SODIUM BROMATE

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
SODIUM BROMATE

OTHER NAMES

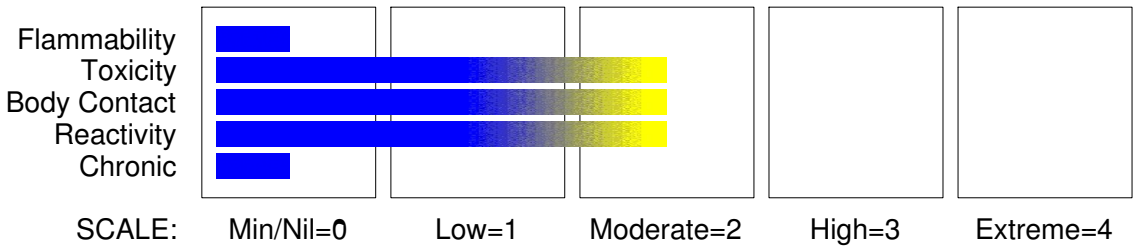
NaBrO3, "bromic acid, sodium salt"

PROPER SHIPPING NAME
SODIUM BROMATE

PRODUCT USE
Used as laboratory reagent.

SUPPLIER
Company: S D FINE- CHEM LIMITED
Address:
315- 317, T.V. INDUSTRIAL ESTATE,
248, WORLI,
MUMBAI- 400030.INDIA.
technical@sdfine.com
Telephone: 91- 22- 24959898
Telephone: 91- 22- 24959899
Fax: 91- 22- 24937232

HAZARD RATINGS



Section 2 - HAZARDS IDENTIFICATION

GHS Classification
Acute Toxicity (Oral) Category 4
Eye Irritation Category 2A
Oxidizing Solid Category 2
Respiratory Irritation Category 3
Skin Corrosion/Irritation Category 3

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EMERGENCY OVERVIEW

HAZARD

DANGER
Determined by using GHS criteria:
H335 H272 H302 H316 H319
May cause respiratory irritation
May intensify fire; oxidizer
Harmful if swallowed
Causes mild skin irritation
Causes serious eye irritation

PRECAUTIONARY STATEMENTS

Prevention

Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Keep away from heat.
Take any precaution to avoid mixing with combustible or incompatible materials.

Response

If skin irritation occurs, seek medical advice/attention.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists, get medical advice/attention.
Wear eye/face protection.
Specific treatment: refer to Label or MSDS.

Storage

Store away from combustibles and incompatible materials
Store locked up.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
sodium bromate	7789-38-0	>99

Section 4 - FIRST AID MEASURES

SWALLOWED

For advice, contact a Poisons Information Centre or a doctor.
· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
· For advice, contact a Poisons Information Centre or a doctor.

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Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
· Induce vomiting with fingers down the back of the of the throat, ONLY IF CONSCIOUS.
· Lean patient forward or place on left side (head-down position if possible) to maintain open airway and prevent aspiration.
NOTE: Wear a protective glove when inducing vomiting by mechanical means.
· In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
· If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
· If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

If this product comes in contact with the eyes:
· Immediately hold eyelids apart and flush the eye continuously with running water.
· Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
· Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
· Transport to hospital or doctor without delay.
· Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin contact occurs:
· Immediately remove all contaminated clothing, including footwear.
· Flush skin and hair with running water (and soap if available).
· Seek medical attention in event of irritation.

INHALED

· If dust is inhaled, remove from contaminated area.
· Encourage patient to blow nose to ensure clear passage of breathing.
· If irritation or discomfort persists seek medical attention.

NOTES TO PHYSICIAN

· Administer syrup of ipecac or gastric lavage with tap water or perhaps a 1% solution of sodium thiosulfate.
· Administer a demulcent and an analgesic like meperidine (Demerol). Avoid morphine.
· If readily available, the prompt use of haemodialysis or peritoneal lavage may serve to remove absorbed but unreacted bromate in significant amounts.
· Administer oxygen. If methaemoglobinaemia becomes severe a replacement transfusion with whole blood may become necessary.
· DO NOT attempt to correct methaemoglobinaemia with methylene blue as the dye may enhance the toxicity.
· Sodium thiosulfate solution (100 to 500 ml of 1%) by intravenous drip has been recommended by some authors.
· Correct dehydration by infusing intravenously a glucose solution (5% in water). Avoid electrolytes (except as above) unless acid-base imbalance or shock becomes severe.
· Supportive treatment of acute renal failure.
[GOSSELIN et al, Clinical Toxicology of Commercial Products, Fifth Edition].

