

TECHNICAL DATA SHEET

Hydrochloric Acid 25% ACS Grade

ACS · 25%

CAS NUMBER

7647-01-0

ALLIANCE CODE

hydrochloric-acid-25-ac-s-grade

GENERATED

2026-09-01

REVISION

1.4

REVIEWED

2026-07-17 · Andre Taki

IDENTITY & COMPOSITION

PRODUCT NAME

Hydrochloric Acid 25% ACS Grade

ALLIANCE CODE

hydrochloric-acid-25-ac-s-grade

GRADE

ACS

CONCENTRATION

25%

CAS NUMBER

7647-01-0 [PubChem](#)

FORMULA

ClH [PubChem](#)

MOLECULAR WEIGHT

36.46 [PubChem](#)

PRODUCT TYPE

solution

SPECIFICATIONS

TEST	SPECIFICATION	TYPICAL	METHOD	SOURCE
Assay (HCl)	24.5 – 25.5 %	25.0 %	—	Commercial practice
Ammonium (NH4)	2 ppm max	0.20 ppm	—	Derived by dilution
Arsenic (As)	0.007 ppm max	0.0014 ppm	—	Derived by dilution

TEST	SPECIFICATION	TYPICAL	METHOD	SOURCE
Bromide (Br)	0.0034 % max	0.00054 %	—	Derived by dilution
Extractable organic substances	3.4 ppm max	0.27 ppm	—	Derived by dilution
Free chlorine (Cl)	0.7 ppm max	0.07 ppm	—	Derived by dilution
Heavy metals (as Pb)	0.7 ppm max	0.05 ppm	—	Derived by dilution
Iron (Fe)	0.14 ppm max	0.020 ppm	—	Derived by dilution
Residue after ignition	3.4 ppm max	0.41 ppm	—	Derived by dilution
Sulfate (SO ₄)	0.7 ppm max	0.14 ppm	—	Derived by dilution
Sulfite (SO ₃)	0.7 ppm max	0.034 ppm	—	Derived by dilution

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	25%	—	current
ACS Reagent	37%	—	hydrochloric-acid-37-ac-s-reagent-grade
Technical Grade	37%	—	hydrochloric-acid-37-hcl-37-technical-grade

GRADE	CONCENTRATION	TYPICAL ASSAY	SKU
ACS	31%	—	hydrochloric-acid-31-acs-grade
Technical Grade	31%	—	hydrochloric-acid-31-technical-grade
Technical	25%	—	hydrochloric-acid-25-technical-grade
ACS	20%	—	hydrochloric-acid-20-acs-grade
ACS	15%	—	hydrochloric-acid-15-acs-grade
Technical Grade	15%	—	hydrochloric-acid-15-technical-grade
ACS	10%	—	hydrochloric-acid-10-acs-grade
Technical	10%	—	hydrochloric-acid-10-technical-grade
ACS	5%	—	hydrochloric-acid-5-acs-grade
Technical Grade	5%	—	hydrochloric-acid-5-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	7 max	Derived by dilution
Specific Gravity (20 °C)	1.121 – 1.127	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 ≈ 25%

MATERIAL	RATING	MAX T (°C)	NOTES	SOURCE
Buna-N (NBR) Elastomer	Poor	—	Hardens and cracks; do not use.	Parker O-ring Chemical Compatibility
EPDM Elastomer	Good	80	Standard for HCl and H2SO4 gaskets.	Parker O-ring Chemical Compatibility
Viton (FKM) Elastomer	Good	80	Acceptable for HCl gaskets up to 37 %.	Parker O-ring Chemical Compatibility
PTFE Fluoropolymer	Excellent	200	Universal acid compatibility.	Cole-Parmer Chemical Compatibility
PVDF (Kynar) Fluoropolymer	Excellent	120	Excellent for HCl piping at elevated temperature.	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 H2 gas	Cole-Parmer Chemical Compatibility
Carbon Steel Metal	Not recommended	—	Catastrophic corrosion; never use.	Cole-Parmer Chemical Compatibility
Hastelloy C-276 Metal	Excellent	80	Preferred metal for concentrated HCl service.	Haynes International C-276 datasheet

