UNIVERSITY OF BATH HEALTH AND SAFETY STANDARD					
Controlling Fire and Explosion Risk					
Version Number	Version 3	Date of Approval	March 2023	Review Date	Three years from acceptance by UHSC
Author and Lead	Mark Burton; Fire Safety Advisor Debbie Robarts; Scientific Safety Advisor				
Aims	The University is committed to ensuring the health, safety and welfare of all staff, students and visitors. Fundamental to achieving this objective is to identify, assess and control fire and explosion risks in the workplace. To achieve this the University shall aim to make a suitable and sufficient assessment of all significant fire and explosion hazards to reduce the risk of harm to a tolerable level. The aim of this standard is to describe the University's arrangements for identifying and assessing risks associated with the use of dangerous substances that could result in a fire and/or explosion, and to ensure that control measures are identified and implemented to reduce the risk of fire/explosion, so far as is reasonably practicable, to a tolerable level.				
Scope	The requirements of this standard apply to all employees of the University of Bath while undertaking their work activities both on and off campus. It also applies to all persons including students, members of the public, contractors etc. whilst on University of Bath property and who may be affected by the Universities work activities. Typical work activities include: • use of flammable solvents in laboratories • transporting flammable substances in containers around a workplace • use of flammable gases, such as acetylene, for welding • handling and storage of flammable wastes such as fuel oils • handling, storage and use of gases under pressure • handling, storage and use of substances corrosive to metal				
Relevant Legislation	• Health & Safety at Work etc. Act 1974 (HASWA) • The Management of Health & Safety at Work Regulations 1999 (MHSWR) • Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) • Regulatory Reform (Fire Safety) Order 2005 • SHEW Fire Safety Policy • SHEW Risk Assessment Standard • HSE Guidance DSEAR in detail				
Definitions	Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR) Requires employers to assess the risks of fires and explosions that may be caused by dangerous substances in the workplace. These risks must then be eliminated or reduced as far as is reasonably practicable.				
	Dangerous Substances Dangerous substances are substances or mixtures of substances (called 'preparations' in DSEAR) that could create risks to people's safety from fires and explosions or similar events, such as 'thermal runaway' from chemical reactions, or which are corrosive to metal. Liquids, gases, vapours and dusts that may be found in a workplace can all be dangerous substances. Examples include: • Solvents, such as acetone, toluene, diethyl ether • Paints and varnishes • Flammable gases such as acetylene, hydrogen, propane • Liquefied petroleum gas (LPG)				

