

TCEP Hydrochloride

Tris(2-carboxyethyl)phosphine Hydrochloride — Non-Thiol Reducing Agent | Catalogue No. ASC-8056

1. Product Overview

TCEP Hydrochloride (Tris(2-carboxyethyl)phosphine hydrochloride) is a high-purity, odourless, non-thiol reducing agent widely used in biochemistry and molecular biology. Unlike thiol-based reducing agents such as DTT or β -mercaptoethanol, TCEP is more chemically stable in aqueous solution, does not require an inert atmosphere, and lacks the strong odour associated with thiol reagents. It is commonly used to reduce disulfide bonds in proteins and peptides as a preparatory step for gel electrophoresis, mass spectrometry, and other biochemical workflows.

2. Chemical & Physical Information

Product Name	TCEP Hydrochloride
Catalogue Number	ASC-8056
CAS Number	51805-45-9
Chemical Formula	$C_9H_{15}O_6P \cdot HCl$
Formula Weight	286.65 g/mol
Appearance	White crystalline powder
Solubility	Freely soluble in water — clear, colourless solution
Storage	Store at +4°C
HS Tariff Code	2931.4990

3. Mode of Action

TCEP reduces disulfide bonds (R-S-S-R) to free thiols (R-SH) via a phosphine-mediated mechanism, distinct from the thiol-exchange mechanism used by DTT and β -mercaptoethanol. Because TCEP itself does not contain a free thiol group, it does not need to be removed before subsequent thiol-reactive labelling steps (e.g. maleimide conjugation), and it remains active over a broader pH range and for longer periods in solution than thiol-based reducing agents.

4. Key Features

- Non-thiol reducing agent — odourless, more stable in aqueous solution than DTT or β -mercaptoethanol
- Effective over a broad pH range; does not require an inert atmosphere
- High purity, suitable for reproducible research applications

- Compatible with downstream thiol-reactive labelling (e.g. maleimide chemistry) without removal

5. Typical Applications

Category	Typical Use
Protein biochemistry	Reduction of disulfide bonds prior to SDS-PAGE, mass spectrometry, or other analytical workflows
Molecular biology	Sample preparation for gel electrophoresis; protein/peptide reduction
Bioconjugation	Reduction step preceding maleimide-based labelling and conjugation chemistry
Cell & molecular biology research	General-purpose reducing agent in buffer systems and reaction mixtures

6. Storage & Stability

- Store at +4°C
- Keep container tightly sealed, protected from moisture
- Stable under recommended storage conditions; re-test/retest date applies to unopened raw material

7. Intended Use & Safety

For research use only. Not for human, veterinary, diagnostic, or therapeutic use. This product is classified as a corrosive substance (Skin Corrosion Category 1B, H314) — refer to the Safety Data Sheet in full before handling. Appropriate PPE and handling precautions are mandatory.

8. Quality & Supply Assurance

- Supplied with Certificate of Analysis (COA) for every batch
- Identity confirmed by IR spectroscopy against reference spectrum
- Consistent batch-to-batch quality
- Technical support available from AuSaMicS Life Science

9. Literature & References

1. Shafer DE, Inman JK, Lees A. Reaction of Tris(2-carboxyethyl)phosphine (TCEP) with Maleimide and α -Haloacyl Groups: Anomalous Elution of TCEP by Gel Filtration. *Analytical Biochemistry*. 2000;282(1):161–164.
2. Han JC, Han GY. A procedure for quantitative determination of tris(2-carboxyethyl)phosphine, an odorless reducing agent more stable and effective than dithiothreitol. *Analytical Biochemistry*. 1994;220(1):5–9.



TDS
ASC-8056
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