SC 9 Development involving hazardous chemicals

SC9.0.1—Hazardous chemicals self-assessable thresholds

Hazchem description	PG or type	Threshold quantity	Applicable storage and handling description	Exclusions
Flammable gases	n/a	1,000 - 5,000L	Cylinder stores with natural ventilation	1. Refrigerated gases; 2. Gases stored in tanks; 3. Exchange facilities for portable cylinders managed in accordance with AS1596; 4. Stores within or attached to buildings, with mechanical ventilation or containing aerosols with a WC <1L; 5. Oxy-acetylene gas systems in AS4839; 6. Cylinders connected to a consuming device, including fire protection systems;
Oxidising gases	n/a	1,000 – 20,000L		
Non-flammable non-toxic gases	n/a	2,000 – 200,000L		
Flammable liquids	PGII or PGIII	10,000 – 60,000L	Aboveground storage areas with natural ventilation	1. Blending, processing, pressurised or heated tanks; 2. Tanks >6m in diameter; 3. Storage areas within or attached to a building; 4. Package stores with mechanical ventilation; 5. Storage areas co-locating Classes 2, 3, 4, 5 or 6.1; 6. Combustible liquid storage areas also containing Class 2, 3, 4 or 5
		10,000 – 500,000L	Underground storage	
Combustible liquids with a flashpoint <93°C	n/a	10,000 – 100,000L	Package stores with natural ventilation	
		10,000 – 500,000L	Aboveground or underground tanks	
Oxidising substances	PGII	10,000 – 20,000kg	Liquid storage tanks or package stores with natural ventilation	1. Ammonium Nitrate; 2. Blending, processing, pressurised or heated tanks; 3. Solids stored in silos, bunkers or loose bulk stockpiles; 4. Storage areas within or attached to a building; 5. Package stores constructed of combustible materials; 6. Package stores with mechanical ventilation; 7. Package store with a floor area >500m2
	PGIII	10,000 - 250,000kg		
Toxic or very toxic substances	PGII or PGIII	10,000 – 500,000L/kg	Storage tanks or package stores with natural ventilation	1) Arsenic Trioxide or Pentoxide; 2) Blending, processing, pressurised or heated tanks; 3) Very toxic materials >20,000kg; 4) Toxic materials >200,000kg; 5) Storage areas co-locating Classes 2.1, 3, 4, 5
Corrosive substances	PGII or PGIII	10,000 – 200,000L/kg	Storage tanks or package stores with natural ventilation	1) Blending, processing, pressurised or heated tanks; 2) Hydrofluoric Acid with a concentration >50% >50,000kg;
Substances hazardous to the environment	PGII	>2,500L/kg	Store area located within an LG flood hazard area	Non environmentally hazardous substances
	PGIII	>10,000L/kg		

Note -

I. A Dangerous Goods (DG) class(es) and Packing Group (PG) or type, where applicable, can be found under Section 14 of the chemical's Safety Data Sheet (SDS). Flash points can be found under section 9.

II. Exclusions may trigger assessable development under Table 3.2 or under Schedule 3 of the Sustainable Planning Regulations 2009 as a Major Hazard Facility.

Table 9.0.1 Hazardous chemicals assessable thresholds

Hazchem description	PG or type	Threshold quantity	Applicable storage and handling description	Exclusions (MHF Quantities)
GTDTBT	n/a	>500L/kg	Any	Any oxidising material or peroxide >50,000kg
2.1	n/a	>1,000L – 200,000kg	Cylinder stores with at least one of the following attributes: a. contains aerosols; b. co-located with Class 3, 4 or 5; c. mechanical ventilation; d. is within or attached to a building	1. Phosgene >750kg; 2. Arsine >1,000kg; 3. Very toxic gases >20,000kg; 4. Chlorine >25,000kg; 5. Acetylene >50,000kg; 6. Hydrogen >50,000kg; 7. Nitrous Oxide >50,000kg; 8. Nitrogen Dioxide >50,000kg; 9. Nitrogen Trioxide >50,000kg; 10. Ethylene Oxide >50,000kg; 11. Hydrogen Sulfide >50,000kg; 12. Ammonia >200,000kg; 13. Sulfur Dioxide >200,000kg; 14. Toxic gases >200,000kg; 15. Liquefied oxidising gases >200,000kg; 16. Hydrogen Chloride >250,000kg; 17. Oxygen >2,000,000kg
		>2,500 kg – 200,000 kg	Aboveground, unmounded tanks	
		>5,000L – 200,000kg	Cylinder stores with natural ventilation	
2.2 sub-risk 5.1	n/a	>1,000L	Cylinder stores with at least one of the following attributes: a. contains aerosols; b. co-located with Class 2.1, 2.3, 3, 4 or 5; c. mechanical ventilation; d. within or attached to a building	
		>1,000 – 10,000L	Aboveground tanks co-located with Classes 2.1, 3, 4, or 5	
		>10,000L	Aboveground tanks	
		>20,000L	Cylinder stores with natural ventilation	
2.2	n/a	>200,000L	Any	
2.3	n/a	>500L	Any	
3	PGI	>500L	Any	1. Propylene Oxide >50,000kg; 2. Class 3 PGI >200,000kg or if Crude Oil PGI in remote locations >2,000,000kg; 3. Flammable liquids stored above their boiling points >200,000kg; 4. Assigned to HAZCHEM Code 4WE >500,000kg; 5. Class 3 >50,000,000kg
	PGII or PGIII	>1,000L	Pressure or reaction vessels and blending or heated tanks with a W/C > 1,000 L	
		>10,000L	Storage areas with at least one of the following attributes: a) co-located with Classes 2, 4, 5	

			or 6.1; b) mechanical ventilation; c) within or attached to a building	
		>60,000L	Any	
Combustible liquids with a flashpoint <93°C	n/a	>1,000L	Aboveground tanks within a multi-story building	
		>10,000L	Storage areas with at least one of the following attributes: a. co-located with Classes 2, 3, 4 or 5; b. mechanical ventilation; c. within or attached to a building; d. tanks > 6m in diameter	
		>100,000L	Package stores with natural ventilation	
		>500,000L	Aboveground tanks	
4	PGI	>500kg	All	1. Class 4.1, PGI >200,000kg; 2. Class 4.2, PGII >200,000kg;
	PGII or PGIII	>1,000kg	Pressure or reaction vessels and blending or heated tanks with a W/C > 1,000 L	
		>2,500kg	All	3. Class 4.3, PGII >200,000kg
5.1	PGI	>500kg	All	1. PGI or PGII > 200,000kg; 2. Ammonium Nitrate >2,500,000kg; 3. Ammonium Nitrate fertilisers >5,000,000kg
	PGII or PGIII	>1,000kg	Pressure or reaction vessels and blending or heated tanks with a W/C > 1,000 L	
	PGIII	>20,000kg	Package stores with at least one of the following attributes: a. co-located with Classes 2.1, 2.3, 3, 4, 5.2 or 8; b. mechanical ventilation; c. within or attached to a building; d. floor area > 500m2; e. constructed of combustible materials	
		>20,000kg	Solids stored in silos, bunkers or loose bulk stockpiles	
		>250,000kg	Tanks or package stores with natural ventilation	
5.2	Any	>500	Any	1. GTDTBT >50,000kg; 2. Any 5.2 >200,000kg
6.1	PGI	>500L/kg	Any	1. Arsenic Trioxide >100kg; 2. Methyl Isocyanate >150kg;

