1. IDENTIFICATION OF SUBSTANCE / PREPARATION AND OF THE COMPANY

Product Name	**Certified by Technical Association of Refractories, Japan Standard Reference Materials for XRF Analysis Fire clay refractories Series (Class II) JRRM120Series(121,122,123,124,125,126,127,128,129,130,131,132,133,134,135) 15 piece/set**
Manufacturer	**The Technical Association of Refractories, Japan**
Address	**New Ginza Bldg.,7-3-13,Ginza,Chuo-ku,Tokyo 104-0061, Japan**
Phone number	**+81-3-3572-0705**
Fax number	**+81-3-3572-0175**
Distributer	**SEISHIN TRADING CO., LTD.**
Address	**1-4-4, Minatojima-Minamimachi, Chuo-ku, Kobe 650-0047, Japan**
Phone number	**+81-78-303-3810**
Fax number	**+81-78-303-3822**
Emergency phone number	**+81-3-3572-0705**
E-mail	**taigikyou@tarj.org**
Recommended use of the chemical and restriction on use	**This material is used as standard material for calibration curve, standardized sample, sample for analytical accuracy test etc in X-ray fluorescence analysis. This series of standard substances was manufactured for fluorescent X-ray analysis by the glass bead method. When using this product under other uses or under special conditions, please be evaluated and take the best safety measures under your own responsibility.**

2. HAZARDS IDENTIFICATION

GHS classification

Physical Hazards	**Flammable solids**	**Not classified**
	Pyrophoric solids	**Not classified**
	Self-heating substances and mixtures	**Not classified**
	Substances and mixtures, which in contact with water, emit flammable gases	**Not classified**
	Oxidizing solids	**Not classified**
Health Hazards	**Acute toxicity (oral)**	**Not classified**
	Acute toxicity (dermal)	**Not classified**
	Acute toxicity (inhalation: dust, mist)	**Not classified**
	Skin corrosion/irritation	**Not classified**
	Serious eye damage/eye irritation	**Category 1**
	Skin/Respiratory sensitizer	**Category 1**
	Germ cell mutagenicity	**Not classified**
	Carcinogenicity	**Category 1A**

2. HAZARDS IDENTIFICATION

	Specific target organ systemic toxicity (single exposure)	Category 1(respiratory system) Category 3(respiratory tract irritation)
	Specific target organ systemic toxicity (repeated exposure)	Category 1(respiratory system, kidney and lung)
Environmental Hazards	Acute hazards to the aquatic environment	Category 3
	Chronic hazards to the aquatic environment	Category 3

*** Unstated information is either 'classification not possible or 'not applicable'**

Pictogram or Symbol

Signal word	**Danger**
Hazard Statement	**H317: May cause an allergic skin reaction**
	H318: Causes serious eye damage
	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
	H335: May cause respiratory irritation
	H350: May cause cancer
	H370: Causes damage to respiratory system
	H372: Causes damage to respiratory system, kidney and lung through prolonged or repeated exposure
	H412: Harmful to aquatic life with long lasting effects
<Prevention>	**P201: Obtain special instructions before use.**
	P202: Do not handle until all safety precautions have been read and understood.
	P260: Do not breathe dust/fume/gas/mist/vapours/spray.
	P264: Wash hands thoroughly after handling.
	P270: Do not eat, drink or smoke when using this product.
	P271: Use only outdoors or in a well-ventilated area.
	P272: Contaminated work clothing should not be allowed out of the workplace.
	P273: Avoid release to the environment.
	P280: Wear protective gloves/protective clothing/eye protection/face protection.
	P284: [In case of inadequate ventilation] wear respiratory protection.
<Response>	**P302+P352: IF ON SKIN: Wash with plenty of water/...**

2. HAZARDS IDENTIFICATION

P304+P340: IF INHALED: Remove person to fresh air and comfortable for breathing.

P305+P351+P338: IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308+P313: IF exposed or concerned: Get medical advice/attention.

P314: Get Medical advice/attention if you feel unwell.

P333+P313: If skin irritation or a rash occurs: Get medical advice/attention.

P337+P313: IF eye irritation persists: Get medical advice/attention.

P342+P311: If experiencing respiratory symptoms: Call a POISON CENTER/doctor/...

P362+P364: Take off contaminated clothing and wash it before reuse.

<Storage> **P403+P233: Store in a well ventilated place. Keep container tightly closed.**

P405: Store locked up.

