Material Safety Data Sheet
FOR INDUSTRIAL USE ONLY

Super F® H15E9

Revision Date 19-OCT-2012

1. Product and company identification

<table>
<thead>
<tr>
<th>Product name</th>
<th>Super F® H15E9</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSDS Number</td>
<td>000000101807</td>
</tr>
<tr>
<td>Product Type</td>
<td>Resin Coated Sand</td>
</tr>
<tr>
<td>Product use</td>
<td>Foundry Core and Mold/Mould Applications</td>
</tr>
<tr>
<td>Manufacturer, Importer,</td>
<td>HA International, LLC</td>
</tr>
<tr>
<td>Supplier</td>
<td>630 Oakmont Lane</td>
</tr>
<tr>
<td></td>
<td>Westmont, IL 60559</td>
</tr>
<tr>
<td>Print date</td>
<td>20-OCT-2012</td>
</tr>
<tr>
<td>Telephone</td>
<td>For Emergency Medical Assistance</td>
</tr>
<tr>
<td></td>
<td>Call Health &amp; Safety Information Services, 1-866-303-6949</td>
</tr>
<tr>
<td></td>
<td>For Emergency Transportation Information</td>
</tr>
<tr>
<td></td>
<td>CHEMTREC US Domestic (800) 424-9300</td>
</tr>
<tr>
<td></td>
<td>CHEMTREC International (703) 527-3887</td>
</tr>
<tr>
<td></td>
<td>CANUTEC CA Domestic (613) 996-6666</td>
</tr>
<tr>
<td></td>
<td>For additional health and safety or regulatory information, call (630)575-5722, or (630)575-5705.</td>
</tr>
</tbody>
</table>

2. Hazards identification

<table>
<thead>
<tr>
<th>Form</th>
<th>Free flowing granules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor</td>
<td>Odorless/Odourless</td>
</tr>
<tr>
<td>OSHA/HCS status</td>
<td>This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).</td>
</tr>
<tr>
<td>Emergency overview</td>
<td>CAUTION! THIS PRODUCT IS COATED WITH A PHENOLIC RESIN WHICH MAY ABRADE DURING HANDLING OR MECHANICAL CONVEYANCE GENERATING ORGANIC DUST. WHEN HANDLING OR CONVEYING IN ENCLOSED SPACES, ANY ABRADED PHENOLIC RESIN DUST FROM THIS PRODUCT CAN BE COMBUSTIBLE AND MAY PRESENT A FIRE OR EXPLOSION HAZARD WHEN DISPERSED AND IGNITED IN AIR. MAY CAUSE RESPIRATORY TRACT IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.</td>
</tr>
</tbody>
</table>

Potential acute health effects
Inhalation
Slightly irritating to the respiratory system.

Ingestion
Not expected to be harmful under normal conditions of use.

Skin
May cause irritation on prolonged or repeated contact.

Eyes
Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

Potential chronic health effects

Chronic effects
Contains material that can cause target organ damage. Can cause fibrotic lung disease.

Inhalation of silica dust may cause delayed lung injury or lung fibrosis (including silicosis and/or pneumoconiosis) and/or other diseases which may lead to permanent disability and/or death. Silicosis is a form of disabling pulmonary fibrosis which can be progressive. Prolonged exposure to respirable silica may cause diminished lung capacity with shortness of breath during physical exertion and may cause fatigue, breathlessness, wheezing, cough, and sputum production. Preexisting respiratory disorders may be aggravated by exposure. Smoking may aggravate the effects of exposure and may increase the risk of developing respiratory disease from exposure. Consult with your employer and your doctor for further information or if you believe you may be developing any breathing or lung problems. There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifest by fibrosis of the lungs, skin and other internal organs) and kidney disease. Silicosis is also reported to increase the risk of tuberculosis. Some studies show an increased incidence in chronic bronchitis and emphysema in workers exposed to respirable crystalline silica.

Carcinogenicity
Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity
No known significant effects or critical hazards.

Teratogenicity
No known significant effects or critical hazards.

Developmental effects
No known significant effects or critical hazards.

Fertility effects
No known significant effects or critical hazards.

Target organs
Contains material which causes damage to the following organs: kidneys, lungs, immune system, skin, eye, lens or cornea Review Section 2 and 11 for any additional assessments.

Note: Residual formaldehyde gas may be released from this product during processing. The amount and level will depend on local conditions of use. Formaldehyde gas is irritating to the eyes and upper respiratory tract and may aggravate existing respiratory conditions or allergies. OSHA has listed formaldehyde as a potential human carcinogen. See the OSHA formaldehyde standard 29 CFR 1910.1048 for further details. The International Agency for Research on Cancer (IARC) has classified formaldehyde as carcinogenic to humans. Product contains traces of hexamethylenetetramine which may cause allergic skin and respiratory reactions.

Over-exposure signs/symptoms

Inhalation
Adverse symptoms may include the following: respiratory tract irritation, coughing,
Ingestion: No specific data.

