

SAFETY DATA SHEET



ILUKA

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name SYNTHETIC RUTILE
Synonyms CAPEL SYNTHETIC RUTILE • NARNGULU SYNTHETIC RUTILE • TITANIUM ORE CONCENTRATE • UGI (UPGRADED ILMENITE)

1.2 Uses and uses advised against

Uses RAW MATERIAL
Raw material for titanium dioxide pigment manufacture by the chloride process. Also used for titanium metal production.

1.3 Details of the supplier of the product

Supplier name ILUKA RESOURCES LIMITED
Address Level 23, 140 St Georges Terrace, Perth, WA, 6000, AUSTRALIA
Telephone +61 8 9360 4700
Fax +61 8 9360 4777
Website <http://www.iluka.com>

1.4 Emergency telephone numbers

Emergency +61 8 9780 3555; +61 13 11 26 (PIC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

NOT CLASSIFIED AS HAZARDOUS UNDER OSHA HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200

2.2 GHS Label elements

No signal word, pictograms, hazard or precautionary statements have been allocated.

2.3 Other hazards

No information provided.

HMIS

Health	0
Flammability	0
Physical Hazard	0
Personal Protection	0

NFPA



3. COMPOSITION/ INFORMATION ON INGREDIENTS

3.1 Substances / Mixtures

Ingredient	CAS Number	EC Number	Content
TITANIUM DIOXIDE	13463-67-7	236-675-5	84 to 95.5%
IRON	7439-89-6	231-096-4	<8%
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	238-878-4	0.4 to 2.7%
ALUMINIUM OXIDE	1344-28-1	215-691-6	0.7 to 2.5%
SULPHUR	7704-34-9	231-722-6	0.02 to 0.7%

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VANADIUM PENTOXIDE	1314-62-1	215-239-8	0.22 to 0.6%
NIOBIUM PENTOXIDE	1313-96-8	215-213-6	0.1 to 0.4%
PHOSPHORUS PENTOXIDE	1314-56-3	215-236-1	0.01 to 0.12%
URANIUM	7440-61-1	231-170-6	0.0006 to 0.003%
ZIRCON	14940-68-2	239-019-6	<0.4%
THORIUM	7440-29-1	231-139-7	0.004 to 0.047%

Ingredient Notes Respirable Crystalline Silica <0.01%.

4. FIRST AID MEASURES

4.1 Description of first aid measures

Eye	If in eyes, rinse cautiously with water for several minutes, or until particle is removed. Remove contact lenses if present and easy to do - continue rinsing.
Inhalation	If inhaled move to fresh air and keep comfortable.
Skin	If skin or hair contact occurs, brush off loose particles. If on clothing, brush off loose particles. If irritation occurs, seek medical advice.
Ingestion	If swallowed, rinse mouth and get medical attention if you feel unwell.
First aid facilities	Eye wash facilities should be available.

4.2 Most important symptoms and effects, both acute and delayed

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

4.3 Immediate medical attention and special treatment needed

Treat symptomatically.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Use an extinguishing agent suitable for the surrounding fire.

5.2 Special hazards arising from the substance or mixture

Non flammable. May evolve toxic gases if strongly heated.

5.3 Advice for firefighters

No fire or explosion hazard exists.

5.4 Hazchem code

None allocated.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear Personal Protective Equipment (PPE) as detailed in section 8 of the SDS. Contact emergency services where appropriate.

6.2 Environmental precautions

Prevent product from entering drains and waterways.

6.3 Methods of cleaning up

Contain spillage, then collect and place in suitable containers for reuse or disposal. Avoid generating dust.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Before use carefully read the product label. Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Observe good personal hygiene, including washing hands before eating. Prohibit eating, drinking and smoking in contaminated areas.

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7.2 Conditions for safe storage, including any incompatibilities

Store in a well ventilated area, removed from incompatible substances and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. When stockpiled, ensure leachate and runoff cannot enter drains or waterways.

