UNIVERSITY OF Southampton

RECORD OF RISK ASSESSMENT

Title of the risk assessment	Equipment Risk Assessment for Metprep Saphir 520 grinding/polishing machine in nCATS Laboratory
Date risk assessment carried out	30th August 2018
Describe the work being assessed	Grinding and lapping of samples for surface characterisation and tribological testing for teaching, research and for commercial clients.
Describe the location at which the work is being carried out	Building 7, room 2023
Where appropriate list the individuals doing the work and the dates/times when the work will be carried out	Visitors, Technical, Academic Staff, Research and Project Students
List any other generic or specific risk assessments or other documents that relate to this risk assessment – use hyperlinks if possible	"Risks outside this generic assessment (based on the materials employed) will require a separate assessment to be made. Undergraduate student (and where appropriate staff) research activities to be risk assessed on individual basis."
Name and post of risk assessor	Terry Harvey, Area Academic Lead
List the names and post of those assisting in compiling this risk assessment	
Name, post and where required, signature of the responsible manager/supervisor approving the risk assessment	Ling Wang, Head of Group
Reference number and version number of risk assessment	Version One

Assessment

Title of risk assessment	Equipment Risk Assessment for lapping machine in nCATS Laboratory

Risk Acceptability	
1-3	Risk Acceptable
4-6	Risk to be reduced if readily possible
7-14	Risk to be reduced if reasonably practicable
15-25	Risk Unacceptable

Risk Matrix			Severity				
			very low	low	medium	high	very high
			1	2	3	4	5
Likelihood	Certain	5	5	10	15	20	25
	Likely	4	4	8	12	16	20
	Possible	3	3	6	9	12	15
	Less likely	2	2	4	6	8	10
	Improbable	1	1	2	3	4	5

ref	Task/Aspect of work	Hazard	Harm and how it could arise	Who could be affected?	Existing measures to control risk	Risk Factors: Overall Likelihood	Risk Factors: Overall Severity	Residual Risk Score	Any changes or extra controls?
1	Machinery and equipment	Finger trap; rotating components; sharp edges	Crush injury, bruising, trapping as the sample holder is lowered onto the grinding/lapping discs; cuts, bruising and amputation due to entanglement in rotating machinery; cuts on samples that have been ground and lapped producing sharp edges	User	Users are trained in the safe operation of the rig.	1	3	3	no
2	Fire	Ignition of flammable substances	Burn, smoke inhalation due ignition of flammable chemicals	All	Only small volumes of flammable substances are used, all electrical sources of ignition are away from flammables and insulated	1	2	2	no
3	Electrical equipment	Electricity	Electrical shock/burn from contact with mains powered equipment	User	Installation and maintenance of equipment conducted by qualified electricians. Users will do a quick visual inspection before use. Annual PAT testing.	1	2	2	no
4	Pneumatic loading system	Pressurised air	Injury from pressurised jet due to escape of compressed air	User	The rig is connected by standard push-it connectors to laboratories 6 mm plastic pipe. All other pneumatics are handled internally within the rig.	1	2	2	no

Post Risk Assessment Actions

Title of risk assessment

Equipment Risk Assessment for lapping machine in nCATS Laboratory

Have any of the specialist control measures listed below been identified as required during risk assessment? – indicate yes or no – if yes then include details on the post assessment action list below.	**yes/no**
Is any exposure monitoring required?	No
Is any occupational health monitoring required?	No
Are there any hazards or other factors that could affect pregnant or nursing mothers?	No

Is any specific training required before people can carry out this work?	Yes
All operators of equipment should have training in that equipment before they carry out any experimental work	

Are there any additional procedures or risk assessments required as a result of this risk assessment?	Yes
Training on test equipment undertaken plus undergraduate students and visitors will be required to complete a Risk Assessment before any testing starts.	

