

Safety Data Sheet



Version: 01

Revised On: May/2015

Print Date: 02 June 2015

SECTION 1. IDENTIFICATION

Product Name: : **KL6656 PRES (HC)**

SDS Number : 23,326

Manufacturer or supplier's details

Manufacturer/Supplier : CRI/Criterion Marketing Asia Pacific Pte Ltd.
The Metropolis Tower 1,
9, North Buona Vista Drive, #11-04
Singapore 138588
(65) 6694-5493
(65) 6551-2029 (FAX)

Emergency Telephone Number

: CHEMTREC (US): +1-800-424-9300

CANUTEC (Canada): +613-996-6666

CHEMTREC (International): +1-703-527-3887 (Call Collect)

Recommended use of the chemical and restrictions on use

Recommended use : Catalyst / Catalyst Precursor

SECTION 2. Hazards Identification

GHS Classifications

Carcinogenicity : Category 1A, H350i: May cause cancer by inhalation.

Germ cell mutagenicity : Category 2, H341: Suspected of causing genetic defects

Specific target organ toxicity - repeated exposure : Category 1, H373: May cause damage to organs through prolonged or repeated exposure

Skin sensitizer : Category 1, H317: May cause an allergic skin reaction.

Chronic hazards to the aquatic environment : Category 2, H411: Toxic to aquatic life with long lasting effects.

GHS Label element

Hazard pictograms :



Signal Word: : **DANGER**

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Hazard statements	: Health Hazards H350i May cause cancer by inhalation. H341 Suspected of causing genetic defects H373 May cause damage to organs through prolonged or repeated exposure H317 May cause an allergic skin reaction. Environmental Hazards: H411 Toxic to aquatic life with long lasting effects.
Precautionary Statements	: Prevention P260 Do not breathe dust/fume/gas/mist/vapours/spray. P272 Contaminated work clothing should not be allowed out of the workplace. P273 Avoid release to the environment. P281 Use personal protective equipment as required. Response P302+P352 IF ON SKIN: Wash with plenty of soap and water. P308+P313 IF exposed or concerned: Get medical advice/attention. P333+P313 If skin irritation or rash occurs: Get medical advice/attention.

SECTION 3. Composition/Information on Ingredients

Substance / Mixture : Mixture

Chemical Name	Classification	Hazard Statement	%wt
Aluminum oxide Synonyms: Al ₂ O ₃ CAS: 1344-28-1	Not classified as dangerous under GHS criteria.		Balance
Nickel oxide Synonyms: NiO CAS: 1313-99-1	Carcinogenicity, Category 1A Specific target organ toxicity - repeated exposure, Category 1 Skin sensitizer, Category 1 Chronic hazards to the aquatic environment, Category 4	H350i H372 H317 H413	1 - 10 %

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Nickel sulfide Synonyms: NiS CAS: 16812-54-7	Carcinogenicity, Category 1A Germ cell mutagenicity, Category 2 Specific target organ toxicity - repeated exposure, Category 1 Skin sensitizer, Category 1 Acute hazards to the aquatic environment, Category 1 Chronic hazards to the aquatic environment, Category 1	H350i H341 H372 H317 H400 H410	2.5 - 10 %
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SECTION 4. First Aid Measures

