

JIS

JAPANESE INDUSTRIAL STANDARD

**Glossary of Terms Used
in Refractory**

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Glossary of Terms Used in Refractory

R 2001-1985

1. Scope

This Japanese Industrial Standard specifies principal terms used in refractory.

2. Classification

The glossary of terms used in refractory shall be classified into the following 6 parts.

- (1) General
- (2) Raw materials and minerals
- (3) Manufacture
- (4) Types of refractories
- (5) Kilns and shapes of refractories
- (6) Characteristics and test methods

3. Terms, Readings and Definitions

The terms, readings and definitions shall be as follows:

(1) General

No.	Term	Definition	Equivalent English (Reference)
102	KASHŌ	A heat-treatment preliminarily carried out for changing raw materials physically or chemically.	calcination
103	KASOSEI	A property capable of molding a shape, especially remarkable for clay. A material can be formed without generating cracks and the new shape can be kept by this plasticity.	plasticity
104	KADOKAKE	A state in which a portion of the corner and edge of refractory is lost by breakdown, peeling, etc.	edge defect, corner defect
105	SOSEI HENKEI	A deformation in which a material is deformed without being broken by outer force and the shape as it is, is kept even if the outer force is removed.	plastic deformation

Applicable Standards: See page 34.

No.	Term	Definition	Equivalent English (Reference)
106	KIRETSU	A split spreading from the surface of a product into its interior unless the surface crack is noted.	crack
107	KIZU	Remarkable contaminations, spots, fusion holes, etc. generated on a brick by firing.	flaw
108	KURINKĀ	Strongly burned and solidified magnesia, dolomite, etc.	clinker
109	KŌKAZAI	A material a small amount of which is added for the purpose of promoting the generation and crystallization of a sort of compound by firing (it occasionally exists in raw materials).	mineralizer
112	SHERINGU, PĪRINGU, FURĒKINGU	A phenomenon in which the heating surface portion of a refractory is peeled and vanished by cracks at the back of the heating surface.	shelling, peeling, flaking
113	SHŌKETSU (SHŌKO)	A phenomenon in which combination takes place among particles by firing.	sinter (vitrification)
114	SHIRAJI	An intermediate product before drying a formed product, or otherwise before firing it after the forming and drying has been completed.	green, green body
115	SHINSHOKU	A phenomenon in which when refractories contact with gas, slag fused material, etc. in a hot state, materials having low melting points are manufactured by the reaction therewith, the texture being weakened, or otherwise the refractories are deteriorated and consumed by the friction of fused materials and other outer forces.	corrosion, erosion

No.	Term	Definition	Equivalent English (Reference)
116	SHITTO	A phenomenon in which a glassy material crystallizes crystals therein and becomes turbid.	devitrification
117	SARAGU	A product derived from the combination of unnecessary constituents in a raw material with flux constituents such as calcium oxide or the like when metals are fused and refined.	slag
119	SERAMIKKU BONDO	A glassy or crystalline material which is produced among coarse grain constituents of a ceramic by firing and bonding them. It gives mechanical strength to a burned product.	ceramic bond
120	SOSHIKI	A relation among pores and grains of various shapes or sizes in a refractory product.	texture
121	SORI	Bend, torsion or distortion.	warpage
122	TAIKABUTSU	A shaped refractory of 1500°C min. and a monolithic refractory, a refractory mortar and an insulating firebrick of 800°C min. in the highest service temperature.	refractory, refractory product, refractory material
123	TAIKA RENGU	A refractory product having various shapes suitable for the construction of kilns and other structures used at high temperatures.	refractory brick
124	DASUCHINGU	The natural pulverization caused by physicochemical transformation conversion.	dusting
126	TEN'I	A phenomenon in which the crystal form of a material is, as a rule, changed by the change of temperature.	inversion, conversion, transition
127	TETSUHANTEN	A black spot derived from iron or other compound grains in a brick.	iron spot