Are there any specialist disposal arrangements required?	No

Are there any special emergency arrangements required?	No

Post Assessment Actions			
Ref	Action	By whom	By when

Examples of hazards	Examples of work activities during hazard may be encountered	Examples of harm that can result if risks are not adequately controlled
Substances that are harmful if contacted, ingested, injected, inhaled	Use or generation during laboratory work, cleaning activities, outdoor pursuits, maintenance work	Dermatitis, chemical burn, poisoning or other illness
Manual handling	lifting, carrying, pushing, pulling, sliding of equipment or people	Bruising, Back injury, strains
Water	watersports, outdoor pursuits, field work, research using flumes	drowning
Pressure and vacuum systems	compressed air or gas systems, vacuum rigs	explosion or implosion, injury from pressure jets, hearing damage
Psychological	working alone, overseas, isolated situations, adverse conditions	stress or distress, suicide, long term mental conditions
Vehicle	moving or manoeuvring vehicles on public or private roads or yards, towing, cross country	Crushing, impact injuries
Electrical	equipment, temporary generators or supplies, experimental rigs, exposed cables, maintenance work	Electrical shock/burn
Environmental	exposure to extremes of heat, cold, wind, dust during field work or maintenance work	Hot burns, cold burns
Height	working at height, outdoor activities	Cuts/bruises, Broken bones, Concussion
Fire	flame cutting equipment, welding or brazing, heating equipment, outdoor barbeques or fires	burns, smoke inhalation,
Ionising radiation	radioactive materials, imaging machines	long term illness, burns
Machinery and equipment	workshop tools, mobile equipment, hand tools	Crushing. trapping, cuts and bruises, amputation
Non Ionising radiation	lasers, ultrasound, microwaves	surface or deep burns, eyesight damage
Noise or vibration	agricultural machinery, wind tunnels. vehicles. workshop equipment, test rigs	hearing loss, hand arm vibration syndrome, internal organ damage
Confined spaces	entering tanks, voids in buildings, boilers, furnaces, sewer and water pipes and manholes	Asphyxiation, illness due to breathing harmful gasses or vapours, explosion

Faculty of Engineering and the Environment	Method Statement (Equipment)

Name of Equipment Metprep Saphir 520 grinding/lapping machine			
Location of Equipment *(Building and Room/Laboratory number)*	7/2023	**Date**	30th August 2018
Assessor *(Name, ID number)* Dr. Terry Harvey, 11467115		**Contact Details** *(Email, Telephone number)* harveyt@soton.ac.uk; x23761	
Supervisor Prof. Ling Wang		**Contact Details** *(Email, Telephone, Room number)* Ling.wang@soton.ac.uk; 7/4081, x25076	

Introduction / Overview.
(What is the purpose of the equipment? Who is likely to use it?)

The Metprep Saphir 520 grinding/lapping machine is used in the preparation of engineering surfaces for Teaching, Research and Commercial Clients.

A printout of this method statement, the associated Equipment Risk Assessment (ERA), along with a list of users will be kept near the equipment. Also included will be contact details of the equipment leader(s) (person or persons responsible for maintenance and training of the equipment). Also included are a products data sheets for common grinding and lapping consumables, these are classified as not harmful to health or hazardous to the environment and does not present a fire hazard.

Note any activities outside those contained within this document will require an individual risk assessment.

All users will receive a copy of the above documents once they have been trained for unsupervised operation.

Description of Equipment.
(*Provide details of the equipment, what is does and how it does it – the more detail you provide the more likely is anybody reading this will understand what is being done)*
The Saphir 520 has a rotating base that the magnet platen is positioned on, see Figure 1. This enables a variety of consumable discs (such MD-Piano, MD-Nap, MD-Allegro, etc.) to be affix to the top by the magnet offering both coarse (grinding) or fine (lapping) removal of material. Lubrication can be applied either by the water spray system. For the cloths (such as MD-Nap) the lapping fluid is applied manually from a dispensing bottle. The amount of lubrication/lapping fluid is varied according the operation and material been processed.

Figure 1 Image of the Saphir 520 grinding/lapping machine with labels for important parts.

