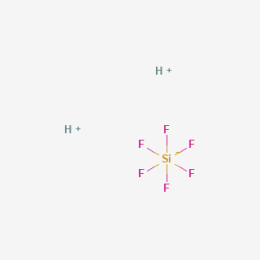
Technical Data Sheet

Hydrofluorosilicic Acid 23% (HFS)

Technical · 23% w/w

Alliance Code	Revised	Revision
hydrofluorosilicic-acid-23-hfs	2026-10-08	1.7

CAS number 16961-83-4	UN number UN1778	Hazard class · packing group 8 · PG II
 Structure · PubChem	Grade Technical · 23% w/w	Signal word **Danger**
Hazards Corrosive · Acute toxicity · H290 H302 H311 H314 H332		
Proper shipping name Fluorosilicic acid		

IDENTITY & COMPOSITION

PRODUCT NAME
Hydrofluorosilicic Acid 23% (HFS)

ALLIANCE CODE
hydrofluorosilicic-acid-23-hfs

GRADE
Technical

CONCENTRATION
23% w/w

CAS NUMBER
16961-83-4 PubChem

FORMULA
H2SiF6 Adjudicated

MOLECULAR WEIGHT
144.09 g/mol Adjudicated

PRODUCT TYPE
Solution

SPECIFICATIONS

TEST	SPECIFICATION	TYPICAL	METHOD	SOURCE
Assay (H2SiF6)	23.0 % w/w min.	—	—	Interpreted
Free acid (HF)	1.0 maximum %	—	—	Interpreted
Heavy Metals (as lead, Pb)	<0.02%	—	—	Interpreted
Suspended matter	clean and free of visible suspended matter	—	—	Interpreted
Arsenic (As)	10 mg/kg maximum	—	ICP-MS	Interpreted
Sulfate (SO4)	0.5 % maximum	—	Ion chromatography / gravimetric (BaSO4)	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	23% w/w	—	current
ACS Grade	23% w/w	—	hydrofluorosilicic-acid-23-acs

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	Colorless, fuming liquid	Adjudicated
Form	Liquid	Published reference
Color	water white to straw yellow	Interpreted
Odor	Pungent, acrid	Adjudicated
pH	Below 1 as supplied (strong acid); 1.5–2 as a 10% solution	Adjudicated
Specific Gravity	1.185–1.215 at 15.6 °C (water = 1)	Adjudicated
Density	1.19 g/cm^3 (23% w/w aqueous solution, 20 °C)	Published reference
Boiling Point	Approx. 106–108 °C (223–227 °F); decomposes	Adjudicated
Melting Point	-20 to -16 °C (-4 to 3 °F), freezing point (aqueous solution)	Adjudicated
Flash Point	Not applicable	Adjudicated
Vapor Pressure	17–24 mmHg at 20–25 °C	Adjudicated
Solubility (water)	Completely miscible with water	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

MATERIAL	RATING	CONDITIONS	SOURCE
polyethylene	Compatible	—	s3.amazonaws.com
cross-linked high-density polyethylene (with UV stabilizer)	Compatible	polyethylene must be high-density, cross-linked, with a minimum of 0.25 percent ultraviolet stabilizer	s3.amazonaws.com

MATERIAL	RATING	CONDITIONS	SOURCE
rubber-lined steel	Compatible	—	s3.amazonaws.com
glass	Not recommended	—	s3.amazonaws.com
ceramics	Not recommended	—	s3.amazonaws.com
steel (unlined)	Not recommended	—	s3.amazonaws.com
concrete	Not recommended	—	s3.amazonaws.com
wood	Not recommended	—	s3.amazonaws.com
rubber lining / saran	Compatible	source product is a 23-25 % H2SiF6 aqueous solution (TDS typical analysis 23.5 %)	cdn-contenu.quebec.ca
polyethylene shipping containers (vs. glass carboys)	Compatible	23-25 % H2SiF6 aqueous solution per the TDS typical analysis	cdn-contenu.quebec.ca
high-density, cross-linked polyethylene	Compatible	—	s3.amazonaws.com
unlined steel	Not recommended	—	s3.amazonaws.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

UN1778 49 CFR 172.101

HAZARD CLASS

8 Adjudicated

PACKING GROUP

II Adjudicated

PROPER SHIPPING NAME

Fluorosilicic acid Adjudicated

GHS / OSHA HCS 2024

SIGNAL WORD

Danger Adjudicated

H-CODES (HAZARD STATEMENTS)

H290, H302, H311, H314, H332 Adjudicated

P-CODES (PRECAUTIONARY STATEMENTS)

