



# VENA® PEM CELL FLAME

## Elastomer

Vena® PEM CELL FLAME has been specially designed and tested to meet **not only** the main requirements of Proton-Exchange Membrane Fuel Cell and Electrolyzers and contribute to the overall efficiency of these systems but also achieved the **UL-94 V0**. The use of high-purity and quality raw materials in Vena® PEM CELL FLAME ensures the ultra-low content of leachable substances and component inertness in PEM technologies ambient.

This, along with the low-permeability rate and great mechanical properties in Vena® PEM CELL FLAME and due the versatility of the material, makes it a good election for any part within a Fuel Cell and Electrolyzers systems (either in the Oxygen, Hydrogen, DI Water or refrigeration lines). Vena® PEM CELL material is used for the whole construction of the hoses, not only the inner layer, thus leading to the improvement of overall permeability and performance of the hose.

**PROPERTIES**

- Flame retardant hoses according to UL-94 classification V0.
- Low permeability.
- Excellent purity – extremely low extractables and volatile compounds content.
- Specific postcuring process and cleaning protocol is applied to reduce the amount of environmental and production contaminants. Pharma-grade treatment.
- Imparts almost no conductivity to contact fluids.
- Excellent chemical resistance.
- Excellent resistance to thermal aging and oxidizing agents (oxygen, ozone, UV).
- Good mechanical properties.
- Hoses are capped so that they can be delivered with the lower possible level of contaminants.
- Operational temperature range from -50°C (-58°F) to +130°C (266°F), it may reach up to 150°C (302°F) during short periods of time.

**Vena® PEM CELL material**

Vena® PEM CELL is an EPDM-derived composite. The main properties of this material are listed below:

Property	Method	Unit	Value
Hardness	ISO 868	Shore-A	62±5
Specific gravity	ISO 2781	g/cm <sup>3</sup>	1,10±0,02
Tensile strength	ISO 37	MpA	>12
Elongation at break	ISO 37	%	>200
Tear Strength	ISO 34	kN/m	>35
Glass transition temperature (Tg)	ISO 11357	°C	-51

Vena® PEM CELL FLAME is an EPDM-derived composite. The main properties of this material are listed below:

Property	Method	Unit	Value
Hardness	ISO 868	Shore-A	75±5
Specific gravity	ISO 2781	g/cm <sup>3</sup>	1,16±0,02
Tensile strength	ISO 37	MpA	>7
Elongation at break	ISO 37	%	>200
Tear Strength	ISO 34	kN/m	>35

Resistance against DI WATER, 168 hours at 100°C, ISO 188

Property	Method	Unit	Value
Δ Hardness	ISO 868	Shore-A	1
Δ Tensile strength	ISO 37	%	8
Δ Elongation at break	ISO 37	%	-10

Resistance against coolant (Glysantin® FCG20-00/50), 168 hours at 108°C, ISO 188

Property	Method	Unit	Value
Δ Hardness	ISO 868	Shore-A	-2
Δ Tensile strength	ISO 37	%	8
Δ Elongation at break	ISO 37	%	30

## CONSTRUCTION MATERIALS

- Blue and smooth inner and outer appearance (can be produced in other colours)
- Inner layer of Vena ® PEM CELL and outers layers of Vena ® PEM CELL FLAME.

This reference is manufactured with three polyester fabric reinforcements. Different shapes can be manufactured to adapt the construction to any installation and geometry requirement. (can be produced with additional polyester layers to increase pressure resistance).

- Can be produced with customized lateral outlets and metal screwed connections for adapting any sensor.
- Can be equipped with stainless steel or aluminum connections.
- Encapsulated SS steel wire to improve vacuum resistance and bend availability.

**QUALITY AND COMPLIANCE**

This reference is in accordance with the RoHS Directive 2002/95/EC and its subsequent amendments including the RoHS2 Directive 2011/65/EU and RoHS3 Directive 2015/863. This reference is classified as V0 by the flammability specification UL-94 (flame retardant and self-extinguishing).

Inner Diameter		Wall Thickness		Working pressure ISO 1402		Bursting pressure ISO 1402	
mm	inch	+1.0/-0.5 mm	+0.04/ -0.02 inch	Bar at room temperature	Psi at room temperature	Bar at room temperature	Psi at room temperature
6	1/4	4,30	0,17	14,0	203,1	42,0	609,4
13	1/2	4,30	0,17	10,5	152,3	31,5	457,0
19	3/4	4,30	0,17	8,8	127,4	26,4	382,2
25	1	4,30	0,17	7,5	109,4	22,6	328,1
32	1 1/4	4,30	0,17	6,4	93,2	19,3	279,5
38	1 1/2	4,30	0,17	5,6	81,9	16,9	245,6
45	1 3/4	4,30	0,17	4,9	70,8	14,6	212,3
51	2	4,30	0,17	4,3	62,5	12,9	187,6
57	2 1/4	4,30	0,17	3,8	55,2	11,4	165,7
63	2 1/2	4,30	0,17	3,4	48,7	10,1	146,0
70	2 3/4	4,30	0,17	2,9	41,7	8,6	125,2
76	3	4,30	0,17	2,5	36,3	7,5	109,0
80	3 1/8	4,30	0,17	2,3	33,0	6,8	98,9
90	3 1/2	4,30	0,17	1,7	25,2	5,2	75,7
102	4	4,30	0,17	1,2	17,0	3,5	51,0

## VENA®PEM CELL FLAME

Gas Permeability comparison between PEM CELL and FKM material on hose sample.

HOSE	H2 Permeance ml/m <sup>2</sup> ·day·atm	H2 Permeability ml·mm/m <sup>2</sup> ·day·atm
BLACK FKM HOSE: 1mm layer FKM + 3 layers of Silicone (3,30mm of silicone)	58,77	255,60
VENA® PEM CELL FLAME: 4 layers of VENA® PEM CELL (4,30mm)	30,50	153,11

\* test made according to ISO 15015-1 Plastics- Film and sheeting – Determination of gas-transmission rate – Part 1: Differential-pressure methods. This is equivalent to ASTM D1434-82 e1 Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting, Procedure M.

### Fabric properties

The typical properties of the polyester mesh fabric are:

Property	Method	Unit	Value
Weight	ISO 3801	g/m <sup>2</sup>	140±10%
Thickness	-	mm	0,45-0,55
Break strength (length)	ISO 13934-2	N	>450
Break strength (width)	ISO 13934-2	N	>480
Break elongation (length)	ISO 13934-2	%	>50
Break elongation (width)	ISO 13934-2	%	>50

### LIMITATIONS

Respect the work pressure established values. High temperatures may affect the bursting and working pressure values.

# CONTACT