During operation the selected grade of grinding disc or lapping cloth disc are place on the magnetic platen, the sample holder, see Figure 2, is lowered into position over the disc and up to five samples are placed in the slots. Using the control panel, see Figure 3 the rotating speed of the base plate (and thus discs) is set. Also the applied load to the sample can be adjusted and grinding/lapping duration can be set. Once the conditions are set, either the lubricant (water) is turned on or lapping fluid applied, then the machine can be started. The grinding/lapping will automatically run for the set period and during this time a load will be applied to each sample via the pneumatic system (internally within the machine) and the base plate (and attached disc) and sample will rotate. During this period the user will have been trained not to approach rotating components and observe operation remotely but close enough to stop the machine if a problem occurs.

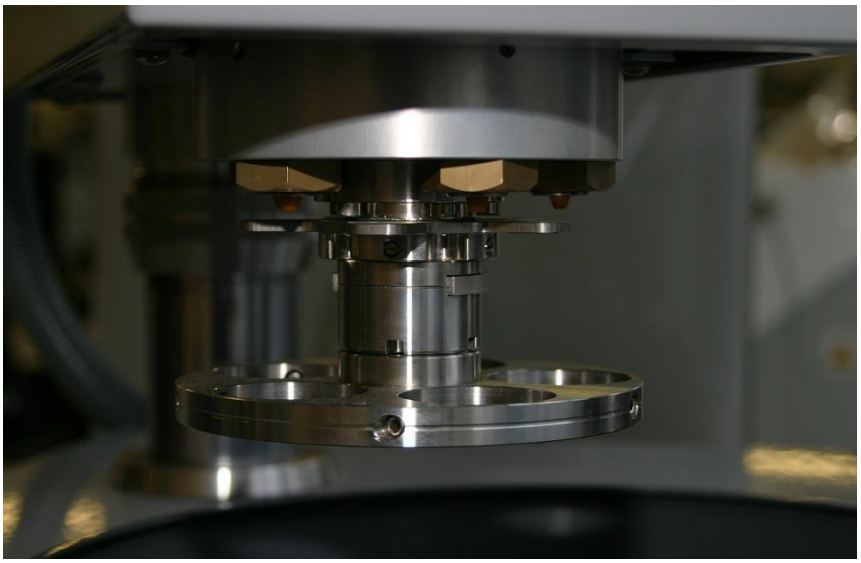

Figure 2 Image of the feed system for supplying diamond and lubricant to lapping discs.

Once the rotating components stop and the samples are removed from the holder and either dried if water was used as lubricant or wiped clean, then washed with a solvent (isopropanol) and dried to remove any

trace of the lapping fluid. The samples are then ready for the next step of the grinding/lapping process, which will mean a smaller size of abrasive particle/material; this could either a change of grinding disc or lapping fluid.

Once the grinding/lapping process is finished the machine is cleaned and returned to park position, by raising the sample holder and turning the machine off at the mains socket.

Figure 3 Image of the control panel.

The control panel, see Figure 3, is used to adjusted and select various functions including:

- Adjust the working duration,
- Adjust the load on the samples and whether it is applied individually to the samples or centrally to the sample holder,
- Adjust the rotation speed,
- Adjust the direction of sample holder rotation: options are synchronous (same direction of base unit) or reverse (opposite direction of base unit),
- Select if water lubrication or suspension feed is used, the latter is not available but will be used with the lapping cloths and fluids,
- Save, load and run grinding/lapping programs,
- Turn water on and off,
- Lower and raise sample holder.

During training users are made aware of the health and safety aspects of operation this machine. These include hazards involving the rotating base and sample holder; users are trained to employ the remote operation system, via the control panel, and to remain away from the rig while it is rotating. Also lowering the sample holder into position can lead to finger/hand trapping and users are made aware of this during training.