- Inhalation: : DO NOT DELAY. Move individual to fresh air and provide oxygen if breathing is difficult. Give artificial respiration if not breathing. Get medical attention. WARNING: If sulphur dioxide is present, effects from overexposure may be delayed. Act quickly! Unconscious individuals can die if not removed from contaminated area as soon as possible. Put on an approved air-supplied pressure demand respirator before entering contaminated area. Remove individual to fresh air and provide oxygen if breathing is difficult. Give artificial respiration if not breathing. Get medical attention as soon as possible. Keep individual quiet and warm.
- Skin Contact: : DO NOT DELAY! Wash skin with plenty of water for 15 minutes. Use soap if readily available and follow by thoroughly washing with soap and water. Remove contaminated clothing. If persistent skin irritation or rash occurs, get medical attention immediately.
- Eye Contact: : DO NOT DELAY. Remove contact lenses, if present and easy to do. Immediately flush eyes with plenty of water for 15 minutes while holding eyelids open. Get medical attention immediately.
- Ingestion: : DO NOT DELAY. Do not induce vomiting. Do not give liquids if individual is unconscious or drowsy. Otherwise, rinse mouth with water and give large quantity of water (0.5L at least). If vomiting occurs, keep head below hips, repeat liquid administration. Get medical attention immediately.
- Most important symptoms/effects, acute & delayed : To the best of our knowledge: Symptoms of systemic nickel/nickel oxide poisoning may include: Irritant effects, Cough, Allergic reactions, In some cases nickel dermatitis may manifest itself. See also section 2.2 and section 11 for the most important symptoms and effects
- Advice to Physician : Treat symptomatically.

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SECTION 5. Fire Fighting Measures

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| Suitable Extinguishing Media | : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment (e.g. water spray, foam, carbon dioxide). |
| Unsuitable extinguishing media | : There are no limitations of extinguishing media for this substance/ mixture. |
| Specific extinguishing methods | : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment (e.g. water spray, foam, carbon dioxide). |
| Advice for fire-fighters | : At temperatures above 50°C, in the presence of air/oxygen, sulfur dioxide (a toxic and corrosive compound) can be emitted. |
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SECTION 6. Accidental Release Measures

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| Personal precautions, protective equipment and emergency procedures | : Avoid dust generation. Do not inhale dust. Wear gloves, goggles, protective clothing and respiratory protection to avoid exposure. For guidance on selection of personal protective equipment see Chapter 8. Observe emergency procedures. Evacuate not-required personnel to safe areas. If necessary, consult an expert. |
| Methods and materials for containment and cleaning up | : Contain spillage, and then collect with an electrically protected vacuum cleaner or Shovel up and place in a labeled, sealable container for subsequent safe disposal (see section 13). Observe possible material restrictions (see section 10). |
| Additional Advice | : For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Safety Data Sheet. |
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SECTION 7. Handling and Storage

- | | |
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| Precautions for safe handling | : Dry. Tightly closed. Keep in well-ventilated place. Do not store together with combustible or fire supporting materials. Consume opened container immediately. Use only non-flammable containers that can be tightly sealed. Store in an area only accessible to authorized or qualified persons. |
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Incompatibilities : For guidance of incompatible substance or mixture see section 10.3.

Specific End Uses Apart from the uses mentioned in section 1.2 no other specific end uses are stipulated.

SECTION 8. Exposure Controls/Personal Protection

Components with workplace control parameters

Component	CAS No.	Value type (Form of exposure)	Permissible concentration	Authority
Aluminum oxide	1344-28-1	TWA	10 mg/m ³	S343/96
Nickel and Nickel Compounds	1313-99-1	TWA	1 mg/m ³	S343/96
Nickel Subsulphide	16812-54-7	TWA	0.1 mg/m ³	ACGIH

Monitoring Methods : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods <http://www.cdc.gov/niosh/> Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha.gov/> Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances <http://www.hse.gov.uk/> Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany <http://www.dguv.de/inhalt/index.jsp> L'Institut National de Recherche et de Sécurité, (INRS), France <http://www.inrs.fr/accueil>

Engineering Controls: : Technical measures and appropriate working operations should be given priority over the use of personal protective equipment! Use sealed systems as far as possible. Local exhaust ventilation is recommended. Eye washes and showers for emergency use have to be present. Always observe good personal hygiene measures, such as washing

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hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation. Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or subsequent recycle.

Personal Protective Equipment

Respiratory protection:



: In case of insufficient ventilation, use either an atmosphere-supplying respirator or an air-purifying respirator for particulates (acc. to EN136/140 or comparable standards). Use a filter type P3 (acc. to EN143 or comparable standard).

