Flammable and Combustible Liquids: Storage and Handling Procedure

Section 1 - Purpose and Scope

(1) This Procedure outlines requirements for the storage and handling of flammable and combustible liquids at The University of Queensland (UQ).

(2) For the purposes of this Procedure, the definition of UQ workers is broad – it applies to all UQ workers (including staff, higher degree by research students, contractors, volunteers) and others (undergraduate students, visitors, clinic clients), across all UQ operations and sites, including Controlled Entities – and is intended to ensure UQ meets its responsibilities under the Work Health and Safety Act 2011. The definition of UQ workers is provided in Section 7- Appendix.

(3) This Procedure should be read in conjunction with relevant procedures and guidelines related to occupational hygiene and chemical safety.

Context

(4) The storage and handling of flammable and combustible liquids is governed by the Work Health and Safety Act 2011 and the Work Health and Safety Regulation 2011. Workplace Health and Safety Queensland's Guide for Flammable and Combustible Liquids outlines the regulatory requirements for storage and handling of flammable and combustible liquids under the legislation and its relationship with other classification systems.

(5) Various Australian Standards (Standards) apply to the storage and handling of flammable and combustible liquids. Standards are published documents that are designed to provide guidance and help ensure safety, performance and reliability of systems. The following Standards guide safe work practices and procedures in relation to the storage and handling of flammable and combustible liquids at UQ:

a. AS 1940:2017 The Storage and Handling of Flammable and Combustible Liquids
b. AS 2243.2:2021 Safety in Laboratories - Chemical Aspects and Storage
c. AS/NZS 60079.10.1:2022 Explosive Atmospheres - Classification of Areas - Explosive Gas Atmospheres
d. AS/NZS 60079.10.2:2016 Explosive Atmospheres - Classification of Areas - Explosive Dust Atmospheres

(6) Copies of the Standards are available to UQ workers via the Standards Databases through UQ Library. See Health, Safety and Wellness Division website for additional information.

Section 2 - Process and Key Controls

(7) The following requirements apply:

a. UQ workers must assess the risk of using flammable or combustible liquids prior to use based on the Safety Data Sheet (SDS).
b. Where the creation of a hazardous atmosphere is expected from the use of flammable liquids, a hazard zone

assessment of the work area (see Hazardous Area Assessment and Classification provisions in Section 3) must be undertaken.

c. Containers of flammable and combustible liquids must be labelled correctly in accordance with the Globally Harmonised System of Classification and Labelling of Chemicals (GHS).
d. Flammable and combustible liquids that exceed minor quantity limits (as prescribed in 'Storage and Permissible Quantities' provisions in this document) must be stored in an approved flammable liquids cabinet. Supervisors and managers must ensure that storage quantity limits are adhered to and that flammable liquids cabinets are correctly rated with appropriate external signage.
e. Organisational Units that use flammable and combustible liquids must implement safe work instructions or standard operating procedures that have been developed based on AS 1940:2017 The Storage and Handling of Flammable and Combustible Liquids.

Section 3 - Key Requirements

Hazardous Area Assessment and Classification

(8) Before using a flammable or combustible liquid, UQ workers must assess the occupational health and safety risks of its intended use and storage through the risk assessment process and based on the SDS (refer to the Health and Safety Risk Assessment Procedure) to determine whether a hazardous atmosphere is expected to be present (hazardous atmosphere is defined in the WHS Regulation and outlined in Section 7).

(9) If the risk assessment indicates that a hazardous atmosphere is expected to be present from the use of flammable liquids (or its gases or dusts) and cannot be eliminated (either through redesigning work practices or operations), then a formal hazardous area assessment and classification must be undertaken in accordance with the following standards:

a. AS/NZS 60079.10.1:2022 Explosive Atmospheres - Classification of Areas - Explosive Gas Atmospheres; and
b. AS/NZS 60079.10.2:2016 Explosive Atmospheres - Classification of Areas - Explosive Dust Atmospheres.

Labelling

(10) All containers of flammable and combustible liquids at UQ must:

a. be labelled in accordance with the Globally Harmonised System for the Classification and Labelling of Chemicals (GHS); and
b. have a current Safety Data Sheet that reflects GHS information.

