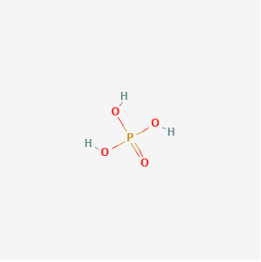
Technical Data Sheet

Phosphoric Acid 50% Technical Grade

Technical · 50% w/w

Alliance Code	Revised	Revision
phosphoric-acid-50-technical-grade	2026-10-20	1.9

CAS number 7664-38-2	UN number UN1805	Hazard class · packing group 8 · PG III
 Structure · PubChem	Grade Technical · 50% w/w	Signal word **Danger**
Hazards Corrosive H290 H314		
Proper shipping name Phosphoric acid solution		

IDENTITY & COMPOSITION

PRODUCT NAME
Phosphoric Acid 50% Technical Grade

ALLIANCE CODE
phosphoric-acid-50-technical-grade

GRADE
Technical

CONCENTRATION
50% w/w

CAS NUMBER
7664-38-2 PubChem

FORMULA
H3PO4 PubChem

PRODUCT TYPE
Solution

SPECIFICATIONS

TEST	SPECIFICATION	TYPICAL	METHOD	SOURCE
Assay (H3PO4)	49.5 - 50.5 % w/w	—	—	Interpreted
Color (APHA)	10 max.	—	—	Interpreted
Chloride (as Cl)	15 ppm max	—	—	Interpreted
Iron (as Fe)	5.9 ppm max	—	—	Interpreted
Arsenic	0.000029 % max	—	—	Interpreted
Cadmium	0.000059 % max	—	—	Interpreted
Fluoride	0.00059 % max	—	—	Interpreted
Heavy metal	0.00029 % max	—	—	Interpreted
Lead	0.000059 % max	—	—	Interpreted
Mercury	0.000059 % max	—	—	Interpreted
Nitrates	0.00031 % max	—	—	Interpreted
Oxidable matter	0.0071 % max	—	—	Interpreted
Sulfates	0.003 % max	—	—	Interpreted

TEST	SPECIFICATION	TYPICAL	METHOD	SOURCE
Volatile acid	0.00059 % max	—	—	Interpreted
Copper	2.9 ppm max	—	—	Interpreted
Composition	50 % phosphoric acid in deionized water, by weight	—	By formulation; batch weights (scale ticket)	Interpreted

Values are reproduced from the current product reference. Source labels do not by themselves establish a supplier guarantee or a test result for your lot. Confirm applicable acceptance limits and request lot-specific documentation.

AVAILABLE GRADES SAME CAS, ALTERNATE GRADES AND CONCENTRATIONS

GRADE	CONCENTRATION	TYPICAL ASSAY	SKU
THIS GRADE Technical	50% w/w	—	current
ACS Grade	85% w/w	—	phosphoric-acid-85-acs-grade
ACS Grade	75% w/w	—	phosphoric-acid-75-acs-grade
Technical	75% w/w	—	phosphoric-acid-75
USP Food Grade	75% w/w	—	phosphoric-acid-75-usp-food-grade
ACS	45% w/w	—	phosphoric-acid-45-acs-grade
Food	20% w/w	—	phosphoric-acid-20-food-grade
Technical	20% w/w	—	phosphoric-acid-20-technical-grade
Technical	15% w/w	—	phosphoric-acid-15-technical-grade
ACS	10% w/w	—	phosphoric-acid-10-acs-grade
Food	10% w/w	—	phosphoric-acid-10-food-grade
Technical	10% w/w	—	phosphoric-acid-10-technical-grade

GRADE	CONCENTRATION	TYPICAL ASSAY	SKU
ACS	5% w/w	—	phosphoric-acid-5-acs-grade

Typical assay for each grade is the average of its recent lots. Confirm a grade meets your specification before substituting it.

