



**AS-14523**

CAS Number 919-30-2

## 3-Aminopropyltriethoxysilane (APTES)

The world's most widely used amino silane coupling agent

### Overview

APTES is a bifunctional organosilane combining a primary amine group ( $-NH_2$ ) with a triethoxysilyl anchor. On exposure to moisture the ethoxy groups hydrolyse to silanols, which condense onto inorganic surfaces (glass, metal oxides, silica) to form covalent Si-O-M bonds. The amine group then reacts with epoxy, carbonyl, anhydride, or isocyanate functionalities in organic polymer matrices, creating a covalent bridge at the organic-inorganic interface. The result is dramatically improved adhesion, wet strength, and durability.

### Key applications

- Glass-fibre sizing for epoxy and polyester composites – improves wet flexural strength by up to 40%
- Metal surface pre-treatment as a chromate-free adhesion promoter for epoxy and polyurethane primers
- Nanoparticle surface functionalisation – introduces reactive amine groups onto  $SiO_2$ ,  $TiO_2$ , and  $Fe_3O_4$
- Biosensor fabrication – standard method for immobilising antibodies, DNA, and enzymes on oxide surfaces
- Dental adhesives – promotes resin bonding to silica-based ceramic fillers
- Anti-corrosion coatings for steel and aluminium alloys as chromate pretreatment replacement

### Selected literature

- [1] Zhang W. & Lai E.P.C. (2022). Chemical Functionalities of 3-Aminopropyltriethoxysilane for Surface Modification of Metal Oxide Nanoparticles. *Silicon* 14, 6535–6545. <https://doi.org/10.1007/s12633-021-01477-7>
- [2] Nikpour M. et al. (2023). APTES Deposition Methods on Oxide Surfaces for Biosensing Applications. *Biosensors* 13(1), 36. <https://doi.org/10.3390/bios13010036>
- [3] Al-Saadi S. & Singh Raman R.K. (2022). Silane Coatings for Corrosion Resistance of Mild Steel: A Review. *Materials* 15, 7809. <https://doi.org/10.3390/ma15217809>

### Key Benefits:

- ✓ Affordable
- ✓ Usually Ex-Stock
- ✓ Purity >98%
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