(11) The Labelling of Workplace Hazardous Chemicals Code of Practice 2021 supports these requirements and provides practical guidance to assist UQ workers meet their compliance obligations.

Storage and Permissible Quantities

(12) Organisational Units must develop safe work instructions or standard operating procedures, with reference to AS 2243.2:2021 Safety in Laboratories - Chemical Aspects and Storage and AS 1940:2017 The Storage and Handling of Flammable and Combustible Liquids, including information addressing the following:

a. maintaining adequate facilities and equipment for safe storage and handling, including a fire extinguisher suitable for class B fires (dry chemical or carbon dioxide) where the quantities of flammable liquids stored are greater than 100 L;
b. avoiding concentrated storage of liquids in one area to reduce the fire load;

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c. ventilating storage areas adequately to avoid the build-up of flammable vapours;
d. segregating materials that interact dangerously with flammable and combustible liquids (e.g. oxidising agents); and
e. storing flammable and combustible liquids:
    i. in minor quantities wherever possible (refer to 'Flammable Liquids Cabinets' provisions);
    ii. away from ignition sources (e.g. flames, electrical equipment, grinding and cutting operations) and excessively hot areas; and
    iii. where they will not prevent escape of occupants from a room or building in the event of a fire.

Flammable Liquids Cabinets

(13) Limited minor quantities of flammable and combustible liquids may be stored on open shelves or work benches. The following minor quantity limits apply at UQ:

a. Offices: 5 L per floor or level.
b. Laboratories: 10 L per 50 m^2 floor area.
c. Workshops: 1 L per 2 m^2 of floor area (to a maximum of 100 L).

(14) Quantities of flammable and combustible liquids that exceed these minor quantity limits must be stored in a flammable liquids cabinet that complies with the requirements of AS 1940.

(15) The maximum quantity that may be stored in:

a. a single flammable liquids cabinet is 100 L; or
b. aggregated flammable liquids or solids cabinets is 250 L or 250 kg, calculated within a radius of 10m from any single cabinet (including horizontally through intervening walls).

(16) Supervisors and Managers must ensure that storage limits are adhered to and that flammable liquid cabinets are correctly rated with appropriate external signage.

(17) Organisational Units that use large volumes of flammable liquids may require a purpose-built 500 L store or arrange for more frequent deliveries of smaller quantities. Advice about acquiring a flammable liquids cabinet is available from the local Work Health and Safety Coordinator (WHSC) or the Health, Safety and Wellness Division.

Safe Usage

(18) Organisational Units that use flammable and combustible liquids must comply with the requirements set out in this Procedure and adhere to any additional safe working procedures outlined in AS 1940:2017 The Storage and Handling of Flammable and Combustible Liquids. The minimum safe working procedures for storage and use of minor quantities of flammable and combustible liquids are prescribed in the Standard and include information about:

a. storage – away from ignition sources, storage limits, appropriate storage vessels, storage segregation;
b. spill kits and containment;
c. firefighting equipment;
d. decanting and use in an appropriately ventilated and earthed area (where required);
e. disposal; and
f. training and procedures for use.

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Waste

(19) The storage and permissible quantities requirements set out in this Procedure also apply to waste flammable and combustible liquids.

(20) UQ workers must ensure prompt disposal of combustible waste and residue and its segregation from areas where flammable or combustible liquids are stored or decanted

Section 4 - Roles, Responsibilities and Accountabilities

UQ Workers

(21) UQ workers that work with flammable and combustible liquids at UQ must comply with this Procedure, including:

a. assessing the health and safety risks of using a flammable or combustible liquid in the workplace prior to use through completing risk assessment in UQSafe;
b. ensure all controls as outlined in the risk assessment are completed and adhered to;
c. ensuring the safe and correct labelling of flammable and combustible liquids;
d. adhering to operational level safe work instructions and operating procedures regarding the storage and safe use of flammable and combustible liquids; and
e. reporting spills of flammable and combustible liquids in UQSafe.