PHYSICAL & CHEMICAL PROPERTIES

PROPERTY	VALUE	SOURCE
Appearance	Clear, viscous liquid	Adjudicated
Specific Gravity	1.337 at 20/20 °C (water = 1)	Adjudicated
Density	1.3350 g/cm^3 at 20 °C	Adjudicated
Boiling Point	approx. 110 °C (230 °F) (aqueous solution)	Adjudicated
Melting Point	< 0 °C (< 32 °F), freezing point (aqueous solution)	Adjudicated

Strong acid — density and vapor-pressure values shown are at 20 °C; values shift markedly with concentration and temperature. Reference concentration-temperature curves before specifying equipment.

MATERIALS OF CONSTRUCTION SERVICE ENVELOPE ≈ 50%

MOC ratings are required for this chemical class but no compatibility data has been seeded yet. Treat as no-data and consult Alliance Technical Services before equipment selection.

REGULATORY & TRANSPORT

DOT / 49 CFR

UN NUMBER
UN1805 Adjudicated

HAZARD CLASS
8 Adjudicated

PACKING GROUP
III Adjudicated

PROPER SHIPPING NAME
Phosphoric acid solution Adjudicated

GHS / OSHA HCS 2024

SIGNAL WORD
Danger Adjudicated

H-CODES (HAZARD STATEMENTS)
H290, H314 Adjudicated

P-CODES (PRECAUTIONARY STATEMENTS)
P234, P260, P264, P280, P301+P330+P331, P303+P361+P353, P304+P340, P305+P351+P338, P310, P321, P363, P390, P405, P406, P501

Adjudicated

OCCUPATIONAL EXPOSURE LIMITS

OSHA PEL (29 CFR 1910.1000)
1 mg/m³ TWA OSHA 29 CFR 1910.1000

ACGIH TLV
— no canonical

NIOSH REL
1 mg/m³ TWA / 3 mg/m³ STEL NIOSH Pocket Guide

NIOSH IDLH
1000 mg/m³ NIOSH Pocket Guide

Transport descriptions reflect 49 CFR 172.101 lookup at time of publication. Sourced data: NIOSH Pocket Guide for REL/IDLH, OSHA Z-Tables for PEL. Always verify against the latest regulatory text before shipment-critical decisions.

CATALOG EQUIVALENTS CROSS-REFERENCE VS MAJOR CHEMICAL SUPPLIERS

SIGMA-ALDRICH

SKU	GRADE	CONC.	MATCH	NOTES
345245	ACS Reagent	85%	Unverified candidate	ACS Reagent ≥85%

Cross-references are informational. Confirm against the manufacturer's current specification before substitution. Competitor trademarks are property of their respective owners.

APPLICATION GUIDANCE

Phosphoric Acid 50% Technical Grade (Technical) is a strong mineral acid used across pH control, metal pickling, food and beverage processing, and chemical synthesis. Grade and concentration determine the appropriate end-use and materials.

- Metal pickling, etching, and surface preparation
- pH adjustment in water and wastewater treatment
- Regeneration of ion-exchange resins
- Chemical manufacturing and synthesis
- Food and beverage processing (food-grade only)

Always add acid to water, never water to acid. Use lined or fluoropolymer piping rated for the concentration; carbon steel is not suitable for dilute acid service.

STORAGE & HANDLING

RECOMMENDED STORAGE

Keep closed in polyethylene or other acid-resistant containers, not mild steel, away from bases, bleach and metals.

Adjudicated

HANDLING PRECAUTIONS

Use full PPE including face shield, acid-resistant gloves and apron. Add acid to water slowly with stirring; never reverse. Ventilation required.

Class-level guidance — not product-specific; the SDS controls.

INCOMPATIBILITIES

Strong bases (violent reaction); bleach and other hypochlorites (release chlorine) and ammonia; most metals (release flammable hydrogen); sulfides, sulfites and cyanides (release toxic gases).

