Technical Data Sheet

Hydrochloric Acid 31% Technical Grade

Technical Grade · 31%

Alliance Code	Revised	Revision
hydrochloric-acid-31-technical-grade	2026-10-07	1.7

CAS number 7647-01-0	UN number UN1789	Hazard class · packing group 8 · PG II
 Structure · PubChem	Grade Technical Grade · 31%	Signal word **Danger**
Hazards Corrosive · Irritant / harmful · H290 H314 H335		
Proper shipping name Hydrochloric acid		

IDENTITY & COMPOSITION

PRODUCT NAME
Hydrochloric Acid 31% Technical Grade

ALLIANCE CODE
hydrochloric-acid-31-technical-grade

GRADE
Technical Grade

CONCENTRATION
31% w/w

CAS NUMBER
7647-01-0 PubChem

FORMULA
HCl Adjudicated

MOLECULAR WEIGHT
36.46 PubChem

PRODUCT TYPE
Solution

IUPAC NAME
hydrogen chloride PubChem

INCHI-KEY
VEXZGXHMUGYJMC-UHFFFAOYSA-N PubChem

SMILES
Cl PubChem

SPECIFICATIONS

TEST	SPECIFICATION	TYPICAL	METHOD	SOURCE
Assay, Baumé	20.0 min. (20° Bé = 31.45 % w/w HCl min.)	—	—	Interpreted
Arsenic (As)	0.5 max. (ppm as As)	—	—	Interpreted
Fluorinated organic compounds	25 max. (ppm)	—	—	Interpreted
Heavy metals (as Pb)	1 max. (ppm)	—	—	Interpreted
Oxidizing substances (as Cl2)	10 max. (ppm as Cl2)	—	—	Interpreted
Specific gravity	Min 1.1602 at 60°F (15.5°C)	—	—	Interpreted
Sulfate (SO4)	Max 60.00 ppm	—	—	Interpreted
Total organic compounds (non-fluorine-containing)	5 max. (ppm)	—	—	Interpreted
Iron (Fe)	3 ppm max	—	ICP-MS	Interpreted
Free chlorine (as Cl2)	10 ppm max	—	DPD colorimetric	Interpreted
Nonvolatile matter	100 ppm max	—	Gravimetric, evaporation to dryness at 105 C	Interpreted
baume °	20 min	—	—	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 Grade	31%	—	current
ACS Reagent	37%	—	hydrochloric-acid-37-acs-reagent-grade
Technical Grade	37%	—	hydrochloric-acid-37-hcl-37-technical-grade
ACS	31%	—	hydrochloric-acid-31-acs-grade
ACS	25%	—	hydrochloric-acid-25-acs-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 for each grade is the average of its recent lots. Confirm a grade meets your specification before substituting it.

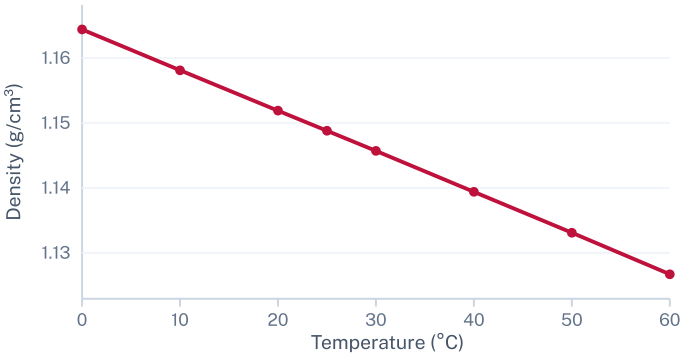
PHYSICAL & CHEMICAL PROPERTIES

PROPERTY	VALUE	SOURCE
Appearance	Clear, colorless corrosive liquid	Adjudicated
Form	Liquid	Published reference
Color	0 - 20	Interpreted
Odor	Pungent, acrid odor	Adjudicated
pH	< 1	Adjudicated
Specific Gravity	1.155–1.162 (water = 1)	Adjudicated
Density	1.155 (31% w/w aqueous solution, 20 °C)	Published reference
Boiling Point	85 °C (185 °F)	Adjudicated
Melting Point	-46.9 °C (-52.5 °F), freezing point	Adjudicated
Flash Point	Not applicable	Adjudicated
Vapor Pressure	35–40 mmHg at 30 °C (86 °F)	Adjudicated
Vapor Density	1.27 (air = 1)	Adjudicated
Solubility (water)	Completely miscible with water	Adjudicated
Viscosity	1.55 mPa·s at 30 °C	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.

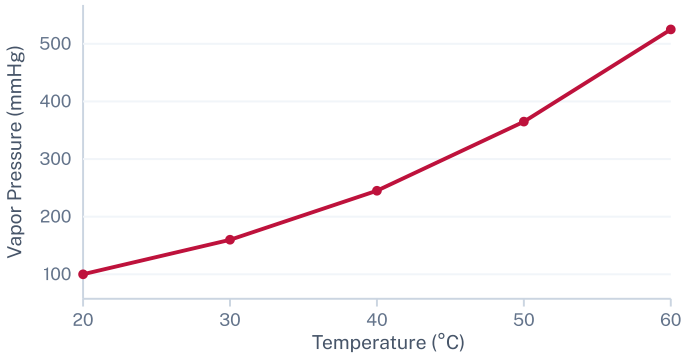
PROPERTY CURVES

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

MATERIAL	RATING	CONDITIONS	SOURCE
Rubber-lined steel (rubber lining)	Compatible	20° Bé muriatic acid, 31.45 wt.% min HCl; bulk tank car and tank truck service	oxychem.com

Compatibility is drawn from published manufacturer and supplier documentation for this product; each rating is sourced. Confirm against your specific duty cycle before equipment selection.

