

TECHNICAL DATA SHEET

Hydrochloric Acid 31% Technical Grade

Technical Grade · 31%

CAS NUMBER

7647-01-0

ALLIANCE CODE

hydrochloric-acid-31-technical-grade

GENERATED

2026-07-18

1. IDENTITY & COMPOSITION

PRODUCT NAME

Hydrochloric Acid 31% Technical Grade

ALLIANCE CODE

hydrochloric-acid-31-technical-grade

GRADE

Technical Grade

CONCENTRATION

31%

CAS NUMBER

7647-01-0 [PubChem](#)

FORMULA

ClH [PubChem](#)

MOLECULAR WEIGHT

36.46 [PubChem](#)

PRODUCT TYPE

solution

IUPAC NAME

hydrogen chloride [PubChem](#)

INCHI-KEY

VEXZGXHMUGYJMC-UHFFFAOYSA-N [PubChem](#)

SMILES

Cl [PubChem](#)

AVAILABLE GRADES SAME CAS, ALTERNATE GRADES AND CONCENTRATIONS

GRADE	CONCENTRATION	TYPICAL ASSAY	SKU
THIS GRADE Technical Grade	31%	—	current
ACS Reagent	37%	—	hydrochloric-acid-37-acs-reagent-grade

GRADE	CONCENTRATION	TYPICAL ASSAY	SKU
Technical Grade	37%	—	hydrochloric-acid-37-hcl-37-technical-grade
ACS	31%	—	hydrochloric-acid-31-accs-grade
—	25%	—	hydrochloric-acid-25-accs-grade
—	25%	—	hydrochloric-acid-25-technical-grade
ACS	15%	—	hydrochloric-acid-15-accs-grade
Technical Grade	15%	—	hydrochloric-acid-15-technical-grade
ACS	5%	—	hydrochloric-acid-5-accs-grade
Technical Grade	5%	—	hydrochloric-acid-5-technical-grade
—	—	—	hydrochloric-acid-10-accs-grade
—	—	—	hydrochloric-acid-10-technical-grade
—	—	—	hydrochloric-acid-20-accs-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

One or more physical-property values are temporarily suppressed pending verification against vendor COA data. For complete properties refer to the Safety Data Sheet (SDS) or contact sales@alliancechemical.com.

FORM

Liquid [Product record](#)

SPECIFIC GRAVITY (20 °C)

1.155 [Product record](#)

BOILING POINT

Not characterized for the 31% solution

[Product record](#)

FLASH POINT

Not applicable [Product record](#)

SOLUBILITY (WATER)

82.3 g/100 g at 32 °F (NTP, 1992) [Product record](#)

ODOR

Pungent, irritating odor [Product record](#)

DENSITY

1.155 (31% w/w aqueous solution, 20 °C)

[Product record](#)

MELTING POINT

Not characterized for the 31% solution

[Product record](#)

