

EMS-CL-PG25

Inhibited propylene glycol coolant, 25 % v/v premix

The common design point for single-phase direct-to-chip loops, at $-10.1\text{ }^{\circ}\text{C}$ freeze point

EMS-CL-PG25 is the 25 % v/v inhibited premix that most single-phase direct-to-chip deployments are designed around: freeze point $-10.1\text{ }^{\circ}\text{C}$ on the published curve, corroborated by an independent 25 % fluid data sheet at $-11\text{ }^{\circ}\text{C}$ by ASTM D1177, and viscosity 2.48 mPa·s at $20\text{ }^{\circ}\text{C}$. Thermal properties at this concentration are kinematic viscosity 2.88 mm²/s, thermal conductivity 0.471 W/m·K and specific heat capacity 3.92 kJ/kg·K at $20\text{ }^{\circ}\text{C}$. The failure it exists to catch is a loop charged below the recommended minimum concentration, where the blend freezes inside the range the site actually experiences.

ORDERING INFORMATION

Part number	EMS-CL-PG25
Propylene glycol concentration	25 % v/v
Freeze point	$-10.1\text{ }^{\circ}\text{C}$
Freeze point, corroborating source	$-11\text{ }^{\circ}\text{C}$ by ASTM D1177 on an independent 25 % fluid data sheet
Viscosity at $20\text{ }^{\circ}\text{C}$	2.48 mPa·s
pH band	ca. 8.8
Reserve alkalinity	1.4 mL
Container sizes	1, 2.5, 5, 30, 55 and 265 US gallons; 5 000-gallon tankers

FLUID IDENTITY AND FREEZE PROTECTION

Parameter	Value	Notes
Propylene glycol concentration	25 % v/v	The common design point for single-phase direct-to-chip deployments
Freeze point	$-10.1\text{ }^{\circ}\text{C}$	Published curve value at 25 %
Freeze point, corroborating source	$-11\text{ }^{\circ}\text{C}$ by ASTM D1177	Independent 25 % fluid data sheet; one design point from two sources
Freeze-point curve	20 % $\rightarrow -7.2\text{ }^{\circ}\text{C}$ · 25 % $\rightarrow -10.1\text{ }^{\circ}\text{C}$ · 30 % $\rightarrow -13.3\text{ }^{\circ}\text{C}$ · 40 % $\rightarrow -22.2\text{ }^{\circ}\text{C}$ · 50 % $\rightarrow -35.0\text{ }^{\circ}\text{C}$ · 55 % $\rightarrow -43.3\text{ }^{\circ}\text{C}$	One curve, published once; no second, differently-shaped curve is published
Recommended minimum concentration	25 % water-glycol by volume	A secondary loop should be a minimum 25 % water-glycol mix or particulate-free deionised fluid with inhibitors and biocides
Viscosity at $20\text{ }^{\circ}\text{C}$	2.48 mPa·s	Measured at $20\text{ }^{\circ}\text{C}$ on the 25 % blend; the family runs 1.68 mPa·s at 15 % to 8.20 mPa·s at 55 %
Kinematic viscosity at 25 %	2.88 mm ² /s	Thermal property at this concentration
Thermal conductivity at 25 %	0.471 W/m·K	Thermal property at this concentration
Specific heat capacity at 25 %	3.92 kJ/kg·K at $20\text{ }^{\circ}\text{C}$	Thermal property at this concentration and temperature
Viscosity effect on flow instruments	Turndown and low-flow cut-off move with concentration	Viscosity moves Reynolds number, so it moves the turndown and the low-flow cut-off of every meter on the loop; the blend the loop will finally hold must be stated when the flow instrument is specified

Parameter	Value	Notes
Specific gravity	Not published in the retrieved material for this grade	Quoted on request against the fluid data sheet
Loop operating envelope	6.9 bar (100 psig) nominal operating pressure and 60 °C (140 °F) fluid temperature	Technology cooling pipework envelope the fluid is specified against; a bulk maximum temperature for this grade is quoted on request