	PGII Or PGIII	>1,000L/kg	Pressure or reaction vessels and blending or heated tanks with a W/C > 1,000 L	3. Arsenic Pentoxide >1,000kg; 4. Very toxic materials >20,000kg; 5. Toxic materials >200,000kg; 6. Toluene Diisocyanate >200,000kg
		>10,000L/kg	Storage areas with at least one of the following attributes: a. co-located with Classes 2.1, 3, 4 or 5; b. mechanical ventilation; c. within or attached to a building	
		>500,000L/kg	Any	
8	PGI	>500 L/kg	Any	1. Sulfur Dichloride >1000kg; 2. Hydrofluoric Acid (with a concentration > 50%) >50,000kg; 3. Hydrogen Fluoride >50,000kg; 4. Sulfuric Anhydride or Sulfur Trioxide >75,000kg; 5. Bromine or Bromine solutions >100,000kg; 6. Assigned to HAZCHEM Code 4WE >500,000kg
	PGII Or PGIII	>1,000L/kg	Pressure or reaction vessels and blending or heated tanks with a W/C > 1,000 L	
		>10,000L/kg	Package store with at least one of the following attributes: a. co-located with Class 5; b. compounds containing > two Class 8's that may react dangerously with each other; c. mechanical ventilation; d. within or attached to a building	
		>200,000L/kg	Any	

Note -

I. A Dangerous Goods' (DG) class(es) and Packing Group (PG) or type, where applicable, can be found under Section 14 of a chemical's Safety Data Sheet (SDS). Flash points can be found under section 9.

II. Exclusions may trigger assessable development under Schedule 3 of the Sustainable Planning Regulations 2009 as a Major Hazard Facility (MHF), which are measured in tonnes only.

III. Care shall be taken when noting the units used throughout this table.

Table 9.0.2 Hazardous chemicals

Gases in cylinders
General requirements— Cylinder stores
1. All separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development. 2. Separation distances shall be measured laterally from the outermost cylinder to any area to be protected. 3. Cylinder stores (areas of stored cylinders) shall be located outdoors and used to store closed cylinders only. 4. Toxic gases are not permitted within a cylinder store. 5. LPG decanting cylinders are not permitted in cylinder stores. 6. Gas cylinders shall be stored in the upright position only unless specified by the cylinder's manufacturer. 7. Nominally empty cylinders shall be separated in the same manner as those which are full.
Construction requirements

1. Cylinder stores shall be constructed from non-combustible materials that are compatible with the gases to be stored. Hardwood frames or floors are not considered combustible materials for the purposes of this code, however, hardwood cladding is.
2. Where there is a space between the floor of a cylinder store and the ground (i.e. cylinders are stored on a platform), such a space shall be either completely filled with a non-combustible solid material or shall be empty, open on at least three sides and free of any combustible materials.
3. The floor of a cylinder store shall not be capable of pooling liquid.
4. Any doors in a cylinder store shall open outwards or be of a ventilated roller type. Any door shall also be able to be opened from inside the store.

Siting and separation— Cylinder stores

1. Where no minimum separation distance between a cylinder store and an on-site protected place is specified, the cylinder store shall be located > 1m from building openings.
2. For cylinder stores with mixed divisions of gases separation distances shall be based on the aggregate of all gas cylinders within in the store with the greatest separation distance of Tables CS1-3 applying to the store.
3. Any two cylinder stores can be considered separate stores if they are separated from each other by > 3m or the same distance required between the largest store and a property boundary, whichever is greater.
4. Cylinder stores shall be separated from UN1075 (LPG) decanting cylinders or filling points by > 6.5m.
5. Cylinder stores shall be separated from property boundaries by > Table CS1.
6. Cylinder stores shall be separated from on-site protected places by > Table CS2.
7. Cylinder stores shall be separated from aboveground accumulations of combustible materials or storage and handling areas of other DG classes or combustible liquids > Minor Storage by > Table CS3.
8. Gas cylinders shall be segregated by > 3m from any incompatible gases or substances. Division 2.2 gases are not considered to be incompatible with flammable gases, oxidising gases or toxic gases and can be used to segregate incompatible gases.
9. Gases shall be segregated from any other substance they may react dangerously with by > 5m.

CS1

Aggregate capacity cylinder store	UN1075 only	Class 2.1, other than UN1075	Class 2.2, sub-risk 5.1	Class 2.2, no subrisk
1000 - 2000L	3m	3m	3m	1m
2000 - 2500L	3m	6m	5m	5m
2500 - 5000L	4.5m	6m	5m	5m
5000 - 20,000L	Not self-assessable	Not self-assessable	5m	5m
>20,000L			Not self-assessable	5m

CS2

Aggregate capacity cylinder store	UN1075 only	Class 2.1, other than UN1075	Class 2.2, sub-risk 5.1	Class 2.2, no subrisk
1000 - 2000L	3m	3m	3m	not specified

2000 - 2500L	3m	3m	3m	not specified
2500 - 5000L	*4.5m*	3m	3m	3m
5000 - 20,000L	Not self-assessable	Not self-assessable	3m	3m
>20,000L			Not self-assessable	3m

CS3

Aggregate capacity cylinder store	UN1075 only	Class 2.1, other than UN1075	Class 2.2, sub-risk 5.1	Class 2.2, no subrisk
1000 - 2000L	3m	3m	3m	3m
2000 - 2500L	3m	5m	5m	3m
2500 - 5000L	3m	5m	5m	3m
5000 - 20,000L	Not self-assessable	Not self-assessable	5m	3m
>20,000L			Not self-assessable	3m

Siting and separation— LPG decanting cylinders

1. LPG decanting cylinders shall be located outdoors on the ground in a static position only, with the outlet and safety relief valves directed away from any above ground LPG storage tank, dangerous goods storage area or fuel dispenser for flammable or combustible materials.
2. LPG decanting cylinders shall be segregated by > 3m from any incompatible gases or substances and any other substance they may react dangerously with by > 5m.
3. The centre point of any LPG decanting cylinder shall be a located to achieve the following minimum separation distances:

    a. 6.5m to any boundary;
    b. 6.5m to any on-site protected place;
    c. 6.5m to any aboveground LPG storage tank;
    d. 6.5m to any fire-risk dangerous goods or combustible materials stored above ground;
    e. 4.5m to any fuel dispenser for a flammable or combustible material;
    f. 4.5m to any non fire-risk dangerous goods stored above ground;
    g. 4.5m to any entrance to any drain, pit or basement;
    h. 3.5m to any opening into a building;
    i. 3.5m to any structure that limits egress past the cylinder;
    j. 2.5m to any fill or dip cap of any underground storage tank.

Note - These separation distances are inclusive of a maximum hose length of 1.5 m.

Ventilation

1. Cylinder stores shall be provided with a ventilation system capable of providing sufficient fresh air to dilute and remove gases and allow any flammable vapours to dissipate and reduce any risk of asphyxiation, fire or explosion. Where lighter-than-air gases are to be stored high-level ventilation shall be provided in the roof ridge or at the highest point(s) of any roof. Ceilings are not permitted in any roof.
2. Ventilation shall be in the form of an open wall or vents.

3. An open wall means a completely open external wall or wall of fixed louvers, chequered brickwork, slotted bricks, slotted roller doors or wire mesh from floor to ceiling with a minimum of 50% of its area as openings.
4. A vent means an opening in an external wall with a minimum free surface area of ≥ 0.1m^2. Where vents are used, they shall be provided at both high and low levels relative to the floor and roof and ventilate directly to outdoor areas away from building entrances, doors, windows, air conditioning intakes, sources of ignition, areas people are not likely to congregate or other areas that allow free air movement. Vents that pass through cavity walls must be lined to prevent vapours from escaping into a wall cavity.
5. Cylinder stores shall be provided with at least one of the following ventilation systems:

    a. Two opposing external sides that are open; or
    b. One external side that is open, provided at a minimum it is twice as long as it is wide; or Vents in at least one pair of opposing external sides, provided that:

        i. the distance between the opposing external walls does not exceed 10 m; and
        ii. in every 2m length of external opposing walls, there are at least two vents evenly distributed; and
        iii. the total area of vents per meter length of wall.

