Exotic Inorganics Research Material Safety Brief (RMSB)

Material: Han Blue (Barium Copper Silicate). No standard or regulatory compliance asserted.

Prepared by Exotic Inorganics LLC.

Toxicological Status

Compound-specific toxicological analysis (acute/chronic, inhalation, dermal, ingestion, other) **has not been performed for this material as supplied by EI.**

 Dust irritation / nuisance particulate  Prevent environmental release

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1. Document Control

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Purpose & Scope

This document is a best-effort **Research Material Safety Brief (RMSB)** prepared informationally in the absence of a widely accepted standard. It is **not** an OSHA-compliant SDS at time of publication. The data supplied below represents the good-faith understanding of Exotic Inorganics LLC at the time of publication and is not a substitute for adequate analysis under compelling standards or regulatory regimes.

2. Material Identification

Material Name	Han Blue (barium copper silicate pigment)
Synonyms / Trade Names	Chinese Blue; Han Dynasty Blue; copper barium silicate pigment
Composition (nominal)	Barium copper tetrasilicate: **$BaCuSi_4O_{10}$**
Alt. description in analog SDS	"Ceramic pigment, copper barium silicate, $CuOBaO_4SiO_2$"
CAS / EC No.	Unable to affirm.
Form	Micron-scale inorganic powder
Color / Appearance	Blue powder, odorless
Intended Use	Research material (R&D, characterization, prototyping)

BLUF: Insoluble ceramic pigment; primary hazard is particulate exposure (dust), with composition-driven cautions under aggressive chemical conditions.

3. Composition / Information on Components

Best-known composition:

- Primary phase: Han Blue ($BaCuSi_4O_{10}$)
- Expected minor constituents (batch-dependent): residual silicates / glassy frit fraction; trace metal oxides (process-derived)
- Water solubility (analog SDS): **insoluble**

Practical implication: Insolubility lowers immediate systemic uptake risk relative to soluble Ba/Cu salts, but does **not** remove risk from inhalation of respirable particulates, long-term exposure, or chemical processing that increases bioavailability (e.g., strong acids).

4. Hazard Identification

Analog SDS summary (Han Blue pigment)

A widely used EU-format MSDS for Han Blue pigment (Kremer Pigmente, 2012) states the product **does not require classification and labeling as hazardous under CLP/GHS**, and notes: avoid dust formation; dust may cause **mechanical eye irritation**; provide adequate ventilation; and use respiratory protection if dust forms.

EI Hazard Posture:

- **Inhalation (primary):** treat as a potentially harmful particulate. Minimize respirable dust. Avoid chronic exposure.
- **Eyes/skin:** dust can cause mechanical irritation. Wash after handling; avoid rubbing eyes.
- **Ingestion:** avoid hand-to-mouth transfer; treat as potentially harmful if swallowed.
- **Chemical escalation:** strong acids/bases may increase dissolution/leaching of barium/copper species; avoid unnecessary acid contact.
- **Thermal processing escalation:** high-temperature operations can generate hazardous airborne particulates (hot dust/smoke) depending on binders/contaminants; use locally compliant exhaust.

Routes of exposure: inhalation (dust/aerosols), eye contact, skin contact, ingestion.

High-risk operations ("dust escalators"):

- Dry milling, grinding, aggressive sieving, brushing, compressed air cleanup.
- Ultrasonic dispersion or spray application that can aerosolize fine solids.
- Cleanup of dry residues without wet methods or HEPA vacuum.

5. First Aid Measures

- **Inhalation:** Move to fresh air. If symptoms persist (coughing, wheeze, shortness of breath), seek medical attention.
- **Eye contact:** Rinse cautiously with water for several minutes. Remove contacts if present and able. Seek care if irritation persists.
- **Skin contact:** Wash with soap and water. Remove contaminated clothing; launder before reuse.
- **Ingestion:** Rinse mouth. Do **not** induce vomiting. Seek medical advice if unwell; provide this RMSB.

6. Firefighting Measures

Han Blue (ceramic pigment) is not combustible. Packaging and any organic binders/vehicles may burn.

- **Suitable extinguishing media:** as appropriate for surrounding fire.
- **Specific hazards:** avoid inhalation of smoke/fumes and airborne particulates in a fire.
- **Protective equipment:** firefighters should wear SCBA.

7. Unplanned Rapid Release Measures

Principle: prevent dust generation and environmental release.

- Restrict area; wear PPE (Section 9).
- Avoid dry sweeping or compressed air.
- Prefer wet cleanup methods: lightly mist compatible solvent (water or IPA) to suppress dust, then wipe.
- HEPA vacuum preferred for dry particulate collection.
- Collect waste into labeled container for appropriate disposal (Section 14).

8. Handling and Storage

Handling:

- Use local exhaust ventilation or a fume hood for powders.
- Use wet methods where feasible; keep containers closed.
- Do not eat/drink/smoke in work area; wash hands after handling.
- Minimize grinding/milling; treat as high-dust work and upgrade controls.

Storage:

- Store in tightly sealed containers in a cool, dry place.
- Secondary containment recommended.
- Segregate from strong acids/bases.
- Store away from living quarters, food preparation and storage areas, and recreational facilities.