Other health and safety issues come from the process itself, grinding and lapping can produce sharp edges on samples and users are made aware of this in training. As the machine is electrical powered by single phase mains electricity it is annually PAT tested (and labelled accordingly), users are also trained to perform a visual examination of the mains lead prior to testing. The machine uses air pressure (from main air-line connected to a remote compressor) to pneumatically raise and lower the sample holder, as well as

load the sample holder/samples. The machine has been connected to an existing 6 mm nylon air-line via a push-fit 't'-piece with an appropriate adaptor to the back of the machine. All other pneumatics are contained internal within the machine, for which it is designed.

Identification of risks and risk mitigation

(list all associated risk likely encountered when using the equipment and any existing risk mitigation in place)

Type of Risk: Rotating machinery

Hazards: The machine uses a rotating base and sample holder.

Mitigation: The rotation speeds are moderate (100s rpm) and offer no snag points for entanglement. Operation is also remotely performed so that the user should not be near the rotation components during operation. There is an emergency stop button on the front of the machine, which is easily accessible during operation.

Type of Risk: Pressure gas

Hazards: The machine uses compressed air to run the pneumatically powered loading system.

Mitigation: The connection to the machine is via standard push-fit employed through the laboratory, all other pneumatic (air pressurised) system are contained within the machine, which is purpose built for this type of operation.

Type of Risk: Electrical equipment

Hazards: The lapping machine has an electric operated motor and pump. The motor and its electrical system are contained within the machine. The pump is a self-contained unit, with a lead that connects the main unit.

Mitigation: The machine has been designed for purpose and has been supplied by a company. Annual PAT testing ensures that it is safe to use.

Type of Risk: Chemicals

Hazards: Isopropanol solvent is used: is used for general cleaning.

Mitigation: Appropriate PPE is supplied and users are required to wear them when handling this chemicals. Waste solvent is collected for hazardous waste disposal. COSHH forms and MSDS are provided.

Control Measures including training, PPE

(Identify significant hazards and actions/control measures to be taken)

All users will be trained in the safe operation of the polishing machine. Until training is complete all trainees will be supervised and not allowed to operate the machine by themselves.

Emergency Equipment Shutdown Procedure

(Describe the steps to shut the equipment in the event of an emergency and the location of any emergency stop(s) the equipment has)

In the event of emergency the polishing machine can be stopped using the red emergency stop button on the front of the machine, see Figure 1.

Unattended running

(Can this rig be run unattended? And if so what precautions are needed)

Due to the duration of grinding and lapping unattended running is not common and it is recommended that this is not done.

Faculty of Engineering and the Environment
COSHH assessment form

This form must be completed **before** any work with substances hazardous to health is begun, so that a suitable and sufficient assessment of the health risks is made.

Procedure being carried out	Using Saphir 520 grinding/lapping machine		
Location where the substance will be used	7/2023		
What supervision or training will the person carrying out the procedure receive?	Training by / instruction from facility manager of experienced user	**Review date** [1]	30/8/2018
	Name	**Signature**	**Date**
Person performing the work	Dr. Terry Harvey		
Supervisor/grant holder	Prof. Ling Wang		
Divisional Safety Officer or other designated person	Dr. Terry Harvey		

[1] This assessment should be reviewed immediately if there is any reason to consider that the original assessment is no longer valid, e.g. due to significant changes in the work activity.

Attachments
The following documents must be attached:
- Risk assessment identifying the need for the COSHH assessment and clearly indicating the persons potentially at risk (e.g. staff, students, visitors etc.)
- Full description of the procedure.
- MSDS for all substances in 1 a) or b) below
- Any health and safety information provided by supplier in 1 c) below

1 Nature of the hazard and risks identified

a) Chemicals with Health hazards H phrases H300, H301, H304, H310, H311, H314, H318, H330, H331, H334, H340, H341, H350, H351, H360, H361, H370, H371, H372, H373, EUH029, EUH031, EUH032

Name of substance	Hazard phrases (Refer to MSDS - must be attached)	Possible exposure route (see key below)[2]	Risk from single acute exposure	Risks from repeated low exposure	Duration of adverse effect	Effects could be hazardous to human reproductive systems
Propanol	H319, H336	1, 2	Serious	Not serious	Short term	Not known

