

## Technical Data Sheet (TDS)

### 1. Product Overview

- Product Name: Sodium Fluoride
- English Name: Sodium Fluoride
- CAS Number: 7681-49-4
- Formula: NaF
- Molecular Weight: 41.99 g/mol
- Product Characteristics: High-purity white crystalline powder, odorless, mildly alkaline, soluble in water. Fluoride ion provides strong mineralization and etching properties; used in water fluoridation, dental care and industrial surface treatment. Reacts with acids to release toxic HF gas, must be handled with care.

### 2. Technical Specifications

Item	Specification
Appearance	White to off-white crystalline powder/crystals
Purity (NaF)	≥ 98.0%
Moisture Content	≤ 0.5%
Fluoride (F <sup>-</sup> ) Content	45.0-46.5%
Chloride (Cl <sup>-</sup> )	≤ 0.05%
Sulfate (SO <sub>4</sub> <sup>2-</sup> )	≤ 0.05%
Heavy Metals (Pb)	≤ 5 ppm
Iron (Fe)	≤ 5 ppm
Insoluble Matter in Water	≤ 0.1%
pH Value (1% solution, 25°C)	8.0-9.5
Solubility (20°C)	≥ 4.0 g/100 mL (water)

### 3. Product Advantages

- **High purity:** Low impurity content, suitable for food/dental/industrial use.
- **Effective mineralization:** Fluoride ion strengthens tooth enamel (dental care) and prevents dental caries.
- **Strong etching:** Reacts with glass/metal oxides for surface etching and treatment.
- **Stable:** Long shelf life under dry, acid-free storage conditions.
- **Controllable:** Exact fluoride content for precise formulation (water fluoridation, toothpaste).

### 4. Application Fields

- **Dental Care:** Toothpaste, mouthwash additive (0.1-0.5% F<sup>-</sup>) – prevents dental caries, strengthens enamel.
- **Water Fluoridation:** Public water supply additive (0.7-1.2 mg/L F<sup>-</sup>) – community dental health improvement (per WHO/CDC standards).
- **Metal Surface Treatment:** Pickling agent for aluminum/steel, rust remover, electroplating bath additive (improves coating adhesion).
- **Glass Industry:** Glass etching agent (mix with acid), opal glass production, glass fiber manufacturing.



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- **Pesticides & Chemicals:** Intermediate for fluoride-containing pesticides, fungicides and fine chemicals.
- **Other:** Wood preservative, ceramic glaze additive, flux for metallurgy.

## 5. Usage Methods

- **Dental Toothpaste:** Add 0.2-0.3% NaF (0.1-0.15% F<sup>-</sup>) to toothpaste base; mix evenly (comply with national food and drug standards).
- **Water Fluoridation:** Prepare 1% stock solution; add to water supply to reach 0.7-1.2 mg/L F<sup>-</sup> (automatic dosing recommended).
- **Glass Etching:** Mix NaF with dilute hydrochloric acid (1:1 ratio); apply to glass surface for 5-10 minutes; rinse with water (use fume hood and PPE).
- **Metal Pickling:** Add 1-5% NaF to pickling solution (HCl/H<sub>2</sub>SO<sub>4</sub>); immerse metal parts for 3-10 minutes; rinse and dry.
- **Optimal Conditions:** Use in well-ventilated area; avoid mixing with concentrated acids; strictly control dosage (toxic if overused).

## 6. Packaging & Storage

- **Packaging:** 500 g/bottle (amber glass, sealed), 25 kg HDPE drums (inner plastic bag, sealed), 100 kg fiber drums (sealed).
- **Storage:** Cool, dry, well-ventilated warehouse ( $\leq 30^{\circ}\text{C}$ ); store in plastic/glass containers (avoid metal); keep tightly sealed to prevent moisture; separate from acids, food, beverages and animal feed (dedicated storage area).
- **Shelf Life:** 36 months (unopened, under specified conditions).
- **Transportation:** Class 6.1 toxic substance (UN1690); transport in sealed containers; avoid collision, acid contact and direct sunlight; label with hazard pictograms and warnings.

## 7. Safety & Protection

- **Strict PPE Required:** Wear nitrile gloves, chemical splash goggles, N95 dust mask and protective clothing for all operations.
- **No Ingestion/Inhalation:** Do not eat, drink or smoke in work area; wash hands thoroughly after handling.
- **Acid Contact Prohibition:** Do not mix with concentrated acids (releases toxic HF gas – use fume hood if necessary).
- **Emergency Preparedness:** Keep calcium gluconate (antidote) and eye wash station in work area; know emergency contact numbers.
- **Waste Disposal:** Do not discharge to environment; dispose as hazardous waste (per local regulations).

## 8. Quality Assurance

- Manufactured under ISO 9001 quality management system and GMP (for dental/food use).
- Each batch is strictly tested for purity, fluoride content and heavy metals; accompanied by a Certificate of Analysis (COA).
- Provide technical support for formulation (e.g., toothpaste, water fluoridation dosing) and safe operation.