9. Exposure Controls / Personal Protection

Engineering controls:

- **Local exhaust ventilation (LEV)** or fume hood for weighing, transfers, and cleanup.
- **HEPA vacuum housekeeping:** use a dedicated HEPA-rated vacuum for ceramic dust; avoid shop-vacs and household vacuums without HEPA filtration.
- **Filter discipline:** treat prefilters/HEPA cartridges as contaminated consumables; bag, label, and dispose appropriately.
- **If using enclosures/gloveboxes:** maintain slight negative pressure relative to room; filter any exhaust through HEPA.
- **No compressed-air cleaning** of pigment dust on benches, tools, or clothing.

Exposure limits (not medical advice):

- **General dust limit suggested by analog Han Blue MSDS):** 4 mg/m^3 inhalable fraction (DE "general dust limit").
- **Copper dusts/mists (as Cu):** OSHA PEL 1 mg/m^3 TWA for copper dusts/mists. (not fume)
- **Barium, soluble compounds (as Ba):** OSHA PEL 0.5 mg/m^3 TWA.

PPE & Hygiene Suggestions:

- **Respiratory:** N95 minimum for low dust; **P100 elastomeric** for weighing, transfers, milling/sieving, or unknown dustiness.
- **Eye:** safety glasses; goggles for high-dust work.
- **Hands:** nitrile gloves; change frequently to prevent cross-contamination.
- **Body:** lab coat; consider disposable sleeves/cover garments for dusty operations.
- **Hygiene:** HEPA vacuum + wet wipe; avoid tracking dust outside the work area. Treat cleaning wipes and PPE as chemical waste if visibly contaminated.

10. Physical and Chemical Properties

Property	Value / Notes
Appearance	Blue powder
Odor	None reported (odorless)
Water solubility	Insoluble (analog SDS)
Melting/boiling	Not applicable / not determined for pigment powder
Flammability	Not combustible (pigment itself)
Dustiness	Treat as dust-forming

11. Stability and Reactivity

- **Stability:** stable under normal storage/handling as an inorganic ceramic pigment per analog SDS.
- **Conditions to avoid:** unnecessary dust generation; uncontrolled heating of contaminated mixtures.
- **Incompatibilities (conservative, practical):**
  - **Strong acids** (e.g., HCl, HNO_3, H_2SO_4): may increase leaching/dissolution of Ba/Cu species and increase bioavailability.
  - **Strong bases** (concentrated alkali solutions): may attack silicate surfaces over time..
  - **Fluoride-containing acids / HF / ammonium bifluoride:** may attack silicate lattices aggressively.
  - **Reactive fluorinating agents** (general lab precaution): incompatible with many inorganics.
- **Hazardous decomposition products:** thermal and mechanical processing may generate airborne particulates—control exposure.

12. Toxicological Information (Limited / Inference-Based)

Status: No acute toxicity data on the product is reported in the commonly cited Han Blue pigment MSDS; eye irritation is described as **mechanical irritation from dust**. Respiratory guidance emphasizes **avoid inhalation of dust**.

General Risk Notes:

- Chronic effects from long-term exposure to insoluble inorganic particulates can be non-trivial even when materials are not formally classified as hazardous.
- Presence of barium and copper in an insoluble lattice is generally less concerning than soluble salts, but chemical processing (especially acids) can increase bioavailability.
- Assume particle size is submicron.

Recommendation: treat as a potentially harmful particulate; minimize airborne dust; prefer wet methods; treat milling/sieving operations as high-risk.

13. Ecological Information (Precautionary)

Avoid release to the environment. Aquatic toxicity for the insoluble pigment lattice is unlikely but unstudied , uncontrolled release of fine particulates is poor practice and may contribute to metal loading in sediments. Prevent entry into drains.

14. Disposal Considerations

Dispose as chemical waste according to local regulations.

- Treat as **inorganic pigment waste** and do not dispose to drains.
- For contaminated wipes/filters: bag and label as pigment-contaminated waste.
- If material has been or is suspected to have been exposed to strong acids/bases during processing, dispose under a conservative hazardous waste stream (heavy-metal-containing).

15. Transport Information

Analog Han Blue pigment MSDS indicates: not classified as dangerous goods under transport regulations (for that supplier/product). Confirm requirements for your jurisdiction and your specific packaging/quantity.

16. Regulatory Information (Not Legal Advice)

- Many retail/artist-market Han Blue pigments are distributed with EU-format MSDS documents that state **no CLP/GHS classification required**.
- This RMSB is **not** a substitute for jurisdiction-specific regulatory determinations.
- Obtain professional EHS review and complete a compliant SDS/labeling package prior to consumer distribution.

17. References / Basis of Assessment

- Kremer Pigmente MSDS: *10071 – HAN-Blue Fine, 0–40 µ* (REACH format, revised 01.04.2012). (Public mirror) labshop.nl/wp-content/uploads/2019/06/10071_SHD_ENG.pdf
- OSHA Chemical Data (exposure reference): Copper, dusts & mists (as Cu), 1 mg/m^3 TWA. osha.gov/chemicaldata/1030
- ATSDR ToxFAQs (exposure reference): OSHA PEL for soluble barium compounds 0.5 mg/m^3 TWA. cdc.gov ToxFAQs: Barium

18. Disclaimer

This Research Material Safety Brief (RMSB) is provided by Exotic Inorganics LLC as a best-effort, conservative handling guide for barium copper silicate. Information is based on publicly available analog SDS documents, general industrial hygiene practice for particulates, and composition-driven

hazard reasoning. No warranty is made regarding completeness or applicability to any or all operational conditions. Users are responsible for conducting their own risk assessment, implementing appropriate controls, and complying with all applicable laws and regulations.

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