

Safety Recommendations for EID600

(Ultra-Fine Elemental Iron Powder, Particle Size: 1 nm – 12 μ m)

1. General Precautions

- Treat EID600 as a hazardous fine particulate.
- Store and handle in accordance with established nanomaterial and fine metal dust protocols.
- Restrict access to authorized personnel trained in chemical hygiene, nanomaterial safety, and fire prevention.
- Avoid generating dust clouds. Work in well-ventilated areas or fume hoods designed for fine powders.

2. Inhalation Hazards

Risk: Prolonged or repeated inhalation of iron dust can cause siderosis (iron accumulation in lungs). While typically non-fibrotic, it may impair lung clearance and increase susceptibility to other lung diseases.

Recommendations:

- Use NIOSH-approved respirators (P100 filters or equivalent).
- Implement local exhaust ventilation (LEV) with HEPA filters.
- Conduct air monitoring to ensure concentrations remain below OSHA PEL for iron oxide fumes/dust: 10 mg/m³ (total dust).
- Never use compressed air for cleaning work surfaces or clothing.

3. Dermal Exposure Hazards

Risk: Iron nanoparticles may adhere to skin. Penetration through intact skin is unlikely, but damaged skin (cuts, dermatitis) increases risk of penetration and localized toxicity due to oxidative stress.

Recommendations:

- Always wear nitrile gloves; latex gloves may not be adequate.
- Avoid handling with bare hands, especially if skin integrity is compromised.
- Wash exposed skin promptly with soap and water; 85–90% of nanoparticles can be removed this way.
- Do not use solvents or abrasive cleaners on skin.

4. Eye Exposure Hazards

Risk: Particles can cause mechanical irritation or embed in ocular tissue.

Recommendations:

- Wear ANSI-approved chemical safety goggles when handling powders.
- In case of exposure, rinse eyes immediately with copious amounts of water for at least 15 minutes and seek medical evaluation.

5. Ingestion Hazards

Risk: Accidental ingestion can occur from hand-to-mouth contact. Small quantities are unlikely to cause systemic toxicity, but chronic or significant intake may contribute to iron overload in susceptible individuals.

Recommendations:

- Prohibit eating, drinking, or smoking in handling areas.
- Wash hands thoroughly before meals and breaks.

6. Fire and Explosion Hazards

Risk: Fine iron dust is pyrophoric under certain conditions and may present a combustible dust explosion hazard. Nano- and micron-sized particles have high surface area and may ignite spontaneously in air when dispersed.

Recommendations:

- Prevent accumulation of dust on surfaces.
- Eliminate ignition sources (sparks, flames, static discharge).
- Ground and bond all equipment to prevent electrostatic buildup.
- Store in inert atmosphere or sealed containers when possible.
- Use Class D fire extinguishers (dry powder type, e.g., graphite, sodium chloride) for fires; do not use water or CO₂.

7. Environmental Considerations

Risk: Iron dust can enter soil and water, altering local chemistry and potentially causing ecological stress (oxidative and pH effects).

Recommendations:

- Prevent uncontrolled releases.
- Collect spills with HEPA vacuum or wet wiping (never dry sweeping).
- Dispose of waste according to local hazardous waste regulations.

8. Medical Monitoring

- Workers with chronic exposure should undergo periodic medical evaluations, including pulmonary function tests and serum ferritin levels.

- Individuals with hemochromatosis or iron metabolism disorders should not be assigned to work with ultrafine iron powders.

9. Emergency Measures

- Spills: Isolate area, shut off ignition sources, and clean with HEPA-filtered vacuum or wet wiping.
- Skin contact: Wash thoroughly with soap and water.
- Eye contact: Rinse immediately for at least 15 minutes, seek medical attention.
- Inhalation: Move to fresh air, provide oxygen if necessary, seek medical care.
- Ingestion: Rinse mouth, do not induce vomiting, seek medical attention.

References & Bibliography

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2. IARC. Iron and Iron Oxides. IARC Monographs, Vol. 118 (2017).
3. OSHA PELs, 29 CFR 1910.1000 – Table Z-1.
4. PubMed ID: 28426382. Fate of 20–30 nm iron oxide nanoparticles on human skin.
5. Panosyan H, et al. Nanoparticles and human skin penetration. PMC2835875.
6. Larese Filon F, et al. In vitro percutaneous absorption of iron oxide nanoparticles. J Nanobiotechnology (2017).
7. NFPA 484: Standard for Combustible Metals.
8. Maynard A, Kuempel E. Airborne nanostructured particles and occupational health. J Nanoparticle Res (2005).
9. NIOSH. Current Intelligence Bulletin 63: Occupational Exposure to Titanium Dioxide and Fine Particles.
10. WHO. Health effects of dietary and supplementary iron. Technical Report, 2003.

Personal Protective Equipment (PPE) Icons

The following pictograms illustrate the recommended PPE for handling EID600:

		
Gloves (Nitrile)	Safety Goggles	Respirator (P100)
		
Protective Clothing	No Eating/Drinking	Combustible Dust Warning