7.3 Specific end uses

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Aluminium oxide (a)	SWA (AUS)	--	10	--	--
Iron oxide fume (Fe ₂ O ₃) (as Fe)	SWA (AUS)	--	5	--	--
Iron salts, soluble, as Fe	SWA (AUS)	--	1	--	--
Phosphorus pentoxide	SWA (AUS)	--	--	--	--
Respirable Crystalline Silica	OSHA PEL (US)	--	0.05	--	--
Titanium dioxide (a)	SWA (AUS)	--	10	--	--
Uranium (natural)	SWA (AUS)	--	0.2	--	0.6
Vanadium (as V ₂ O ₅), (respirable dust & fume)	SWA (AUS)	--	0.05	--	--

Biological limits

Ingredient	Determinant	Sampling Time	BEI
URANIUM	Uranium in urine	End of shift	200 µg/L
VANADIUM PENTOXIDE	Vanadium in urine	End of shift at end of workweek	50 mg/g creatinine

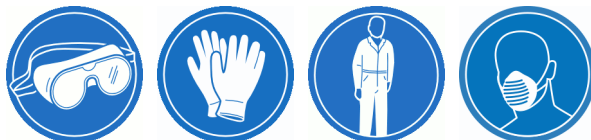
Reference: ACGIH Biological Exposure Indices

8.2 Exposure controls

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain dust levels below the recommended exposure standard.

PPE

- Eye / Face** Wear safety glasses and if there is a potential for dust, wear dust-proof goggles.
- Hands** Wear industrial grade gloves when handling material.
- Body** Where heavy contamination is likely, wear coveralls.
- Respiratory** In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary.



9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	BLACK GRANULAR SOLID
Odour	SLIGHT ACRID ODOUR
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	NOT AVAILABLE
Melting point	> 1000°C
Evaporation rate	NOT AVAILABLE
pH	3.5 to 4.5

PRODUCT NAME SYNTHETIC RUTILE**9.1 Information on basic physical and chemical properties**

Vapour density	NOT AVAILABLE
Specific gravity	3.4 to 4.4
Solubility (water)	INSOLUBLE
Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Partition coefficient	NOT AVAILABLE
Autoignition temperature	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Explosive properties	NOT AVAILABLE
Oxidising properties	NOT AVAILABLE
Odour threshold	NOT AVAILABLE

9.2 Other information

Bulk density	1500 to 2300 kg/m ³
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10. STABILITY AND REACTIVITY**10.1 Reactivity**

Carefully review all information provided in sections 10.2 to 10.6

10.2 Chemical stability

Stable under recommended conditions of storage.

10.3 Possibility of hazardous reactions

Polymerization is not expected to occur.

10.4 Conditions to avoid

Avoid contact with incompatible substances.

10.5 Incompatible materials

Incompatible with acids (e.g. nitric acid).

10.6 Hazardous decomposition products

May evolve toxic gases when heated to decomposition.

11. TOXICOLOGICAL INFORMATION**11.1 Information on toxicological effects**

Acute toxicity Non-toxic. There are no known hazards resulting from accidental ingestion of this product as may occur during normal handling. Ingestion of large quantities may cause irritation to the gastrointestinal system, mainly as a result of abrasion, but also from the slightly acidic nature of the product.

Information available for the ingredients:

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
TITANIUM DIOXIDE	5000 mg/kg (rat)	--	3.43 - 6.82 mg/L air (rat)
IRON	20000 mg/kg (guinea pig)	--	--
ALUMINIUM OXIDE	> 5000 mg/kg (rat)	--	--
SULPHUR	> 5,000 mg/kg (rat)	> 2,000 mg/kg (rabbit)	1660 mg/m ³ (mammal)
VANADIUM PENTOXIDE	314 - 716 mg/kg (rats)	> 2500 mg/kg (rats)	2.21 - 4.29 mg/L/4hrs (rats)
PHOSPHORUS PENTOXIDE	--	--	61 mg/m ³ /1 hour (guinea pig)
URANIUM	750 mg/kg (rat)	--	--

Skin Not classified as a skin irritant. Contact may result in mechanical irritation.