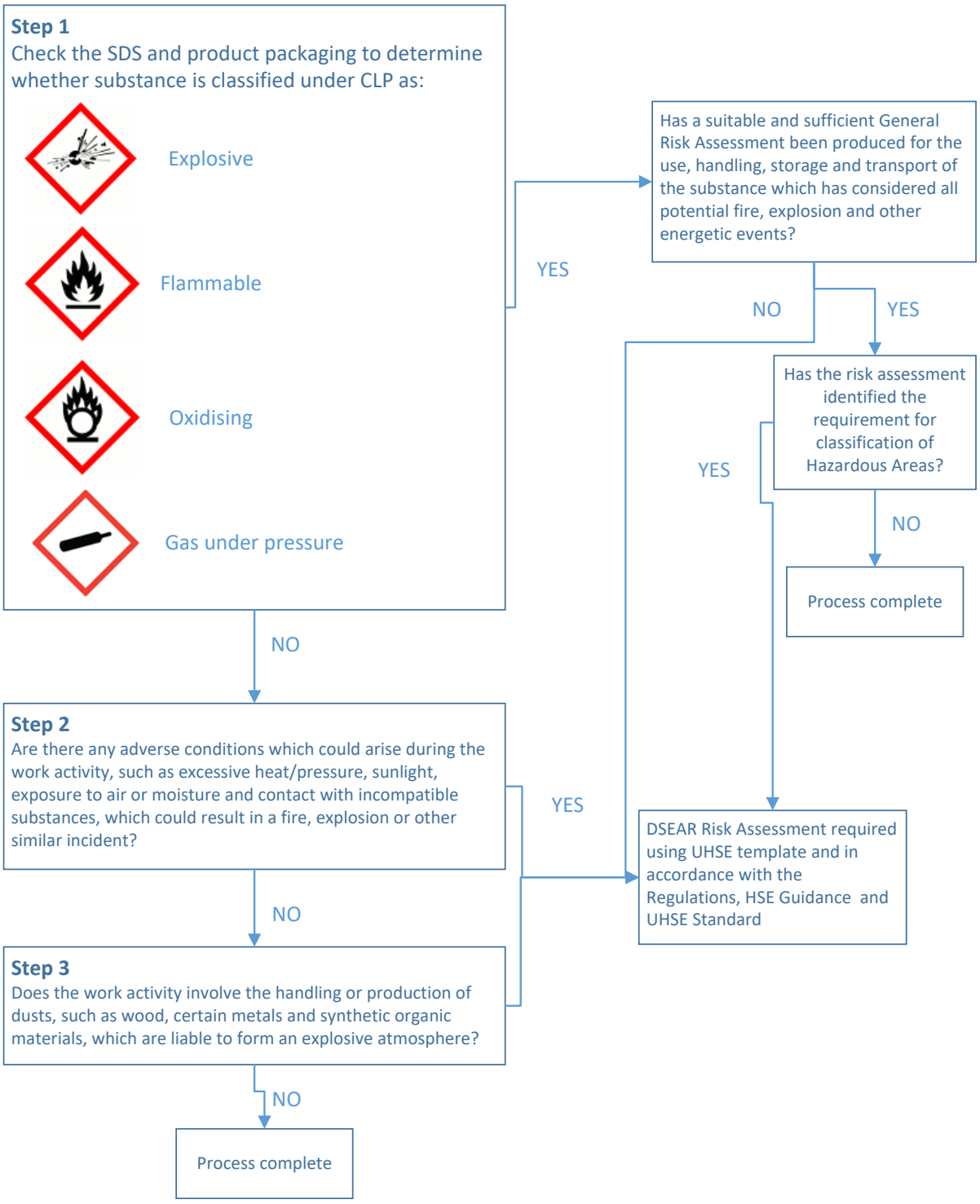
	• Dusts from machining and sanding operations
	Explosive atmosphere An explosive atmosphere is a mixture of a dangerous substance or substances (gas, mist, dust or vapour) with the air, which has the potential to catch fire or explode.
	DSEAR Risk Assessment A risk assessment which concentrates on the risks from a fire, explosion or similar event involving a "dangerous substance". The control and mitigation measures identified in the risk assessment including emergency arrangements, should be proportionate to reduce the risk to a tolerable level and appropriate to the nature of the activity or operation.
	Other energetic event In addition to fire and explosion events, DSEAR also applies to "other energetic events" such as runaway exothermic reactions or decompositions of unstable substances, e.g. decomposition of peroxides.
Responsibility for implementation	Faculty Deans Heads of Departments Technical Managers/Principal Investigators Supervisors/Managers
Training availability:	Induction Training by Supervisors/Area Safety Co-ordinators

	Standard to meet	Accountability	Reference documents and more information
1.	**Identify** fire and explosion hazards for work areas within department control. This includes: • dangerous substances present including those formed in the workplace • potential ignition sources • work activities involving the dangerous substance • possible formation and extent of explosive atmospheres • scale of anticipated event	Heads of Department/ Managers/ Supervisors	Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L138 Appendix 1: Decision Tree for Identifying Fire and Explosion Hazards
2.	**Assess** the risks associated with identified fire and explosion hazards. Carry out a risk assessment using DSEAR template taking into consideration: • work processes and substances used and their possible interactions • amount of substance involved • risks presented by using more than one dangerous substance in combination • arrangements for safe handling, storage and transport of dangerous substances	Heads of Department/ Technical Managers/ Managers/ Supervisors	Appendix 2: DSEAR Assessment template SHEW Risk Assessment Guidance DSEAR Risk assessments to be reviewed annually, and completion reported to SHEW
3.	**Eliminate** or **reduce** the risks where reasonably practicable; apply hierarchical approach: • Replace with another substance (not classed as dangerous) • Use a different work process where the risk of fire or explosion is inherently reduced • Substitute for a less dangerous substance, e.g. one with a higher flashpoint	Technical Managers/ Managers/ Supervisors	HSE Guidance Controlling Fire and Explosion risk in the workplace

4.	Implement control measures to **prevent** fire, explosion or similar energetic event. These should be prioritised as follows: • reduce the quantity of dangerous substances to a minimum • avoid or minimise releases of dangerous substances • control releases of dangerous substances at source • prevent the formation of an explosive atmosphere, including by ventilation • collect, contain and remove any releases to a safe place • avoid ignition sources • avoid adverse conditions (such as exceeding pressure/temperature limits) that could lead to danger • keep incompatible substances apart	Technical Managers/ Managers/ Supervisors	HSE Guidance Work Process Fire Safety
5.	Implement mitigation measures to **reduce** the detrimental effects of a fire, explosion or similar incident as follows: • reduce the number of employees exposed to the risk • provide plant that is explosion resistant • provide explosion suppression or explosion relief equipment • take measures to control or minimise the spread of fires or explosions • provide suitable personal protective equipment (PPE) Note: The provision of suitable PPE should not be a substitute for providing appropriate protective measures on the plant, equipment or workplace itself.	Technical Managers/ Managers/ Supervisors	
6.	Put in place **appropriate** arrangements to **prepare** for accidents, incidents and emergencies. Consider: • need for any additional first aid facilities • additional safety drills required and tested • provision of warning signs and other appropriate communication systems such as alarms, warning lights or tannoy systems • provision of any equipment or clothing for persons dealing with an incident Any required plans and procedures should be recorded.	Technical Managers/ Managers/ Supervisors	
7.	Provide appropriate information, instruction and training to employees including: • details of dangerous substances in the workplace and the risks they present • access to any relevant Safety Data Sheets (SDS) • information on any other legislation that applies to the dangerous substance/s • the significant findings of the risk assessment • actions to be taken to safeguard themselves and others (emergency procedures) Information, instruction and training to other people (non-employees) need only be provided where it is required to ensure their safety, and it should be in proportion to the level and type of risk.	Technical Managers/ Managers/ Supervisors	

