SAFETY DATA SHEET

Product: THERMO TUBE®

Revision: 01 Date: **03/08/2015** Pages: 1 /15

1- CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Identification of the product:	ThermoTube®
Recommended uses:	Suitable for distance instantaneous initiation, underground mining, open pit, quarries, civil works and takedowns underwater.
Restrictions on use:	Non available.
Company:	IBQ Indústrias Químicas S/A
Address:	Rodovia Régis Bittencourt (BR 116), Km 01 sem número. Bairro Florestal - Quatro Barras – Paraná
Telephone number:	55 (41) 3671-8200
Emergency telephone number:	Emergence in the application: 0800 770 8099 Emergencies during transport: 0800 770 8099 / 0800 720 8000 (WGRA)
Fax:	55 (41) 3672-2931
E-mail:	emergencia@britanite.com.br

2- HAZARDS IDENTIFICATION

Most important hazards:	None.
Product effects	
Adverse effects to the human health:	Not expected.
Environmental effects:	Not expected.
Physical and chemical hazards:	Not applicable
Chemical product-specific hazards:	Thermo Tube contains a non-explosive, powdered reactive mixture, adhered to the inner wall of a small diameter plastic tube.
Important symptoms:	There are not expected symptoms following exposure to the product.

Classification of the chemical product:	Not Applicable
Classification system adopted:	Globally Harmonized System of Classification and Labeling of Chemicals (GHS), United Nations.
Adequate labeling elements:	
Pictograms:	Not Applicable
Signal word:	Not Applicable
Hazard statement(s):	
Precautionary statement(s):	P210 Keep away from heat, sparks, open flames and hot surfaces. No smoking. P240 Ground container and receiving equipment. P250 Do not subject to grinding, shock and friction. P280 Wear protective gloves, eye protection, face protection. P370 + P380 In case of fire: evacuate area. P401 Store in accordance with local, regional, national and international regulations. P501 Dispose of contents in accordance with local, regional, national and international regulations.
Outline of an anticipated emergency:	Not Applicable

3- COMPOSITION/INFORMATION ON INGREDIENTS

MIXTURE

Impurities which contribute to hazards:

Components	Concentration (%)	CAS number	Classification in accordance with GHS
Confidential 1	< 4.0	Confidential	H302; H351; H360; H372
Confidential 2	< 2.0	Confidential	H272; H302; H317; H332; H350; H400; H410

Confidential 3	< 0.5	Confidential	H228; H319
Confidential 4	< 0.5	Confidential	H250
Confidential 5	< 0.1	Confidential	H201
Confidential 6	< 0.1	Confidential	H301; H401

4- FIRST-AID MEASURES

Exposure routes	
Inhalation:	It is not expected the product presents inhalation hazard, but if the coating is damaged and the content's leak occurs, remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, contact a TOXICOLOGICAL INFORMATION CENTER or doctor. Take this SDS.
Skin contact:	It is not expected the product presents a danger by contact with the skin, but if the coating is damaged and the content's leak occurs, wash exposed skin with sufficient water to remove the material. In case of irritation: Consult a doctor. Take this SDS.
Eye contact:	It is not expected the product presents danger by contact with the eyes, but if the coating is damaged and the content's leak occurs, rinse thoroughly with water for several minutes. In case of contact lenses, remove them, if it is easy. Continue to rinse. If eye irritation persists: consult a doctor. Take this SDS.
Ingestion:	It is not expected the product presents a danger if swallowed, but if the coating is damaged and the content's leak occurs, immediately contact one TOXICOLOGICAL INFORMATION CENTER or doctor. Rinse mouth. Take this SDS.
Most important symptoms/effects:	There are not expected symptoms or effects following exposure to the product. Only in case of coating mechanical violation.
Protection of first-aiders and/or special notes to a physician:	Avoid contact with the product to help the victim. If necessary, symptomatic treatment should comprise mainly supportive measures such as correction of electrolyte disturbances, metabolic, and respiratory care. In case of skin contact not rub the affected area. In

	case of skin contact not rub the affected area. Inform whether the intoxication was by inhalation, ingestion or contact and quantity of product, if it's possible, that reach the victim.