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Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
· Jet of water - Flooding quantities only.
· Water spray or fog.
· BCF (where regulations permit).
· Dry chemical Powder.
· Carbon Dioxide.

FIRE FIGHTING
· Alert Fire Brigade and tell them location and nature of hazard.
· May be violently or explosively reactive.
· Wear breathing apparatus plus protective gloves.
· Prevent, by any means available, spillage from entering drains or water course.
· Consider evacuation (or protect in place).
· Fight fire from a safe distance, with adequate cover.
· Extinguishers should be used only by trained personnel.
· Use water delivered as a fine spray to control fire and cool adjacent area.
· Avoid spraying water onto liquid pools.
· Do not approach containers suspected to be hot.
· Cool fire exposed containers with water spray from a protected location.
· If safe to do so, remove containers from path of fire.
· If fire gets out of control withdraw personnel and warn against entry.
· Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD
WARNING!.
Oxidising Agent.
· Will not burn but increases intensity of fire.
· Heating may cause expansion or decomposition leading to violent rupture of containers.
· Heat affected containers remain hazardous.
· Contact with combustibles such as wood, paper, oil or finely divided metal may produce spontaneous combustion or violent decomposition.
· May emit irritating, poisonous or corrosive fumes.
Decomposition may produce toxic fumes of: halogens and caustic compounds.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS
WARNING!.
Oxidising Agent.
· Clean up all spills immediately.
· No smoking, naked lights, ignition sources.
· Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result.
· Avoid breathing dust or vapours and all contact with skin and eyes.
· Control personal contact by using protective equipment.
· Contain and absorb spill with dry sand, earth, inert material or vermiculite.
· DO NOT use sawdust as fire may result.
· Scoop up solid residues and seal in labelled drums for disposal.
· Neutralise/decontaminate area.

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MAJOR SPILLS

· Clear area of personnel and move upwind.
· Alert Fire Brigade and tell them location and nature of hazard.
· May be violently or explosively reactive.
· Wear breathing apparatus plus protective gloves.
· Prevent, by any means available, spillage from entering drains or water courses.
· Consider evacuation (or protect in place).
· No smoking, flames or ignition sources.
· Increase ventilation.
· Contain spill with sand, earth or other clean, inert materials.
· NEVER USE organic absorbents such as sawdust, paper or cloth.
· Use spark-free and explosion-proof equipment.
· Collect any recoverable product into labelled containers for possible recycling.
· Avoid contamination with organic matter to prevent subsequent fire and explosion.
· DO NOT mix fresh with recovered material.
· Collect residues and seal in labelled drums for disposal.
· Wash area and prevent runoff into drains.
· Decontaminate equipment and launder all protective clothing before storage and re-use.
· If contamination of drains or waterways occurs advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:
sodium bromate 60 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:
sodium bromate 12.5 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:
sodium bromate 1.5 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects:
sodium bromate 0.6 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

· Avoid personal contact and inhalation of dust, mist or vapours.
· Provide adequate ventilation.
· Always wear protective equipment and wash off any spillage from clothing.
· Keep material away from light, heat, flammables or combustibles.
· Keep cool, dry and away from incompatible materials.
· Avoid physical damage to containers.

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· DO NOT repack or return unused portions to original containers. Withdraw only sufficient amounts for immediate use.
· Contamination can lead to decomposition leading to possible intense heat and fire.
· When handling NEVER smoke, eat or drink.
· Always wash hands with soap and water after handling.
· Use only good occupational work practice.
· Observe manufacturer's storing and handling directions.

