



Coolant XCL E-TECH

DESCRIPTION

XCL E-TECH is a ready-to-use heat transfer fluid and coolant based on very high-quality ethylene glycol and the latest generation of non-ionic inhibitors. XCL E-TECH is to be used in fuel cell systems and other electric vehicles subject to high temperatures.

For EV, FCEV, FHEV, HE, MHEV, PHEV, RETROFIT, and "RANGE EXTENDER".

XCL E-TECH provides complete protection for all parts and compartments of the electric vehicle's thermal control system, from the battery to the engine. Its additive package protects the battery cooling plates, the power electronics heat sinks and the engine.

Thanks to its very low electrical conductivity and its ability to reduce heat, it provides the fuel cell system with long-lasting, stable electrical conductivity.

XCL E-TECH is compatible with aluminum, stainless steel, copper, thermoplastics and elastomers commonly used in cooling systems.

PROPERTIES

- ✓ Very low and durable conductivity (<5 $\mu\text{S}/\text{cm}$)
- ✓ Optimum protection against corrosion,
- ✓ Excellent long-term stability of the fuel cell system,
- ✓ Low viscosity,
- ✓ Protection of bi-polar plates and ion exchanger,
- ✓ Ready to use,
- ✓ Not recommended for use with carbon steel alloys, cast iron, zinc and galvanised parts.

APPLICATION

- **EV (Electric Vehicle)/BEV (Battery Electric Vehicle)**
Electric vehicle whose electric engine(s) is (are) powered by a battery.
- **FCEV (Fuel Cell Electric Vehicle)/Fuel Cell Electric Vehicle**
An electric vehicle that generates its electricity from a hydrogen-powered fuel cell. The electricity produced is then used to power the electric engine(s) in the same way as in a battery-powered model. A battery is still present to recover energy from the electric engine(s) during braking and deceleration, and to act as a reserve of energy immediately available if sudden, strong acceleration is required.
- **FHEV (Full Hybrid Electric Vehicle)/non-rechargeable hybrid**
A vehicle whose motive power is provided by a combustion engine and an electric engine, either in combination or in turn, depending on the situation. This type of vehicle cannot therefore be combined with a manual gearbox, and the range in 100% electric mode is around three to five kilometers.





- **Hybridization**

The combination of several types of engine to power a vehicle. An electric vehicle with a battery and an internal combustion engine that can be connected to the wheels as required is a hybrid. On the other hand, if the combustion engine is only used to recharge the battery, with no possible link between it and the wheels, then the vehicle is a 100% electric vehicle with a combustion generator. A hybrid car may or may not be rechargeable. However, the term 'mild' hybridization is used when a small electric engine (usually a starter-alternator) provides power to the combustion engine without being able to drive the wheels directly, which is more akin to an electric 'boost' than to hybridization.

- **MHEV (Mild Hybrid Electric Vehicle)/micro-hybrid**

A vehicle whose motive power is provided by an internal combustion engine, backed up by a small electric engine, usually in the form of a belt-driven starter-alternator to add power and supply on-board equipment in order to reduce fuel consumption. Micro-hybridization (also known as light hybridization) can, depending on the model, automatically shift the gearbox into neutral and cut the combustion engine, allowing the vehicle to coast along while providing on-board electrical power. However, a micro-hybrid vehicle cannot run in 100% electric mode.

- **PHEV (Plug-in Hybrid Electric Vehicle)/rechargeable hybrid**

A vehicle powered by an internal combustion engine and an electric engine, either in combination or in turn, depending on the situation. Thanks to the possibility of recharging from the grid, and with a larger-capacity battery than that found on a non-rechargeable hybrid vehicle (FHEV), the range in 100% electric mode reaches several tens of kilometers.

- **Retrofit**

The addition of a recent technology to an object that is older than that technology, and that was not originally designed to receive it. In the automotive industry, retrofitting mainly involves adapting an electric engine to replace an internal combustion engine.