Impact avoidance— Cylinder stores

1. Cylinders within a cylinder store shall be secured to restrict their movement by railings, chains or barriers.
2. Cylinder stores serviced by motor vehicles (including forklifts) or in vehicle manoeuvring areas (e.g. car parks or hard stands) shall be provided with impact protection in accordance with at least one of the following:

    a. fully enclosed metal cage, not including the floor or roof of the store; or
    b. platform ≥ 900mm above the ground level where motor vehicles can operate/manoeuvre; or
    c. 1.2m high x 75mm wide core filled metal bollard buried a minimum of 500mm deep and located either side of any point a motor vehicle can access or exit the store; or
    d. concrete kerb a minimum of 190mm high located a minimum of 2m from the cylinder store.

Impact avoidance— Decanting cylinders

1. Decanting cylinders located in or adjacent to vehicle manoeuvring area shall be provided with impact protection in accordance with at least one of the following:

    a. Core-filled metal bollards:

        i. minimum of 1.2m high x 75mm wide; and
        ii. buried a minimum of 500mm deep below ground; and
        iii. spaced at a maximum of 1.3m between any 2 posts or bollards required to separate a cylinder from a vehicle access area; and
        iv. a minimum of 1.5m away from the side of the cylinder or

    b. Metal guardrail a minimum of 700mm high with posts buried a minimum of 500mm deep and located a minimum of 1.5m from any cylinder; or
    c. A chain-wire metal fence a minimum of 1.8m high with a minimum of 50mm steel posts buried a minimum of 600mm deep and located a minimum of 3m from the cylinder; or
    d. A concrete or masonry kerb a minimum of 190mm high located a minimum of 5m from a cylinder.

Fire safety

1. Cylinder stores shall have ≥ 1 x hose reel and ≥ 1 x 9kg ABE extinguisher within 10m but not closer than 3m.
2. Decanting cylinders shall have ≥ 1 x 9kg ABE extinguisher within 10m but not closer than 3m. Where ≥ 2 decanting cylinders are stored ≤ 6.5m from each other, a hose reel shall also be provided within 10m but not closer than 3m from each cylinder.
3. Any hose reel shall be capable of reaching all sides of the package store or decanting cylinder it is protecting.

Access restriction

Cylinder stores shall be kept under lock and key.

Flammable and combustible liquids in packages and IBCs

General requirements

1. Package stores (areas of stored packages and IBCs) shall be located outdoors only and used for the storage of closed packages and/or IBCs only.
2. All separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development.
3. Separation distances shall be measured from the inside edge of any bund wall or natural vent opening to any areas to be protected.
4. Package stores shall be constructed from non-combustible materials that are compatible with the flammable and combustible liquids to be stored. Hardwood frames are not considered combustible materials for the purposes of this Code, however, hardwood cladding is.
5. The lowest point of any package store containing >2,500L of PGII or >10,000L of PGIII shall be higher than any relevant flood height level identified in an area's flood hazard area. Alternatively, package stores are provided with impervious bund walls or racking systems higher than the relevant flood height level.

Siting and separation – Package store

1. Package stores shall be separated from property boundaries and on-site protected places by ≥ Table FL1.
2. Flammable and combustible liquids shall be segregated from any other substance that it may react dangerously with by ≥ 5m and stored in separate spill compounds.
3. Package stores shall be separated from any decanting area for flammable or combustible liquids by ≥ 6m.
4. Package stores shall be separated form aboveground tanks containing flammable liquids by ≥ 6m or the diameter of the tank up to a maximum of 15m, whichever is greatest.
5. Package stores shall be separated from aboveground tanks containing combustible liquids by ≥ 3m or the diameter of the tank up to a maximum of 7m, whichever is greatest.

Table FL1

PGII with or without PGIII, C1 or C2	PGIII with or without C1 or C2	C1 with or without C2	Minimum separation distance
	2 500L	10 000L	3m
2 000L	8 000L	20 000L	4m
4 000L	16 000L	40 000L	5m
7 000L	28 000L	70 000L	6m
10 000L	40 000L	100 000L	7m
14 000L	60 000L		8m
20 000L			9m
26 000L			10m
34 000L			11m
42 000L			12m
52 000L			13 m
60 000L			14m

Note - Flammable or combustible liquids with differing flashpoints stored within the same package store, shall all be treated as an aggregate of the liquid with the lowest flashpoint.

Spill Containment

1. Spill containment systems shall not bring together two or more hazardous chemicals that are not compatible (including common drains).
2. Package stores shall be provided with a spill compound (e.g. bund) that complies with all of the following:

    a. is impervious;
    b. constructed of a fire resistant material(s);
    c. capable of holding liquid when full;
    d. sloped to a low point or sump;
    e. provided with a means of being emptied;
    f. free from any other dangerous goods;
    g. provided with restraints or barriers to prevent packages falling outside of the bund if packages are positioned closer than 600mm from a bund wall;
    h. has a minimum internal volume as per Table FL2:

Table FL2

Aggregate volume of packages/IBCs	Minimum volume of spill compound
2,000L	2,100L
4,000L	2,600L
7,000L	3,350L
8,000L	3,600L
10,000L	4,100L
14,000L	4,500L
16,000L	4,700L
20,000L	5,100L
26,000L	5,700L
28,000L	5,900L
34,000L	6,500L
40,000L	7,100L
42,000L	7,300L
52,000L	8,300L
60,000L	9,100L
70,000L	10,100L
100,000L	13,100L

Ventilation

1. Package stores shall be provided with ventilation to allow for flammable vapours to dissipate. Ventilation shall be in the form of an open wall or vent.
2. An open wall means any external wall that is completely open above the top of the bund wall or a wall of fixed louvers or wire mesh having a minimum of 50% of its area are openings.
3. A vent means 2 x openings in an external wall with a minimum free surface area of 0.15m^2 with one located directly above the top of a bund wall and the other above the highest package. For package stores storing combustible liquids only, the opening above the highest package is not mandatory.
4. Any vent that passes through a cavity wall must be lined to prevent vapours from escaping into a wall cavity.
5. Package stores shall be provided with at least one of the following ventilation systems:

    a. Two or more open walls; or
    b. One open wall, provided it is longer than it is wide; or
    c. One open wall and vents in the opposite or adjacent wall at a minimum of every 3m; or
    d. A minimum of two opposite walls provided with vents a minimum of every 3m; or
    e. For package stores longer than 6m but no wider than 5m, vents in the longest wall a minimum of every 1.4m.

Impact Avoidance

1. Impact damage caused by fork-lift trucks or other moving equipment against racking uprights shall be avoided by the protection of corner uprights as follows:

a. An upright protector with a height of not less than 400mm shall be positioned at the end upright of each run of racking between cross-aisles;
b. An upright protector shall be positioned at all those uprights positioned at aisle and gangway intersections;
c. The upright protector shall be designed for energy absorption of > 400 Nm in any direction at any height between 0.1 m and 0.4 m;
d. The upright protector shall be positioned in such a way that, after its deformation by absorbing an impact, the upright will not be damaged.

Note - As an alternative to the use of upright protectors, the installation may be designed to survive the complete removal of a section at the bottom of an upright.