SUITABLE CONTAINER

Glass container.
· Metal can or drum
· Packaging as recommended by manufacturer.
· Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY

Avoid storage with acids, reducing agents, ammonium compounds, organic materials, combustible materials, aluminium, arsenic, powdered metals, metal sulfides, phosphorus, lead acetate, selenium and sulfur.
· Mixtures of bromates with organic sulfurised matter are heat and friction sensitive.
· During the oxidation of alkaline sodium bromate to perbromate by fluorine explosions have been reported in the vapour above the solution.
Intimate mixtures of chlorates, bromates or iodates of barium, cadmium, calcium, magnesium, potassium, sodium or zinc, with finely divided aluminium, arsenic, copper, carbon, phosphorus, sulfur, hydrides of alkali- and alkaline earth-metals; sulfides of antimony, arsenic, copper or tin; metal cyanides, thiocyanates; or impure manganese dioxide may react explosively or violently, either spontaneously (especially in the presence of moisture) or on initiation by heat, impact or friction, sparks or addition of sulfuric acid. BRETHERICKS HANDBOOK OF REACTIVE CHEMICAL HAZARDS, 4th Edition.

STORAGE REQUIREMENTS

· Store in original containers.
· Keep containers securely sealed as supplied.
· Store in a cool, well ventilated area.
· Keep dry.
· Store under cover and away from sunlight.
· Store away from flammable or combustible materials, debris and waste. Contact may cause fire or violent reaction.
· Store away from incompatible materials and foodstuff containers.
· DO NOT stack on wooden floors or pallets.
· Protect containers from physical damage.
· Check regularly for leaks.
· Observe manufacturer's storage and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

X	X	X	X	0	0

+: May be stored together
O: May be stored together with specific preventions
X: Must not be stored together

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

• sodium bromate: CAS:7789- 38- 0

MATERIAL DATA

These "dusts" have little adverse effect on the lungs and do not produce toxic effects or organic disease. Although there is no dust which does not evoke some cellular response at sufficiently high concentrations, the cellular response caused by P.N.O.C.s has the following characteristics:

· the architecture of the air spaces remain intact,
· scar tissue (collagen) is not synthesised to any degree,
· tissue reaction is potentially reversible.

Extensive concentrations of P.N.O.C.s may:

· seriously reduce visibility,
· cause unpleasant deposits in the eyes, ears and nasal passages,
· contribute to skin or mucous membrane injury by chemical or mechanical action, per se, or by the rigorous skin cleansing procedures necessary for their removal. [ACGIH]

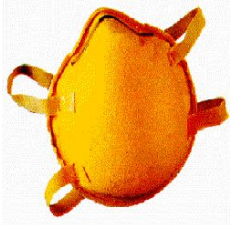
This limit does not apply:

· to brief exposures to higher concentrations
· nor does it apply to those substances that may cause physiological impairment at lower concentrations but for which a TLV has as yet to be determined.

This exposure standard applies to particles which

· are insoluble or poorly soluble* in water or, preferably, in aqueous lung fluid (if data is available) and
· have a low toxicity (i.e.. are not cytotoxic, genotoxic, or otherwise chemically reactive with lung tissue, and do not emit ionizing radiation, cause immune sensitization , or cause toxic effects other than by inflammation or by a mechanism of lung overload).

PERSONAL PROTECTION

EYE

· Safety glasses with side shields; or as required,
· Chemical goggles.
· Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

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HANDS/FEET

Wear chemical protective gloves, eg. PVC.
Wear safety footwear.

OTHER

· Overalls.
· Eyewash unit.

RESPIRATOR

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	P1 Air- line*	- -	PAPR- P1 -
50 x ES	Air- line**	P2	PAPR- P2
100 x ES	-	P3	-
		Air- line*	-
100+ x ES	-	Air- line**	PAPR- P3

* - Negative pressure demand ** - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25- 0.5 m/s (50- 100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5- 1 m/s (100- 200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200- 500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood- local control only

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

White, deliquescent powder or granules, soluble in water.
No odour. Solubility in water = 28%. Absorbs water from air and becomes hard. Strong oxidising agent. Insoluble in alcohol.

PHYSICAL PROPERTIES

Solid.
Mixes with water.