[2] (1) Contact skin and/or eyes, (2) Inhalation, (3) Injection and/or sharps

b) Substances with Physical hazards H phrases H200, H201, H202, H203, H204, H205, H220, H221, H222, H223, H224, H225, H226, H228, H240, H241, H242, H250, H251, H252, H260, H261, H270, H271, H272, H280, H281, EUH001, EUH006, EUH014, EUH018, EUH019, EUH044

Name of substance	Hazard phrases (Refer to MSDS - must be attached)	What are the storage requirements for this material? How will they be met?	Quantity used in procedure	Quantity likely to be held in storage	Risk in planned use	Risk in uncontrolled release from storage
Propanol	H225	Supplied bottle or solvent spray bottle	10-100ml	5 litres	Minor	Minor

c) Substances without a CAS No and no associated H phrases

Name of substance	Nature of the hazard e.g. biological, flammable, explosive, corrosive	Any other information relating to risks arising from this hazard
n/a		

2 Use of substance and control of risks

a) Control measures

Name of substance	Provide a description of the control measures in place to protect the health and safety of both the user and other persons who may be exposed. Control measures should aim to reduce the risks of exposure to the minimum achievable. Consideration should be given to the use of alternative substances which are less hazardous and have a lower risk associated with their use. In this section you should also provide details of any post reactive products that have been made as a result of the procedure you have followed and the control measures you intend to use to minimise risks associated with these products. Provide details of any monitoring that will be carried out (e.g. for airborne contaminants or of exposed individuals) [3]. (NB: a full description of the procedure must be attached)	List personal protective equipment or containment required
Propanol	Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.	nitrile gloves; laboratory coat; safety spectacles

[3] For the majority of work, atmospheric monitoring should not be necessary for protecting health, providing sufficient thought has gone into ensuring the adequacy of control measures in relation to risks, and the control measures are properly used and maintained

b) Emergency measures

Name of substance	Describe the actions to be taken in the event of uncontrolled release taking into account the quantity of the spill of the substance (i.e. several grams or kilograms), with details of any equipment and/or service required	List equipment and services required
Propanol	Minor spills can be adsorbed with laboratory wipes, very large spills may require evacuation of the laboratory after opening the windows	nitrile gloves; laboratory coat; safety spectacles

c) Disposal of substance or product resulting from its use.

Name of substance / product	Describe the method to be used for disposal of the substance or its products, with details of any control measures, services, labelling, and/or permissions required	List equipment and services required
Propanol	Disposal initial requires pouring waste liquid into the ‘waste solvent bottle’, when the bottle is full it will collected in as ‘hazardous waste’	Hazardous waste collection

SAFETY DATA SHEET

Creation Date 01-Sep-2009 **Revision Date** 30-May-2018 **Revision Number** 16

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identification

Product Description:	**Propan-2-ol**
Cat No. :	**P/7490/08, P/7490/15, P/7490/17, P/7490/21, P/7490/FP21, P/7490/25, P/7490/27, P/7490/DH25, P/7490/MC15, P/7490/PB08, P/7490/PB17, P/7490/PC24, P/7490/PC25, P/7490/21RSS, P/7490/24RSS, P/7490/25RSS, P/7490/34RSS, P/7490/27RSS**
Synonyms	2-Propanol; IPA; Isopropyl alcohol; Propan-2-ol; Isopropanol
CAS-No	67-63-0
EC-No.	200-661-7
Molecular Formula	C3 H8 O
Reach Registration Number	01-2119457558-25

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use	Laboratory chemicals.
Sector of use	SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites
Product category	PC21 - Laboratory chemicals
Process categories	PROC15 - Use as a laboratory reagent
Environmental release category	ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
Uses advised against	No Information available

1.3. Details of the supplier of the safety data sheet

Company	Fisher Scientific UK Bishop Meadow Road, Loughborough, Leicestershire LE11 5RG, United Kingdom
E-mail address	begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