<Disposal> **P501: Dispose of contents/container to in accordance with local regulations and statutory provisions.**

3. COMPOSITION / INFORMATION ON INGREDIENTS

Substance/Mixture **Mixture**

Chemical identity	CAS-No	Concentration (%)	EC-No	Hazard statement Codes
Cristobalite	14464-46-1	37 - 87	238-455-4	H350, H370, H372
Aluminium oxide	1344-28-1	6 - 49	215-691-6	H335, H372
Diiron trioxide	1309-37-1	0.2 – 4.5	215-168-2	H315, H318, H335, H372
Titan oxide	13463-67-7	0.05 – 3.4	236-675-5	H320, H335, H372
Calcium oxide	1305-78-8	0.1 – 2.9	215-138-9	H315, H318, H370, H372
Chromium(III) oxide	1308-38-9	0.01-1.3	215-160-9	H334, H317, H410
Zirconium(IV) oxide	1314-23-4	0.00-1.2	215-227-2	H317

The type (chemical formula) of the crystal in the standard substance (15 species) was identified by X-ray diffraction method. Silicon oxide (IV) which is a main component is composed of quartz, cristobalite, tridymite, amorphous silica. Aluminum oxide exists as corundum. They are present together with other components as the below crystal. That is, cordierite [chemical formula of crystal $Mg_2Al_4Si_5O_{18}$], mullite [chemical formula of crystal Al_6SiO_{13}], spinel [chemical formula of crystal $MgAl_2O_4$], indialite [chemical formula of crystal $Mg_2Al_4Si_5O_{18}$], anorthite [chemical formula of crystal $(Ca,Na)(Al,Si)_2Si_2O_8$], ferrian [crystal formula $Mg(Al,Fe)_2O_4$]. Rutile [crystal formula TiO_2], hematite [crystal formula Fe_2O_3] and eskolaite [chemical formula of crystal Cr_2O_3] are present as crystals of other components. Besides this, it is pointed out that the existence of sanidine [chemical formula of crystal $(K,Na)(Si_3Al)O_8$] and Pseudorutile [crystal formula $Fe_2(TiO_3)_3$] exists. Here, CaO and $Ca(OH)_2$, ZrO_2 which are dangerous and hazardous have not been detected.

4. FIRST AID MEASURES

4. FIRST AID MEASURES

If inhaled:	**If inhaled plenty of dust, immediately remove victim to fresh air. If the victim shows breathing abnormality, immediately get medical advice/attention.**
If on skin:	**Wash with soap and water.**
If in eyes:	**If dust contact with eyes, immediately rinse with clean water or eyewash. If abnormality persists, get medical advice/attention.**
If swallowed:	**Rinse mouth with water. Immediately get medical advice/attention.**

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	**The product is not flammable. Use extinguishing media appropriate to surrounding fire conditions.**
Unsuitable extinguishing media:	**No information**
Specific hazards arising from the chemical:	**Nothing particular**
Special precautions for fire-fighters:	**Nothing particular**
Firefighters equipment:	**Firefighters should wear proper protective equipment.**

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:	**Avoid raising dust during a process and recover it. Wear proper protective equipment and avoid contacting dust with eyes and skin and inhaling dust.**
Environmental precautions:	**Nothing particular**

7. HANDLING & STORAGE

Advice on safe handling:	**Wear a dust respirator, safety glasses and so one, as appropriate. Avoid collapse and dropping of the goods.**
Storage conditions:	**Store indoors, way from water.**

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

ACGIH	**TWA**	**0. 5 mg/m^3 (chromium oxide compound as Cr)**
	TWA	**10 mg/m^3 (aluminum oxide)**
	TWA	**2 mg/m^3 (calcium oxide)**
	TWA	**5 mg/m^3 (diiron trioxide)**
	TWA	**10 mg/m^3 (titan oxide)**
	TWA	**5 mg/m^3 (zirconium compound)**
	TWA	**0.025 mg/m^3 (quartz, respirable dust)**

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

	TWA 0.025 mg/m^3 (cristbalite, respirable dust)
Appropriate engineering controls:	**To keep below exposure limit, make available local exhaust ventilation if necessary.**
Individual protection measures:	
Respiratory protection:	**When above exposure limit, use a dust respirator, if ventilation is judged to be insufficient.**
Hand protection:	**Wear protective gloves.**
Eye protection:	**Wear dust goggles, if necessary.**
Skin and body protection:	**Wear long sleeve clothes to protect skin.**
Hygiene measures:	**Wash hands after handling.**

9. PHYSICAL & CHEMICAL PROPERTIES

Physical form, color etc:	**Powder / White or light brown**
Odor:	**No odor**
pH:	**No data, insoluble in water**
Melting point:	**No data**
Boiling point, Flash point, Auto-ignition point:	**Not flammable solids**
Specific gravity:	**No data**
Solubility:	**Insoluble in organic solvents and water**

10. STABILITY & REACTIVITY

Stability:	**Stable under normal conditions.**
Possibility of hazardous reactions:	**React with strong acids and hydrogen fluoride.**
Conditions to avoid:	**Nothing particular**
Material to avoid:	**Strong acids and hydrogen fluoride.**
Hazardous decomposition products:	**Nothing**

11. TOXICOLOGICAL INFORMATION

GHS classification was performed by the data of a pure substance, because tested data as a mixture is not available.
As reference, data of each ingredient are shown below.