WATER-QUALITY BANDS THE FLUID IS SPECIFIED AGAINST

Parameter	Value	Notes
Conductivity, facility water / glycol-premix loop	50–300 µS/cm	Wide band. Glycol is a weak electrolyte, so a 25 % premix loop cannot sit at 5 µS/cm
Conductivity, de-ionised technology cooling loop	0.2–20 µS/cm	Narrow band, ASHRAE technology-cooling guidance; a de-ionised loop must hold it and a premix loop cannot
Why the two conductivity bands differ	Glycol content	Applying the technology band to a facility loop, or the reverse, is the documented and costly misapplication
pH, facility water / glycol-premix loop	7.0–9.0	Wide band, published for the facility-water side
pH, de-ionised technology cooling loop	8.0–9.5	Narrow band, published for the technology cooling side
Chloride, facility water side	<50 ppm	Facility-water side limit
Chloride, technology cooling side	<5 ppm	Ten times tighter than the facility-water limit
Sulfate, facility water side	<100 ppm	Facility-water side limit
Sulfate, technology cooling side	<10 ppm	The same limit sulfur-cured EPDM can breach as the seal ages
Total hardness as CaCO ₃ , facility water side	<200 ppm	Facility-water side limit
Total hardness as CaCO ₃ , technology cooling side	<20 ppm	Technology cooling side limit
Bacteria, facility water side	<1 000 CFU/mL	Facility-water side limit
Bacteria, technology cooling side	<100 CFU/mL	Technology cooling side limit
Residue after evaporation, facility water side	<500 ppm	Facility-water side limit
Residue after evaporation, technology cooling side	<50 ppm	Technology cooling side limit
Biocide, facility water side	Not required	Published as not required on the facility-water side
Biocide, technology cooling side	Required	Published as required on the technology cooling side

INHIBITOR PACKAGE AND CORROSION PERFORMANCE

Parameter	Value	Notes
pH band of this grade	ca. 8.8	Published band for the 25 % premix, quoted as approximate in the source

Parameter	Value	Notes
Reserve alkalinity	1.4 mL	Published figure for the 25 % premix, measured per ASTM D1121; the family also publishes ≥15.0 mL minimum on an inhibited concentrate and ≥5 mL on a direct-to-chip grade
Inhibitor chemistry class	Inhibited propylene glycol premix	Automotive antifreeze is unacceptable and must not be used in any fluid system
Corrosion performance basis	ASTM D1384, with a target of less than 0.5 mils penetration per year	Target applies to all system metals
Inhibited against raw glycol	Carbon steel at 0.01 mpy inhibited, against 23.65 mpy for raw uninhibited propylene glycol at 40 %	A 2 365× difference on the same test
Dilution water limits	<25 ppm chloride and sulfate and <50 ppm hard-water ions	Applies to any dilution water used on site
Dye for leak detection	Fluid is dyed for leak detection	A drip shows on a white floor tile

DELIVERY, SAMPLING AND HANDLING

Parameter	Value	Notes
Container sizes	1, 2.5, 5, 30, 55 and 265 US gallons, plus 5 000-gallon tankers	Container sizes as the fluid data sheets carry them; no litre equivalent of the package ladder is published
Container labelling check	Validate that containers are properly labelled and match design intent	Product or batch mismatch against the delivery note is a listed failure mode
Transport documentation	Container label and safety data sheet issued with the delivery	The safety data sheet is supplied with the delivery documentation; no transport classification is published.
Sampling cadence	Every 50–100 days, or quarterly	Annual analysis is standard practice for systems containing more than 250 gallons
Sampling points	Hot closed-loop samples	Analyse before start-up and after any significant make-up addition
Laboratory panel	Glycol concentration, freeze point, pH, reserve alkalinity, organic-acid inhibitor level, conductivity, ICP metals and anions	The panel establishes the inhibitor-depletion pattern
Automatic water make-up	Discouraged	Make-up dilutes the propylene glycol without an operator noticing
Cross-brand top-up	Sample and obtain laboratory approval before mixing	Cross-brand top-up can cause phase separation
Vacuum fill caveat	Sample after a vacuum fill to confirm the blend is uniform	A vacuum fill can partially separate glycol