Eye protection:



: Dust-tight safety goggles according to EN166 or NIOSH(US)-standard.

Hand protection:



: Nitrile rubber gloves (Glove thickness : min. 0.11 mm, Break through time: >480 min.) For example: ANSELL TNT (TM) BLUE 92-670 Nitrile gloves, The protective gloves must be comply with the specifications mentioned in EC Directive 89/686/EEC and the related standard EN 374. Provide employee skin care programmes.

Skin and Body Protection



: Protective clothing which cover the skin and approved to EU Standard EN14605 or other comparable Standards. Provide employee skin care programmes.

Protective Measures

: The provided information is made in consideration of the PPE directive (89/686/EEC) and the European Committee for Standardisation (CEN) standards. Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

SECTION 9. Physical and Chemical Properties

Odour threshold : Not applicable
pH: : Not applicable
Melting point: : No information available.
Initial Boiling Point and Boiling : No information available.

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Range	
Flash Point	: Not applicable
Evaporation Rate:	: Not applicable - (solid with no measurable vapour pressure)
Flammability	: Not flammable In certain circumstances product can exhibit a self-heating potential.
Upper / lower Flammability or Explosion limits	: Not applicable
Vapour Pressure:	: No measurable vapour pressure
Vapour Density:	: Not applicable
Relative density	: No information available.
Solubility(ies)	: @ 20° C Insoluble in water
Partition coefficient (n-octanol/water)	: Not applicable
Auto-ignition temperature	: Self-heating potential at temperatures above 100°C
Decomposition temperature	: No information available.

Other Information

SECTION 10. Stability/Reactivity

Reactivity	: Further dangerous reactions in addition to those mentioned in the below sub-sections are not expected while handling the product in accordance to its intended use.
Chemical Stability	: Stable under normal ambient temperature and pressure (-50°C to +50°C; 1013hPa) during storage in original containment. Hygroscopic!
Hazardous Reactions	: Risk of formation of dangerous gases or strong exothermic reactions with: Strong acids, strong bases, strong oxidizing/ reducing agents, hydrogen sulfide.
Conditions to avoid:	: Avoid excessive temperatures (>50°C), excessive exposure to air, sparks, open flames or other ignition sources. Humidity.
Incompatible materials	: Strong acids, strong bases, strong oxidizing/ reducing agents, and hydrogen sulfide
Hazardous Decomposition Products	: Does not decompose when used for intended uses. Also see section 5.2

SECTION 11. Toxicological Information

Information on likely routes of exposure

Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

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Acute Toxicity

Route	Material Tested	LD/LC50	Species
Oral	Aluminum oxide	>2000 mg/kg	Rat
Oral	Nickel Oxide on a carrier of Aluminum oxide.	>6000 mg/kg	Rat
Oral	Nickel Oxide on a carrier of Aluminum oxide.	>2000 mg/kg	Rat
Oral	Nickel Oxide on a carrier of Aluminum oxide.	>430 mg/m ³	Rat
Oral	Nickel sulfide	>5000 mg/kg	Rat
Dermal	Aluminum oxide	>2000 mg/kg	Rat
Respiratory Irritation	Nickel oxide	5.08 mg/l(14 days)	Rat

Eye/Skin corrosion/irritation

Route	Material Tested	Description	Species
Eye	Aluminum oxide	Mildly irritating	Rabbit
Eye	Nickel oxide	Mildly irritating	Rabbit
Eye	Nickel sulfide	Irritating	
Dermal	Aluminum oxide	Not irritating	Rabbit
Dermal	Nickel oxide	Slightly irritating.	Rabbit
Dermal	Nickel sulfide	Slightly irritating.	Rabbit
Respiratory Irritation	Aluminum oxide	Mildly irritating	Rabbit
Respiratory Irritation	Nickel oxide	Irritating	Human

Respiratory or skin sensitization

Route	Material Tested	Description	Species
Dermal	Aluminum oxide	Not a sensitiser	Guinea pig
Dermal	Nickel compounds	Sensitiser	Guinea pig
Dermal	Nickel sulfide	Sensitiser	Guinea pig

Germ cell mutagenicity

No information available.

