

ZEELCHEM™ 121 — PBTC 50

PBTC 50 % — 2-Phosphonobutane-1,2,4-Tricarboxylic Acid

Technical Data Sheet · Revision 00 · Date of issue 19-10-2026

ISO 9001:2015 · ISO 22000:2018 · ISO 14001:2015 CERTIFIED MANUFACTURER · MADE IN INDIA

Product name	ZEELCHEM™ 121 PBTC 50
Chemical name	PBTC 50 % — 2-Phosphonobutane-1,2,4-Tricarboxylic Acid
Synonyms / abbreviation	PBTC / PBTCA
CAS No.	37971-36-1
Molecular formula	C ₇ H ₁₁ O ₉ P
Molecular weight	270.13
Category	Water Treatment Phosphonate
HS code (indicative)	2931.49
Physical form	Colourless to light-yellow transparent liquid

PRODUCT DESCRIPTION

ZEELCHEM™ 121 is PBTC (2-phosphonobutane-1,2,4-tricarboxylic acid, PBTCA) supplied as a 50 % solution. Its structure combines one phosphonic group with three carboxylic groups, giving low phosphorus content together with outstanding scale inhibition at high temperature, high hardness and high pH, and excellent stability against chlorine and bromine.

PBTC outperforms conventional phosphonates in high-alkalinity, high-calcium cooling water and remains stable where oxidising biocides break down HEDP and ATMP. It is also an excellent zinc-salt stabiliser and therefore a key component of high-pH zinc programmes.

Its low phosphorus content helps operators meet discharge limits, while its high calcium tolerance makes it suitable for high-cycle operation, oilfield reinjection and bottle-washing and CIP detergents.

KEY FEATURES & BENEFITS

- Low phosphorus content; supports discharge compliance
- Superior CaCO₃ inhibition at high pH and high hardness
- Excellent chlorine and bromine stability
- Very high calcium tolerance
- Effective zinc-salt stabiliser
- Thermally stable for heat-exchanger surfaces

TYPICAL SPECIFICATIONS

Parameter	Specification	Test method
Appearance	Colourless to light-yellow transparent liquid	Visual (25 °C, clear glass)
Active content (as PBTC)	≥ 50.0 %	Ion chromatography / titration

Parameter	Specification	Test method
Phosphorous acid (as PO_3^{3-})	$\leq 0.8 \%$	Ion chromatography / iodometric
Phosphoric acid (as PO_4^{3-})	$\leq 0.5 \%$	Spectrophotometric (molybdate)
pH (1 % aqueous solution)	1.5 – 2.0	pH meter, 1 % aq., 25 °C
Density at 20 °C	$\geq 1.27 \text{ g/cm}^3$	Density bottle / hydrometer, 20 °C
Iron (as Fe^{3+})	$\leq 10 \text{ mg/L}$	Spectrophotometric (1,10-phenanthroline)

Values are typical specifications. Each consignment is supplied with a batch Certificate of Analysis (COA). Custom specifications are available on request.

APPLICATIONS

- High-pH, high-hardness cooling water
- Programmes with chlorine or bromine biocides
- Zinc-based corrosion inhibitor programmes
- Oilfield water reinjection
- Bottle washing and CIP detergents
- Industrial cleaning formulations
- RO antiscalant formulations

DOSAGE & METHOD OF USE

4 – 15 mg/L in cooling water, usually blended with polymers such as ZEELCHEM™ 3100 or 7000. In detergents and CIP formulations, 0.5 – 3 % of the formulation is typical.

Dose with a metering pump into a point of good mixing. The product may be diluted with good-quality (soft or demineralised) water; dilute solutions should be prepared fresh. Compatible with other ZEELCHEM™ polymers and phosphonates; check compatibility before blending with strong oxidisers or cationic products.

PACKAGING

65.0 kg net HDPE carboy. Each carboy is labelled with product name, batch number, net weight and GHS hazard information.

STORAGE & SHELF LIFE

Store in original closed HDPE / stainless-steel containers in a cool, dry, well-ventilated and shaded area away from strong alkalis and oxidisers. Avoid freezing and prolonged direct sunlight. Shelf life: 12 months in unopened packing.

SAFETY & HANDLING



Signal word: **DANGER**

H290: May be corrosive to metals.

H318: Causes serious eye damage.

Acidic product. Wear chemical goggles, nitrile/PVC gloves and protective clothing. In case of eye or skin contact, rinse with plenty of water for at least 15 minutes and seek medical advice. Refer to the ZEELCHEM™ SDS (GHS / CLP format) before handling. Full information is given in the ZEELCHEM™ Safety Data Sheet (SDS/MSDS).

QUALITY & REGULATORY

- Manufactured under an ISO 9001:2015 quality management system; ISO 22000:2018 and ISO 14001:2015 certified.
- Batch traceability with retained samples; COA with every consignment.
- SDS prepared to GHS (UN Rev. 10), ISO 11014, Indian MSIHC Rules 1989 (Schedule 9), EU REACH Annex II and US OSHA HCS formats.
- Transport: UN 3265, CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S., Class 8, PG III (ADR / IMDG / IATA).

The information in this data sheet is based on our present knowledge and experience and is given in good faith. It does not constitute a warranty of specific properties or suitability for a particular application. Users should carry out their own tests. ZEEL PRODUCT accepts no liability for use outside our recommendations.