

### 9.4.4 Industry design code

#### 9.4.4.1 Application

- (1) This code applies to assessing development:
  - (a) for Industry activities; or
  - (b) for Special industry; or
  - (c) located within the Low impact industry zone; or
  - (d) located within the Medium impact industry zone; or
  - (e) located within the High impact industry zone; or
  - (f) located within the Waterfront and marine industry zone.

Note – Refer to defined activity group for Industry activities contained in Schedule 1.2

- (2) When using this code, reference should be made to Part 5.

#### 9.4.4.2 Purpose

- (1) The purpose of the Industry design code is to ensure that industry activities and areas protect the public safety, provide a high quality of design and amenity and are appropriately located to ensure their long-term viability.
- (2) The purpose of the code will be achieved through the following overall outcomes:
  - (a) the scale, character and built form of development contributes to a high standard of amenity;
  - (b) the design incorporates facilities and features that contribute to a high standard environment for workers and customers;
  - (c) the development has access to development infrastructure, including utility installations and essential services;
  - (d) industrial, noxious and hazardous land uses are adequately separated from sensitive land uses to avoid the occurrence of environmental harm or environmental nuisance;
  - (e) a site that is contaminated or poses a health risk is remediated prior to being developed for an alternative land use.
  - (f) hazardous chemicals are appropriately located, handled and stored to protect the public safety and reduce the risk of contamination on the environment and to appropriately mitigate associated risks and off site hazards.

#### 9.4.4.3 Criteria for assessment

Part A - Criteria for self-assessable and assessable development

**Table 9.4.4.3.a – Industry design code – self-assessable and assessable development**

| Performance outcomes  | Acceptable outcomes  |
|---|--|
| <b>For self-assessable and assessable development</b>   |  |
| <b>Site coverage</b>  |  |
| <b>PO1</b><br>The site coverage of buildings ensures that there is sufficient area for the provision of services and landscaping, and caters for flood storage in areas affected by flooding. | <b>AO1.1</b><br>The site coverage is not more than 80%.  |
| <b>Setbacks</b>   |  |
| <b>PO2</b><br>Setbacks:<br>(a) contribute to an attractive and consistent streetscape appearance;   | <b>AO2.1</b><br>Buildings, display areas and storage areas are set back:<br>(a) 6 metres from the primary road frontage; |

| Performance outcomes   | Acceptable outcomes   |
|--|---|
| <ul style="list-style-type: none"> <li>(b) provide for visible employee and customer car parking;</li> <li>(c) allow for landscape planting along street frontages;</li> <li>(d) minimise unusable spaces between buildings and boundaries.</li> </ul> | <ul style="list-style-type: none"> <li>(b) 3 metres from any secondary road frontage;</li> <li>(c) where the site has a common boundary with land in an Industry zone, the building is setback either:               <ul style="list-style-type: none"> <li>(i) zero metres from the side or rear boundary; or</li> <li>(ii) not less than 3 metres from the side or rear boundary.</li> </ul> </li> <li>(d) where a site adjoins land in any other zone, the building is set back not less than 3 metres from the side or rear boundary.</li> </ul> <p>Note – Refer to the definition of Industry zone contained in Schedule 1.2.</p>  |
| Amenity  |   |
| <p><b>PO3</b><br/>The appearance of development provides a quality, legible appearance and workplace.</p>  | <p><b>AO3.1</b><br/>Pedestrian entrances to buildings are:</p> <ul style="list-style-type: none"> <li>(a) easily identifiable from the street and directly accessible from the car parking areas;</li> <li>(b) provided with sun and rain shelter a minimum of 900mm width immediately above the entryway.</li> </ul> <p><b>AO3.2</b><br/>Ancillary office or sales space is orientated toward the street frontage and is provided with human scale elements (such as windows, doors, shading devices and variation of construction materials and colours).</p> <p><b>AO3.3</b><br/>Customer car parking is located to the front or side of premises with clear and direct pedestrian access to the main customer building entry.</p> <p><b>AO3.4</b><br/>Outdoor storage areas are not located forward of the building line.</p> <p>Note – Outdoor storage does not include the display of goods for sale associated with the following land uses; agricultural supplies store, bulk landscape supplies, hardware and trade supplies or outdoor sales.</p> <p><b>AO3.5</b><br/>Illumination is provided within parking and pedestrian areas during night time hours of operation.</p> <p><b>AO3.6</b><br/>Development provides clear and legible street numbering for the benefit of motorists.</p> <p><b>AO3.7</b><br/>Gates to a road frontage are sliding or open inwardly into the site.</p> <p><b>AO3.8</b></p> |