Skin: No specific data.

Eyes: No specific data.

Medical conditions aggravated by over-exposure: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See section 11 for more detailed information on health effects and symptoms.

### 3. Composition/Information on ingredients

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>CAS number</th>
<th>WT %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartz (SiO2)</td>
<td>14808-60-7</td>
<td>70.0% - 100.0%</td>
</tr>
</tbody>
</table>

** Any applicable Canadian trade secret numbers will be listed in Section 15.

### 4. First aid measures

**Eye contact:** Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

**Skin contact:** Wash contaminated skin with soap and water. Get medical attention if symptoms occur.

**Inhalation:** Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention if symptoms occur.

**Ingestion:** Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms occur.

**Protection of first aid personnel:** If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

**Notes to physician:** No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See section 11 for more detailed information on health effects and symptoms.

### 5. Fire-fighting measures

**Flammability of the product:** Fine dust clouds may form explosive mixtures with air.

**Extinguishing media Suitable:** Use water.

**Special exposure hazards:** Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Hazardous combustion products:** Decomposition products may include the following materials: carbon monoxide, carbon dioxide, soot, smoke, aromatic compounds including benzo[a]pyrene, irritating and toxic fumes and gases.
Special protective equipment for fire-fighters

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special Remarks on Explosion Hazards

This product is coated with a phenolic resin. The phenolic resin surface may abrade during handling or mechanical conveyance. Such abrasion may allow dispersion of organic dust. When handling or conveying in enclosed spaces, any abraded phenolic resin dust from this product can be combustible and may present a fire or explosion hazard when dispersed and ignited in air.

6. Accidental release measures

Personal precautions

No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8 of SDS). During clean-up minimise the creation and distribution of dust.

Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Large spill

Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor. Note: see section 1 of SDS for emergency contact information and section 13 of SDS for waste disposal.

Small spill

Move containers from spill area. Vacuum material and place in a designated, labelled waste container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling

Put on appropriate personal protective equipment (see section 8 of SDS). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Avoid creating dust. Empty containers retain product residue and can be hazardous. Do not reuse container.

This product is coated with a phenolic resin. The phenolic resin surface may abrade during handling or mechanical conveyance. Such abrasion may allow dispersion of organic dust. Take precautionary measures, such as capturing dust at generation points, practicing good housekeeping, controlling sources of ignition (including static electricity), and grounding equipment, to minimize dust accumulation, airborne dust, and static discharges during handling and/or conveyance as instructed.
in NFPA Pamphlet No. 654, "Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids," UK HSE Guidance HSG 103, approved Codes of Practice (ACOPS) established for Explosive Atmospheres under the ATEX Directive 1999/92/EC for worker protection and ATEX Directive 94/9/EC that regulates equipment and protection systems used in potentially explosive atmospheres or other national guidance on safe handling of combustible dusts.

Storage

Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10 of SDS) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Occupational exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartz (SiO2)</td>
<td></td>
</tr>
<tr>
<td>ACGIH TLV Time Weighted Average (TWA)</td>
<td>0.025 mg/m3 (respirable fraction)</td>
</tr>
<tr>
<td>OSHA PEL Z3 Time Weighted Average (TWA)</td>
<td>10 mg/m3 (divided by %SiO2+2, respirable)</td>
</tr>
<tr>
<td>OSHA PEL Z3 Time Weighted Average (TWA)</td>
<td>30 mg/m3 (divided by %SiO2+2, total dust)</td>
</tr>
</tbody>
</table>

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures

Review ASTM E 1132-99, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica," as well as other guidelines such as NIOSH publications.

Engineering measures

Avoid creating dust. If airborne contaminants are generated when the material is heated, handled, or transported, appropriate administrative and engineering controls, including sufficient ventilation in volume and air flow patterns, should be provided to keep air contaminant concentration levels below acceptable criteria. Minimize the collection (build-up) of dust on walls, floors, sills, ledges, machinery, or equipment. Work clothes should be changed daily and washed to prevent dust contact. These techniques may not necessarily address all issues pertaining to your operation. We, therefore, recommend that you consult with experts of your choice to determine whether or not your programs are adequate. Consult OSHA, state/provincial and local laws, and regulations.

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Respiratory

Use a properly fitted, air-purifying or air-fed respirator complying with an
approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

**Hands**
Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

**Eyes**
Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

**Skin**
Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Environmental exposure controls**
Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### 9. Physical and chemical properties

#### Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td></td>
</tr>
<tr>
<td>Physical state</td>
<td>Free flowing granules</td>
</tr>
<tr>
<td>Color</td>
<td>Tan.</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless/Odourless</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Boiling point</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Flash point</td>
<td>Non-flammable.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Flammable limits</td>
<td></td>
</tr>
<tr>
<td>Upper:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Lower:</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Relative density</td>
<td>Approx. 2.65</td>
</tr>
<tr>
<td>Solubility</td>
<td>Slightly</td>
</tr>
<tr>
<td>Partition coefficient:</td>
<td></td>
</tr>
<tr>
<td>n-octanol/water</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Kinematic-Not available</td>
</tr>
<tr>
<td></td>
<td>Dynamic- Not applicable.</td>
</tr>
<tr>
<td>Typical % solids</td>
<td>Not available</td>
</tr>
</tbody>
</table>

#### Other information
Not applicable.

### 10. Stability and reactivity

**Reactivity**
Stable under normal conditions.
Stability
The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.

Conditions to avoid
Prevent dust accumulation.