4
R 2001-1985

No.	Term	Definition	Equivalent English (Reference)
128	NETSUSHŌGEKI	The sudden change of temperature liable to result in spalling.	thermal shock
129	BATCHI	The unit of one group which is treated as one lot in a manufacturing process. For example, the amount of each raw material mixed at a suitable proportion, or otherwise the mixture mixed in such a way.	batch
130	BĀSUCHINGU	The disintegration caused by the permanent expansion of volume, a phenomenon taking place especially when a chrome-magnesite refractory absorbs iron oxide.	bursting
131	FŪKA	A deterioration phenomenon in which a material is oxidized, a specific impurity is dissolved, or otherwise a portion thereof disappears.	weathering
132	BONDO	A substance by which respective grains of a mixture are mutually bonded with each other.	bond
133	MONORISHIKKU	A large size one united object having no joint.	monolithic
134	YŌKO, JIKIKA	A phenomenon in which a considerable amount of glassy phase is generated in a product by heat-treatment and its apparent porosity is changed to disappear.	vittrification
135	RAMINĒSHON	It is the directional defect of texture, which is occasionally generated when a refractory is molded.	lamination
136	SHŌKA	A phenomenon in which the calcined calcia, magnesia and dolomite or the like become hydroxides thereof by the absorption reaction with water.	slaking

No.	Term	Definition	Equivalent English (Reference)
138	GYŌKETSU	A state in which the shape can be kept. It means the state in which when cement groups are added with water, the fluidity thereof is gradually lost and a fixed shape is kept.	setting
139	KETSUGŌZAI	It is a material for binding the main raw materials of a refractory to make an united object from them, for which clay, soda silicate milk of lime and other various materials are used.	binder
140	SEGURIGEISHON	A phenomenon in which the homogeneity of the grain size and the grain shape of a mixed material decreases.	segregation
141	MIPPEI KIKŌRITSU	A pore into which water or gas can not easily infiltrate.	closed pore
142	YŌJŌ	It is a treatment in which the hardening of a material is promoted by protecting the temperature or drying of the material, or otherwise by positively heating it, and otherwise the generation of heat is controlled by cooling.	ageing

(2) Raw Materials and Minerals

No.	Term	Definition	Equivalent English (Reference)
201	ARUMINA	Aluminium oxide (Al_2O_3)	alumina
202	UORASUTO-NAITO	Natural or artificial calcium metasilicate ($CaSiO_3$)	wollastonite
203	KAIYANAITO	One of the polymorphous minerals having the same chemical composition of Al_2O_3 , SiO_2 as that of andalusite and sillimanite. Further, this term is used for the rock having this mineral as a main constituent, too.	kyanite

6
R 2001-1985

No.	Term	Definition	Equivalent English (Reference)
204	KAORIN	Primary or secondary clay consisting of comparatively large kaolinite crystals. Its plasticity is large and it is whitely roasted.	kaolin
205	KAORINAITO	It is the representative clay mineral of caolinite group, which is the main constitutional mineral of kaolin.	kaolinite
206	KANRANSEKI	It is the group name of a mineral expressed by a general formula R_2SiO_4 (Mg and Fe or Ca in R). It is naturally produced as forsterite having fayalite in solid solution.	olivine
207	KAISUI MAGUNESHIA- KURINKA	It is the magnesia clinker produced from sea-water.	sea-water magnesia clinker, sea-water magnesite clinker
208	GYOKUZUI	The quartz of criptocrystalline fibrous state.	chalcedony
209	GIBUSAITO	It is one of the trihydrates of alumina ($Al_2O_3 \cdot 3 H_2O$). Further, this term is used for the one having it as a main constituent.	gibbsite
210	KUROMU TEKKO	The end component is the spinel of iron, chromium, ($FeO \cdot Cr_2O_3$). It is, as a rule, produced as the form of $(Fe, Mg) \cdot O \cdot (Fe, Al, Cr)_2 \cdot O_3$ in solid solution.	chromite
211	KURISUTO- BARAITO	One of the polymorphous minerals of crystalline silica.	cristobalite
212	KUROMU- SUPINERU	The spinel the sesquioxide (R_2O_3) of which is chromium oxide (Cr_2O_3). The spinel having chromium as one of main constituents.	chrome spinel