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Carcinogenicity:

The National Toxicology Program and International Agency for Research on Cancer have determined there is sufficient evidence for the carcinogenicity of nickel oxides in experimental animals.

Nickel oxide is classified by:

IARC: Group 1, Carcinogenic to Humans.

U.S. NTP - reasonably anticipated to be human a carcinogen.

OSHA - carcinogenic to humans.

Reproductive Toxicity

Product

No information available.

STOT - single exposure

Product

No information available.

STOT - repeated exposure

Product

No information available.

Further information

Product

Nickel and nickel compounds as dust may cause effects on the respiratory tract, lymph nodes, blood, eyes and cardiovascular system. Nickel is a sensitiser. Nickel and nickel compounds bind to DNA and have been shown to cause genotoxicity. Aluminum and aluminum compounds are not considered to be carcinogenic or mutagenic to humans or carcinogenic to animals. Aluminum and aluminum compounds have low acute toxicity potential and may cause CNS, liver, kidney and cardiovascular effects in animals. Developmental toxicity was seen in animals following intraperitoneal injection. Mutagenicity studies in animals gave mixed results.

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SECTION 12. Ecological Information

Basis for Assessment : Ecotoxicological data have not been determined specifically for this material. The information given below is based on a knowledge of the components and the ecotoxicology of similar products.

Ecotoxicity

Product

Toxicity to fish : No information available.

Persistence and degradability

Product

Bioaccumulation : Methods for the determination of biodegradability are not applicable to inorganic substances/ mixtures.

Mobility in soil

Product

Mobility: : Sinks in water. If product enters soil, one or more constituents will be mobile and may contaminate groundwater.

Results of PBT and vPvB assessment

Product

Assessment : In accordance to Annex XIII of regulation (EC) 1907/2006 a PBT/vPvB assessment shall not be conducted for inorganic substances.

Other Adverse Effects

Product

Additional ecological information : Discharge into the environment must be avoided due to the potential dangerousness for drinking water supplies.

SECTION 13. Disposal Considerations

Product disposal: Recover or recycle, if possible. Otherwise: Send to an approved contractor for regeneration or metal recovery or dispose with a licensed disposal contractor.

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Waste disposal:	It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.
Container disposal:	Empty containers may contain residues. Ensure container is properly cleaned. Remove all packaging for recovery or waste disposal. DO NOT USE CONTAINER FOR OTHER PURPOSES.
Regulatory Controls:	Comply with applicable regional, national, and local laws and regulations about the handling and disposal of wastes.

14. TRANSPORT INFORMATION

Transport Statement:

Not dangerous for conveyance by road/rail under USA DOT, Canadian TDG, and other non-ADR (European union) codes. Consult local laws to determine transportation regulations.

International Regulation

Road/Rail Transportation

IMDG

UN No.	UN 3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Nickel sulfide)
Transport Hazard Class	9
Packing Group	III
Hazard symbol	MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES , ENVIRONMENT
Guide	171
HIN	90

Maritime transportation

IMO

UN No.	UN 3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Nickel sulfide)
Transport Hazard Class	9
Packing Group	III
Hazard symbol	MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES , ENVIRONMENT
Marine pollutant	YES
Remarks	EmS: F-A, S-F

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Air transport

ICAO/IATA

UN No.	UN 3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Nickel sulfide)
Transport Hazard Class	9
Packing Group	III
Hazard symbol	MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES , ENVIRONMENT

SECTION 15. Regulatory Information

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

National Inventories

National Authority	Country	Status
EINECS/ELINCS	EC	All components listed.
TSCA	USA	All components listed.
MITI	Japan	All components listed.
DSL/NDSL	Canada	All components listed.
TCCL	Korea	All components listed.
AICS	Australia	All components listed.
PICCS	Philippines	All components listed.
IECS	China	All components listed.