Fire safety

Package stores shall be provided with a 24hr monitored fire detection system and fire protection equipment. Table FL3.

Table FL3

Storage type	Fire protection
Unroofed package store containing flammable liquids only	4 x 9kg ABE extinguishers, 2 x 9kg foam extinguishers and 1 x hose reel able to reach all areas of the package store with a branch pipe, pick up and a supply of foam concentrate*.
Roofed package store containing flammable liquids only	1 x 9kg ABE extinguisher located at each doorway(s), 1 x 9kg ABE extinguisher located internally every 15m and 1 x hose reel able to reach all areas of the package store with a branch pipe, pick up and a supply of foam concentrate*.
Unroofed package store containing combustible liquids only	1 x 9kg ABE extinguishers and 2 x 9kg foam extinguishers

Roofed package store containing combustible liquids only	1 x 9kg ABE extinguisher located at each doorway(s) with a total no less than 2 and 1 x 9kg foam extinguisher located at each doorway(s) also with a total of no less than 2.
Unroofed package store containing flammable and combustible liquids	4 x 9kg ABE extinguishers, 2 x 9kg foam extinguishers and 1 x hose reel able to reach all areas of the package store with a branch pipe, pick up and a supply of foam concentrate*.
Roofed package store containing flammable and combustible liquids	1 x 9kg ABE extinguisher located at each doorway(s), 1 x 9kg ABE extinguisher located internally every 15m and 1 x hose reel able to reach all areas of the package store with a branch pipe, pick up and a supply of foam concentrate*.

* A supply of foam concentrate shall be consistent with the quantity identified in a site's emergency plan required under the Work Health and Safety Act 2011.

Access restriction

Package stores shall be kept under lock and key.

Flammable and combustible liquids in tanks

General requirements for tanks

1. Aboveground tanks, vents, fill points and dispensers shall be located outdoors only.
2. Separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development.
3. Separation distances for any tank, dispenser, pump, vent or fill point shall be measured from the outermost external surface.
4. Separation distances for any spill compound (bund) containing a flammable liquid tank shall be measured from the inside edge of the bund walls.
5. Aboveground tanks shall be made of steel only. The outer shell of any fire-rated double walled tank can be made of heat resistance materials required to achieve a 240/240/240 fire resistance level.
6. Underground tanks shall be double walled with the outer wall constructed of corrosion resistant materials.
7. Separation distances for spill compounds (bund) shall be measured from the inside edge of the bund walls.
8. Tanks shall be located ≥ 1m from any wall to allow access for inspection and maintenance.
9. Spill compounds and tank supporting structures shall be constructed of fire resistant materials only.
10. ADG Code compliant isotainers and intermodal tanks are considered tanks for the purposes of this code.
11. Aboveground tanks, including isotainers or intermodial tanks shall not be stacked on top of each other.
12. Where the base of any tank containing >2,500L of PGII or >10,000L of PGIII is lower than a relevant flood height level identified in a local government's flood hazard area such a tank shall be anchored so it cannot float if submerged or inundated by water; and, any opening not provided with a liquid tight seal, i.e. an atmospheric vent, shall be extended above the relevant flood height level.

Siting and separation – tanks not including fire-rated tanks

1. Aboveground tanks shall be separated from property boundaries by ≥ Table FL4.
2. Aboveground flammable liquid tanks shall be separated from on-site protect places by ≥ Table FL4.
3. Aboveground combustible liquid tanks shall be separated from on-site protect places by ≥ 50% of Table FL4 or 7.5m, whichever is less.
4. Spill compounds containing flammable liquid tanks shall be separated from property boundaries by ≥ 50% of Table FL4.
5. Any two aboveground flammable and/or combustible liquid tanks shall be separated from each other by ≥Table FL5.
6. Flammable and/or combustible liquid tanks shall be segregated from substances they may react dangerously with by ≥ 5m and be stored in separate spill compounds.

7. Aboveground flammable liquid tanks shall be separated from package stores and decanting areas for flammable or combustible liquids by ≥ 6m.
8. Aboveground combustible liquid tanks shall be separated from package stores containing flammable or combustible liquids by ≥ 3m or the diameter of the tank, whichever is greater.
9. Underground tanks shall be separated from property boundaries by ≥ 2m.

Siting and separation – Fire-rated double walled tanks

Aboveground fire-rated self-bunded tanks shall be separated from property boundaries and on-site protected places by ≥ 50% of Table FL4.

Siting and separation – Tank openings, vents and fill points

1. Fill points for flammable liquid tanks shall be located outside in open air ≥ 4m from property boundaries and building openings.
2. Fill points for combustible liquid tanks shall be located outside in open air ≥ 2m from building openings.
3. Tank fill points shall also be adequately located to ensure delivery vehicles:

    a. can park entirely inside the property boundaries;
    b. are not required to enter a tank bund;
    c. are capable of exiting the fill point area without reversing.

4. Any vent discharge point of a flammable liquid tank shall be located a minimum of:

    a. 4m aboveground or a minimum of 150mm above the top of the tank or above the highest point of a refuelling vehicle, whichever is greater; and
    b. 4m from any opening into a building (i.e. window, mechanical vent intake etc) for flammable liquids;
    c. 1.5m from a property boundary for underground tanks and self-bunded tanks; or
    d. 3m from a property boundary for an aboveground tank.

5. Any vent discharge point for a combustible tank shall be located a minimum of:

    a. 4m above ground or a minimum of 150mm above the top of the tank or above the highest point of a refuelling vehicle, whichever is greater; and
    b. 2m from any opening into a building.

Siting and separation – Dispensers

1. Flammable liquid dispensers shall be separated from property boundaries by ≥ 4m.
2. Flammable liquid dispensers shall be separated from aboveground non fire-rated tanks by ≥ 8m.

Table FL4

PG II	PG III	C1	Minimum separation distance
1,000	2,500	10,000	3m
2,000	8,000	20,000	4m
4,000	16,000	40,000	5m
7,000	28,000	70,000	6m
10,000	40,000	100,000	7m
14,000	60,000	140,000	8m
20,000		200,000	9m

26,000		260,000	10m
34,000		340,000	11m
42,000		420,000	12m
52,000		500,000	13m
60,000			14m

Table FL5

Liquid type	Vertical tanks	Horizontal tanks	Vertical and horizontal
Flammable liquid tanks only < 60,000L.	≥ 1m or 1/3 of the larger tank's diameter, whichever is greater.	≥ 600mm and side to side, (not end-to-end).	≥ 1m or 1/3 of the larger tank's diameter, whichever is greater, and horizontal tank ends shall not face vertical tanks.
Combustible liquid tanks only < 60,000L.	≥ 1m.	≥ 600mm and side to side, (not end-to-end).	All tanks shall be separated from each other by 1m and horizontal tanks cannot face vertical tanks.
A mix of flammable and combustible tanks < 60,000L.	≥ 1m or 1/3 of the diameter of the largest flammable liquid tank, whichever is greater.	≥ 600mm side to side, (not end-to-end).	≥ 1m or 1/3 of the diameter of the largest flammable liquid tank, whichever is greater, and horizontal tank ends cannot face vertical tanks.
A mix of flammable and combustible tanks > 60,000L..	Not self assessable.	Not self assessable.	Not self assessable.