Tel: 01509 231166
Chemtrec US: (800) 424-9300
Chemtrec EU: 001 (202) 483-7616

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Flammable liquids	Category 2 (H225)

Health hazards

Serious Eye Damage/Eye Irritation	Category 2 (H319)
Specific target organ toxicity - (single exposure)	Category 3 (H336)

Environmental hazards
Based on available data, the classification criteria are not met

2.2. Label elements

Signal Word **Danger**

Hazard Statements
H225 - Highly flammable liquid and vapor
H319 - Causes serious eye irritation
H336 - May cause drowsiness or dizziness

Precautionary Statements
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P240 - Ground/bond container and receiving equipment
P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

2.3. Other hazards

Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Isopropyl alcohol	67-63-0	200-661-7	>95	Flam. Liq. 2 (H225) Eye Irrit. 2 (H319) STOT SE 3 (H336)

Reach Registration Number	01-2119457558-25

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.
Ingestion	Do not induce vomiting. Obtain medical attention.
Inhalation	Move to fresh air. Obtain medical attention. If not breathing, give artificial respiration.
Self-Protection of the First Aider	Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

4.2. Most important symptoms and effects, both acute and delayed

Breathing difficulties. May cause central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically. Symptoms may be delayed.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
CO_2, dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.

Extinguishing media which must not be used for safety reasons
Do not use water jet. Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products
Carbon monoxide (CO), Carbon dioxide (CO_2), peroxides.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes and clothing.

6.2. Environmental precautions

Should not be released into the environment. See Section 12 for additional ecological information.

6.3. Methods and material for containment and cleaning up

Prevent further leakage or spillage if safe to do so. Remove all sources of ignition. Soak up with inert absorbent material. Take precautionary measures against static discharges. Use spark-proof tools and explosion-proof equipment. Keep in suitable, closed containers for disposal.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment. Keep away from open flames, hot surfaces and sources of ignition. Use explosion-proof equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Do not get in eyes, on skin, or on clothing. Do not breathe vapors or spray mist. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing before re-use. Wash hands before breaks and at the end of workday.

7.2. Conditions for safe storage, including any incompatibilities

Keep away from heat and sources of ignition. Flammables area. Keep container tightly closed in a dry and well-ventilated place.

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **UK** - EH40/2005 Containing the workplace exposure limits (WELs) for use with the Control of Substances Hazardous to Health Regulations (COSHH) 2002 (as amended). Updated by September 2006 official press release and October 2007 Supplement. **IRE -** 2010 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001. Published by the Health and Safety Authority.

Component	The United Kingdom	European Union	Ireland
Isopropyl alcohol	STEL: 500 ppm 15 min STEL: 1250 mg/m^3 15 min TWA: 400 ppm 8 hr TWA: 999 mg/m^3 8 hr		TWA: 200 ppm 8 hr. STEL: 400 ppm 15 min Skin

Biological limit values
List source(s):

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS70 General methods for sampling airborne gases and vapours
MDHS 88 Volatile organic compounds in air. Laboratory method using diffusive samplers, solvent desorption and gas

chromatography
MDHS 96 Volatile organic compounds in air - Laboratory method using pumped solid sorbent tubes, solvent desorption and gas chromatography

Derived No Effect Level (DNEL) See table for values

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				888 mg/kg
Inhalation				500 mg/m³

Predicted No Effect Concentration (PNEC) According to our experience and to the information provided to us, the product does not have any harmful effects if it is used and handled as specified. See values below.

