TECHNICAL DATA SHEET
V062026

Coolant
XCL E-TECH



CONTEXT

Electromobility is transforming vehicle thermal management. While internal combustion engines have historically tolerated coolants with high electrical conductivity (several thousand µS/cm), electric architectures introduce a major shift: cooling circuits now pass through aluminum cold plates in direct contact with lithium-ion cells, inverters, electric motors and — in hybrid powertrains — conventional thermal systems.
Controlling **electrical conductivity** and **mixed-material compatibility** (Al, Cu, stainless steel, elastomers) is becoming a primary functional safety criterion. The new **BARDAHL XCL E-TECH** formulation is particularly well suited to the market.
The reference threshold set by **ASTM D8485 / D8566**, **VW TL 774-M [G15]** and **GB 29743.2-2025** is now **< 100 µS/cm**. BARDAHL XCL E-TECH performs far below this limit, at **31.56 µS/cm** measured at the SADAPS laboratory, providing a safety margin three times better than the standard target while remaining fully approved for **indirect battery cooling** and **inverter thermal management** in current EV and hybrid vehicle applications.

DESCRIPTION

BARDAHL XCL E-TECH is a **ready-to-use** coolant and heat transfer fluid based on very high-purity monoethylene glycol (MEG, 1,2-ethanediol) and a package of **latest-generation non-ionic inhibitors**, free from silicates, borates, 2-ethylhexanoic acid, nitrites, amines and phosphates.

Designed for **indirect cooling** of lithium-ion batteries and the thermal management systems of **electric vehicles (BEV)** and **hybrids (HEV, MHEV, FHEV, PHEV, REX/Range Extender, Retrofit)**, it provides complete protection for all metal surfaces in the circuit, from battery cooling plates to power electronics heat sinks.

Its very low and stable electrical conductivity (**31.56 µS/cm at 25 °C**) prevents leakage currents and ensures the **electrical safety** of the cooling loop. Its **antifreeze protection down to −44.5 °C** enables safe operation across the full thermal range of an electric vehicle, from cold starts in winter climates to heat dissipation during fast DC charging or sustained driving. BARDAHL XCL E-TECH is compatible with **aluminum, stainless steel, titanium, copper, brass, graphite, PTFE and PE**, which are common materials in EV/HEV cooling circuits.

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PROPERTIES

- ✓ Very low electrical conductivity < 100 µS/cm (measured at 31.56 µS/cm)
- ✓ High thermal stability — long service life
- ✓ Antifreeze protection down to −44.5 °C
- ✓ Electrical safety for the thermal management circuit
- ✓ Excellent heat transfer (high-purity MEG)
- ✓ Optimal corrosion protection (Al, Cu, stainless steel, brass)
- ✓ Free from silicates, borates, nitrites, amines and phosphates
- ✓ Low viscosity — reduced pumping pressure losses
- ✓ Stable alkaline pH (8.18) — alkalinity reserve 2.49
- ✓ Free from 2-ethylhexanoic acid (2-EHA)
- ✓ Ready to use — never dilute or mix
- ✓ Clear transparent liquid — easy visual condition monitoring

APPLICATION

BARDAHL XCL E-TECH is recommended for the thermal management of all electrified architectures: indirect cooling of battery packs, power modules (inverters, DC/DC converters, onboard chargers), electric motors and — in hybrid powertrains — the internal combustion engine circuit when the manufacturer authorizes a shared circuit.

• **BEV / EV (Battery Electric Vehicle)** — 100% electric vehicle powered by a high-voltage battery. XCL E-TECH indirectly cools the battery pack, inverter, motor and onboard charger.

• **MHEV (Mild Hybrid Electric Vehicle)** — 12V/48V mild hybrid with starter-generator. The thermal circuit manages the auxiliary electrical system and, depending on the architecture, the 48V module.

• **FHEV (Full Hybrid Electric Vehicle)** — non-plug-in hybrid. Combination of an internal combustion engine and an electric motor, with integrated thermal management.

• **PHEV (Plug-in Hybrid Electric Vehicle)** — plug-in hybrid with an extended-capacity battery (several dozen kilometers of 100% electric range). Combined battery and thermal cooling.

• **REX / Range Extender** — electric vehicle with an onboard thermal generator (not connected to the wheels) that extends range. XCL E-TECH cools the battery and the high-voltage powertrain.

• **Retrofit** — conversion of an original internal combustion vehicle to electric propulsion. Compatible with redesigned aluminum/copper cooling circuits for conversion projects.

