



Appendix 12: Chemical and Hydrocarbon Storage Procedure



Procedure

Chemical and Hydrocarbon Storage

Pilbara Operations Environment

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1 PURPOSE

This Procedure provides a process for the appropriate storage of chemicals and hydrocarbons to minimise the impact of environmental harm and ensure compliance with internal and external obligations.

The Procedure aligns with relevant legislation and Australian Standards (Appendix B) and Fortescue documentation (References).

1.1 Applicability

This Procedure is to be implemented at Fortescue Pilbara operational and project sites.

1.2 Definitions

Definitions and acronyms used throughout this procedure are provided in the *Definitions and Acronyms* (100-GU-EN-0055).



2 PROCEDURE

2.1 Key accountabilities

The Key Accountabilities associated with this Procedure are listed in Table 1.

Table 1: Key Accountabilities

Role	Responsibility
Senior Site Official (SSO) and Department Managers / Superintendents / Supervisors	Oversee the implementation of this procedure. Report / manage / remediate all chemical and hydrocarbon incidents and hazards. Complete identified corrective actions.
Site/Project H&S Staff/Representatives	Assessing compliance with relevant Fortescue Dangerous Goods and Hazardous Chemicals procedures.
Site/Project Environmental Staff	Review and update this Procedure as required. Provide stakeholders with advice regarding chemical and hydrocarbon storage. Assess the implementation of this Procedure during site environmental inspections. Develop and oversee the completion of corrective actions relating to chemical and hydrocarbon storage.
All Site/Project Staff	Comply with this Procedure. Report all chemical and hydrocarbon incidents and hazards.

2.2 Storage Standards

- Chemicals and hydrocarbons must be stored in accordance with the relevant Australian Standards and safety data sheets (SDS).
- In accordance with Australian Standards, chemicals and hydrocarbons must be stored within bunds of appropriate capacity.
 - Bunds must have a net capacity of at least 110% of the capacity of the largest vessel, and 25% of the total capacity of all vessels stored within the bund.
 - If two or more vessels operate as a single unit, the capacity of all such vessels must be utilised when calculating the necessary compound capacity.
- Any leakage and spills from storage facilities must be contained to prevent contamination of surrounding soil, watercourses and drainage systems. See the *Environmental Spills Procedure* (IO-PR-EN-0003).
- Suitable spill response equipment must be available and maintained in close proximity to the chemical and hydrocarbon storage location.
- All chemicals and hydrocarbons must be appropriately segregated from potential ignition sources.
- SDSs must be readily available for all stored chemicals and hydrocarbons. These must be in close proximity to the chemical and hydrocarbon storage location.



- Chemical and hydrocarbons must be stored in areas with:
 - Adequate ventilation.
 - Readily available first aid and eyewash stations.
 - Egress pathways in case of emergency.
 - Sufficient segregation between storage areas.

2.3 Bunding

- All permanent chemical and hydrocarbon storage locations must be sufficiently impervious to retain spillage and be made of suitable construction materials (for example, HDPE, geosynthetic clay liners, and/or concrete).
- Where practical, bunds must be covered (or under cover) to prevent rainfall collection, reducing the bund's available capacity.
- Bunds must be sufficiently designed to allow practical recovery of any spillage and/or any collected and potentially contaminated rainfall. This recovery should occur when needed to ensure optimal availability of bund capacity.
- Discharge of any spillage and/or rainfall from within a bund is not permitted.
- Bunds must not be higher than 1.5m in height unless there are means for safe and rapid entry and exit.
- In addition to the aforementioned, earthen bunds must:
 - Be lined and sealed with an appropriate material to ensure containment of any chemical or hydrocarbon spills.
 - Have a flat section of at least 600mm wide where any walls are 1m or more in height.
 - Have a wall slope consistent with the angle of repose of the material.
 - Never have a capacity less than the nominated capacity. Original height markers should be installed to support this.
- Portable bunding units are the least preferred method of chemical and hydrocarbon storage. These are intended to be utilised as temporary storage only. This includes instances where goods are in transit, are within handling areas, and/or are in use. See section 2.6.2.1.

2.4 Tanks

- All tanks must be double-walled.
- The spacing between adjacent tanks must be at least 600mm.



- Must be protected from damage caused by vehicle or equipment impact. This can include windrows and/or bollards.
- Must have a method of determining the level of its contents.