REGULATORY & TRANSPORT

DOT / 49 CFR

UN NUMBER
UN1789 49 CFR 172.101

HAZARD CLASS
8 Adjudicated

PACKING GROUP
II Adjudicated

PROPER SHIPPING NAME
Hydrochloric acid Adjudicated

GHS / OSHA HCS 2024

SIGNAL WORD
Danger Adjudicated

H-CODES (HAZARD STATEMENTS)
H290, H314, H335 Adjudicated

P-CODES (PRECAUTIONARY STATEMENTS)
P234, P260, P261, P264, P271, P280, P301+P330+P331, P303+P361+P353, P304+P340, P305+P351+P338, P310, P321, P363, P390, P403+P233, P405, P406, P501

Adjudicated

OCCUPATIONAL EXPOSURE LIMITS

OSHA PEL (29 CFR 1910.1000)
5 ppm ceiling OSHA 29 CFR 1910.1000

ACGIH TLV
2 ppm Ceiling Adjudicated

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: 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

LD_{50} ORAL (RAT)

700 mg/kg Web SDS consensus

LC_{50} 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.

CATALOG EQUIVALENTS CROSS-REFERENCE VS MAJOR CHEMICAL SUPPLIERS

HONEYWELL

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

SIGMA-ALDRICH

SKU	GRADE	CONC.	MATCH	NOTES
258148	Technical	37%	Unverified candidate	Technical grade — lower spec but same chemistry
320331	ACS Reagent	37%	Unverified candidate	ACS Reagent grade, 37% in water

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

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

Store in a cool, well-ventilated area out of direct sunlight in closed, vented, corrosion-resistant containers (polyethylene or glass). Keep away from bleach and other oxidizers, bases 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

Bases, hydroxides, carbonates, amines and ammonia; oxidizers, including sodium hypochlorite (bleach) (release chlorine gas); most metals and metal oxides, including iron, copper, nickel and aluminum (release flammable hydrogen); cyanides, sulfides and sulfites (release toxic gases); formaldehyde.

Adjudicated

SHELF LIFE

Consult Technical Services for product-specific shelf life

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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UN1789, Hydrochloric acid, 8, PG II
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Sourced from 49 CFR 172.101. Confirm against shipping documents and carrier requirements before tender.

NMFC CLASS	PLACARD	PACKING GROUP
60	Corrosive	PG II

REVISION HISTORY

Last reviewed 2026-10-07 by Andre Taki, Chief Commercial Officer, DOT Hazmat–certified (49 CFR 172.704).

VERSION	DATE	CHANGE	TRIGGER
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: 23 fields changed via the provenance/adjudication pipeline. • oel_osha_pel · canonical change (coa.data_provenance / adjudication) • formula · canonical change (coa.data_provenance / adjudication) • synonyms · canonical change (coa.data_provenance / adjudication) • recommended_use · canonical change (coa.data_provenance / adjudication) • restrictions_on_use · canonical change (coa.data_provenance / adjudication) • odor · canonical change (coa.data_provenance / adjudication) • odorThreshold · canonical change (coa.data_provenance / adjudication) • pH · canonical change (coa.data_provenance / adjudication) • meltingPoint · canonical change (coa.data_provenance / adjudication) • boilingPoint · canonical change (coa.data_provenance / adjudication) • flashPoint · canonical change (coa.data_provenance / adjudication) • vaporPressure · canonical change (coa.data_provenance / adjudication) • vaporDensity · canonical change (coa.data_provenance / adjudication) • specificGravity · canonical change (coa.data_provenance / adjudication) • solubility · canonical change (coa.data_provenance / adjudication) • evaporationRate · canonical change (coa.data_provenance / adjudication) • viscosity · canonical change (coa.data_provenance / adjudication) • 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) • oel_acgih_tlv · canonical change (coa.data_provenance / adjudication) • cercla_rq · canonical change (coa.data_provenance / adjudication)	canonical_change
1.5	2026-09-30	Canonical data updated: 1 field changed via the provenance/adjudication pipeline. • appearance · canonical change (coa.data_provenance / adjudication)	canonical_change
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: 4 fields changed via the provenance/adjudication pipeline. • hazardClass · canonical change (coa.data_provenance / adjudication) • packingGroup · canonical change (coa.data_provenance / adjudication) • signalWord · canonical change (coa.data_provenance / adjudication) • unNumber · canonical change (coa.data_provenance / adjudication)	canonical_change
1.2	2026-07-22	Canonical data updated: 1 field changed via the provenance/adjudication pipeline. • dotSubsidiaryHazardClass · canonical change (coa.data_provenance / adjudication)	canonical_change

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
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.