Spill containment – Aboveground tanks, not including double walled self-bunded tanks

1. Spill containment systems shall not bring together two or more hazardous chemicals that are not compatible (including common drains).
2. Aboveground tanks, other than self-bunded aboveground tanks, shall be located inside a spill compound (e.g. bund) that complies with all of the following:
   a. is impervious;
   b. free from pipe work penetrating through any wall of the bund;
   c. constructed of fire resistant material(s);
   d. able to hold liquid when full;
   e. sloped to a low point or sump;
   f. provided with a means of being emptied;
   g. the distance between a bund wall and the nearest tank is a minimum of half the distance between the top of the tank and the top of the bund wall or 1m whichever is greater;
   h. has an internal volume ≥ 110% of the largest tank within the compound. (Includes 10% for fire water)

Impact avoidance – Aboveground tanks

1. Aboveground tanks, not including fire-rated self-bunded tanks or those with a bund wall >190mm high shall be provided with impact protection in accordance with at least one of the following:
   a. core-filled metal bollards:

i. minimum of 1.2m high x 75mm wide; and
ii. buried a minimum of 500mm deep below ground; and
iii. spaced at a maximum of 1.3m between any 2 posts or bollards required to separate a tank from a vehicle access area; and
iv. a minimum of 1.5m away from the side of the tank; or

b. metal guardrail a minimum of 700mm high with posts buried a minimum of 500mm deep and located a minimum of 1.5m from the tank; or
c. a chain-wire metal fence a minimum of 1.8m high with a minimum of 50mm steel posts buried a minimum of 600mm deep and located a minimum of 3m from the tank; or
d. a concrete or masonry kerb a minimum of 190mm high located a minimum of 5m from the tank.

Impact avoidance – Underground tanks

Underground tanks shall be buried a minimum of 300mm below ground and provided with a reinforced concrete slab a minimum of 150mm thick covering the tank storage area.

Impact avoidance – Fill points

Fill points shall be positioned below ground and provided with a metal cover or located inside an above ground tank bund or provided with impact protection as required for above ground tanks.

Impact avoidance – Vent pipes

Vent pipes shall be located inside an above ground tank bund or provided with impact protection as required for above ground tanks.

Impact avoidance – Vehicle dispensers

1. Dispensers for road vehicles shall be provided with metal bollards in accordance with all of the following:

a. core-filled with concrete;
b. minimum of 1.2m high x 75mm wide;
c. buried a minimum of 500mm deep;
d. located at all 4 corners of a dispenser at a distance as wide as or wider than the dispenser;
e. located a minimum of 500mm from any side of a dispenser.

Note - Multiple dispensers in a row ≤ 2m apart may be grouped together and considered as one individual dispenser.

Fire safety – Storage tanks

Tanks shall be provided with fire protection equipment in accordance with Table T3 and all fire fighting equipment shall be located outside of spill compounds and within 10m.

Fire safety – Dispensers

Dispenser shall have access to ≥ 2 x 9kg ABE extinguishers within 10m and one no closer than 3m.

Fire safety – Tank fill points

Fill points shall have access to ≥ 2 x 9kg ABE extinguishers with one extinguisher > 3m from the fill point.

Fire safety – Transfer pumps

Transfer pumps shall have access to ≥ 1 x 9kg ABE extinguisher within 10m but not closer than 3m.

Table T3

Storage type	Storage capacity	Fire protection
Aboveground flammable liquid tanks	< 30,000L	1 x 9kg ABE extinguisher and 1 x 9kg foam extinguisher.
	30,000 - 60,000L	1 x 9kg ABE extinguisher and 1 x hose reel able to reach all sides of the storage tank(s) with a branch pipe, pick up and a supply of foam concentrate*.
Aboveground combustible liquid tanks	< 60,000L	1 x 9kg ABE extinguisher in a single tank; or 2 x 9kg ABE extinguishers if multiple tanks
	60,000 - 500,000L	1 x 9kg ABE extinguisher and 1 x hose reel able to reach all sides of the storage tank(s) with a branch pipe, pick up and a supply of foam concentrate*.
Aboveground flammable and combustible liquid tanks stored within the a common spill compound	< 30,000L	1 x 9kg ABE extinguisher and 1 x 9kg foam extinguisher.
	30,000 - 60,000L	1 x 9kg ABE extinguisher and 1 x hose reel able to reach all sides of the storage tank(s) with a branch pipe, pick up and a supply of foam concentrate*.
Underground flammable or combustible liquid tanks	any	Nil

* A supply of foam concentrate shall be consistent with the quantity identified in a site's emergency plan required under the *Work Health and Safety Act 2011*.

Access restriction

Aboveground tanks shall be kept under lock and key.

Oxidising substances in packages and IBCs

General requirements

1. Package stores (areas of stored packages and IBCs) shall be located outdoors only and used for the store closed packages and/or IBCs only.
2. Separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development.
3. Separation distances shall be measured from the inside edge of any bund wall or natural vent opening to any areas to be protected.
4. Package stores shall be constructed from non combustible materials that are compatible with the oxidising substances to be stored. Hardwood frames are not considered combustible materials for the purposes of this Code, however, hardwood cladding is.
5. Package stores with a spill compound >250m2 shall have a minimum of 2 egress points.
6. The lowest point of any package store containing >2,500L of PGII or >10,000L of PGIII shall be higher than any relevant flood height level identified in an area's flood hazard area. Alternatively, package stores are provided with impervious bund walls or racking systems higher than the relevant flood height level.

Siting and separation

1. Package stores shall be separated from property boundaries and on-site protected places by > Table OS1.
2. Oxidising substances shall be segregated from any other substance that it may react dangerously with by a minimum of 5m and stored in separate spill compounds.

Table OS1

Maximum aggregate quantity of store	PGII with or without PGIII	PGIII only
2,500 – 10,000L or kg	5m	3m
10,000 – 20,000L or kg	8m	5m
20,000 – 50,000L or kg	Not self-assessable	5m
50,000 - 250,000L or kg	Not self-assessable	8m

Storage in stacks

1. Oxidising substances stacked ≥ 2 high and not in a pallet racking system, shall comply with the following:
   a. not exceed 3m in height;
   b. separated a minimum of 1.2m from any perimeter wall of a package store;
   c. multiple stacks within the same package store are separated from each other by ≥ 3m;
   d. each stack shall not exceed table OS2:

Table OS2

Stack size	PGII with or without PGIII	PGIII only
Involving combustible pallets	20,000kg	20,000kg
No combustible pallets	20,000kg	50,000kg

Spill containment

1. Spill containment systems shall not bring together two or more hazardous chemicals that are not compatible (including common drains).
2. Package stores, containing liquids shall be provided with a spill compound that achieves the following:
   a. is impervious;
   b. constructed or lined with material(s) compatible with the oxidising substance(s) kept;
   c. capable of holding liquid when full;
   d. sloped to a low point or sump;
   e. provided with a means of being emptied;
   f. internal volume ≥ 35% of aggregate storage volume (includes provision for fire water);
   g. Where liquid IBCs are stored, the distance between a bund wall and the nearest IBC shall be ≥ 50% the distance between the top of the highest IBC tank and the top of the closest bund wall; *(Impervious shields can be used to extend bund walls)*
   h. provided with restraints or barriers to prevent packages falling outside of the bund if packages are positioned ≤ 1m from a bund wall.

Ventilation

1. Package stores shall be provided with ventilation to allow for any vapours to dissipate. Ventilation shall be in the form of an open wall or vent.
2. An open wall means any external wall that is completely open above the top of the bund wall or a wall of fixed louvers or wire mesh having a minimum of 50% of its area are openings.
3. A vent means 2 x openings in an external wall that are completely open each with a minimum surface area of 0.1m^2 with one located directly above the top of a bund wall and the other above the highest package.