Eye Not classified as an eye irritant. Contact may result in mechanical irritation.

Sensitisation This product is not known to be a skin or respiratory sensitiser.

Mutagenicity No evidence of mutagenic effects.

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Carcinogenicity	This product contains a small amount of respirable crystalline silica and precautions should be taken to avoid inhaling the dust. Crystalline silica is classified as carcinogenic to humans (IARC Group 1). The normal grain size of the product precludes it from being an inhalation hazard.
Reproductive	Not classified as a reproductive toxin.
STOT - single exposure	No known effects from this product.
STOT - repeated exposure	The normal grain size of the product precludes it from being an inhalation hazard. This product contains a small amount of respirable crystalline silica and precautions should be taken to avoid inhaling the dust. Radiation: This product contains low levels of naturally occurring radioactive elements of the uranium and thorium series. Low level gamma radiation from bulk or bagged stockpiles of this product can increase gamma levels slightly above normal background.
Aspiration	This product does not present an aspiration hazard.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

The material is unlikely to cause any environmental damage. It is insoluble in water and is unlikely to contaminate waterways or food chains.

12.2 Persistence and degradability

Not applicable.

12.3 Bioaccumulative potential

This product is not expected to bioaccumulate.

12.4 Mobility in soil

This product has low mobility in soil.

12.5 Results of PBT and vPvB assessment

No information provided.

12.6 Other adverse effects

No information provided.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal	Disposal must be in accordance with Federal, State and Local Council regulations. If approved, may be transferred to an approved landfill site. Many states are developing new regulations for the disposal of waste containing Naturally Occurring Radioactive Materials (NORM) or Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) above background levels. Consult and comply with current regulations.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

NOT CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF DOT, IMDG OR IATA

	LAND TRANSPORT (DOT)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	None allocated.	None allocated.	None allocated.
14.2 Proper Shipping Name	None allocated.	None allocated.	None allocated.
14.3 Transport hazard class	None allocated.	None allocated.	None allocated.
14.4 Packing Group	None allocated.	None allocated.	None allocated.

14.5 Environmental hazards

No information provided.

14.6 Special precautions for user

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

US EPCRA and CAA Regulatory Information

The following components are subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act (CAA):

Ingredient	CAS Number	Sara 302 (TPQ)	Sara 304 (RQ)	CERCLA (RQ)	Sara 313	RCRA Code	CAA (TQ)
ALUMINIUM OXIDE	1344-28-1				313		
VANADIUM PENTOXIDE	1314-62-1	100/1000 0	1000	1000	313c	P120	

* Refer to Section 16 - Summary of Codes

Carcinogenicity

The following components are reported to be carcinogenic:

Ingredient	CAS Number	NTP	IARC	OSHA
TITANIUM DIOXIDE	13463-67-7		Group 2B	
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	知られている	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	Kilala	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	Known	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	ဇာနည်	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	diketahui	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	Bekannt	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	알려진	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	Conocido	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	Conhecido	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	мэдэгдэж байгаа	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	ที่รู้จักกัน	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	yang diketahui	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	已知	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	Nổi tiếng	Group 1	Regulated
QUARTZ (CRYSTALLINE SILICA)	14808-60-7	Connu	Group 1	Regulated
VANADIUM PENTOXIDE	1314-62-1		Group 2B	
THORIUM	7440-29-1	Known	Group 1	
THORIUM	7440-29-1	알려진	Group 1	
THORIUM	7440-29-1	ที่รู้จักกัน	Group 1	
THORIUM	7440-29-1	Conocido	Group 1	
THORIUM	7440-29-1	已知	Group 1	
THORIUM	7440-29-1	Kilala	Group 1	
THORIUM	7440-29-1	Connu	Group 1	
THORIUM	7440-29-1	知られている	Group 1	
THORIUM	7440-29-1	yang diketahui	Group 1	
THORIUM	7440-29-1	ဇာနည်	Group 1	
THORIUM	7440-29-1	Bekannt	Group 1	
THORIUM	7440-29-1	Conhecido	Group 1	
THORIUM	7440-29-1	diketahui	Group 1	
THORIUM	7440-29-1	мэдэгдэж байгаа	Group 1	
THORIUM	7440-29-1	Nổi tiếng	Group 1	

