

# PRODUCT INFORMATION



## Automotive Chemicals – Coolant Antifreeze

Version: 2021/50#1a

### Valvoline™ HEAT TRANSFER FLUID, FUEL CELL *Recommended for fuel cell vehicles*

Valvoline Heat Transfer fluid (HTF), Fuel Cell (FC) has been developed especially for the use with fuel cell systems like PEMFC. It must not be used as engine coolant in conventional combustion engines. Conventional engine coolants having a very high electrical conductivity are not allowed for use in fuel cell cooling circuits.

Valvoline HTF, FC through its selected, non-ionic inhibitors exhibits a very low, long-term stable electrical conductivity. This assures safe operation of the fuel cell power unit. Valvoline HTF, FC offers a safe freeze protection down to -36°C and good heat dissipation. Metals currently used in the construction of PEMFC cooling systems are well protected against corrosion.

Valvoline HTF, FC is ready to use and does not need any further make up with water. It contains 50% vol ethylene glycol. Further dilution with distilled or demineralized water is possible provided that the electrical conductivity of the water is possible provided that the electrical conductivity of the water does not exceed 2  $\mu\text{S}/\text{cm}$  at 25°C. However, by addition of water corrosion protection decreases. The amount of water used should be less than 10%. Addition of extra ethylene glycol slightly improves the frost protection but impairs the corrosion protection as well.

**Valvoline HTF, FC - Major Characteristics**

Characteristics	Specifications	Typicals
Chloride, ASTM D3634	25 ppm max	<10
Silicon	110 – 150 ppm	130
Specific gravity, 60/60° F, ASTM D1122	1.067 – 1.073	1.070
Freezing point (undiluted), ASTM D1177	-34°F/-36°C	-34°F/-36°C
Boiling point (undiluted), ASTM D1120	226°F/108°C	226°F/108°C
Effect on engine or vehicle finish	No Effect	No Effect
Ash content, mass %, ASTM D1119	5 max	2
pH, 40% V/V EG solution, ASTM D1287	5 - 6	5.5
Conductivity, $\mu\text{S}/\text{cm}$ @25°C, ASTM D1125	5 max	2
Water mass %, ASTM D1123	47 - 52	50
Color	Clear	Clear
Effect on nonmetals	No Adverse Effect	No Adverse Effect
Storage stability	-	1 year
Foaming, ASTM D1881	70 ml Vol. max. 3 sec. Break max.	20 ml 1 sec
Breakdown Voltage, GB/T 507-2002	-	17 kV

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Valvoline HTF, FC Physical Properties							
Temperature (°C)	Density (kg/m <sup>3</sup> )	Viscosity (cP, Centipose)	Thermal Conductivity (W/m·K)	Heat Capacity/ Specific Heat (kJ/kg·C)	Relative Volume (V[T]/V[20°C])	Vapor Pressure (kPa)	Electrical Conductivity (μSm/cm)
-35	1097	72.86	0.406	3.30	0.977	0.022	0.13
-30	1096	45.28	0.408	3.32	0.979	0.036	0.16
-25	1094	31.06	0.409	3.33	0.981	0.059	0.19
-20	1092	23.40	0.410	3.35	0.982	0.092	0.23
-15	1090	17.06	0.412	3.36	0.984	0.142	0.28
-10	1088	13.01	0.413	3.38	0.986	0.214	0.35
-5	1086	10.07	0.414	3.39	0.988	0.318	0.42
0	1083	7.85	0.414	3.41	0.990	0.463	0.51
5	1081	6.32	0.415	3.43	0.992	0.664	0.63
10	1078	5.24	0.416	3.44	0.995	0.939	0.77
15	1076	4.27	0.416	3.46	0.997	1.308	0.93
20	1072	3.59	0.417	3.47	1.000	1.799	1.14
25	1069	3.09	0.417	3.49	1.003	2.443	1.39
30	1066	2.70	0.417	3.50	1.006	3.278	1.69
35	1063	2.37	0.417	3.52	1.008	4.351	1.86
40	1061	2.09	0.417	3.53	1.011	5.715	2.06
45	1058	1.85	0.417	3.55	1.014	7.432	2.28
50	1055	1.64	0.416	3.56	1.017	9.574	2.54
55	1051	1.47	0.416	3.58	1.020	12.225	2.85
60	1048	1.32	0.416	3.59	1.023	15.478	3.23
65	1045	1.19	0.415	3.61	1.026	19.442	3.67
70	1042	1.09	0.414	3.62	1.029	24.234	4.17
75	1038	1.00	0.413	3.64	1.033	29.991	4.71
80	1035	0.93	0.412	3.66	1.036	36.861	5.27
85	1031	0.87	0.411	3.67	1.040	45.009	5.83
90	1028	0.81	0.410	3.69	1.044	54.616	6.33
95	1024	0.76	0.409	3.70	1.048	65.879	6.73
100	1019	0.72	0.407	3.72	1.052	79.015	6.98
105	1014	0.68	0.406	3.73	1.057	94.256	7.02