4. Any vent that passes through a cavity wall must be lined to prevent vapours from escaping into a wall cavity.
5. Package stores shall be provided with at least one of the following ventilation systems:

    a. Two or more open walls; or
    b. One open wall, provided it is longer than it is wide; or
    c. One open wall and vents in the opposite or adjacent wall at a minimum of every 3m; or
    d. Two opposite walls provided with vents a minimum of every 3m; or
    e. For package stores > 6m long and < 5m wide, vents in the longest wall ≥ every 1.4m.

Impact avoidance

1. Impact damage caused by fork-lift trucks or other moving equipment against racking uprights shall be avoided by the protection of corner uprights as follows:

    a. An upright protector with a height of not less than 400 mm shall be positioned at the end upright of each run of racking between cross-aisles;
    b. An upright protector shall be positioned at all uprights positioned at aisle and gangway intersections;
    c. The upright protector shall be designed for energy absorption of ≥ 400 Nm in any direction at any height between 0.1 m and 0.4 m;
    d. The upright protector shall be positioned in such a way that, after its deformation by absorbing an impact, the upright will not be damaged.

Note - As an alternative to the use of upright protectors, the installation may be designed to survive the complete removal of a section at the bottom of an upright.

Fire safety

Package stores shall be provided with a 24hr monitored fire detection system and ≥1 x 9kg ABE fire extinguisher, within 10m but no closer than 3m and ≥1 x hose reel capable of reaching all areas of the store.

Security

Package stores shall be kept under lock and key.

Oxidising substances in tanks

General requirements

1. Aboveground tanks, vents, fill points and dispensers shall be located outdoors only.
2. Underground tanks are not permitted.
3. Separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development.
4. Separation distances shall be measured from the outermost external surface of a tank, fill point or dispenser.
5. Separation distances for spill compounds (bund) shall be measured from the inside edge of the bund walls.
6. Tanks shall be located ≥ 1m from any wall to allow access for inspection and maintenance.
7. Spill compounds and tank supporting structures shall be constructed of fire resistant materials only.
8. ADG Code compliant isotainers and intermodal tanks are considered tanks for the purposes of this code.
9. Aboveground tanks shall not be stacked on top of each other.
10. Hydrogen Peroxide tanks ≥ 5,000L shall be fitted with an externally visible temperature measuring device.
11. Where the base of any tank containing >2,500L of PGII or >10,000L of PGIII is lower than a relevant flood height level identified in a local government's flood hazard area such a tank shall be anchored so it cannot float if submerged or inundated by water; and, any opening not provided with a liquid tight seal, i.e. an atmospheric vent, shall be extended above the relevant flood height level.

Siting and separation

1. Tanks shall be separated from property boundaries and on-site protected places by ≥ Table OS3.

2. Tank bunds shall be separated from property boundaries and on-site protected place ≥ 3m.
3. Tanks containing oxidising substances that are compatible with each other shall be separated by ≥ 1m.
4. Oxidising substances shall be separated from any other substance that it may react dangerously with, including any another oxidising substance, by a minimum of 5m and stored in separate spill compounds.
5. Tank fill points shall also be adequately located to ensure delivery vehicles:

    a. can park entirely inside the property boundaries;
    b. are not required to enter a tank bund;
    c. are capable of exiting the fill point area without reversing.

6. Fill or dispensing points shall be located ≥ 3m from property boundaries or on-site protected places.
7. Separation distances may be measured around an intervening screen wall provided it is ≥ 1m above the transfer point, impervious to liquid and vapour, immune to attack by the oxidising substance(s) kept and acts as a shield or deflection barrier.

Table OS3

Tank size	PGII	PGIII
2,500 – 10,000L	5m	5m
10,0000 – 20,000L	8m	5m
20,0000 – 50,000L	Not self-assessable	5m
50,000 – 250,000L	Not self-assessable	8m

Spill containment – Tank shell

1. No two spill compounds containing incompatible substances or substances that may react dangerously with each other shall be connected to a common drain.
2. Tanks containing liquids shall be located inside a spill compound that achieves the following:

    a. is impervious;
    b. compatible with the oxidising substance(s) kept and fire-resistant;
    c. capable of holding liquid when full;
    d. sloped to a low point or sump;
    e. provided with a means of being emptied;
    f. free from pipe work penetrating through any bund walls;
    g. the distance between a bund wall and the nearest tank shall be ≥ 50% the distance between the top of the tank and the top of the bund wall or 1m whichever is greater; *(Impervious shields may be used to extend bund wall heights)*
    h. has an internal volume ≥ 110% of the largest tank stored within the compound.

Impact avoidance

1. Tanks, other than those provided with masonry bunds >190mm high or self bunded fire-rated tanks shall be provided with impact protection in accordance with at least one of the following:

    a. core-filled metal bollards:

        i. minimum of 1.2m high x 75mm wide; and
        ii. buried a minimum of 500mm deep below ground; and
        iii. spaced at ≤ 1.3m between any 2 posts or bollards required to separate a tank from a vehicle access area;
        iv. a minimum of 1.5m away from the side of the tank.

b. metal guardrail a minimum of 700mm high with posts buried a minimum of 500mm deep and located a minimum of 1.5m from the tank; or
c. a chain-wire metal fence a minimum of 1.8m high with a minimum of 50mm steel posts buried a minimum of 600mm deep and located a minimum of 3m from the tank; or
d. a concrete or masonry kerb a minimum of 190mm high and a minimum of 5m from the tank.

Fire safety

Tanks shall be provided with ≥ 1 x 9kg dry chemical fire extinguisher, within 10m but no closer than 3m and ≥ 1 x hose reel capable of reaching all sides of the tank(s).

Security

Tanks shall be kept under lock and key.

Toxic substances in packages and IBCs

General requirements

1. Package stores (areas of stored packages and IBCs) shall be free standing and used for the storage of closed packages and/or IBCs only.
2. Package stores within buildings shall be located on a floor with immediate access outside the building.
3. All separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development.
4. Separation distances shall be measured from the inside edge of any bund wall or natural vent opening to any areas to be protected.
5. Package stores shall be constructed from materials compatible with the toxic substances to be stored.
6. Package stores with a spill compound > 25m^2 shall have a minimum of 2 access points.
7. Toxic substances with a flammable liquid subsidiary risk or vice versa shall not be stored with toxic substances that do not have a flammability (class 3) risk.
8. Decanting, blending or filling packages is not permitted in package stores containing toxic substances.
9. The lowest point of any package store containing >2,500L of PGII or >10,000L of PGIII shall be higher than any relevant flood height level identified in an area's flood hazard area. Alternatively, package stores are provided with impervious bund walls or racking systems higher than the relevant flood height level.

Siting and separation

1. Separation distances between a package store and a property boundary shall be ≥ Table TS1.
2. Separation distances between a package store and an on-site protected place shall be > 50% Table TS1.
3. Toxic substances shall be separated from any other substance that it may react dangerously with by a minimum of 5m and stored in separate spill compounds.

Table TS1

Package store volume (L/kg)	PGII with or without PGIII	PGIII only
2,500 – 10,000	5m	3m
10,000 – 20,000	6m	4m
20,000 – 50,000	8m	5m
50,000 – 100,000	10m	8m
100,000 – 200,000	15m	10m
200,000 - 500,000	17.5m	15m

Spill containment

1. Spill containment systems shall not bring together two or more hazardous chemicals that are not compatible (including common drains).
2. Package stores, including those storing solids only, shall be provided with a bund that complies with all of the following:

    a. is impervious;
    b. constructed or lined with a material compatible with the toxic substance(s) kept;
    c. capable of holding liquid when full;
    d. sloped to a low point or sump;
    e. provided with a means of being emptied;
    f. free from any other dangerous goods, incompatible materials or materials that may react violently with the toxic substances;
    g. has a minimum internal volume ≥ 25% of the aggregate storage capacity;
    h. Where liquid IBCs are stored, the distance between a bund wall and the nearest IBC shall be ≥ 50% the distance between the top of the highest IBC tank and the top of the closest bund wall. *(Impervious shields may be used to extend bund walls)*;
    i. provided with restraints or barriers to prevent packages falling outside of the bund if packages are positioned < 1m from a bund wall.