- **Electric vehicle with thermal generator/Range extender**

An electric vehicle whose electric engine(s) is (are) powered by a battery, which in turn is recharged from the mains by plugging into the electrical network or, when driving, by an internal combustion engine that is not connected to the wheels. This combustion engine therefore extends the range without stopping and acts as a generator or range extender.





TECHNICAL DATA

Electrical data

	Method	Values
Conductivity at 20°C	ASTM D 1125	1,49 µS/cm
Conductivity at 80°C	ASTM D 425	4,54 µS/cm

Physical data

	Method	Values
Colour		Colourless
Density at 20°C	ASTM D 1122	1.074
Refraction index at 20°C	ASTM D 1218	1.386
Freezing point °C	ASTM D 1177	-40
Pour point °C	ASTM D 97	-51
pH	ASTM D 1287	5.6
Kinematic viscosity at 0°C	ASTM D 445	8.10
Kinematic viscosity at 20°C	ASTM D 445	3.66
Foam properties ml	ASTM D 1881	25
Foam properties	ASTM D 1181	2
Ash content (%)	ISO 2719	-
Boiling balance	ASTM D 1120	108

Thermal data

	Method	Values
Specific heat at 20°C	ASTM D 7890	3,1 kJ/kg
Thermal conductivity	ASTM D 7890	0,387 w/m

Corrosion tests

Glass corrosion 88°C/336h		
ASTM D 1384	Copper	-1
	Steel 304	-1
	Brass	0
	5052 Alu	-4
	Steel 316L	0
	6061 Alu	-4
Glass corrosion		
AFNOR NF R15-602-7	Steel 304	-2
	Steel 316L	0
	5052 Alu	-1
	6061 T6 Alu	-4
Heat transfer Aluminium corrosion 135°C/168h		
ASTM D 4340		<0.06

Compatibility with elastomers

Original physical properties – ASTM D412 – D 2240

	VMQ	FKM	EPDM
Durometre A (points)	61	73	72
Tensile strength (psi)	1309	1878	1939
Elongation at break %	410	349	332
100% Module (psi)	267	521	490
200% Module (psi)	538	1099	1089
300% Module (psi)	890	1649	1691



Fluid immersion properties - ASTM D 471

Sample immersed 168h/212°F (100°C) in BARDAHL XCL E-Tech liquid

	VMQ	FKM	EPDM
Change in durometer point	-5	2	-1
Tensile strength % change	-4.1	-28.8	-3.2
Elongation % change	2.9	14.1	-17
Volume % change	-0.6	5.7	1.5
Weight % change	0.2	3.5	1.3

Original physical properties - ASTM D412 - D 2240

Tested on sample C Dumbbell at 20in/min

	HNBR	NBR-1
Durometer A (points)	70	73
Tensile strength (psi)	3884	2675
Ultimate elongation %	457	330
100% Modulus (psi)	499	741
200% Modulus (psi)	1536	1755
300% Modulus (psi)	2652	2624

Fluid immersion properties - ASTM D 471

Sample immersed 168 hours/212°F (100°C) in BARDAHL XCL E-Tech liquid

	HNBR	NBR-1
Change in durometer point	-1	-1
Tensile strength % change	-34	7.6
Elongation % change	64	-12.6
Volume % change	2.8	2.0
Weight % change	2.6	1.9

Tested at the ISO 17025 accredited ARDL laboratory ISO 9001 registered - USA.





XCL E-Tech compatibility

Not compatible with:

- Zinc and galvanised steel
- FKM (fluoroelastomers)
- Natural rubber (NR)
- Silicone (VMQ)

RECOMMENDATIONS

Always check the manufacturer's manual before use. We recommend draining the system before changing the coolant.

Handling : any safety information related to the handling and use of this product are gathered in the Safety Data Sheet.

Storage : it should be stored in its original packaging, closed, and protected from light, humidity and excessive temperature.

REFERENCES & AVAILABILITIES

35621	12x1L
35623	3x5L
35625	20L
35627	200L