Skin corrosion/Irritation:	**Redness and moderate irritation on humans. (Category 2) (diiron trioxide)**
Serious eye damage / eye irritation	**Corrosive in humans. (Category 1) (diiron trioxide)**

11. TOXICOLOGICAL INFORMATION

	Mild by rabbit test. (Category 2B) (titanium dioxide)
Respiratory sensitizer	**Chromium is classified into "Respiratory Sensitizing Substance" by the ad hoc committee of the Japanese Society of Occupational Allergy, and "Respiratory Sensitizing Substance: Group 2"* by the Japan Society for Occupational Health. These classifications, through not specifying chromium (III) oxide, seem to include chromium compounds. (Category 1) (Chromium (III) oxide)**
Skin sensitizer	**Chromium is classified into "Skin Sensitizing Substance" by the ad hoc committee of the Japanese Society of Occupational Allergy, and "Skin Sensitizing Substance: Group 1"* by the Japan Society for Occupational Health. These classifications, though not specifying chromium (III) oxide, seem to include chromium compounds. (Category 1) (Chromium (III) oxide)**
Carcinogenicity	**May cause cancer. IARC68: 1, NTP RoC: K, Japan Society for Occupational Health: 1. (Category 1A) (crystalline quartz)**
Specific target organs/systemic toxicity following single exposure	**Upper respiratory irritation (Category 3, respiratory tract irritation) (aluminum oxide)**
	Short-term exposure affects the respiratory system in humans in case of high inhalation concentration. (Category 1, respiratory system) (crystalline quartz)
	The coughing and also closeness were seen in humans (Category 3) (diiron trioxide)
	Fume stimulates an respiratory tract (Category 3) (titanium dioxide)
Specific target organs/systemic toxicity following repeated exposure	**By occupational exposure of aluminas, pulmonary fibrosis was occurred. (Category 1, lung) (aluminum oxide)**
	Respiratory system and kidney are affected in humans. (Category 1, respiratory system and kidney) (crystalline quartz)
	Although abnormalities are found on a chest x-rays test in humans, it is clinically satisfactory, and if it accumulates in lungs, it will become siderosis, but it is benign and does not progress to fibrosis. Metal fevers may be occurred by exposure.(Category 1, respiratory system) (diiron trioxide)
	Pneumoconiosis changes became clear by x-ray test, although not accompanied by change of the lung function of very few of the laborers with occupational exposure for 20 years or more. (Category 1, lung) (titanium dioxide)
	(Category 1, respiratory system)(chromium(III) oxide)

12. ECOLOGICAL INFORMATION

Bio-accumulative potential (aqueous environmental hazard) (acute):	**Crustacea sp. (Daphnia magna) LC50(48hrs)=0.162mg/L (Category 1)(Chromium (III) oxide)**
Bio-accumulative potential (aqueous environmental hazard) (chronic):	**Relevant toxicity is not indicated in the water solubility, but being metal compound, its behavior in water is uncertain.(Category 4) (titanium dioxide)**
	Being metal compound, its behavior in water and bio-accumulative potential are uncertain. Acute toxicity is classified into Category 1. (Category 1)(Chromium (III) oxide)

13. DISPOSAL CONSIDERATIONS

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Waste must be sent to an approved incinerator or disposed in an approved waste facility.

14. TRANSPORT INFORMATION

National regulations

Ground regulation information:	**Not regulated**
Maritime regulation information:	**Non-hazardous material**

Prevent exposure to water and collapse of cargo in freight transport.

United Nations number:	**-**
UN Proper shipping name:	**-**
Transport Hazard class:	**-**
Packing group, if applicable:	**-**
Marine pollutant (Y/N):	**Not applicable**

15. REGULATORY INFORMATION

International Inventories

EINECS/ELINCS Listed

TSCA Listed

Japanese regulations

ISHA: Chemical Substances requiring Labeling and Deliver of Documents, etc.

Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof: Classification I, Chromium and chromium(III) compounds(Cabinet Order Number 1-87)

Water Pollution Control Law: Designated Substances, Aluminium and its compounds(Article 3-3-44 of Cabinet order)

16. OTHER INFORMATION

This information is based on our present state of knowledge and is intended to describe our products from the point of view of the safety requirements. It should not be construed as guaranteeing specific properties.

End of SDS