| Performance outcomes  | Acceptable outcomes   |
|---|---|
|   | <p>Development provides staff amenity areas that incorporate:</p> <ul style="list-style-type: none"> <li>(a) seating and tables;</li> <li>(b) weather protection.</li> </ul>  |
| <b>Safety</b>   |   |
| <p><b>PO4</b><br/>Design actively contributes to the safety of users of the development.</p> <p>Note – Guidance to demonstrating compliance with the Performance Outcome is outlined in Planning scheme policy – Crime prevention through environmental design (CPTED).</p> | <p><b>AO4.1</b><br/>Crime prevention through environmental design principles are integrated into the form and design of the development.</p>  |
| <b>Landscaping</b>  |   |
| <p><b>PO5</b><br/>Landscaping is provided to:</p> <ul style="list-style-type: none"> <li>(a) enhance the appearance and amenity of the development;</li> <li>(b) contribute positively to the appearance of the streetscape.</li> </ul>                                     | <p><b>AO5.1</b><br/>At least 5% of the site is landscaped.</p> <p><b>AO5.2</b><br/>A landscape strip not less than 2 metres is provided within the site along the road frontage.</p> <p><b>AO5.3</b><br/>Landscaped areas adjoining parking and manoeuvring areas are protected from vehicular encroachment by a 150mm high vertical concrete kerb or similar obstruction.</p> <p><b>AO5.4</b><br/>Planting is to consist of a combination of hardy tropical trees and spreading ground cover species in accordance with Planning scheme policy - Landscaping that will complement the scale of proposed development, without interfering with casual surveillance and sightlines.</p> <p><b>AO5.5</b><br/>Hardy tropical shrubs are provided in accordance with Planning scheme policy - Landscaping to screen bin storage and service areas.</p> <p><b>AO5.6</b><br/>Fencing along street frontages is more than 50% transparent.</p> |
| <b>Services</b>   |   |
| <p><b>PO6</b><br/>Development adequately takes into account the functional requirements of infrastructure needs and service of the use.</p>   | <p><b>AO6.1</b><br/>Design takes into account the potential need to provide:</p> <ul style="list-style-type: none"> <li>(a) space and access for trade waste connections to the sewer network;</li> <li>(b) waste and recyclable material storage areas;</li> <li>(c) storage tanks;</li> <li>(d) fire fighting booster pumps;</li> <li>(e) electrical infrastructure;</li> <li>(f) car parking, manoeuvring areas including loading facilities.</li> </ul>   |

| Performance outcomes   | Acceptable outcomes   |
|--|---|
| <b>Access and loading/unloading of goods</b>   |   |
| <p><b>PO7</b><br/>The transport of goods and materials to and from sites does not adversely affect the movement of traffic on roads adjacent to the site.</p>  | <p><b>AO7.1</b><br/>All vehicles are contained within the site when loading and unloading.</p> <p><b>AO7.2</b><br/>Manoeuvring area is provided on site to allow a Medium rigid vehicle to enter and exit the site in a forward gear.</p> <p><b>AO7.3</b><br/>Site access is limited to one access point to each frontage.</p> <p><b>AO7.4</b><br/>Where a site has a frontage greater than 40 metres, two access points to the street frontage can be provided they are separated by a distance of not less than 10 metres.</p>  |
| <b>Air and noise pollution</b>   |   |
| <p><b>PO8</b><br/>Development should not result in sensitive land uses being exposed to air, noise and odour emissions from industrial uses, major sport, recreation and entertainment facilities or other noisy sport and recreation activities that have the potential to adversely impact on human health, amenity and wellbeing.</p> <p>Editor's note – Noisy sport and recreation activities include shooting and motor sport facilities.</p> | <p><b>AO8.1</b><br/>The use is designed to ensure that:</p> <ul style="list-style-type: none"> <li>(a) the indoor noise objectives set out in the Environmental Protection (Noise) Policy 2008 are met;</li> <li>(b) the air quality objectives in the Environmental Protection (Air) Policy 2008, and any relevant national or international standard (for example the World Health Organisation Guidelines for Air Quality 2000) are met;</li> <li>(c) noxious and offensive odours are not experienced at the location of sensitive land uses.</li> </ul> <p>Editor's note – The Queensland odour impact assessment guideline, available from the Department of Environment and Heritage Protection website, provides a methodology for assessing odour impacts. <a href="http://www.ehp.qld.gov.au">www.ehp.qld.gov.au</a>.</p> <p>Note – Design measures may include:</p> <ul style="list-style-type: none"> <li>(1) landscape buffers and physical barriers such as fences and that set appropriate setback/separation distances</li> <li>(2) adequate allotment design that reduces impacts of emissions</li> <li>(3) adequate construction materials and positioning of rooms and windows to mitigate impact of emissions.</li> </ul> |
| <b>Protection of medium impact, high impact, extractive and noxious and hazardous industries</b>   |   |
| <p><b>PO9</b><br/>Industrial land uses are protected from encroaching incompatible land uses.</p>  | <p><b>AO9.1</b><br/>Sensitive land uses:</p> <ul style="list-style-type: none"> <li>(a) do not compromise the viability of existing or future industrial development, including industrial land within an SDA, or an enterprise opportunity area or employment opportunity area identified in a regional plan;</li> </ul>   |