PRODUCT SAFETY CLASSIFICATIONS

Canada WHMIS

Canadian - Workplace Hazardous Materials Information System (WHMIS)	
Class D - Toxic and Infectious Materials	Division 2 - Materials Causing other Toxic Effects
Subdivision A - Very Toxic Materials	

United States of America - State of Massachusetts	
Aluminum oxide	Right-To-Know Substances List
Nickel oxide	Extraordinarily Hazardous Substance E (1 ppm threshold) Carcinogen C

United States of America - State of Pennsylvania	
Aluminum oxide	Right-To-Know Hazardous Substance
Nickel oxide	PA Special Hazard (0.01 % threshold) PA Environmental Hazard E (1 % threshold)

NATIONAL ENVIRONMENTAL AND SAFETY REGULATIONS

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Superfund Amendments and Reauthorization Act (SARA)

SARA 313 Chemicals:

Nickel oxide

SECTION 16. Other Information

Further information

Indication of changes

Amendments from the previous version of the MSDS are indicated by two vertical bars in the left margin and the section is highlighted.

Abbreviations and Acronyms

ACGIH = American Conference of Governmental Industrial Hygienists
ADR = European Agreement concerning the International Carriage of Dangerous Goods by Road
AICS = Australian Inventory of Chemical Substances
BEL = Biological exposure limits
CAS = Chemical Abstracts Service
CEPIC = European Chemical Industry Council
CLP = Classification Packaging and Labelling
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
DSL = Canada Domestic Substance List
EC = European Commission
EC50 = Effective Concentration fifty
ECETOC = European Center on Ecotoxicology and Toxicology Of Chemicals
ECHA = European Chemicals Agency
EINECS = The European Inventory of Existing Commercial Chemical Substances
EL50 = Effective Loading fifty
ENCS = Japanese Existing and New Chemical Substances Inventory
EWC = European Waste Code
GHS = Globally Harmonised System of Classification and Labelling of Chemicals
IARC = International Agency for Research on Cancer
IATA = International Air Transport Association
IC50 = Inhibitory Concentration fifty
IL50 = Inhibitory Level fifty
IMDG = International Maritime Dangerous Goods
INV = Chinese Chemicals Inventory
KECI = Korea Existing Chemicals Inventory
LC50 = Lethal Concentration fifty
LD50 = Lethal Dose fifty per cent.
LL/EL/IL = Lethal Loading/Effective Loading/Inhibitory loading
LL50 = Lethal Loading fifty
MARPOL = International Convention for the Prevention of Pollution From Ships
NOEC/NOEL = No Observed Effect Concentration / No Observed Effect

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Level

OE_HPVS = Occupational Exposure - High Production Volume

PBT = Persistent, Bioaccumulative and Toxic

PICCS = Philippine Inventory of Chemicals and Chemical Substances

PNEC = Predicted No Effect Concentration

REACH = Registration Evaluation And Authorisation Of Chemicals

RID = Regulations Relating to International Carriage of Dangerous Goods by Rail

SKIN_DES = Skin Designation

STEL = Short term exposure limit

TRA = Targeted Risk Assessment

TSCA = US Toxic Substances Control Act

TWA = Time-Weighted Average

vPvB = very Persistent and very Bioaccumulative

MFSU = Manufacture, Formulation, Supply & Use

Revision Date

May/2015

Country/Language

Singapore - British English

Uses and restrictions:

Use as a raw material/intermediate for catalyst manufacture, as a catalyst for refinery processing or for petrochemicals manufacture.

Training advice

The information in this document should be made available to all who may handle the product. Provide adequate information, instruction and training for operators.

SDS Prepared By:

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Disclaimer:

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not, therefore, be construed as guaranteeing any specific property of the product.