Fresh water	140.9 mg/l
Fresh water sediment	552 mg/kg
Marine water	140.9 mg/l
Water Intermittent	140.9 mg/l
Food chain	160 mg/kg
Microorganisms in sewage treatment	2251 mg/l
Soil (Agriculture)	28 mg/kg

8.2. Exposure controls

Engineering Measures
Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure adequate ventilation, especially in confined areas.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Butyl rubber	> 480 minutes	0.5 mm	EN 374	Permeation rate < 0.9 µg/cm2/min
Nitrile rubber	> 360 - 480 minutes	0.35 - 0.55 mm		As tested under EN374-3 Determination of Resistance to Permeation by Chemicals
Viton (R)	> 480 minutes	0.4 mm		
Neoprene	< 40 minutes	0.7 mm		

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

Large scale/emergency use Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

Recommended Filter type: Organic gases and vapours filter Type A Brown conforming to EN14387

Small scale/Laboratory use

Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Recommended half mask:- Valve filtering: EN405; Half mask: EN140; plus filter, EN 141
When RPE is used a face piece Fit Test should be conducted

Environmental exposure controls No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance	Colorless	
Physical State	Liquid	
Odor	Alcohol-like	
Odor Threshold	No data available	
pH	7	1% aq. sol
Melting Point/Range	-89.5 °C / -129.1 °F	
Softening Point	No data available	
Boiling Point/Range	81 - 83 °C / 177.8 - 181.4 °F	@ 760 mmHg
Flash Point	12 °C / 53.6 °F	**Method -** Abel Closed Cup (BS 2000 Part 170, IP 170, AS/NZS 2106)
Evaporation Rate	1.7	ASTM D 3539 (Butyl acetate = 1.0)
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	**Lower** 2 Vol% **Upper** 12 Vol%	
Vapor Pressure	43 mmHg @ 20 °C	
Vapor Density	2.1 @ 20 °C / 68 °F	(Air = 1.0)
Specific Gravity / Density	0.785	ASTM D-4052
Bulk Density	Not applicable	Liquid
Water Solubility	Miscible	
Solubility in other solvents	No information available	

Partition Coefficient (n-octanol/water)

Component	**log Pow**
Isopropyl alcohol	0.05

Autoignition Temperature	425 - °C / 797 - °F	ASTM E-659
Decomposition Temperature	No data available	
Viscosity	2.27 mPa.s at 20 °C	
Explosive Properties	Not explosive	explosive air/vapour mixtures possible Vapors may form explosive mixtures with air
Oxidizing Properties	No information available	

9.2. Other information

Molecular Formula	C3 H8 O
Molecular Weight	60.1
VOC Content(%)	100% (Organic Carbon (by mass) = 59.9 %) (EC/1999/13)
Refractive index	1.377 at 20 °C / 68 °F (ASTM D-1218)
Surface tension	22.7 mN/m at 20 °C / 68 °F
Coefficient of expansion	0.0009 / °C
Dielectric constant	18.6 at 20 °C / 68 °F
Heat of vapourisation	665 J/g
Specific heat capacity	3 kJ/kg °C at 20 °C / 68 °F
Thermal conductivity	0.137 W/m °C at 20 °C / 68 °F

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions None under normal processing.

10.4. Conditions to avoid

Heat, flames and sparks. Keep away from open flames, hot surfaces and sources of ignition.

10.5. Incompatible materials

Strong oxidizing agents. Acids. Halogens. Acid anhydrides.

10.6. Hazardous decomposition products

Carbon monoxide (CO). Carbon dioxide (CO_2). peroxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Product Information

(a) acute toxicity;

Oral Based on available data, the classification criteria are not met
Dermal Based on available data, the classification criteria are not met
Inhalation Based on available data, the classification criteria are not met

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Isopropyl alcohol	5840 mg/kg (Rat)	13900 mg/kg (Rat) 12870 mg/kg (Rabbit)	72.6 mg/L (Rat) 4 h

(b) skin corrosion/irritation; Based on available data, the classification criteria are not met

(c) serious eye damage/irritation; Category 2

(d) respiratory or skin sensitization;

Respiratory Based on available data, the classification criteria are not met
Skin Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; Based on available data, the classification criteria are not met

(f) carcinogenicity; Based on available data, the classification criteria are not met

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; Based on available data, the classification criteria are not met

(h) STOT-single exposure; Category 3

Results / Target organs Central nervous system (CNS).

