.17	4.9	70.8	14.7	212.5
38	1 1/2	4.3	0.17	4.3	62.2	12.9	186.5
45	1 3/4	4.3	0.17	3.8	54.7	11.3	164.0
51	2	4.3	0.17	3.4	49.7	10.3	149.1
57	2 1/4	4.3	0.17	3.2	45.7	9.5	137.0
63	2 1/2	4.3	0.17	2.9	42.3	8.8	127.0

*Other diameters can also be manufactured. Please consult.
** Pressure data is noted at ambient temperature. Pressure values should be reduced by 20% for each increase of 100°C (21°F).

VENA® SIL 200

INNER DIAMETER*		WORKING PRESSURE** ISO 1402/2009		BURSTING PRESSURE ISO 1402/2009	
mm	inch	bar at 20°C	psi at 68°F	bar at 20°C	psi at 68°F
6	1/4	16,1	234	48,5	703
13	1/2	9,7	141	29,1	422
19	3/4	7,2	104	21,8	316
25	1	5,9	86	17,7	257
32	1 1/4	4,9	71	14,7	213
38	1 1/2	4,3	62	12,9	187
45	1 3/4	3,7	54	11,3	164
51	2	3,4	49	10,3	149
57	2 1/4	3,1	45	9,4	136
63	2 1/2	2,9	42	8,8	128

*Other diameters can also be manufactured. Please consult.
** Pressure data is noted at ambient temperature. Pressure values should be reduced by 20% for each increase of 100°C (21°F).

VENA® SIL 700V

INNER DIAMETER*		WORKING PRESSURE** ISO 1402/2009		BURSTING PRESSURE** ISO 1402/2009		BENDING RADIUS ISO 10619-1	
mm	inch	bar	psi	bar at 20°C	psi at 68°F	mm	inch
6	1/4	18.8	272.9	56.4	818.7	21	0.8
10	3/8	17.5	253.3	52.4	760.0	28	1.1
13	1/2	16.5	239.3	49.5	717.8	34	1.3
19	3/4	14.7	212.7	44.0	638.2	49	1.9
25	1	13.0	188.3	38.9	564.8	66	2.6
30	1 3/16	11.7	169.5	35.1	508.5	82	3.2
38	1 1/2	9.8	142.5	29.5	427.4	113	4.4
51	2	7.3	106.6	22.0	319.7	173	6.8
63	2 1/2	5.7	82.1	17.0	246.4	239	9.4
76	3	4.5	65.2	13.5	195.5	324	12.7

*Other diameters can also be manufactured. Please consult.
** Pressure data is noted at ambient temperature. Pressure values should be reduced by 20% for each increase of 100°C (21°F).

VENA® SIL 200 FR-HL/ FR-V0

INNER DIAMETER*		WALL THICKNESS		WORKING PRESSURE** ISO 1402/2009		BURSTING PRESSURE** ISO 1402/2000	
mm	inch	+1/-0,5 mm	+0,04/-0,02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F
18	11/16	3.7	0.15	13.4	194.3	40.3	584.4
25	1	3.7	0.15	8.4	121.8	25.3	366.9
35	1 3/8	3.7	0.15	5.5	79.2	16.2	237.5
38	1 1/2	3.7	0.15	4.6	66.7	13.7	198.7
48	1 7/8	3.7	0.15	4.1	59.5	12.3	178.4
60	2 3/8	3.7	0.15	3.5	51.2	10.6	153.7
65	2 9/16	3.7	0.15	3.3	47.9	9.9	143.6
70	2 3/4	3.7	0.15	3.1	44.5	9.2	133.4
75	3	3.7	0.15	2.8	40.6	8.4	121.8
80	3 1/8	3.7	0.15	2.6	37.2	7.7	111.7

*Other diameters can also be manufactured. Please consult.
** Pressure data is noted at ambient temperature. Pressure values should be reduced by 20% for each increase of 100°C (21°F).

VENA® SIL 240 FR-HL/ FR-V0

INNER DIAMETER*		WALL THICKNESS		WORKING PRESSURE** ISO 1402/2009		BURSTING PRESSURE** ISO 1402/2000	
mm	inch	+1/-0,5 mm	+0,04/-0,02 inch	Bar at 20°C	Psi at 68°F	Bar at 20°C	Psi at 68°F
18	11/16	4.5	0.18	14.6	211.7	43.8	635.1
25	1	4.5	0.18	10.4	150.8	31.3	453.9
35	1 3/8	4.5	0.18	8.4	122.2	22.7	366.8
38	1 1/2	4.5	0.18	7.8	113.1	23.5	340.8
48	1 7/8	4.5	0.18	6.1	88.5	18.3	265.4
60	2 3/8	4.5	0.18	5.4	78.3	16.1	233.5
65	2 9/16	4.5	0.18	5.0	72.5	15.0	217.5
70	2 3/4	4.5	0.18	4.7	68.2	14.1	204.5
75	3	4.5	0.18	4.4	63.8	13.4	194.3
80	3 1/8	4.5	0.18	4.2	60.9	12.6	182.7

*Other diameters can also be manufactured. Please consult.
** Pressure data is noted at ambient temperature. Pressure values should be reduced by 20% for each increase of 100°C (21°F).

3. Venair in the world

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