Inventory listings

AUSTRALIA: AICS (Australian Inventory of Chemical Substances)

All components are listed on AICS, or are exempt.

UNITED STATES: TSCA (US Toxic Substances Control Act)

All components are listed on the TSCA inventory, or are exempt.

16. OTHER INFORMATION

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16.1 Additional information

EXPOSURE STANDARDS - TIME WEIGHTED AVERAGES: Exposure standards are established on the premise of an 8 hour work period of normal intensity, under normal climatic conditions and where a 16 hour break between shifts exists to enable the body to eliminate absorbed contaminants. In the following circumstances, exposure standards must be reduced: Strenuous work conditions; hot, humid climates; high altitude conditions; extended shifts (which increase the exposure period and shorten the period of recuperation).

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: form of product; frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

16.2 Abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAA	Clean Air Act
CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CNS	Central Nervous System
EC No.	EC No - European Community Number
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
EPCRA	Emergency Planning and Community Right-to-Know Act
GHS	Globally Harmonized System
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m ³	Milligrams per Cubic Metre
NTP	U.S. National Toxicology Program
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
RCRA	Resource Conservation and Recovery Act
RQ	Reportable Quantity measured in pounds (304, CERCLA)
SARA	Superfund Amendments and Reauthorization Act
STEL	Short-Term Exposure Limit
STOT-RE	Specific target organ toxicity (repeated exposure)
STOT-SE	Specific target organ toxicity (single exposure)
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity measured in pounds (302)
TQ	Threshold Quantity measured in pounds (CAA)
TWA	Time Weighted Average

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16.3 Summary Of Codes

RQ	Reportable Quantity measured in pounds (304, CERCLA)
TQ	Threshold Quantity measured in pounds (CAA)
TPQ	Threshold Planning Quantity measured in pounds (302)
^	Reporting threshold has changed since November 1998.
+	Member of PAC category.
#	Member of diisocyanate category.
X	Indicates that this is a second name for a chemical already included on this consolidated list. May also indicate that the same chemical with the same CAS number appears on another list with a different chemical name.
*	RCRA carbamate waste: statutory one-pound RQ applies until RQs are adjusted.
**	This chemical was identified from a Premanufacture Review Notice (PMN) submitted to EPA. The submitter has claimed certain information on the submission to be confidential, including specific chemical identity.
***	Indicates that no RQ is assigned to this generic or broad class, although the class is a CERCLA hazardous substance. See 50 Federal Register 13456 (April 4, 1985). Values in Section 313 column represent Category Codes for reporting under Section 313.
c	Although not listed by name and CAS number, this chemical is reportable under one or more of the EPCRA section 313 chemical categories.
s	Indicates that this chemical is currently under a administrative stay of the EPCRA section 313 reporting requirements, therefore, no Toxics Release Inventory reports are required until the stay is removed.
!	Member of the dioxin and dioxin-like compounds category.

16.4 Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

16.5 Prepared by

Risk Management Technologies
5 Ventnor Ave, West Perth
Western Australia 6005
Phone: +61 8 9322 1711
Fax: +61 8 9322 1794
Email: info@rmt.com.au
Web: www.rmt.com.au

Prepared in accordance to OSHA Hazard Communication standard, 29 CFR 1920.1200.

[End of SDS]