Materials to avoid
Reactive or incompatible with the following materials: Powerful oxidizing agents such as fluorine, chlorine trifluoride, manganese trioxide.

Other hazards
Core and mold production operations may yield formaldehyde and ammonia vapors through the decomposition of hexamethylenetetramine. Phenol vapors may also be generated during core production operations. Hazardous airborne concentrations of crystalline silica may be generated during shakeout operations, and during casting cleaning and grinding operations.

Hazardous decomposition products
Hazardous emissions are normally generated when cores or molds are exposed to molten metal during pouring, cooling and shakeout operations through the partial combustion and/or pyrolysis of the binder system and other components of the mold package. These emissions may potentially include but are not limited to carbon monoxide, carbon dioxide, benzene, aldehydes including formaldehyde, phenol, hydrogen cyanide, ammonia, and a wide variety of organic compounds including benzoa pyrene. Oxygen may be deficient in pouring, cooling and shakeout areas. Hazardous particulate matter is also normally generated in pouring, cooling and shakeout operations including, but not limited to smoke, soot, polycyclic organic compounds, particulates, nitrogen oxides and crystalline silica.

11. Toxicological information

Carcinogenicity

<table>
<thead>
<tr>
<th>Ingredient name</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartz (SiO2)</td>
<td>ACGIH: Suspected human carcinogen.</td>
</tr>
<tr>
<td></td>
<td>IARC: IARC Group 1, carcinogenic to humans</td>
</tr>
<tr>
<td></td>
<td>NTP: Proven.</td>
</tr>
<tr>
<td></td>
<td>OSHA: Not classified</td>
</tr>
</tbody>
</table>

12. Ecological information

Environmental effects
No known significant effects or critical hazards.

Other adverse effects
No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal
The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of
environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

14. Transport information

The data provided in this section is for information only and may not be specific to your package size or mode of transport. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

<table>
<thead>
<tr>
<th>International transport regulations</th>
<th>UN/NA number</th>
<th>Proper shipping name</th>
<th>Classes/*PG</th>
<th>Reportable Quantity (RQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory information</td>
<td></td>
<td></td>
<td>Non-regulated</td>
<td></td>
</tr>
<tr>
<td>CFR</td>
<td></td>
<td></td>
<td>Non-regulated</td>
<td></td>
</tr>
<tr>
<td>TDG</td>
<td></td>
<td></td>
<td>Non-regulated</td>
<td></td>
</tr>
<tr>
<td>IMO/IMDG</td>
<td></td>
<td></td>
<td>Non-regulated</td>
<td></td>
</tr>
<tr>
<td>IATA (Cargo)</td>
<td></td>
<td></td>
<td>Non-regulated</td>
<td></td>
</tr>
</tbody>
</table>

*PG : Packing group

15. Regulatory information

US regulations
HCS Classification Carcinogen, Target organ effects

U.S. Federal regulations
SARA 311/312 Classification Immediate (acute) health hazard, Delayed (chronic) health hazard

SARA 313 - Supplier Notification
This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.
None required.

SARA 302 Extremely Hazardous Substances None required.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants The following components are listed: Formaldehyde,

State regulations
Massachusetts RTK Substances The following components are listed: Quartz (SiO2),

New Jersey RTK Hazardous Substances The following components are listed: Quartz (SiO2),

Pennsylvania RTK Hazardous Substances The following components are listed: Quartz (SiO2),

California Prop. 65: WARNING: This product contains a chemical known to the State of California to cause cancer. Quartz (SiO2) - 14808-60-7, Formaldehyde - 50-00-0,

Canada
WHMIS (Canada) Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists Canadian NPRI: None required.
**International regulations**

**Chemical inventories**

- Australia inventory (AICS) All components are listed or exempted.
- Canada inventory All components are listed or exempted.
- Japan inventory All components are listed or exempted.
- China inventory (IECSC) All components are listed or exempted.
- Korea inventory All components are listed or exempted.
- New Zealand Inventory (NZIoC) Not determined.
- Philippines inventory (PICCS) All components are listed or exempted.
- United States inventory (TSCA 8b) All components are listed or exempted.

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**16. Other information**

**Hazardous Material Information System III (U.S.A.)**

- Health: 1
- Flammability: 0
- Physical hazards: 0
- Chronic: *

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

Prepared by: Product Safety & Compliance Group, (630) 575-5722, or (630) 575-5705

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Version: 5.0

Notice to reader:

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