P234, P260, P262, P264, P270, P271, P280, P301+P330+P331, P303+P361+P353, P304+P340, P305+P351+P338, P310, P312, P321, P362, P363, P390, P405, P406, P501

Adjudicated

OCCUPATIONAL EXPOSURE LIMITS

OSHA PEL (29 CFR 1910.1000)

2.5 mg/m^3 TWA (F) Adjudicated

ACGIH TLV

2.5 mg/m^3 TWA (fluorides, as F); hydrogen fluoride 0.5 ppm TWA, 2 ppm ceiling (as F)

Adjudicated

NIOSH REL

2.5 mg/m^3 TWA (F) Adjudicated

NIOSH IDLH

250 mg/m^3 (F) Adjudicated

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

ACUTE TOXICOLOGY

LD_{50} ORAL (RAT)

125–430 mg/kg (fluorosilicic acid); product ATE about 390–500 mg/kg

Adjudicated

LD_{50} DERMAL (RABBIT)

Product ATE (dermal) about 375–500 mg/kg

Adjudicated

LC_{50} INHALATION

1.11 mg/L (fluorosilicic acid, 1 h); product ATE (mist) about 3.6–3.8 mg/L

Adjudicated

Acute toxicology values from SDS Section 11 or NIOSH RTECS.

APPLICATIONS

Fluoridation of public drinking water supplies (NSF/ANSI 60-certified, AWWA B703 water-treatment grade material)

cdn-contenu.quebec.ca

Dosed to a water supply to reach about one part per million total fluoride for reduction of tooth decay

cdn-contenu.quebec.ca

Fed undiluted into water with liquid-feeding devices and metering pumps in water treatment plants

s3.amazonaws.com

Raw material for the production of silicofluoride salts s3.amazonaws.com

Used in the ceramic, brewing, paint and metallurgical industries s3.amazonaws.com

Used as the principal raw material in the production of silicofluoride salts. s3.amazonaws.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 tightly closed polyethylene or other acid-resistant plastic containers — never glass or metal. Keep cool and ventilated, away from bases, metals and oxidizers, with corrosion-resistant secondary containment.

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

Metals (releases flammable hydrogen gas); glass, ceramics and stoneware (etched); bases and alkalis (violent reaction); strong oxidizers; concentrated acids (release hydrogen fluoride and silicon tetrafluoride).

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)

```
UN1778, Fluorosilicic acid, 8, PG II
```

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 2026-10-08 by Andre Taki, Chief Commercial Officer, DOT Hazmat–certified (49 CFR 172.704).

VERSION	DATE	CHANGE	TRIGGER
1.7	2026-10-08	Canonical data updated: 25 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) • formula · canonical change (coa.data_provenance / adjudication) • molecularWeight · 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) • pH · canonical change (coa.data_provenance / adjudication) • vaporPressure · canonical change (coa.data_provenance / adjudication) • specificGravity · canonical change (coa.data_provenance / adjudication) • solubility · canonical change (coa.data_provenance / adjudication) • flashPoint · canonical change (coa.data_provenance / adjudication) • boilingPoint · canonical change (coa.data_provenance / adjudication) • meltingPoint · canonical change (coa.data_provenance / adjudication) • decompositionTemperature · canonical change (coa.data_provenance / adjudication) • oel_acgih_tlv · canonical change (coa.data_provenance / adjudication) • oel_other · 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) • storage_precautions · canonical change (coa.data_provenance / adjudication) • rcra_waste_codes · canonical change (coa.data_provenance / adjudication) • cercla_rq · canonical change (coa.data_provenance / adjudication)	canonical_change
1.6	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

VERSION	DATE	CHANGE	TRIGGER
1.5	2026-10-05	Canonical data updated: 3 fields changed via the provenance/adjudication pipeline. • oel_osha_pel · canonical change (coa.data_provenance / adjudication) • oel_niosh_rel · canonical change (coa.data_provenance / adjudication) • oel_idlh · canonical change (coa.data_provenance / adjudication)	canonical_change
1.4	2026-09-30	Canonical data updated: 2 fields changed via the provenance/adjudication pipeline. • meltingPoint · canonical change (coa.data_provenance / adjudication) • appearance · canonical change (coa.data_provenance / adjudication)	canonical_change
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
1.1	2026-07-17	Canonical data re-verified: 6 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_h_codes · canonical adjudication / reground (coa.data_provenance) • hazard_p_codes · canonical adjudication / reground (coa.data_provenance) • hsCode · canonical adjudication / reground (coa.data_provenance) • physicalProperties · 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.