MATERIAL	RATING	MAX T (°C)	NOTES	SOURCE
Inconel 625 Metal	Good	60	Acceptable for dilute service	Cole-Parmer Chemical Compatibility
Tantalum Metal	Excellent	100	Best-in-class but expensive	Cole-Parmer Chemical Compatibility
CPVC Thermoplastic	Excellent	90	Higher-temp variant of PVC.	Cole-Parmer Chemical Compatibility
FRP (vinyl ester) Thermoplastic	Good	60	Common bulk-storage tank material	Cole-Parmer Chemical Compatibility
HDPE Thermoplastic	Excellent	60	Standard tank/drum material for HCl up to 37 %.	Cole-Parmer Chemical Compatibility
PVC Thermoplastic	Excellent	60	Common for piping; verify rating for service > 50 °C.	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

UN1789 Adjudicated

PACKING GROUP

II Adjudicated

HAZARD CLASS

8 Adjudicated

PROPER SHIPPING NAME

Hydrochloric acid Adjudicated

GHS / OSHA HAZCOM 2012

SIGNAL WORD

Danger Adjudicated

H-CODES (HAZARD STATEMENTS)

H290, H314, H335 ECHA CLP Annex VI

P-CODES (PRECAUTIONARY STATEMENTS)

P234, P260, P261, P264, P271, P280,
P301+P330+P331, P303+P361+P353,
P304+P340, P305+P351+P338, P310, P321,
P363, P403+P233, P405, P501

Adjudicated

OCCUPATIONAL EXPOSURE LIMITS

OSHA PEL (29 CFR 1910.1000)

5 ppm ceiling OSHA 29 CFR 1910.1000

ACGIH TLV

— no canonical

NIOSH REL

5 ppm ceiling NIOSH Pocket Guide

NIOSH IDLH

50 ppm 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

HONEYWELL

SKU	GRADE	CONC.	MATCH	NOTES
258148	ACS	37%	Exact	Fluka brand, ACS grade

SIGMA-ALDRICH

SKU	GRADE	CONC.	MATCH	NOTES
320331	ACS Reagent	37%	Exact	ACS Reagent grade, 37% in water

SKU	GRADE	CONC.	MATCH	NOTES
258148	Technical	37%	Partial	Technical grade — lower spec but same chemistry

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

APPLICATIONS

Pickling and metal cleaning agent in metal processing, to remove oxides and scale [chemceed.com](#)

Oil well acidizing — dissolves calcium and magnesium carbonate rock formations to increase permeability and production

[chemceed.com](#)

Beneficiation of ores and rock phosphate; stimulation of oil and gas wells in carbonate and sandstone reservoirs

[itwreagents.com](#)

Metallurgical pickling, etching and brazing [itwreagents.com](#)

Removal of calcium carbonate (scale) deposits from equipment and cleaning of boreholes and gravel-pack filters after drilling

[itwreagents.com](#)

Dilute acid used in construction to remove mortar residue from masonry and lime film from tiles after grouting

[itwreagents.com](#)

ACS reagent purity makes it acceptable for analytical applications and research laboratories

[laballey.com](#)

Batteries, reagent use, descaling agent, reducing agent [laballey.com](#)

Petroleum well operations, ore reduction, food processing, pH adjustment and general cleaning

[chemceed.com](#)

Listed product uses include acid cleaners, boiler water treatment, electroplating, galvanizing, high fructose corn syrup, pH control, rust and scale removers, sugar refining, swimming pool and toilet bowl cleaner

[chemceed.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)

UN1789, Hydrochloric acid, 8, PG II

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

NMFC CLASS 60	PLACARD Corrosive	PACKING GROUP PG II
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REVISION HISTORY

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

VERSION	DATE	CHANGE	TRIGGER
1.4	2026-08-27	Canonical data updated: 2 fields changed via the provenance/adjudication pipeline. - oel_niosh_rel · canonical change (coa.data_provenance / adjudication) - oel_idlh · canonical change (coa.data_provenance / adjudication)	canonical_change

VERSION	DATE	CHANGE	TRIGGER
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.