Ventilation

1. Package stores shall be provided with ventilation to allow for corrosive vapours to dissipate. Ventilation shall be in the form of an open wall or vent.
2. An open wall means any external wall that is completely open above the top of the bund wall or a wall of fixed louvers or wire mesh having a minimum of 50% of its area are openings.
3. A vent means 2 x openings in an external wall with a minimum free surface area of $0.1m^2$ with one located directly above the top of a bund wall and the other above the highest package.
4. Any vent that passes through a cavity wall must be lined to prevent vapours from escaping into a wall cavity.
5. Package stores shall be provided with at least one of the following ventilation systems:

    a. Two or more open walls; or
    b. One open wall, provided it is longer than it is wide; or
    c. One open wall and vents in the opposite or an adjacent wall at a minimum of every 3m; or
    d. Two opposite walls <10m apart provided with vents a minimum of every 3m; or
    e. For package stores ≥ 6m long and ≤ 5m wide, vents in the longest wall ≥ every 1.4m.

Impact avoidance

1. Impact damage caused by fork-lift trucks or other moving equipment against racking uprights shall be avoided by the protection of corner uprights as follows:

    a. An upright protector with a height of not less than 400 mm shall be positioned at the end upright of each run of racking between cross-aisles;
    b. Upright protectors shall be positioned at uprights positioned at aisle and gangway intersections;
    c. The upright protector shall be designed for energy absorption of ≥ 400 Nm in any direction at any height between 0.1 m and 0.4 m;
    d. The upright protector shall be positioned in such a way that, after its deformation by absorbing an impact, the upright will not be damaged.

Note - As an alternative to the use of upright protectors, the installation may be designed to survive the complete removal of a section at the bottom of an upright.

Fire safety

Package stores shall be provided with a 24hr monitored fire detection system and ≥ 1 x 9kg ABE fire extinguisher, within 10m but no closer than 3m.

Security

A package store shall be kept under lock-and-key.

Toxic substances in tanks

General requirements

1. Underground tanks are not permitted.
2. Separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development.
3. Separation distances shall be measured from the outermost external surface of a tank, fill point or dispenser.
4. Separation distances for spill compounds (bund) shall be measured from the inside edge of the bund walls.
5. Tanks shall be located ≥ 1m from any wall to allow access for inspection and maintenance.
6. Spill compounds and tank supporting structures shall be constructed of fire resistant materials only.
7. ADG Code compliant isotainers and intermodal tanks are considered tanks for the purposes of this code.
8. Tanks shall not be stacked on top of each other.
9. Where the base of any tank containing >2,500L of PGII or >10,000L of PGIII is lower than a relevant flood height level identified in a local government's flood hazard area such a tank shall be anchored so it cannot float if submerged or inundated by water; and, any opening not provided with a liquid tight seal, i.e. an atmospheric vent, shall be extended above the relevant flood height level.

Siting and separation

1. Separation distances between tanks and property boundaries shall be ≥ Table TS2.
2. Separation distances between tanks and on-site protected places shall be ≥ 50% Table TS2.
3. Any two tanks containing toxic substances compatible with each other shall be separated by ≥ 1m.
4. Toxic substances shall be separated from any other substance that it may react dangerously with by a minimum of 5m and stored in separate spill compounds.
5. Tank fill points shall also be adequately located to ensure filling vehicles:
   a. can park entirely inside the property boundaries;
   b. are not required to enter a tank bund;
   c. are capable of exiting the fill point area without reversing.

Table TS2

Volume of tank (L/kg)	PGII		PGIII	
	Inhalation hazard	**No Inhalation hazard**	**Inhalation hazard**	**No Inhalation hazard**
2,500 – 10,000	10m	5m	6m	3m
10,000 – 20,000	12m	6m	8m	4m
20,000 – 50,000	16m	8m	10m	5m
50,000 – 100,000	20m	10m	16m	8m
100,000 – 200,000	30m	15m	20m	10m

200,000 - 500,000	35m	17.5m	30m	15m

Spill containment – Tanks

1. No two spill compounds containing incompatible substances or substances that may react dangerously with each other shall be connected to a common drain.
2. Tanks shall be within an impervious spill compound/bund that achieves the following:

    a. is constructed of material(s) compatible with the toxic substance(s) kept;
    b. capable of holding liquid when full;
    c. sloped to a low point or sump;
    d. provided with a means of being emptied;
    e. free from any other dangerous goods, incompatible materials or materials that will react violently with the toxic substance(s) kept;
    f. free from pipe work penetrating through any bund walls;
    g. the distance between a bund wall and the nearest tank shall be a ≥ 50% the distance between the top of the tank and the top of the bund wall or 1m whichever is greater *(Impervious shields can be used to extend bund wall heights)*;
    h. has an internal volume ≥ 110% of the largest tank within the compound. (includes 500L of fire water)

Impact avoidance

1. Tanks, other than those provided with masonry bunds >190mm high, self bunded fire-rated tanks or tanks located inside a building not accessible by motor vehicles shall be provided with impact protection in accordance with at least one of the following:

    a. core-filled metal bollards:

        i. minimum of 1.2m high x 75mm wide; and
        ii. buried a minimum of 500mm deep below ground; and
        iii. spaced at a maximum of 1.3m between any 2 posts or bollards required to separate a tank from a vehicle access area; and
        iv. a minimum of 1.5m away from the side of the tank; or

    b. metal guardrail a minimum of 700mm high with posts buried a minimum of 500mm deep and located a minimum of 1.5m from the tank; or
    c. a chain-wire metal fence a minimum of 1.8m high with a minimum of 50mm steel posts buried a minimum of 600mm deep and located a minimum of 3m from the tank; or
    d. a concrete or masonry kerb a minimum of 190mm high and a minimum of 5m from the tank.

Fire safety

Tank shall have access to ≥ 1 x 9kg ABE fire extinguisher, within 10m but no closer than 3m.

Security

Aboveground tanks shall be kept under lock and key.

Corrosive substances in packages and IBCs

General requirements

1. Package stores (areas of stored, closed packages and IBCs) shall be free standing and used for the storage of closed packages and/or IBCs only.
2. Package stores within a building shall be located on a floor that has immediate access from outside the building.

3. All separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development.
4. Separation distances shall be measured from the inside edge of any bund wall or natural vent opening to any areas to be protected.
5. Package stores shall be constructed from materials compatible with the corrosive substances to be stored.
6. Package stores with a spill compound > 25m2 shall have a minimum of 2 access points.
7. The lowest point of any package store containing >2,500L of PGII or >10,000L of PGIII shall be higher than any relevant flood height level identified in an area's flood hazard area. Alternatively, package stores are provided with impervious bund walls or racking systems higher than the relevant flood height level.

Siting and separation

1. Package store shall be separated from property boundaries and on-site protected places by ≥ Table CPS1.
2. Corrosive substances shall be separated from any other substance that it may react dangerously with by a minimum of 5m and stored in separate spill compounds.