Adjudicated

SHELF LIFE

24 months from date of manufacture in sealed, original packaging

For full hazard, PPE, and emergency response guidance, refer to the Safety Data Sheet (SDS) for this product. The SDS controls in all cases where guidance differs.

PACKAGING & LOGISTICS

SHIPPING DESCRIPTION (US DOT)

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UN1805, Phosphoric acid solution, 8, PG III
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Sourced from 49 CFR 172.101. Confirm against shipping documents and carrier requirements before tender.

NMFC CLASS	PLACARD	PACKING GROUP
65	Corrosive	PG III

REVISION HISTORY

Last reviewed 2026-10-20 by Andre Taki, Chief Commercial Officer, DOT Hazmat–certified (49 CFR 172.704).

VERSION	DATE	CHANGE	TRIGGER
1.9	2026-10-20	Canonical data updated: 2 fields changed via the provenance/adjudication pipeline. • density · canonical change (coa.data_provenance / adjudication) • specificGravity · canonical change (coa.data_provenance / adjudication)	canonical_change
1.8	2026-10-13	Canonical data updated: 4 fields changed via the provenance/adjudication pipeline. • storage_precautions · canonical change (coa.data_provenance / adjudication) • incompatible_materials · canonical change (coa.data_provenance / adjudication) • conditions_to_avoid · canonical change (coa.data_provenance / adjudication) • hazardous_decomposition_products · canonical change (coa.data_provenance / adjudication)	canonical_change
1.7	2026-10-07	Canonical data updated: 3 fields changed via the provenance/adjudication pipeline. • ghsClassification · canonical change (coa.data_provenance / adjudication) • hazard_h_codes · canonical change (coa.data_provenance / adjudication) • hazard_p_codes · canonical change (coa.data_provenance / adjudication)	canonical_change
1.6	2026-10-05	Canonical data updated: 1 field changed via the provenance/adjudication pipeline. • oel_osha_pel · canonical change (coa.data_provenance / adjudication)	canonical_change
1.5	2026-09-30	Canonical data updated: 3 fields changed via the provenance/adjudication pipeline. • appearance · canonical change (coa.data_provenance / adjudication) • boilingPoint · canonical change (coa.data_provenance / adjudication) • meltingPoint · canonical change (coa.data_provenance / adjudication)	canonical_change
1.4	2026-08-19	Canonical data updated: 1 field changed via the provenance/adjudication pipeline. • unNumber · canonical change (coa.data_provenance / adjudication)	canonical_change
1.3	2026-08-05	Canonical data updated: 3 fields changed via the provenance/adjudication pipeline. • hazardClass · canonical change (coa.data_provenance / adjudication) • packingGroup · canonical change (coa.data_provenance / adjudication) • unNumber · canonical change (coa.data_provenance / adjudication)	canonical_change

VERSION	DATE	CHANGE	TRIGGER
1.2	2026-07-22	Canonical data updated: 2 fields changed via the provenance/adjudication pipeline. • dotSubsidiaryHazardClass · canonical change (coa.data_provenance / adjudication) • dotProperShippingName · canonical change (coa.data_provenance / adjudication)	canonical_change
1.1	2026-07-17	Canonical data re-verified: 4 fields updated against independent vendor SDSs, CLP Annex VI, 49 CFR, and OSHA HazCom 2024 (GHS classification, hazard/precautionary codes, signal word, physical properties as applicable). • countryOfOrigin · canonical adjudication / reground (coa.data_provenance) • ghsClassification · canonical adjudication / reground (coa.data_provenance) • hazard_p_codes · canonical adjudication / reground (coa.data_provenance) • hsCode · canonical adjudication / reground (coa.data_provenance)	canonical_change
1.0	2026-05-20	Initial URL-first TDS published from canonical chemistry registry.	initial

This Technical Data Sheet is provided for technical reference. The Safety Data Sheet (SDS) controls in all cases where guidance differs. Values reflect Alliance Chemical canonical data at time of generation; subsequent revisions are recorded in the Revision History above.