Supervisors and Managers

(22) Supervisors and Managers of work groups that undertake work with flammable and combustible liquids at UQ must ensure:

a. risk assessments are completed and include the hierarchy of control in the development of controls;
b. safe work instructions or standard operating procedures are developed and made available to UQ workers, where required under this Procedure;
c. monitor and supervise UQ workers in their area of responsibility to adhere to these procedures;
d. sufficient resources are available to enable compliance with the requirements of this Procedure (for example, the availability of suitable storage facilities); and
e. spills of flammable and combustible liquids are cleaned up and reported by UQ workers in UQSafe.

Local health, safety and wellness staff

(23) Local HSW Managers and Work Health and Safety Coordinators (WHSCs) are responsible for providing local advice and support to their organisational areas in relation to the requirements of this procedure.

(24) Assessing whether UQ workers in their area of responsibility are able to demonstrate compliance with this Procedure and that any compliance issues that are identified are rectified in a timely manner.

(25) Assist with any investigations that need to be undertaken as a result of incidents, hazards or near misses reported.

Health, Safety and Wellness Division

(26) Health, Safety and Wellness Division is responsible for providing advice and support to local HSW staff in the

compliance with this Procedure.

(27) The HSW Division will report any notifiable incidents to the appropriate regulator with details provided by the HSW Manager of the affected area.

(28) Will provide advice and licencing requirements for flammable and combustible liquids.

Section 5 - Monitoring, Review and Assurance

(29) The HSW Division is responsible for reviewing this Procedure as required to ensure that it remains accurate and relevant to the needs of UQ.

Section 6 - Recording and Reporting

(30) Incidents, hazards or near misses that may have resulted in spills (those leading to a risk to health and safety), fires caused by spills, or spills into the environment are recorded in UQSafe. The Director, HSW Division is responsible for reporting any notifiable matters to the Workplace Health and Safety regulator.

(31) Some flammable compounds will have additional requirements for acquiring, licencing, storing, recording, reporting and logging. Examples include (but are not limited to):

a. restricted and prohibited carcinogens (e.g. Benzene).
b. nitromethane (additional storage and logging requirements as a chemical of security concern); and
c. pyridine (requirement under the Drugs Misuse Regulation 1987 for an end user declaration to be sent to Queensland Police by the supplier).

(32) UQ workers should contact their WHSC or HSW Manager in the first instance, or the HSW Division, to determine any additional obligations.

Section 7 - Appendix

Classifications of Flammable and Combustible Liquids

(33) The classes of liquid covered by this Procedure are principally defined in terms of their flash point with some exceptions being provided for potable and viscous liquids. The 'flash point' of a liquid is the lowest temperature of the liquid at which the vapour above it can be ignited by an ignition source.

a. Flammable Liquids
    i. Packaging group I: liquids with a flash point <23°C and initial boiling point of ≤35°C (e.g. diethyl ether).
    ii. Packaging group II: liquids with a flash point <23°C and initial boiling point of >35°C (e.g. acetone, ethanol, ethyl acetate).
    iii. Packaging group III: liquids with a flash point ≥23°C and ≥60°C (e.g. n-butanol, kerosene).
b. Combustible Liquids
    i. Class C1: liquids with a flash point >61°C and ≤150°C (e.g. distillate, ethylene glycol).
    ii. Class C2: liquids with a flash point >150°C (e.g. cooking oil, glycerol, lubricating and hydraulic oils).

Definitions

Term	Definition
Hazardous atmosphere	The WHS Regulation defines existence of a hazardous atmosphere if: • the atmosphere does not have a safe oxygen level; or • the concentration of oxygen in the atmosphere increases the fire risk; or • the concentration of flammable gas, vapour, mist or fumes exceeds 5% of the lower explosive limit for the gas, vapour, mist or fumes; or • a hazardous chemical in the form of a combustible dust is present in a quantity and form that would result in a hazardous area.
Organisational Unit	A Division, Faculty, Institute, School, Centre, etc.
Safety Data Sheet (SDS)	Document containing information on the health, safety and environmental aspects of a material or chemical for the purposes of storing, using and disposing of the substance in a safe way.
UQ workers	For the purposes of this procedure includes: • staff - continuing, fixed-term, research (contingent funded) and casual staff; • contractors, subcontractors and consultants; • visiting academics and researchers; • affiliates - academic title-holders, visiting academics, emeritus professors, adjunct and honorary title-holders, industry fellows and conjoint appointments; • higher degree by research students; • and volunteers and students undertaking work experience.

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