2.5 Dangerous Goods Storage Cabinets

- Must be purpose built for storing chemicals and hydrocarbons.
- Must have self-closing doors that are automatically held shut.
- Must be clearly and visibly marked, and detail:
 - The manufacturers information.
 - The maximum storage capacity.
 - A label identifying the container's storage contents (at least 250mm in length).
 - Bear the sign 'NO SMOKING, NO IGNITION SOURCES WITHIN 3 m' (in lettering at least 50mm high).

2.6 Minimum Requirements for IBC Storage

Storage refers to the storage of environmentally hazardous material IBCs in a stockpile (e.g. in the warehouse or stores lay down area).

IBCs may also be used (decanted to or from) whilst in an engineering containment area that meets the requirements outlined in Section 2.6.2 below.

2.6.1.1 Spill Containment

All environmentally hazardous materials in IBCs are to be stored within facilities with adequate spill containment (bund).

The size of the storage area and required bund wall height is to be calculated to ensure that the capacity of the spillage containment compound is at least 100% of the largest package plus 25% of the storage capacity up to 10,000L, as per AS1940 *The Storage and Handling of Flammable and Combustible Liquids*.

Hazardous material storage containers (e.g. AS1940 certified self-bunded sea containers) must consist of the following:

- Enclosed to prevent jetting;
- Spill capacity of at least 100% of the largest container plus 25% of the storage capacity up to 10,000L;
- Easy to access (e.g. rollover curbs, forklift accessible); and
- Ability to pump out spilled material and accumulated stormwater.

Hazardous material storage bunds must consist of the following:



- Concrete bund walls and floor; or
- An impervious bund wall (compacted earthen material and appropriate liner (as per *Water Quality Protection Note 26 Liners for Containing Pollutants, Using Synthetic Membranes* (Department of Water 2013)) and;
- An impervious bund floor (compacted earthen material and appropriate liner (as per *Water Quality Protection Note 26 Liners for Containing Pollutants, Using Synthetic Membranes* (Department of Water 2013))).

Earthen bunds with a synthetic liner and concrete bunded facilities must satisfy the following criteria (Figure 1):

- Earthen bund walls must be three times as wide as they are high, flat section at the top should be at least 0.6 m wide if the bund wall height is 1 m or greater.;
- The earthen bund floor must be compacted and rolled to prevent subsidence and remove sharp edges prior to placement of the liner;
- Earthen material that comprises the bund walls must be competent material that will not erode following rainfall;
- Concrete bund floors and walls need to be sufficiently impervious to retain spillage and enable recovery of spills;
- If vehicles need access to the bunded area, utilise ramps, speed humps or a slope to maintain an effective bund height; and
- A sump is required to be installed at the low point of the bund to facilitate the removal of spilled material or accumulated stormwater.

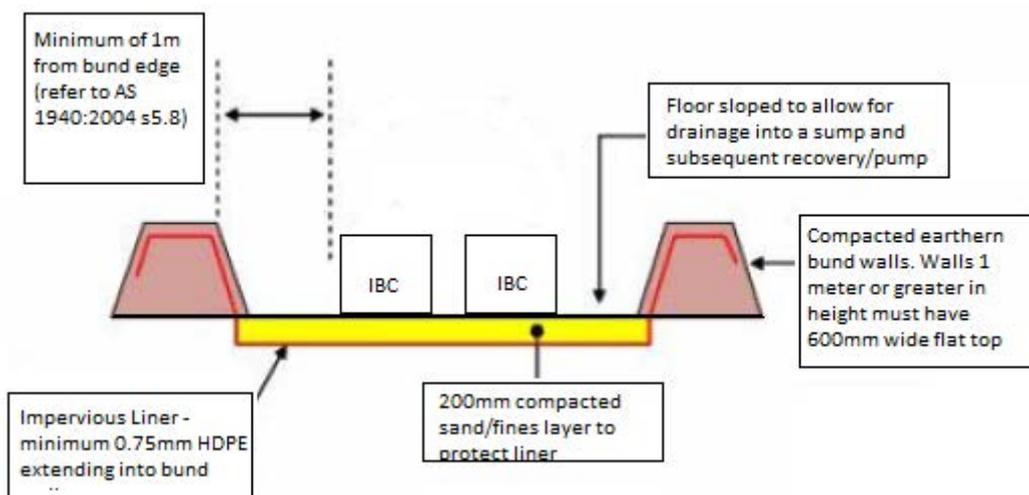


Figure 1: Cross section view of bund



2.6.1.2 Other Considerations

- Signage – storage area must have “Danger”, “No Smoking” and “No Naked Flames” signs in place and fire extinguishers or fire hoses available where the materials to be stored are flammable or combustible;
- Access to the storage area should not compromise the bund integrity (access steps, drive over ramp, etc);
- Sealed apron or drive over bund for containing spills during transfer to/from bulk tanks;
- All hoses, pumps, and equipment used in the transfer of chemicals and hydrocarbons to be contained within bund; and
- Bunds sized appropriately so all IBCs requiring storage can be stored sufficiently from the edge of the bund wall to prevent jetting outside of the bund.