| Performance outcomes   | Acceptable outcomes   |
|--|---|
|  | <ul style="list-style-type: none"> <li>(b) do not compromise the viability of major sport, recreation and entertainment facilities;</li> <li>(c) do not compromise the operation of major hazard facilities, intensive animal industries or explosive facilities and reserves;</li> <li>(d) are not located within close proximity to waste and sewage treatment plants.</li> </ul>   |
| <b>Storage and handling of hazardous chemicals</b>   |   |
| <p><b>PO10</b><br/>Development involving the use, storage or generation of hazardous chemicals minimises off-site hazards and associated risks.</p> <p>Note – If development does not comply with AO10.1, in addition to PO10 development will be required to be assessed against PO12, PO13, PO14 and PO15.</p> <p>Note – To assist in demonstrating compliance with the performance outcomes, a Hazard Assessment Report may be required to be prepared and submitted by a suitably qualified person in accordance with the <i>Model Planning Scheme development Code for Hazardous Industries and Chemicals</i>.</p> <p>Note- Terms used in this section are defined in <i>Model Planning Scheme development Code for Hazardous Industries and Chemicals</i>.</p> | <p><b>AO10.1</b><br/>Development that involves the storage or handling of hazardous chemicals:</p> <ul style="list-style-type: none"> <li>(a) complies within the self-assessable thresholds contained within Table 9.4.5.3b Self-assessable development thresholds and complies with the self-assessable criteria contained within Table 9.4.5.3d Self-assessable criteria for Hazardous chemicals;</li> <li>(b) does not involve identified assessable thresholds contained within Table 9.4.5.3c Assessable development thresholds;</li> </ul> <p>Note – Terms used in this section are defined in <i>Model Planning Scheme development Code for Hazardous Industries and Chemicals</i>.</p> |
| <b>Contaminated land</b>   |   |
| <p><b>PO11</b><br/>Development is located and designed to ensure that users and nearby sensitive land uses are not exposed to unacceptable levels of contaminants.</p>   | <p><b>AO11.1</b><br/>Development is located where soils are not contaminated by pollutants which represent a health or safety risk to users, or contaminated soils subject to a development are remediated prior to plan sealing, operational works permit, or issuing of building works permit.</p>  |
| <b>For assessable development</b>  |   |
| <p><b>Hazardous chemicals</b><br/>Note – Terms used in this section are defined in <i>Model Planning Scheme development Code for Hazardous Industries and Chemicals</i>.</p>   |   |
| <p><b>PO12</b><br/>Off sites risks from foreseeable hazard scenarios involving hazardous chemicals are commensurate with the sensitivity of the surrounding land use zones.</p> <p>Note – To assist in demonstrating compliance with the performance outcomes, a Hazard Assessment Report may be required to be prepared and submitted by a suitably qualified person in accordance with the <i>Model Planning Scheme development Code for Hazardous Industries and Chemicals</i>.</p>   | <p><b>AO12.1</b><br/>Off-site impacts or risks from any foreseeable hazard scenario does not exceed the dangerous dose at the boundary of land zoned for vulnerable or sensitive land uses as described below:</p> <p><u>Dangerous dose:</u></p> <ul style="list-style-type: none"> <li>(a) for any hazard scenario involving the release of gases or vapours:             <ul style="list-style-type: none"> <li>(i) AEGL2 (60 minutes) or if not available ERPG2;</li> <li>(ii) An oxygen content in air &lt;19.5% or &gt;23.5% at normal atmospheric pressure.</li> </ul> </li> <li>b) for any hazard scenario involving fire or explosion:</li> </ul>                                       |

| Performance outcomes  | Acceptable outcomes  |
|---|--|
|   | <p>(i) 7 kPa overpressure;<br/>(ii) 4.7 kW/m<sup>2</sup> heat radiation.</p> <p>Note – If criteria AO12.1 (a) or (b) cannot be achieved, then the risk of any foreseeable hazard scenario shall not exceed an individual fatality risk level of <math>0.5 \times 10^{-6}</math>/year.</p> <hr/> <p><b>AO12.2</b><br/>Off-site impacts or risks from any foreseeable hazard scenario does not exceed the dangerous dose at the boundary of a commercial or community activity land use zone as described below:</p> <p><u>Dangerous dose:</u></p> <p>(a) for any hazard scenario involving the release of gases or vapours:<br/>(i) AEGL2 (60 minutes) or if not available ERPG2;<br/>(ii) An oxygen content in air &lt;19.5% or &gt;23.5% at normal atmospheric pressure.</p> <p>(b) for any hazard scenario involving fire or explosion:<br/>(i) 7 kPa overpressure;<br/>(ii) 4.7 kW/m<sup>2</sup> heat radiation.</p> <p>Note – If criteria AO12.2 (a) or (b) cannot be achieved, then the risk of any foreseeable hazard scenario shall not exceed an individual fatality risk level of <math>5 \times 10^{-6}</math>/year.</p> <hr/> <p><b>AO12.3</b> Off site impacts or risks from any foreseeable hazard scenario does not exceed the dangerous dose at the boundary of an industrial land use zone as described below:</p> <p><u>Dangerous dose:</u></p> <p>(a) for any hazard scenario involving the release of gases or vapours:<br/>(i) AEGL2 (60minutes) or if not available ERPG2<br/>(ii) An oxygen content in air &lt;19.5% or &gt;23.5% at normal atmospheric pressure.</p> <p>(b) for any hazard scenario involving fire or explosion:<br/>(i) 14 kPa overpressure<br/>(ii) 12.6 kW/m<sup>2</sup> heat radiation.</p> <p>Note – If criteria AO12.3 (a) or (b) cannot be achieved, then the risk of any foreseeable hazard scenario shall not exceed an individual fatality risk level of <math>50 \times 10^{-6}</math>/year.</p> |
| <p><b>PO13</b><br/>Buildings and package stores containing fire-risk hazardous chemicals are designed to detect the early stages of a fire situation and notify a designated person.</p> <p>Note – To assist in demonstrating compliance with the performance outcomes, a Hazard Assessment Report may be required to be prepared and submitted by a suitably</p> | <p><b>AO13.1</b><br/>Buildings and package stores containing fire-risk hazardous chemicals are provided with a 24 hour monitored fire detection system for early detection of a fire event.</p>  |

| Performance outcomes  | Acceptable outcomes   |
|---|---|
| <p>qualified person in accordance with the <i>Model Planning Scheme development Code for Hazardous Industries and Chemicals</i>.</p>  |   |
| <p><b>PO14</b><br/>Common storage areas containing packages of flammable and toxic hazardous chemicals are designed with spill containment system(s) that are adequate to contain releases, including firefighting media.</p> <p>Note – To assist in demonstrating compliance with the performance outcomes, a Hazard Assessment Report may be required to be prepared and submitted by a suitably qualified person in accordance with the <i>Model Planning Scheme development Code for Hazardous Industries and Chemicals</i>.</p>  | <p><b>AO14.1</b><br/>Storage areas containing packages of flammable and toxic hazardous chemicals are designed with spill containment system(s) capable of containing a minimum of the total aggregate capacity of all packages plus the maximum operating capacity of any fire protection system for the storage area(s) over a minimum of 60 minutes.</p>   |
| <p><b>PO15</b><br/>Storage and handling areas, including manufacturing areas, containing hazardous chemicals in quantities greater than 2,500 L or kg within a Local Government “flood hazard area” are located and designed in a manner to minimise the likelihood of inundation of flood waters from creeks, rivers, lakes or estuaries.</p> <p>Note – To assist in demonstrating compliance with the performance outcomes, a Hazard Assessment Report may be required to be prepared and submitted by a suitably qualified person in accordance with the <i>Model Planning Scheme development Code for Hazardous Industries and Chemicals</i>.</p> | <p><b>AO15.1</b><br/>The base of any tank with a WC &gt;2,500 L or kg is higher than any relevant flood height level identified in an area’s flood hazard area. Alternatively:<br/>(a) bulk tanks are anchored so they cannot float if submerged or inundated by water; and<br/>(b) tank openings not provided with a liquid tight seal, i.e. an atmospheric vent, are extended above the relevant flood height level.</p> <p><b>AO15.2</b><br/>The lowest point of any storage area for packages &gt;2,500 L or kg is 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.</p> |