(i) STOT-repeated exposure; Based on available data, the classification criteria are not met

Target Organs None known.

(j) aspiration hazard; Based on available data, the classification criteria are not met

Symptoms / effects,both acute and delayed May cause central nervous system depression: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecotoxicity effects . Do not empty into drains.

Component	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
Isopropyl alcohol	LC50: = 11130 mg/L, 96h static (Pimephales promelas) LC50: > 1400000 µg/L, 96h (Lepomis macrochirus) LC50: = 9640 mg/L, 96h flow-through (Pimephales promelas)	13299 mg/L EC50 = 48 h 9714 mg/L EC50 = 24 h	EC50: > 1000 mg/L, 72h (Desmodesmus subspicatus) EC50: > 1000 mg/L, 96h (Desmodesmus subspicatus)	= 35390 mg/L EC50 Photobacterium phosphoreum 5 min

12.2. Persistence and degradability Expected to be biodegradable

Persistence Persistence is unlikely, based on information available.

12.3. Bioaccumulative potential Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Isopropyl alcohol	0.05	No data available

12.4. Mobility in soil The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces Will likely be mobile in the environment due to its volatility. Disperses rapidly in air

Surface tension 22.7 mN/m at 20 °C / 68 °F

12.5. Results of PBT and vPvB assessment Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB).

12.6. Other adverse effects

Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors

Persistent Organic Pollutant This product does not contain any known or suspected substance

Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues / Unused Products Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

European Waste Catalogue (EWC) According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.

Other Information Waste codes should be assigned by the user based on the application for which the product was used. Do not dispose of waste into sewer. Can be incinerated, when in compliance with local regulations.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

14.1. UN number UN1219
14.2. UN proper shipping name Isopropanol (Isopropyl alcohol)
14.3. Transport hazard class(es) 3
14.4. Packing group II

ADR

14.1. UN number UN1219
14.2. UN proper shipping name Isopropanol (Isopropyl alcohol)
14.3. Transport hazard class(es) 3
14.4. Packing group II

IATA

14.1. UN number UN1219
14.2. UN proper shipping name Isopropanol
14.3. Transport hazard class(es) 3
14.4. Packing group II

14.5. Environmental hazards No hazards identified

14.6. Special precautions for user No special precautions required

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

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

International Inventories X = listed.

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Isopropyl alcohol	200-661-7	-		X	X	-	X	X	X	X	X

National Regulations

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Isopropyl alcohol	WGK 1	

Component	France - INRS (Tables of occupational diseases)
Isopropyl alcohol	Tableaux des maladies professionnelles (TMP) - RG 84

Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment.

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has been conducted by the manufacturer/importer

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3

H225 - Highly flammable liquid and vapor
H319 - Causes serious eye irritation
H336 - May cause drowsiness or dizziness

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

IECSC - Chinese Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

ENCS - Japanese Existing and New Chemical Substances

AICS - Australian Inventory of Chemical Substances

NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit

ACGIH - American Conference of Governmental Industrial Hygienists

DNEL - Derived No Effect Level

RPE - Respiratory Protective Equipment

LC50 - Lethal Concentration 50%

NOEC - No Observed Effect Concentration

PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average

IARC - International Agency for Research on Cancer

PNEC - Predicted No Effect Concentration

LD50 - Lethal Dose 50%

EC50 - Effective Concentration 50%

POW - Partition coefficient Octanol:Water

vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road

IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code

OECD - Organisation for Economic Co-operation and Development

BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association

MARPOL - International Convention for the Prevention of Pollution from Ships

ATE - Acute Toxicity Estimate

VOC - Volatile Organic Compounds

Key literature references and sources for data

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
First aid for chemical exposure, including the use of eye wash and safety showers.
Fire prevention and fighting, identifying hazards and risks, static electricity, explosive atmospheres posed by vapours and dusts.

Creation Date	01-Sep-2009
Revision Date	30-May-2018
Revision Summary	SDS sections updated, 9.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet