

TECHNICAL DATA SHEET

Phosphoric Acid 50% ACS Grade

ACS · 50%

CAS NUMBER

7664-38-2

ALLIANCE CODE

phosphoric-acid-50-acs-grade

GENERATED

2026-09-01

REVISION

1.4

REVIEWED

2026-07-17 · Andre Taki

IDENTITY & COMPOSITION

PRODUCT NAME

Phosphoric Acid 50% ACS Grade

ALLIANCE CODE

phosphoric-acid-50-acs-grade

GRADE

ACS

CONCENTRATION

50%

CAS NUMBER

7664-38-2 [PubChem](#)

FORMULA

H3O4P [PubChem](#)

MOLECULAR WEIGHT

97.995 [PubChem](#)

PRODUCT TYPE

solution

SPECIFICATIONS

TEST	SPECIFICATION	TYPICAL	METHOD	SOURCE
Assay (H3PO4)	49.5 - 50.5 %	50.0 %	—	Commercial practice
Arsenic (As)	0.59 ppm Max	0.018 ppm	—	Derived by dilution
Calcium (Ca)	0.0012 % Max	0.00012 %	—	Derived by dilution

TEST	SPECIFICATION	TYPICAL	METHOD	SOURCE
Chloride (Cl)	1.8 ppm Max	0.24 ppm	—	Derived by dilution
Heavy metals (as Pb)	0.00059 % max	0.000059 %	—	Derived by dilution
Insoluble matter	0.00059 % Max	0.000059 %	—	Derived by dilution
Iron (Fe)	0.0018 % Max	0.000059 %	—	Derived by dilution
Magnesium (Mg)	0.0012 % Max	0.000059 %	—	Derived by dilution
Nitrate (NO3)	2.9 ppm Max	0.29 ppm	—	Derived by dilution
Sodium (Na)	0.015 % Max	0.0012 %	—	Derived by dilution
Sulfate (SO4)	0.0018 % Max	0.00029 %	—	Derived by dilution
Substances reducing permanganate (as H3PO3)	0.00059 % Max	0.00012 %	ACS permanganate titration	Interpreted

Specification values are guaranteed limits. Typical values are representative of production lots and are not guaranteed. Lot-specific certificates of analysis ship with every order.

AVAILABLE GRADES SAME CAS, ALTERNATE GRADES AND CONCENTRATIONS

GRADE	CONCENTRATION	TYPICAL ASSAY	SKU
THIS GRADE ACS	50%	—	current
ACS Grade	85%	—	phosphoric-acid-85-acs-grade

GRADE	CONCENTRATION	TYPICAL ASSAY	SKU
USP Food Grade	75%	—	phosphoric-acid-75-usp-food-grade
Technical	50%	—	phosphoric-acid-50-technical-grade
ACS	30%	—	phosphoric-acid-30-acs-grade
Food	20%	—	phosphoric-acid-20-food-grade
Technical	20%	—	phosphoric-acid-20-technical-grade
ACS	10%	—	phosphoric-acid-10-acs-grade
Technical	10%	—	phosphoric-acid-10-technical-grade
Food	5%	—	phosphoric-acid-5-food-grade
Technical	5%	—	phosphoric-acid-5-technical-grade
Food	—	—	phosphoric-acid-45-food-grade
Technical	—	—	phosphoric-acid-45-technical-grade

Typical assay shown is the rolling-window mean from the sibling product's most recent lots. Grade selection drives downstream end-use — verify the sibling grade matches your specification before substitution.

PHYSICAL & CHEMICAL PROPERTIES

PROPERTY	VALUE	SOURCE
Color	10 max	Derived by dilution
Specific Gravity (20 °C)	1.331 – 1.340	Interpreted

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%

MATERIAL	RATING	MAX T (°C)	NOTES	SOURCE
Buna-N (NBR) Elastomer	Poor	—	Swells and degrades	Cole-Parmer Chemical Compatibility
EPDM Elastomer	Good	40	Acceptable but FKM preferred	Cole-Parmer Chemical Compatibility
Viton (FKM) Elastomer	Excellent	80	Preferred elastomer	Cole-Parmer Chemical Compatibility
PTFE Fluoropolymer	Excellent	200	Universal acid compatibility.	Cole-Parmer Chemical Compatibility
Borosilicate Glass Glass Ceramic	Excellent	100	Inert to most strong acids (avoid HF).	Cole-Parmer Chemical Compatibility
Glass (borosilicate) Glass Ceramic	Excellent	100	Inert under all conditions	Cole-Parmer Chemical Compatibility
316 stainless steel Metal	Poor	25	Severe pitting; use only for vapors	Cole-Parmer Chemical Compatibility
Aluminium Metal	Not recommended	—	Reacts to form H ₂ gas	Cole-Parmer Chemical Compatibility
Carbon Steel Metal	Not recommended	—	Catastrophic corrosion; never use.	Cole-Parmer Chemical Compatibility
Hastelloy C-276 Metal	Excellent	90	Premium HCl alloy	Cole-Parmer Chemical Compatibility
Inconel 625 Metal	Good	60	Acceptable for dilute service	Cole-Parmer Chemical Compatibility

MATERIAL	RATING	MAX T (°C)	NOTES	SOURCE
Tantalum Metal	Excellent	100	Best-in-class but expensive	Cole-Parmer Chemical Compatibility
CPVC Thermoplastic	Excellent	90	Preferred for elevated temperature	Cole-Parmer Chemical Compatibility
FRP (vinyl ester) Thermoplastic	Good	60	Common bulk-storage tank material	Cole-Parmer Chemical Compatibility
HDPE Thermoplastic	Excellent	60	Standard drum / IBC material	Cole-Parmer Chemical Compatibility
PVC Thermoplastic	Excellent	60	Standard piping for ambient service	Cole-Parmer Chemical Compatibility

Ratings reflect the service envelope (concentration × temperature) shown. Always confirm against your specific duty cycle and contact-time before equipment selection. The most cautious rating across overlapping references is shown.

REGULATORY & TRANSPORT

DOT / 49 CFR

UN NUMBER

UN1805 **Adjudicated**

PACKING GROUP

III **Adjudicated**

HAZARD CLASS

8 **Adjudicated**

PROPER SHIPPING NAME

Phosphoric acid solution **Adjudicated**

GHS / OSHA HAZCOM 2012

SIGNAL WORD

Danger **Adjudicated**

H-CODES (HAZARD STATEMENTS)

H290, H314 **ECHA CLP Annex VI**

P-CODES (PRECAUTIONARY STATEMENTS)

P234, P260, P264, P280, P301+P330+P331,
P303+P361+P353, P304+P340,
P305+P351+P338, P310, P321, P363, P405,
P501

Adjudicated

OCCUPATIONAL EXPOSURE LIMITS

OSHA PEL (29 CFR 1910.1000)

1 mg/m³ TWA **OSHA 29 CFR 1910.1000**

NIOSH REL

1 mg/m³ TWA / 3 mg/m³ STEL

NIOSH Pocket Guide

ACGIH TLV

— **no canonical**

NIOSH IDLH

1000 mg/m³ **NIOSH Pocket Guide**

Transport descriptions reflect 49 CFR 172.101 lookup at time of publication. Sourced data: ECHA CLP Annex VI for harmonised classifications, 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%	Exact	ACS Reagent ≥85%

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

APPLICATIONS

Fertilizer manufacture, and use as a pH modifier, sanitizing agent and rust converter [laballey.com](#)

Supplied for laboratory, research or manufacturing use as ACS reagent-grade material

[digitalassets.avantorsciences.com](#)

Used in fertilizer, cosmetics, foods and beverages, food-industry sanitation, dental cleaning, and rust conversion.

[laballey.com](#)

Applications are drawn from published manufacturer and supplier documentation; each is sourced. Suitability for a specific use is the buyer's to confirm.

STORAGE & HANDLING

RECOMMENDED STORAGE

Cool, dry, well-ventilated area in compatible containers (lined steel, HDPE, FRP — verify per concentration). Segregate from bases, oxidizers, metals, and cyanides.

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

INCOMPATIBILITIES

Bases, active metals (aluminium, zinc), cyanides, sulfides, oxidizing agents. Reacts violently with organic anhydrides.

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

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.

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.

SHELF LIFE

Consult Technical Services for product-specific shelf life

PACKAGING & LOGISTICS

SHIPPING DESCRIPTION (US DOT)

UN1805, Phosphoric acid solution, 8, PG III

Sourced from 49 CFR 172.101. Confirm against shipping documents and carrier requirements before tender.

NMFC CLASS
65

PLACARD
Corrosive

PACKING GROUP
PG III

REVISION HISTORY

Last reviewed 2026-07-17 by Andre Taki, DOT Hazmat Specialist.

VERSION	DATE	CHANGE	TRIGGER
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
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.