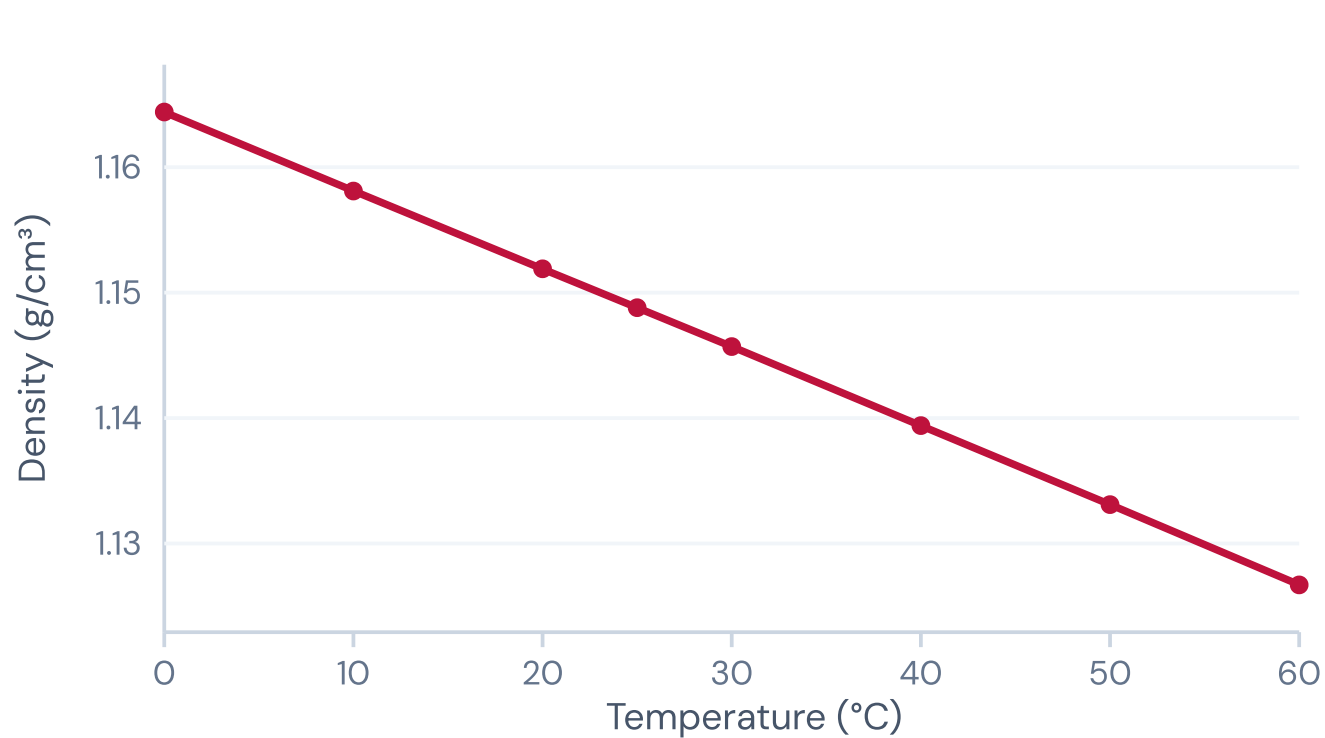
VAPOR PRESSURE

413.6 mmHg (USCG, 1999) [Product record](#)

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.

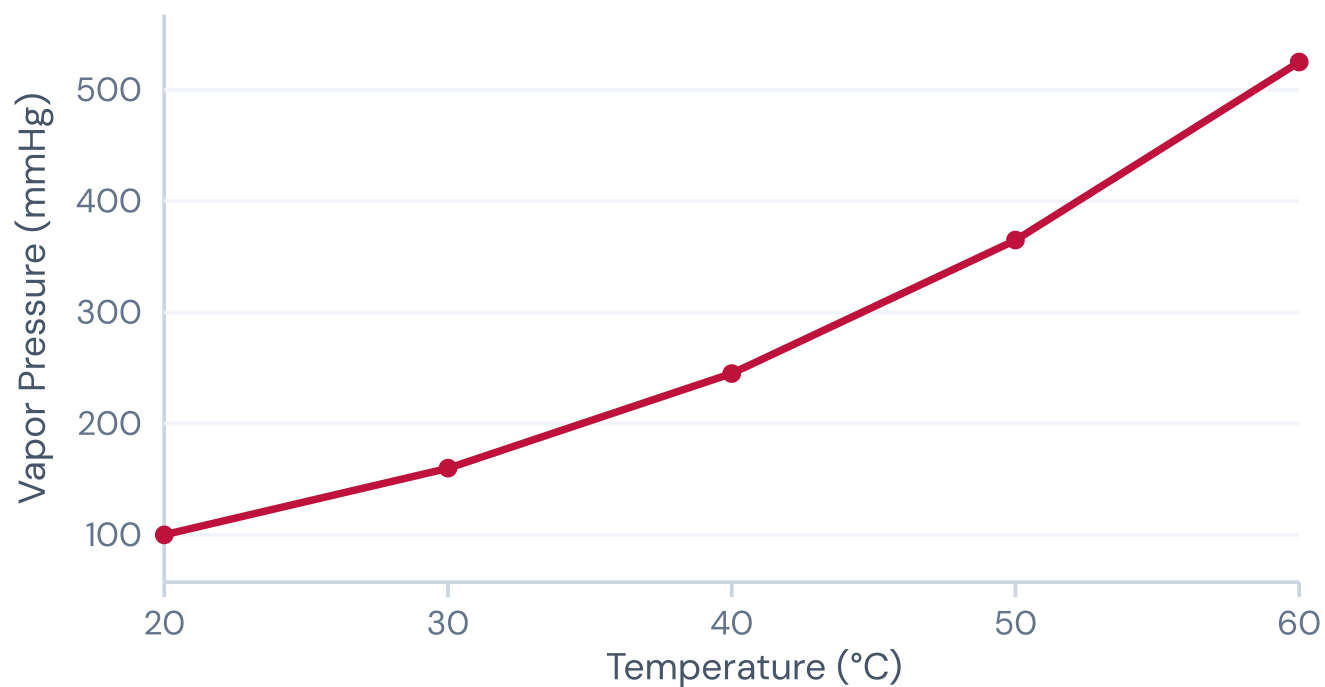
PROPERTY CURVES

Density vs. Temperature (31%)



Source: [Perry's Chemical Engineers' Handbook \(31% reference\)](#)

Vapor Pressure vs. Temperature (31%)



Source: [Perry's Chemical Engineers' Handbook \(31% reference\)](#)

Reference curves drawn from public engineering data. For engineering use, consult the cited source for the underlying tabulated values.