5- FIRE-FIGHTING MEASURES

Extinguishing media:	Dry chemicals, CO2
Specific hazards arising from the chemical product:	Thermo Tube burns like any plastic when involved in a fire. Internal pyrotechnic mixture is unlikelly to deflagrate. If, in particular conditions of heat and confinement, the mixture propagate, a spark will be generated and transmitted inside the tube, but will be confined into the tube.
Specific extinguishing methods:	Dry chemicals, CO2
Special equipment for the protection of firefighters:	Respiratory protective equipment like standalone (SCBA) with positive pressure and full protective clothing.

6- ACCIDENTAL RELEASE MEASURES

Personal precautions	
Removal of ignition sources:	Isolate the leak from sources of ignition. Prevent sparks or flames. Do not smoke. Proceed according to the different measures for large and small leaks. Use personal protective equipment as described in Section 8.
Dust control:	Collect the product with a clean shovel or other instrument that does not disperse the product.
Prevention of inhalation and contact with skin, eyes and mucous membranes:	Do not touch damaged containers or spilled material without the use of appropriate clothing. Avoid inhalation, contact with eyes and skin. Use personal protective equipment as described on section 8.

Environmental protection:	The material dilution from fighting fire may cause pollution. Avoid spillage reaches watercourses and sewerage systems.
Emergency procedures and alarm systems:	It is recommended the installation of fire alarm system and leak detection in storage and handling sites.
Methods and materials for cleaning up:	Eliminate all sources of heat and keep away the combustible materials. Signal and isolate the area. Use only anti-sparking tools. Clean the area with the orientation of a specialist. Collect the product in plastic bags. Remove them to a safe place. For disposal, proceed according to Section 13 of this SDS.
Secondary disaster prevention:	The dilution water from the fire-fighting may cause pollution.
Differences in the action of large and small leaks:	In case of large spills, immediately isolate the area within a radius of at least 800 meters in all directions. For small spills isolate and signal the area in a radius of at least 100 meters.

7- HANDLING AND STORAGE

Technical measures for handling	
Prevention of exposure of the handler:	Handle in a ventilated area or with general ventilation/local exhaustion. Avoid dust formation. Avoid exposure to the product. Avoid contact with incompatible materials. Keep away from heat, sparks, open flames and hot surfaces. — Do not smoke. Ground the container vessel and the receiver of the product during transfers. Not subject to abrasion, shock or friction. To reduce the possibility of potential risk to health, only trained personnel should handle this product.
Prevention of fire and explosion:	Do not rub, do not induce mechanical shock, do not store in a confined, humid, wet or exposed to weathering, subjected to high temperatures..
Precautions for safe handling:	Avoid contact with the product. Use personal protective equipment as described in Section 8.
Hygiene measures	
Suitable:	Wash hands and face thoroughly after handling and before eating, drinking, smoking or using the toilet. Contaminated clothing should be

	changed and washed before reuse.
Unsuitable:	Eat, drink or smoke when handling this product.
Technical measures of storage	
Conditions for safe storage:	Store in a cool, ventilated area away from sources of heat and separated from combustible materials. Use electrical equipment, ventilation and lighting explosion proof. This product may react dangerously with some incompatible materials as mentioned in Section 10. In case of deteriorated or damaged product, contact the manufacturer for safe and proper disposal.
Conditions that must be avoided:	High temperatures and ignition sources.
Incompatible substances or mixtures:	Corrosive agents such as strong acids and bases.
Packaging materials	
Recommended:	Similar to the original packaging.

8- EXPOSURE CONTROLS AND PERSONAL PROTECTION

Permissible concentration

Occupational exposure limit

Chemical name or common	TLV – TWA (ACGIH, 2012)	TLV – STEL (ACGIH, 2012)
Aluminium	1.0 mg/m³ (R)	-
Ciclonite*	0.5 mg/m³	-
Lead and inorganic compounds	0.05 mg/m³	-
Zirconium	5 mg/m³	10 mg/m³

(R): Respirable fraction

* Significant exposure through the skin; Cause liver damage

Biological limit:	- Lead: BEI (ACGIH, 2012): Lead in blood: 30 µg/100 mL Note: In women on childbearing age: 10 µg/100 mL.
Engineering controls measures:	Promote mechanical ventilation and exhaust system directly to the outside environment. These measures help to reduce exposure to the product. Maintain atmospheric concentrations of constituents of the product below occupational exposure limits indicated.
Appropriate personal protective equipment	
Respiratory protection:	Use respiratory protection if ventilation or exhaust system is not adequate.
Hand protection:	PVC or latex gloves.
Eye protection:	Safety glasses.
Skin and body protection:	Use cotton clothing, apron with chemicals protection, safety shoes and cream to protect the hands.
Special precautions:	Avoid wearing contact lenses while using this product.

9- PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Aluminum case containing explosive charge and a plastic tube with pyrotechnic mixture adhered to the inner walls.
Odour:	Absent.
pH:	Not available.
Melting point/freezing point:	Not available.
Boiling point, initial boiling and boiling range:	Not available.
Flashpoint:	Not available.
Upper/ Lower flammability or explosive limits:	Not available.

Vapour pressure:	Not available.
Vapour density:	Not available.
Density:	Not available.
Solubility (ies):	Insoluble in water.
n-octanol/water partition coefficient:	Not available.
Auto-ignition temperature:	Not available.
Decomposition temperature:	> 75°C
Flammability:	Not flammable.
Other information:	Not applicable.

10- STABILITY AND REACTIVITY

Chemical stability:	The product is stable under normal conditions of temperature and pressure.
Hazardous reactions:	Reacts with acids and alkalis, corrosives and reducers.
Conditions to avoid:	Elevated temperatures. Incompatible materials and ignition sources.
Incompatible materials:	Corrosive agents such as strong acids and bases.
Hazardous decomposition products:	Carbon monoxide, nitrogen oxides, chromates and metal oxides.

11- TOXICOLOGICAL INFORMATION

Acute toxicity:	Product not classified as oral acute toxic. Acute Toxicity Estimates (ATE) ATE (oral): > 5000 mg/kg
Skin irritation/corrosion:	It is not expected that the product presents skin irritation potential.
Eye damage/irritation:	It is not expected that the product presents eye irritation potential. Only

	in case of mechanical violation of the container. Information relating to: - Confidential 3: Causes serious eye irritation.
Respiratory or skin sensitization:	It is not expected that the product presents respiratory or skin sensitization potential. Only in case of mechanical violation of the container. Information relating to: - Confidential 2: May cause allergic skin reactions, dermatitis and itching.
Reproductive cell mutagenicity:	It is not expected that the product has reproductive cell mutagenicity.
Carcinogenicity:	It is not expected that the product have carcinogenicity to humans. Only in case of mechanical violation of the container. - Confidential 1: Confirmed animal carcinogen with unknown relevance to humans (Category A3 - ACGIH). - Confidential 2: Confirmed human carcinogen (Category A1 - ACGIH). - Lead compounds: The inorganic lead is considered probable carcinogenic to humans (Group 2A - IARC).
Reproductive toxicity:	It is not expected that the product has toxicity to the reproduction. Only in case of mechanical violation of the container. Information relating to: - Confidential 1: May damage fertility or the unborn child. - Lead compounds: Lead is considered a possible agent teratogenic to humans, may cause reduced fertility in men, women and harm fetal development.
Specific target organ toxicity	It is not expected that the product presents specific target organ toxicity

– single exposure:	– single exposure.
Specific target organ toxicity – repeated exposure:	It is not expected that the product presents specific target organ toxicity – repeated exposure. Only in case of violation mechanical container. Information relating to: - Confidential 1: Causes damage to kidneys and blood by prolonged or repeated exposure. - Confidential 6: Causes liver damage by repeated or prolonged exposure. - Lead compounds: The prolonged and repeated exposure can have effects on the central nervous system, liver and kidneys, resulting in encephalopathy (e.g. convulsions), abdominal pain, and kidney failure.
Aspiration hazard:	It is not expected that the product presents aspiration hazard.
Toxicokinetics, metabolism and distribution:	No information is described on the toxicokinetics and metabolism of this product.

12- ECOLOGICAL INFORMATION

Environmental effects, behavior and fate of the product

Ecotoxicity:	Product not classified as dangerous for the aquatic environment. Only in case of violation mechanical container. Information related to: - Confidential 6: LC_{50} (fish, 96h): 3.6 mg/L
Persistence and degradability:	The product does not have persistence, and it is considered readily biodegradable. Only in case of violation mechanical container. Information relating to: - Confidential 2: Is not considered readily biodegradable in the aquatic environment.