Table CPS1

PGII with or without PGIII		PGIII only
Open containers	**Closed containers**	**Open or closed containers**
5m	3m	3m

Spill containment

1. Spill containment systems shall not bring together two or more hazardous chemicals (including any two incompatible substances of the same class) that are not compatible (including common drains).
2. Package stores including those storing solids only shall be provided with a bund that complies with all of the following:

    a. is impervious;
    b. constructed or lined with a material that is compatible with the corrosive substance(s) to be stored;
    c. capable of holding liquid when full;
    d. sloped to a low point or sump;
    e. provided with a means of being emptied;
    f. has an internal volume ≥ 35% of the aggregate storage capacity but need not exceed 5,500L;
    g. Where liquid IBCs are stored, the distance between a bund wall and the nearest IBC shall be ≥ 50% the distance between the top of the highest IBC tank and the top of the closest bund wall. (*Impervious shields may be used to extend bund wall heights*);
    h. is provided with restraints or barriers to prevent packages falling outside of the bund if packages are positioned closer than 1m from a bund wall.

Ventilation

1. Package stores shall be provided with ventilation to allow for corrosive vapours to dissipate. Ventilation shall be in the form of an open wall or vent.
2. An open wall means any external wall that is completely open above the top of the bund wall or a wall of fixed louvers or wire mesh having a minimum of 50% of its area are openings.
3. A vent means 2 x openings in an external wall with a minimum free surface area of 0.1m^2 with one located directly above the top of a bund wall and the other above the highest package.
4. Any vent that passes through a cavity wall must be lined to prevent vapours from escaping into a wall cavity.
5. Package stores shall be provided with at least one of the following ventilation systems:

    a. Two or more open walls; or
    b. One open wall, provided it is longer than it is wide; or
    c. One open wall and vents in the opposite or adjacent wall at a minimum of every 3m; or

d. Two opposite walls provided with vents a minimum of every 3m; or
e. For package stores > 6m long and < 5m wide, vents in the longest wall ≤ every 1.4m.

Impact avoidance

1. Impact damage caused by fork-lift trucks or other moving equipment against racking uprights shall b Impact damage caused by fork-lift trucks or other moving equipment against racking uprights shall be avoided by the protection of corner uprights as follows:

   a. An upright protector with a height of not less than 400 mm shall be positioned at the end upright of each run of racking between cross-aisles;
   b. An upright protector shall be positioned at all those uprights positioned at aisle and gangway intersections;
   c. The upright protector shall be designed for energy absorption of ≥ 400 Nm in any direction at any height between 0.1 m and 0.4 m;
   d. The upright protector shall be positioned in such a way that, after its deformation by absorbing an impact, the upright will not be damaged.

Note - As an alternative to the use of upright protectors, the installation may be designed to survive the complete removal of a section at the bottom of an upright.

Fire safety

Package stores shall be provided with a 24hr monitored fire detection system and ≥ 1 x 9kg ABE fire extinguisher, within 10m but no closer than 3m.

Security

A package store shall be kept under lock-and-key.

Corrosive substances in tanks

General requirements

1. Underground tanks are not permitted.
2. Separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development.
3. Separation distances shall be measured from the outermost external surface of a tank, fill point or dispenser.
4. Separation distances for spill compounds (bund) shall be measured from the inside edge of the bund walls.
5. Tanks shall be located ≥ 1m from any wall to allow access for inspection and maintenance.
6. Spill compounds and tank supporting structures shall be constructed of fire resistant materials only.
7. ADG Code compliant isotainers and intermodal tanks are considered tanks for the purposes of this code.
8. Aboveground tanks shall not be stacked on top of each other.
9. Where the base of any tank containing >10,000L of PGIII is lower than a relevant flood height level identified in a local government's flood hazard area such a tank shall be anchored so it cannot float if submerged or inundated by water; and, any opening not provided with a liquid tight seal, i.e. an atmospheric vent, shall be extended above the relevant flood height level.

Siting and separation

1. Tanks, not including fire-rated double walled tanks, shall be separated from property boundaries and on-site protected places by ≥ Table CS2.
2. Fire-rated self bunded tanks shall be separated from property boundaries and on-site protected places by ≥ 50% Table CS2.
3. Tank bunds shall be separated from property boundaries and on-site protected places by ≥ 3m.
4. Any two tanks containing corrosive substances compatible with each other shall be separated by ≥ 600mm.
5. Corrosive substances shall be segregated from any other substance that it may react dangerously with, including another corrosive substance, by a minimum of 5m and stored in separate spill compounds.

6. Any fill or dispensing point for a corrosive tank containing PGII shall be located ≥ 5m from property boundaries and on-site protected places.
7. Fill and dispensing points for corrosive tanks containing PGIII shall be located > 3m from property boundaries and on-site protected places.
8. Tank fill points shall be adequately located to ensure delivery vehicles:

    a. can park entirely inside the property boundaries;
    b. are not required to enter a tank bund;
    c. are capable of exiting the fill point area without reversing.

9. Separation distances from fill or dispensing points may be measured around an intervening screen wall if it is a minimum of 1m higher than the fill or dispensing points, impervious to liquid and vapour, immune to attack by the corrosive substances kept and acts as a shield/deflection barrier.

Table CS2

Tank size	PGII or PGIII	
	Solid	**Liquid**
2,500 - 3,000L	3m	3m
3,000 – 50,000L	3m	5m
>50,000L	5m	8m

Spill containment –Tank shell

1. No two spill compounds containing incompatible substances or substances that may react dangerously with each other shall be connected to a common drain.
2. Tanks other than self bunded fire-rated tanks, shall be located inside a secondary spill compound/bund that complies with all of the following:

    a. is impervious;
    b. constructed or lined with a material compatible with the corrosive substance(s) kept;
    c. capable of holding liquid when full;
    d. sloped to a low point or sump;
    e. provided with a means of being emptied;
    f. free from pipe work penetrating through any bund walls;
    g. the distance between a bund wall and the nearest tank shall be ≥ the distance between the top of the tank and the top of the bund wall or 1m, whichever is greater. *(Impervious shields may be used to extend bund wall heights)*;
    h. has an internal volume equal to or greater than 110% of the largest tank within the compound.

Impact avoidance

1. Tanks, other than those provided with masonry bunds >190mm high or self bunded fire-rated tanks shall be provided with impact protection in accordance with at least one of the following:

    a. core-filled metal bollards:

        i. minimum of 1.2m high x 75mm wide; and
        ii. buried a minimum of 500mm deep below ground; and
        iii. spaced at a maximum of 1.3m between any 2 posts or bollards required to separate a tank from a vehicle access area; and
        iv. a minimum of 1.5m away from the side of the tank; or

b. metal guardrail a minimum of 700mm high with posts buried a minimum of 500mm deep and located a minimum of 1.5m from the tank; or
c. a chain-wire metal fence a minimum of 1.8m high with a minimum of 50mm steel posts buried a minimum of 600mm deep and located a minimum of 3m from the tank; or
d. a concrete or masonry kerb a minimum of 190mm high and a minimum of 5m from the tank.

Security

Aboveground tanks shall be kept under lock and key.

Environmentally hazardous substances in package stores or tanks

General requirements

1. The lowest point of any package store containing >2,500L of PGII or >10,000L of PGIII environmentally hazardous substances shall be higher than any relevant flood height level identified in an area's flood hazard area. Alternatively, package stores are provided with impervious bund walls or racking systems higher than the relevant flood height level.
2. Where the base of any tank containing >2,500L of PGII or >10,000L of PGIII environmentally hazardous substances is lower than a relevant flood height level identified in a local government's flood hazard area, such a tank shall be anchored so it cannot float if submerged or inundated by water; and, any opening not provided with a liquid tight seal, i.e. an atmospheric vent, shall be extended above the relevant flood height level.