No.	Term	Definition	Equivalent English (Reference)
213	KEISŌDO	It is the substance having the porous silica deprived from the corpse of diatom piled on the bottom of the water as a main constituent.	diatomaceous earth
214	KŌJIRAITO	It is the aluminosilicate of natural or artificial magnesium. Cordierite occasionally contains manganese or iron, too. Further, this term is used for the rock having it as a main constituent.	cordierite
215	KORANDAMU	α -alumina. It is the form of alumina stable at 1000°C min.	corundum
216	KOKUEN	It is the polymorphous mineral of carbon. [The name of mineral is SEKIBOKU (Japanese) and the name of raw material is KOKUEN (Japanese)].	graphite, plumbago
217	JAMONGAN	It is the name of a mineral group, one of hydrous magnesium silicate ($3\text{MgO} \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$). Further, this term is used for the rock having it as a main constituent.	serpentine
218	SHIRIKA	Silicon dioxide (SiO_2).	silica
219	SHIRIMANAITO	It is one of the polymorphous minerals having the same chemical composition of $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$ as that of andalusite and kyanite. Further, this term is used for the rock having this mineral as a main constituent.	sillimanite
220	JIRUKON	Zirconium orthosilicate (ZrSiO_4). Further, this term is used for the rock having it as a main constituent.	zircon
221	JIRUKONIA	Zirconium dioxide (ZrO_2).	zirconia
222	SHAMOTTO	A burned clay, and the general term of materials used as a nonplastic material.	chamotte, grog

No.	Term	Definition	Equivalent English (Reference)
223	SUPINERU	It is a mineral of cubic system having a general formula $R''O \cdot R_2'''O_3$ (R'' and R''' respectively mean bivalent and trivalent metals). Further, it means magnesium aluminate ($MgO \cdot Al_2O_3$) in a narrow sense.	spinel
224	SEKKŌ	The dihydrate of calcium sulphate ($CaSO_4 \cdot 2H_2O$).	gypsum
225	SEKIEI	One of the polymorphous minerals of crystalline silica.	quartz
226	TANKAKEISO	It is the artificial mineral having the chemical composition of SiC. The industrial products thereof are occasionally impure.	silicon carbide
227	DAIASUPOA	It is one of the monohydrates of alumina. This term is used for the one having it as a main constituent, too.	diaspore
228	TAIKANENDO	It is the clay durable at high temperature which principally contains caoline mineral, free quartz and a very small amount of other constituents.	fire clay
229	CHITANIA	Titanium dioxide (TiO_2)	titania
230	TETSUKANRAN-SEKI	One of olivine group. The chemical composition thereof is iron ortho-silicate (Fe_2SiO_4).	fayalite
231	TENNEN KOKUEN	It is a graphite naturally produced, and there are flake graphite and earthy graphite.	plumbago, (graphite)
232	TORIJIMAITO	It is one of the polymorphous minerals of crystalline silica.	tridymite
233	DOROMAITO	It is a double carbonate mineral of calcium and magnesium. Further, this term is used for the rock having it as a main constituent.	dolomite