Bioaccumulative potential:	It is not expected bioaccumulation potential in aquatic organisms.
Mobility in soil:	Not determined.
Other adverse effects:	There are not known other environmental effects for this product.

13- DISPOSAL CONSIDERATIONS

Methods of disposal to the chemical product, product waste and/or contaminated container and/or packaging:	Must be disposed as hazardous waste according to local regulations. The treatment and disposal should be evaluated specifically for each product. Federal, state and local laws should be consulted. Keep the remaining product in their original packaging and properly sealed. Disposal should be made as provided for the product. Do not reuse empty packaging. They may contain remnants of the product and must be closed and sent for proper disposal as required for the product.

14- TRANSPORT INFORMATION

International regulations	
Land:	UN - "United Nations" Recommendations on the TRANSPORT OF DANGEROUS GOODS. Model Regulations.
UN number:	N.A
Proper shipping name:	THERMO TUBE
Class or division:	N.A
Subsidiary risk:	N.A
Packing group:	NA
Sea:	IMO - "International Maritime Organization" International Maritime Dangerous Goods Code (IMDG Code).
UN number:	NA
Proper shipping name:	THERMO TUBE

Class or division:	N.A
Subsidiary risk:	NA
Packing group:	NA
Marine pollutant:	N
EmS:	F-B, S-X
Air:	IATA - "International Air Transport Association" Dangerous Goods Regulation (DGR).
UN number:	NOT FORBIDDEN FOR AIR TRANSPORT

15- REGULATORY INFORMATION

Convention concerning Safety in the use of Chemicals at Work (Convention 170) - International Labour Organization, 1990.

International Organization for Standardization - ISO 11014:2009.

16- OTHER INFORMATION

This SDS has been prepared based on the current knowledge about proper handling of the product and under normal conditions of use, in accordance with the application specified on the packaging. Any other use of the product involves its combination with other materials, and use forms other than those specified, are the responsibility of the user. Warns that the handling of any chemical requires prior knowledge of its dangers by the user. Workplace rests with the user company's product to promote the training of its employees and contractors about the potential risks from exposure to the chemical.

SDS elaborated in august, 2013.

Hazard statement for section 3:

H200 – Unstable explosive.

H228 – Flammable solid.

H250 – Catches fire spontaneously if exposed to air.

H271 – May cause fire or explosion; strong oxidizer.

H272 – May intesify fire; oxidizer.

H301 – Tóxic if swallowed.

H302 – Harmful if swallowed.

H303 – May be harmful if swallowed.

H317 – May cause an allergic skin reaction.

H319 – Causes serious eye irritation.

H332 – Harmful IF inhaled.

H350 – May cause cancer.

H351 – Suspected of causing cancer.

H360 – May damage fertility or the unborn child.

H372 – Causes damage to organs through prolonged or repeated exposure.

H400 – Very toxic to aquatic life.

H401 – Toxic to aquatic life.

H410 – Very toxic to aquqtic life with long lasting effects.

Abbreviations:

ACGIH – American Conference of Industrial Hygienists

BEI – Biological Exposure Index

CAS – Chemical Abstracts Service

LC_{50} – Lethal concentration 50%

N – No

NA – Not applicable

PVC – Polyvinyl chloride

SCBA – Self-Contained Breathing Apparatus

STEL – Short Term Exposure Limit

TLV – Threshold limit value

TWA – Time weighted average

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HSDB - HAZARDOUS SUBSTANCES DATA BANK. Available at: <http://toxnet.nlm.nih.gov/cgibin/sis/htmlgen?HSDB>. Access in: aug. 2013.

IARC - INTERNATIONAL AGENCY FOR RESEARCH ON CANCER. Available at: <http://monographs.iarc.fr/ENG/Classification/index.php>. Access in: aug. 2013.

IPCS - INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY – INCHEM. Available at: <http://www.inchem.org/>. Access in: aug. 2013.

NIOSH - NATIONAL INSTITUTE OF OCCUPATIONAL AND SAFETY. International Chemical Safety Cards. Available at: <http://www.cdc.gov/niosh/>. Access in: aug. 2013.

NITE-GHS JAPAN - NATIONAL INSTITUTE OF TECHNOLOGY AND EVALUATION. Available at: <http://www.safe.nite.go.jp/english/ghs_index.html>. Access in: aug. 2013.

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