Molecular Weight: 150.90
Melting Range (°C): 381 (Decomposes)
Solubility in water (g/L): Miscible
pH (1% solution): Not available.
Volatile Component (%vol): Not applicable.
Relative Vapour Density (air=1): Not applicable
Lower Explosive Limit (%): Not applicable
Autoignition Temp (°C): Not applicable
State: Divided solid

Boiling Range (°C): Not applicable.
Specific Gravity (water=1): 3.34
pH (as supplied): Not applicable
Vapour Pressure (kPa): Not applicable
Evaporation Rate: Not applicable
Flash Point (°C): Not applicable
Upper Explosive Limit (%): Not applicable
Decomposition Temp (°C): Not available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable under normal handling conditions.
- Prolonged exposure to heat.
- Hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
Nausea and vomiting are almost always apparent after bromate poisonings, usually with epigastric pain. Diarrhoea occurs occasionally and there has been a report of haematemesis (vomiting of blood). These effects have been related to the corrosive actions of hydrobromic acid and bromine produced by acids acting upon bromate ions in the

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stomach. However, experiments with gastric juices on potassium bromate failed to produce bromine or bromine ion above pH 1.0. Loss of hearing has also been reported following ingestion of bromate, 0.5-40 grams, either as the sodium or potassium salt. The onset of deafness occurred within 4 to 16 hours following ingestion, was severe, sensorineural and irreversible. Vestibular function did not appear to have been affected. Bromates are nephrotoxic (cause damage to the kidney) and in man and animals death is due to acute renal failure. Albuminuria and other evidence of impaired kidney function may persist for several days or weeks after ingestion and convalescence may be slow. Bromates also produce central nervous system depression with transient restlessness, apathy with mild lethargy evident amongst poisoned children.

EYE

Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals.
Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

SKIN

The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
Toxic effects may result from skin absorption.

INHALED

Limited evidence exists, or practical experience predicts, that the material produces irritation of the respiratory system in a significant number of individuals following inhalation.
Although inhalation is not thought to produce harmful effects (as classified under EC Directives), the material may still produce health damage, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally confined to doses producing mortality rather than those producing morbidity (disease, ill-health).

CHRONIC HEALTH EFFECTS

Principal routes of exposure are by accidental skin and eye contact and inhalation of generated dusts.
No human exposure data available. For this reason health effects described are based on experience with chemically related materials.
As with any chemical product, contact with unprotected bare skin; inhalation of vapour, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice.

TOXICITY AND IRRITATION

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 400 mg/kg	Nil Reported
	Skin (rabbit) LD50: >2000 mg/kg

Somnolence, muscle weakness, dyspnae, respiratory depression, diarrhoea, haematuria recorded.

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Section 12 - ECOLOGICAL INFORMATION

No data for sodium bromate.

Section 13 - DISPOSAL CONSIDERATIONS

· Recycle wherever possible. Special hazard may exist - specialist advice may be required.
· Consult manufacturer for recycling options.
· Consult State Land Waste Management Authority for disposal.
· Bury or incinerate residue at an approved site.
· Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.
· Puncture containers to prevent re-use and bury at an authorised landfill.
For small quantities of oxidising agent:
· Cautiously acidify a 3% solution to pH 2 with sulfuric acid.
· Gradually add a 50% excess of sodium bisulfite solution with stirring.
· Add a further 10% sodium bisulfite.
· If no further reaction occurs (as indicated by a rise in temperature) cautiously add more acid.

Section 14 - TRANSPORTATION INFORMATION

Labels Required: OXIDIZING AGENT
HAZCHEM: 1YE

UNDG:

Dangerous Goods Class:	5.1	Subrisk:	None
UN Number:	1494	Packing Group:	II

Shipping Name:SODIUM BROMATE

Air Transport IATA:

ICAO/IATA Class:	5.1	ICAO/IATA Subrisk:	None
UN/ID Number:	1494	Packing Group:	II
Special provisions:	None		

Shipping Name: SODIUM BROMATE

Maritime Transport IMDG:

IMDG Class:	5.1	IMDG Subrisk:	None
UN Number:	1494	Packing Group:	II
EMS Number:	F- H, S- Q	Special provisions:	None

Shipping Name: SODIUM BROMATE

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Section 15 - REGULATORY INFORMATION

REGULATIONS

No regulations applicable
No data available for sodium bromate as CAS: 7789-38-0.

Section 16 - OTHER INFORMATION

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 28-Jun-2018