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## Stability

Valvoline HTF, FC operates at temperatures between -30°C and 90°C. Stability of the fluid is confirmed in the temperature range without any sediment, haze or other negative changes. Please be aware that stability of the electrical conductivity depends on the materials used in the fuel cell cooling system and should be individually checked.

## Miscibility

Mixing, even in small amounts with conventional coolant/antifreeze or other ion-containing fluids disables this fuel cell coolant. Scrupulous cleanliness is indispensable to maintain the quality of the coolant. Close containers with Valvoline HTF, FC tightly after usage.

## Electrical Conductivity

In contrast to deionized water (DI-water) Valvoline HTF, FC protects the system from frost. The electrical conductivity of Valvoline FC HTF - compared to non-inhibited glycol water mixtures – stays low, hence secures the electrical safety of the system and avoids loss of energy. The electrical conductivity of the system kept low after adding the special inhibitor package to the glycol/water mixture. The long-term protection of Valvoline FC HTF may be prolonged by using a suitable mixed-bed ion exchanger in the coolant circuit.

## Material Compatibility

As the development of fuel cell systems is rather innovative, the compatibility of the coolant with construction materials must be tested for the individual application. Valvoline offers respective lab tests.

The following types of construction materials have been tested with Valvoline HTF, FC product.

Compatible: Stainless steel, titanium, aluminum, copper, brass, graphite, PTFE, PE.

Not compatible: Zinc, galvanized steel, cast iron, carbon steel. Polymer materials and elastomers often contain considerable amounts of fillers and adjuvants, which might impact the electrical conductivity of the coolant. Examples are EPDM, PVC, PA 66, silicone rubber, Viton, etc.

## Quality Control

The above-listed data represent average values at the time when going to press of this Technical Information. They are intended as guide to facilitate handling and cannot be regarded as specified data. Specified product data are issued as a separate product specification.

## Storage Stability

Valvoline HTF, FC may be stored in unopened, air-tight containers at a temperature of 30°C max. for 1 (one) year. After that, the applicability should be tested by measuring electrical conductivity and pH.

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## Keeping the world moving since 1866™

Serving more than 100 countries around the globe, Valvoline is a leading marketer, distributor and producer of quality branded automotive and industrial products and services. Products include automotive lubricants; transmission fluids; gear oils; hydraulic lubricants; automotive chemicals; specialty products; greases, and cooling system products.

For more information on Valvoline products, programs and services please visit

[www.valvolineeurope.com](http://www.valvolineeurope.com) or  
<https://pisheets.valvoline.com/>

## Typical properties

Typical property characteristics are based on current production. Whilst future production will conform to Valvoline specifications, variations in these characteristics may occur.

**This information only applies to products manufactured in the following location(s):  
Europe**

## Health & Safety

This product is not likely to present any significant health or safety hazards when properly used in the recommended application and good standards of personal hygiene are maintained. Reference is made to the Safety Data Sheet (SDS) which is available on request via your local sales office or via the internet.

<http://sds.valvoline.com>

## Protect the environment

Take used coolant to an authorized collection point. Comply with local regulations. Do not discharge into drains, soil or water.

## Storage

We recommend to store all packages under cover. In case outside storage is unavoidable, drums should be laid horizontally to avoid the possible ingress of water and damage to drum markings. Products should never be stored above 60°C, exposed to hot sun or freezing conditions.

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