TECHNICAL DATA

Physicochemical properties

Characteristic	Method	Typical value
Appearance	Visual	Clear, transparent liquid
Density at 20 °C	ASTM D4052	1.071
Water content (% by mass)	ASTM D1123	50%
pH	ASTM D1287	8.18
Alkalinity reserve (mL)	ASTM D1121	2.49
Freezing point	ASTM D1177	−44.5 °C

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Boiling point	ASTM D1120	≥ 108 °C
Chloride content	ASTM D3634	< 10 ppm
Ash content (% by mass)	ASTM D1119	< 1%
Foaming characteristics (volume / time)	ASTM D1881	20 mL / 1 s
Storage stability	ASTM D1881	1 year

Electrical property — Key EV/HEV criterion

Characteristic	**Method**	**Typical value**
Electrical conductivity at 25 °C	ASTM D1125	**31.56 µS/cm** (spec. < 100 µS/cm)

Glassware corrosion 88 °C / 336 h — ASTM D1384 (mass loss mg/specimen, ASTM D3306 spec. ≤ 10 to 30)

Metal	**Specification (max)**	**Typical value**
Copper	10	−2
Brass	10	2
Solder	30	1
Aluminum	30	−2

Glassware corrosion GB 29743.2-2025 (mass loss mg/specimen, spec. ≤ 5)

Metal	**Specification (max)**	**Typical value**
Copper	5	1
Brass	5	0
Steel	5	1
Cast aluminum	5	−3
Aluminum 3003	5	−1
Aluminum 4043	5	−2
Aluminum 6063	5	−1

Corrosion on heat transfer surfaces — Aluminum 135 °C / 168 h

Characteristic	Method	Specification / Value
Cast aluminum corrosion rate	ASTM D4340	≤ 1.0 mg/cm²/week — typical: 0.0

SPECIFICATIONS & OEM APPROVALS

BARDAHL XCL E-TECH meets the requirements of international EV/HEV coolant standards and is recommended for the manufacturers listed below:

Standard / OEM	Reference / Scope
ASTM	D8485 — D8566
Chinese national standard	GB 29743.2-2025
Volkswagen Group — VW	TL 774-M [G15]
Audi	TL 774-M [G15]
SEAT	TL 774-M [G15]
Škoda	TL 774-M [G15]
Cosworth / Delta Cosworth	Indirect battery cooling
Hyundai	BSC-1 and BSC-2
Kia	BSC-1 and BSC-2
Toyota	Indirect battery / inverter cooling
Tata Motors Group	Indirect battery cooling
Land Rover	STJLR.03.5312
Jaguar	STJLR.03.5312

Blue lines indicate official OEM approvals / recommendations. Always check the up-to-date list of specifications in the vehicle service manual.

MATERIAL COMPATIBILITY

✓ Compatible with	✗ Not compatible with
Stainless steel	Zinc and galvanized steel
Titanium	Cast iron
Aluminum (cast, 3003, 4043, 6063, 6061)	Mild steel
Copper	Natural rubber (NR) — prolonged use
Brass	FKM (fluoroelastomer / Viton®) — prolonged use
Graphite	Silicone (VMQ) — prolonged use
PTFE (Teflon) Polyethylene (PE)	EPDM, PVC, PA 66 (check formulation / fillers)

Elastomers and thermoplastics often contain fillers and additives that may degrade the electrical conductivity of the coolant over time. The selection of materials in contact with the fluid must be validated with the vehicle manufacturer.

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MISCIBILITY

BARDAHL XCL E-TECH may only be mixed with comparable coolants based on **1,2-ethanediol (MEG)** whose electrical conductivity is guaranteed to be **< 100 µS/cm**.

Mixing — even in small proportions — with a conventional coolant (standard OAT, HOAT, IAT, NAP-free) or any ionized fluid destroys the very low conductivity property and makes the product unsuitable for EV/HEV use. If in doubt during top-up, drain and refill the system completely.

RECOMMENDATIONS

Always check the manufacturer's service manual before use. It is recommended to completely drain the circuit before changing coolant and to flush the system if the previous fluid has a different chemistry (silicates, phosphates, 2-EHA, etc.).

Handling: all safety information regarding the handling and use of this product is provided in the Safety Data Sheet (SDS). Follow standard precautions for handling chemicals (nitrile gloves, goggles, ventilation).

Storage: it is recommended to use the product within 12 months after opening the packaging. Keep in the original sealed packaging, protected from light, moisture and excessive temperatures (< 30 °C). **Never store in galvanized containers.** After one year, check electrical conductivity and pH before use.

REFERENCES & PACKAGING

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

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