APPLICATIONS

- Single-phase direct-to-chip loops designed around a nominal 25 % propylene glycol mix
- Loops where the fluid decision and the flow instrument decision are made together
- Systems that will be sampled on a quarterly laboratory panel
- Retrofit and new-build loops where the recommended minimum concentration applies

COMPATIBLE WITH

- EMS-FF-C120, EMS-FF-C200 and EMS-FF-C500 fill carts
- EMS-FF-FL75, EMS-FF-FL340 and EMS-FF-FL1300 flush skids
- EMS-FF-FS20, EMS-FF-FS60 and EMS-FF-FS150 filtration skids
- EMS-TL-SF electromagnetic flow meter, which the premix keeps above its 5 µS/cm floor
- EMS-TL-SK leak channel input module, whose rope is rated to 35 % propylene glycol by weight

LOOP MATERIALS THIS FLUID IS SPECIFIED AGAINST

- 316L stainless steel, peroxide-cured EPDM, Viton, FEP, PTFE, HDPE, PEEK and PP-R
- Free iron and plain carbon steel are excluded
- Brass above 15 % zinc only where dezincification resistance is verified to ISO 6509 at ≤100 µm depth
- Sulfur-cured EPDM is discouraged against peroxide-cured EPDM

SCOPE

- Loop fluid only: coolant distribution units and cold plates are outside this scope

COOLANT LADDER BY PROPYLENE GLYCOL CONCENTRATION

Parameter	Value	Notes
EMS-CL-PG15	15 % v/v · freeze point –5 °C	Viscosity 1.68 mPa·s at 20 °C; pH 8.0–10.5
EMS-CL-PG20	20 % v/v · freeze point –7.2 °C	Viscosity quoted on request; pH 8.0–8.7
EMS-CL-PG25	25 % v/v · freeze point –10.1 °C	The common design point; viscosity 2.48 mPa·s at 20 °C
EMS-CL-PG30	30 % v/v · freeze point –13.3 °C	Viscosity quoted on request; pH 8.0–10.5
EMS-CL-PG40	40 % v/v · freeze point –22.2 °C	Viscosity quoted on request; pH 8.0–10.5
EMS-CL-PG50	50 % v/v · freeze point –35.0 °C	Viscosity quoted on request; pH 7.0–8.5
EMS-CL-PG55	55 % v/v · freeze point –43.3 °C	Viscosity 8.20 mPa·s at 20 °C; pH 8.0–10.5
EMS-CL-PGC	Concentrate, dilute on site	pH 9.5–10.5 at 50 %
EMS-CL-DIW	0 % propylene glycol	De-ionised water, flush duty only; pH 8.0–9.5

NOTES

- Two water-quality bands are published above, each labelled with the loop type it belongs to. Publishing either band alone is misleading.
- One freeze-point curve is published, from 20 % to 55 %. The 25 % design point is corroborated by an independent 25 % fluid data sheet publishing –11 °C by ASTM D1177.
- Reserve alkalinity for this premix is 1.4 mL, which is the figure that has to be trended: the buffering capacity determines remaining corrosion protection, and sampling runs every 50–100 days or quarterly.
- Viscosity moves the flow budget: 2.48 mPa·s at 20 °C on this blend against 1.68 mPa·s at 15 % and 8.20 mPa·s at 55 %, so turndown and the low-flow cut-off change with the blend.
- No transport classification of any kind is published for this coolant. The container label and the safety data sheet issued with the delivery are the transport documentation.
- Container sizes are published in US gallons as the fluid data sheets carry them; no litre conversion of the package ladder is published.
- Certification names are published on the badge cards; approval documents are shown on request.
- Scope: no coolant distribution units and no cold plates.

Full specification sheet and current pricing
 EMS-Trade Cooling · ems-cool.com
 Typical lead time confirmed on order acknowledgement.

EMS-CL-PG25
 Rev. A
 2026-09-19