2.6.2 Minimum Requirements for In-Use Storage

The use of portable bunding units (bundled pallets) is the least preferred option for minimising the risk of uncontrolled release of chemicals and hydrocarbons at Fortescue Operations.

The use of bundled pallets for storage of chemicals and hydrocarbons is addressed in AS1940. The following note is provided:

NOTE: Portable bunding units, e.g. bundled pallets, or flexible bunding units are not suitable for permanent storage as there are no uniform performance criteria for chemical resistance or fire resistance and they can be easily moved to an unsuitable location. They may be suitable for the short-term holding of damaged packages, or where goods are in transit or in manufacturing and handling areas.

At Fortescue portable bundled pallets are only to be utilised whilst the IBC is “in use” or where an IBC is in transit (between delivery vehicle and place of storage).

The bundled pallet used must be specific for use with IBCs and have suitable design to capture any spillage and minimise jetting should the IBCs integrity be compromised (refer to Figure 2 below). Side shields (Figure 2) or splatter guards (Figure 3) are available for bundled pallets to direct any spillage into the bund sump.

Consideration must be given to the properties of the material stored in the IBC to ensure the bundled pallet is compatible with the material. When “in use” the IBC couplings and associated hoses, valves etcetera utilised for decanting the IBC contents must be contained within the bundled pallet.



Figure 2: Example of IBC-specific bunded pallets

Where bunded pallets are exposed to rainfall a process must be in place where accumulated water is removed from the bunded pallet and disposed of appropriately. Additionally, PVC (or similar) covers are available to prevent rainwater filling bunded pallet sumps if the bunded pallet is exposed to rainfall.

2.6.2.1 Requirements for Utilising Bunded IBC Pallets

At Fortescue the minimum requirements for use of bunded pallets for storage of IBCs whilst in transit or “in use” (including standby secondary IBC) are:

- A bunded pallet designed specifically for IBCs with a sump capacity of at least 100% of the largest container plus 25% of the storage capacity;
- Easy to access (e.g. forklift accessible);
- Ability to pump out or decant spilled material and accumulated stormwater from bund sump;
- All valves, hoses, pumps, and equipment used in the transfer of chemicals and hydrocarbons to be contained within bund; and
- Fitted with appropriate side shields or splatter guard to direct any spillage into the bund sump. If located where exposed to rainfall, a rain cover over the IBC and bunded pallet should be considered to minimise stormwater collecting in the bund sump. Note: this provision is not required for “in Transit” storage.



Figure 3: Example of IBC specific bunded pallet with rain cover / splash guard

2.6.3 Minimum Requirements for In Transit Storage

In transit storage refers to the period when the IBC is required to be temporarily stored outside on an engineered containment area or bunded pallet. This may occur when an IBC is delivered to an operation and off loaded from the delivery vehicle before the IBC is placed in the hazardous materials storage area.

It is preferable for IBC's to be stored on bunded pallets whilst "in-transit" however given the practicalities IBCs may remain outside of an engineered containment area or bunded pallet for a period of no longer than 12 hours whilst "in-transit". Refer to Section 2.6.2.1 for the minimum requirements for use of bunded pallets.

2.6.4 Stormwater Management

Clean stormwater must be directed away from the IBC storage facilities to prevent the generation of large quantities of potentially contaminated water requiring treatment prior to disposal.

Potentially contaminated water is to be contained within the facility and directed to a sump to be removed for treatment and/or connected to an oil water separator for onsite treatment prior to disposal.

Onsite treatment is preferred as transporting contaminated water offsite is cost prohibitive.

2.6.5 Spill Kits

A clearly labelled spill kit must be installed at all IBC storage locations and where IBCs are "in use" within the workplace. The spill kit must contain sufficient equipment to contain a spill in the area (i.e. volume of material spilt from the largest vessel).

Spill kits should contain instructions on how to clean up spills and a training package developed and implemented for those personnel involved in the handling and use of chemicals and hydrocarbons.



2.7 Segregation

- Chemicals and hydrocarbons must be appropriately segregated from incompatible materials.
 - Refer to Appendix 1 for specific segregation requirements.

3 REFERENCES

This procedure and all internal supporting documents will be managed as per Fortescue Document Governance Standards. These may be read in conjunction with this procedure.

[1] Environmental Spills Procedure (IO-PR-EN-0003)



DOCUMENT CONTROL

Chemical and Hydrocarbon Storage		
Status	IFU - Issued for Use	4-Oct-24
Summary of Changes	Supersedes 100-PR-EN-1064 and c Updated template	
Author	L Tosney	<hr/> Signature
Checked or Squad Review# (if applicable)	J Humphrey	<hr/> Signature
Approved	S Poole	<hr/> Signature
Next Review Date (if applicable)	4-Oct-28	



APPENDIX A DANGEROUS GOODS STORAGE SEGREGATION CHART

	CLASS		2	3	4	5	6	8				
COMPRESSED GASES												
2.1 Flammable	2		compatible	KEEP APART	segregate	segregate	segregate	segregate	segregate	ISOLATE	KEEP APART	KEEP APART
2.2 Non-Flammable	2		KEEP APART	compatible	KEEP APART	segregation may be necessary	segregate	segregation may be necessary	segregation may be necessary	segregate	segregation may be necessary	KEEP APART
FLAMMABLE LIQUIDS (and combustible liquids)	3		segregate	KEEP APART	compatible	KEEP APART	segregate	segregate	segregate	ISOLATE	KEEP APART	KEEP APART
4.1 Flammable solids	4		segregate	segregation may be necessary	KEEP APART	compatible	KEEP APART	segregate	segregate	segregate	KEEP APART	segregation may be necessary
4.2 Spontaneously combustible	4		segregate	segregate	segregate	KEEP APART	compatible	KEEP APART	segregate	ISOLATE	KEEP APART	KEEP APART
4.3 Dangerous when wet	4		segregate	segregation may be necessary	segregate	segregate	KEEP APART	compatible	KEEP APART	segregate	segregation may be necessary	segregation may be necessary
OXIDISING SUBSTANCES												
5.1 Oxidising agents	5		segregate	segregation may be necessary	segregate	segregate	segregate	KEEP APART	CONSULT SDS	segregate	KEEP APART	KEEP APART
5.2 Organic peroxides	5		ISOLATE	segregate	ISOLATE	segregate	ISOLATE	segregate	segregate	compatible	KEEP APART	KEEP APART
TOXIC SUBSTANCES	6		KEEP APART	segregation may be necessary	KEEP APART	KEEP APART	KEEP APART	segregation may be necessary	KEEP APART	KEEP APART	compatible	segregation may be necessary
CORROSIVE SUBSTANCES	8		KEEP APART	KEEP APART	KEEP APART	segregation may be necessary	KEEP APART	segregation may be necessary	KEEP APART	KEEP APART	segregation may be necessary	CONSULT SDS

- compatible Dangerous goods of the same Class should be compatible. Consult SDS about requirements for individual substances.
- CONSULT SDS Dangerous goods of the same Class could be incompatible or react dangerous. Consult SDS about requirements for individual substances.
- Segregation may be necessary Segregation of these Classes may be necessary. Consult the SDS.
- KEEP APART Dangerous goods of these Classes should be kept apart by at least 3m. Consult the SDS.
- segregate These combinations of dangerous goods should be segregated by at least 5m and kept in separate compounds or building compartments.
- ISOLATE This requirement applies to organisation peroxides, for which dedicated stores or storage cabinets are recommended. Adequate separation from other buildings or boundaries is required.



APPENDIX B LEGISLATIVE CONTEXT

The following Legislation provides the broad framework for which this procedure must operate and with which it needs to comply.

- [1] *Environmental Protection Act* 1986
- [2] AS 1940-2017 The storage and handling of flammable and combustible liquids
- [3] AS/NZ 3833 The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers
- [4] AS 3780 The storage and handling of corrosive substances
- [5] AS 4332 The storage and handling of gases in cylinders
- [6] AS 4681 The storage and handling of class 9 (miscellaneous) dangerous goods and articles
- [7] ADG Code / NZS 5433 Australian Dangerous Goods Code