8.	Identify and **classify** areas of the workplace where explosive atmospheres may occur. • Hazardous areas should be classified into zones on the basis of frequency and duration • Zoned areas must be protected from sources of ignition • Equipment and protective systems must be safe for use within these zones	Technical Managers/ Managers/ Supervisors	HSE Guidance Explosive Atmospheres
9.	Any equipment, facilities and items such as PPE provided to protect employees in the event of a fire, explosion or similar event should be used in accordance with instruction and training. Any incidents, accident or defects associated with these provisions should be reported.	Employees	

Appendix 1 Identification of Fire and Explosion Hazards:



Appendix 2: DSEAR Assessment Template

DSEAR RISK CALCULATOR

ZONE OF RISK			SOURCE OF IGNITION			OCCUPANCY			EXTENT OF CONSEQUENCE			RISK RATING
UNLIKELY TO BECOME HAZARDOUS	1	X	NO IGNITION	1	X	RARELY OCCUPIED OR NO OCCUPANCY	1	X	NO SIGNIFICANT INJURY OR DAMAGE TO PROPERTY	1	=	1-15 BROADLY ACCEPTABLE
ZONE 2 OR 22	2		RARE MALFUNCTION	2		SEVERAL MONTHS A YEAR	2		MINOR INJURY/ MINOR DAMAGE TO PROPERTY	2		
ZONE 1 OR 21	3		EXPECTED MALFUNCTION	3		SEVERAL HOURS A WEEK	3		MAJOR INJURY/ MODERATE PROPERTY DAMAGE	3		16-36 TOLERABLE (SEE BELOW)
ZONE 0 OR 20	4		UNDER NORMAL OPERATION	4		SEVERAL HOURS /DAY	4		SINGLE/MULTIPLE FATALITY EXTENSIVE PROPERTY DAMAGE	4		37-256 NOT TOLERABLE

Definitions – Level of Risk

High (37-256)	Level of risk is not tolerable
Medium (16-36)	Level of risk is only tolerable if all reasonably practicable control measures have been taken to reduce the risk and regular monitoring is undertaken to ensure the control measure(s) remain active
Low (0-15)	Level of risk associated with the activity is broadly acceptable

DSEAR RISK ASSESSMENT Part 1: Assessment with existing control measures

Faculty: …… Department: ……	Location: ……..	Activity (or area) being assessed: ……		Assessment Ref No: …….. Date of Assessment: …… Assessor: …….. Signature: ……
People affected: ……	No. Employees: …… Frequency/duration: ……	Others: …… Frequency/duration: ……		

Periodic Reviews-maximum intervals for activities: Medium Risk (but ALARP)……(at least annually) Low Risk……(at least 3 yearly)	1st Review Date: …….. Name: …….. Signed: ……	2nd Review Date: …….. Name: …….. Signed: ……..	3rd Review Date: …….. Name: …….. Signed: ……..	4th Review Date: …….. Name: …….. Signed: ……..

Potential for harm/Hazardous event (what happens)	Foreseeable cause (cause of hazardous event)	Existing control measures used	Probability			Extent of Consequence (outcome)		Risk rating (1-256)
			Zone of risk (1-4)	Sources of ignition (1-4)	Occupancy (1-4)	Details of Harm	(1-4)	
1								
2								

RISK ASSESSMENT Part 2: Assessment of Risk Reduction Actions

	Proposed actions (risk reduction measures)	Expected risk after completion of actions					Planned action completion date	Actual completion date	I confirm that the proposed actions have been completed and the expected risk reduction has been achieved		
		Probability			Extent of consequences (1-4)	Risk rating (1-256)			Name	Signature	Date
		Zone of Risk (1-4)	Source of ignition (1-4)	Occupancy (1-4)							
Re-assess risks to show how proposed actions will be effective in reducing the risk. Also consider whether any new hazards will be introduced	1										
	2										
	3										
	4										
	5										