No.	Term	Definition	Equivalent English (Reference)
234	NENDO	It is a rock having a clay mineral as a main constituent, which has plasticity when pulverized in soil.	clay
235	HAROISAITO	One of the clay minerals of caolinite group.	halloysite
236	PĀRAITO	It is a kind of natural glass, which is extremely expanded when heated.	pearlite
237	PAIROFERAITO	It is one of hydrous aluminium silicate ($\text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O}$). Further, this term is used for the rock having it as a main constituent.	pyrophyllite
238	HIRUISHI	It is one of the mica minerals which are irreversibly expanded when heated.	vermiculite
239	FURINTOKURĒ	It is a kind of clay which is comparatively hard, minute in quality and which has a shell shaped fracture surface, having hardly plasticity	flint clay
240	FUORUSUTE-RAITO	It is one of olivine group. Its chemical composition is magnesium ortho-silicate (Mg_2SiO_4).	forsterite
241	BENTONAITO	It is a montmorillonite clay extremely rich in plasticity. In substance, it is an alteration substance of volcanic ash.	bentonite
242	BĒMAITO	It is one of the monohydrates of alumina ($\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$).	boehmite
243	HERUSHINAITO	It is the spinel of ferrous oxide and alumina ($\text{FeO} \cdot \text{Al}_2\text{O}_3$).	hercynite
244	PERIKURĒSU	It is a crystal of magnesia (MgO).	periclase
245	BŌRUKURĒ	It is a secondary clay of kaolinite quality extremely rich in plasticity.	ball clay
246	BŌKISAITO	It is one of the hydrates of alumina (diaspore, gibbsite and boehmite), or otherwise a sedimentary rock having the mixture thereof as a main constituent. It includes clay minerals and iron hydroxides, too.	bauxite

10
R 2001-1985

No.	Term	Definition	Equivalent English (Reference)
247	MAGUNESAITO	It is a magnesium carbonate mineral. Though its burned substance and a refractory produced therefrom shall be accurately called magnesia, but this term is used in Britain and the United States of America.	magnesite
248	MAGUNESHIA-KURINKĀ	It is prepared by burning, at a high temperature, natural magnesite or the magnesium hydroxide separated from sea-water or the like, and it has periclase as a main constituent.	magnesite clinker
249	MURAITO	It is the silicate of alumina having the basic chemical formula of $3 \text{Al}_2\text{O}_3 \cdot 2 \text{SiO}_2$.	mullite
250	MONCHISE-RAITO	It is one of olivine group. It is the orthosilicate of calcium and magnesium ($\text{CaO} \cdot \text{MgO} \cdot \text{SiO}_2$).	monticellite
251	MONMORIRO-NAITO	It is one of the clay minerals containing the hydrous silicate of aluminium as a main constituent. It is a principal mineral of bentonite.	montmorillonite
252	GŌSEIDORO-MAITOKURINKĀ	It is a clinker of magnesia·calcia series so synthesized as to be suitable for refractory products and stable in quality as compared with a clinker manufactured from natural dolomite.	synthetic dolomite clinker
253	GŌSEIMURAITO	It is a mullite raw material synthesized by a method wherein kaolin is proportioned with high alumina raw material and burned or the like.	synthetic mullite
254	SHŌKETSU ARUMINA	It is a substance obtained by sintering a high alumina raw material in a kiln.	sintered alumina
255	DENYŪ ARUMINA	It is a substance obtained by fusing a high alumina raw material in an electric furnace.	fused alumina

No.	Term	Definition	Equivalent English (Reference)
256	DENYŪ MAGUNESHIA	It is a substance obtained by fusing a magnesia raw material in an electric furnace.	fused magnesia
257	DOROMAITO KURINKĀ	It is a substance obtained by dead burning natural dolomite.	dolomite clinker

(3) Manufacture

No.	Term	Definition	Equivalent English (Reference)
301	IKOMI	Casting is a process in which the material let to have fluidity is solidified as it is by pouring it into a mould.	casting
302	EJJIRANNĀ MIRU	It is one of machines by which a material is crushed and mixed or kneaded. One to many large rolls or runners are placed on one base or board, rotated and a solid is crushed, ground or kneaded by its weight. There are edge runner mills in which a disc is fixed and rolls are rotated, in which a board is rotated and rolls are rotated following it and in which many small holes are opened on the bottom of a board, too.	edge-runner mill
303	ŌGĀ	It is a machine for pushing out a columnar material (generally, plastic clay) from its mouth mould. The propulsion operation is carried out by a screw.	auger
304	KURASSHINGU RŌRU	It is a crusher utilizing rolls which are rotated in the reverse directions with each other. The rotation speeds of rolls are occasionally different.	crushing rolls
305	KŌNKURASSHĀ	It is a machine in which a cone is placed in a same-shaped case, rotated concentrically and the crushing or grinding is carried out.	cone crusher