

AlCl₃ (Aluminum Chloride)

Chemical formula: AlCl₃ **Common name:** Aluminum chloride **Molar mass:** 133.34 g/mol

Appearance: White to yellowish crystalline solid (anhydrous) or colorless solution (hydrated)

Density: 2.44 g/cm³ (anhydrous) **Melting point:** 192.4 °C (anhydrous, sublimates) **Boiling point:** 180 °C (decomposes)

Chemical Properties

- Highly hygroscopic — absorbs water from air and forms **AlCl₃·6H₂O**
- Acts as a **Lewis acid** — strong electron pair acceptor
- Forms covalent bonds in vapor/gas phase, but ionic in hydrated form
- Reacts violently with water, releasing heat and hydrochloric acid

Uses

- **Catalyst** in Friedel-Crafts alkylation and acylation reactions
- **Polymerization catalyst** in petrochemical industry
- Used in manufacture of **rubber, lubricants, dyes, and pharmaceuticals**
- Etching agent in **metallurgy and electronics**

Safety and Hazards

- **Corrosive** to skin, eyes, and mucous membranes
- Inhalation of fumes can cause respiratory tract irritation
- Reacts exothermically with water → handle with extreme care
- Store in **dry, airtight containers** away from moisture

Industrial Notes

- Commonly used in **anhydrous form** for organic synthesis
- Hydrated form (AlCl₃·6H₂O) is more stable but less reactive in catalytic applications
- In the presence of moisture, releases HCl fumes

References

- [PubChem: Aluminum Chloride](#)
- [ChemEurope: Aluminium Chloride](#)

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Last update: **2025/07/06 12:41**