MATERIALS OF CONSTRUCTION SERVICE ENVELOPE ≈ 31%

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	Good	80	Acceptable for HCl gaskets up to 37 %.	Parker O-ring Chemical Compatibility
PTFE Fluoropolymer	Excellent	200	Lining and gaskets	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	—	Aggressive corrosion	Cole-Parmer Chemical Compatibility

MATERIAL	RATING	MAX T (°C)	NOTES	SOURCE
Carbon Steel Metal	Not recommen ded	—	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
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

UN1789 [Vendor Label](#)

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,...

OCCUPATIONAL EXPOSURE LIMITS

OSHA PEL (29 CFR 1910.1000)

5 ppm ceiling [OSHA 29 CFR 1910.1000](#)

ACGIH TLV

— [unknown](#)

NIOSH REL

5 ppm ceiling [NIOSH Pocket Guide](#)

NIOSH IDLH

50 ppm [NIOSH Pocket Guide](#)

REGIONAL CLASSIFICATIONS

EC NUMBER (EU EINECS)

231-595-7 [Web SDS consensus](#)

REACH SVHC

Not listed [Web SDS consensus](#)

CALIFORNIA PROP 65

Not listed [Web SDS consensus](#)

WGK WATER HAZARD (DE)

1 [Web SDS consensus](#)

TDG CLASSIFICATION (CANADA)

un1789, class 8, pg ii [Web SDS consensus](#)

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.

HEALTH & FIRE HAZARD

NFPA 704



- Health: 3 [Web SDS consensus](#)
- Fire: 0 [Web SDS consensus](#)
- Reactivity: 1 [Web SDS consensus](#)
- Specific: COR [Web SDS consensus](#)

HMIS III

Health	3	Web SDS consensus
Flammability	0	Web SDS consensus
Physical Hazard	2	Web SDS consensus
PPE	C	Web SDS consensus

ACUTE TOXICOLOGY

LD₅₀ ORAL (RAT)
700 mg/kg [Web SDS consensus](#)

LC₅₀ INHALATION (RAT, 4 H)
3124 ppm [Web SDS consensus](#)

NFPA 704 ratings 0 (no hazard) – 4 (severe hazard) per NFPA 704 standard. HMIS III ratings 0 – 4 per the American Coatings Association. Acute toxicology values from SDS Section 11 or NIOSH RTECS.

Supplier Qualification Packet

One zipped download containing the TDS, SDS, latest lot COA (when available), and a fresh Letter of Continuing Guaranty for Hydrochloric Acid 31% Technical Grade. Every file included is SHA-256 hashed and listed in a manifest your QA team can audit.

CATALOG EQUIVALENTS CROSS-REFERENCE VS MAJOR CHEMICAL SUPPLIERS

HONEYWELL

SKU	GRADE	CONC.	MATCH	NOTES
258148	ACS	37%	Exact	Fluka brand, ACS grade
30721	Reagent	32%	Close	Reagent grade at comparable concentration.

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.

APPLICATION GUIDANCE

Hydrochloric Acid 31% Technical Grade (Technical Grade) 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

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

INCOMPATIBILITIES

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

HANDLING PRECAUTIONS

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

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)

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
1.1	2026-07-17	Canonical data re-verified: 25 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) - ec_number · canonical adjudication / reground (coa.data_provenance) - ghsClassification · canonical adjudication / reground (coa.data_provenance) - hazard_p_codes · canonical adjudication / reground (coa.data_provenance) - hmis_flammability · canonical adjudication / reground (coa.data_provenance) - hmis_health · canonical adjudication / reground (coa.data_provenance) - hmis_physical · canonical adjudication / reground (coa.data_provenance) - hmis_ppe · canonical adjudication / reground (coa.data_provenance) - hsCode · canonical adjudication / reground (coa.data_provenance) - inchi · canonical adjudication / reground (coa.data_provenance) - inchi_key · canonical adjudication / reground (coa.data_provenance) - iupac_name · canonical adjudication / reground (coa.data_provenance) - lc50_inhalation_rat_4h · canonical adjudication / reground (coa.data_provenance) - ld50_oral_rat · canonical adjudication / reground (coa.data_provenance) - nfpa_fire · canonical adjudication / reground (coa.data_provenance) - nfpa_health · canonical adjudication / reground (coa.data_provenance) - nfpa_reactivity · canonical adjudication / reground (coa.data_provenance) - nfpa_specific · canonical adjudication / reground (coa.data_provenance) - physicalProperties · canonical adjudication / reground (coa.data_provenance) - prop_65_listed · canonical adjudication / reground (coa.data_provenance) - pubchem_cid · canonical adjudication / reground (coa.data_provenance) - reach_svhc_listed · canonical adjudication / reground (coa.data_provenance) - smiles · canonical adjudication / reground (coa.data_provenance) - tdg_classification · canonical adjudication / reground (coa.data_provenance) - wgk_water_hazard · canonical adjudication / reground (coa.data_provenance)	canonical_change

VERSION	DATE	CHANGE	TRIGGER
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.

ALLIANCE CHEMICAL

Order Hydrochloric Acid 31% Technical Grade

Bulk & packaged sizes · COA/SDS ships with every order