Table 9.4.4.3.b – Self-assessable development thresholds

| Hazardous chemical                            | PG or type    | Applicable storage and handling type                          | Threshold quantity        | Exclusions   |
|---|---------------|---|---------------------------|--|
| Flammable gases – DG class 2.1                | N/A           | Cylinder stores with natural ventilation                      | > 1,000 – ≤ 5,000 L       | (a) Gases connected to a consuming device, fuel burning appliance or within a refrigeration system<br>(b) Tanks with a WC > 500 L<br>(c) Aerosols with a WC < 1 L<br>(d) Cylinder exchange facilities that comply with AS1596,<br>(e) Cylinders stores with any of the following attributes: <ul style="list-style-type: none"> <li>• within or attached to a building,</li> <li>• mechanically ventilated.</li> </ul>     |
| Oxidising gases – DG class 2.2, sub risk 5.1  | N/A           | Cylinder stores with natural ventilation                      | > 1,000 – ≤ 20,000 L      |  |
| Non-toxic, non-flammable gases – DG class 2.2 | N/A           | Cylinder stores with natural ventilation                      | > 2,000 – ≤ 200,000 L     |  |
| Flammable liquids – DG class 3                | PGII or PGIII | Aboveground tanks and package stores with natural ventilation | > 10,000 – ≤ 60,000 L     | (a) Flammable or combustible liquids co-located with DG classes 2, 3, 4, 5 or 6.1 above minor storage<br>(b) Any tank other than a static storage tank located outdoors<br>(c) Tanks with a diameter > 6 m,<br>(d) Package stores with any of the following attributes: <ul style="list-style-type: none"> <li>• within or attached to a building,</li> <li>• mechanically ventilated.</li> </ul>                          |
|   |               | Underground tanks   | > 10,000 – ≤ 500,000 L    |  |
| Combustible liquids with a flashpoint ≤ 93°C  | N/A           | Package stores with natural ventilation                       | > 10,000 – ≤ 100,000 L    |  |
|   |               | Aboveground or underground tanks                              | > 10,000 – ≤ 500,000 L    |  |
| Oxidising substances – DG class 5.1           | PG II         | Aboveground tanks containing liquids                          | > 10,000 – ≤ 20,000 L/kg  | (a) Ammonium Nitrate<br>(b) Any tank other than a static storage tank located outdoors<br>(c) Solids in silos, bunkers or stockpiles,<br>(d) Package stores with any of the following attributes: <ul style="list-style-type: none"> <li>• constructed with combustible materials</li> <li>• within or attached to a building</li> <li>• mechanically ventilated,</li> <li>• floor area &gt; 200 m<sup>2</sup>.</li> </ul> |
|   |               | Package stores with natural ventilation                       |                           |  |
|   | PG III        | Aboveground tanks containing liquids                          | > 10,000 - ≤ 250,000 L/kg |  |
|   |               | Package stores with natural ventilation                       |                           |  |



|   |                      |  |                                     |   |
|---|----------------------|--|-------------------------------------|---|
| <p>Toxic substances – DG class 6.1</p>                      | <p>PGII or PGIII</p> | <p>Aboveground tanks and package stores with natural ventilation</p> | <p>&gt; 10,000 – ≤ 500,000 L/kg</p> | <p>(a) Any tank other than a static storage tank<br/>(b) A Major Hazard Facility under Schedule 3 of the <i>Sustainable Planning Regulation 2009</i>,<br/>(c) Toxic substances co-located with DG classes 2, 3, 4 or 5 above minor storage.</p> |
| <p>Corrosive substances – DG class 8</p>                    | <p>PGII or PGIII</p> | <p>Aboveground tanks and package stores with natural ventilation</p> | <p>&gt; 10,000 – ≤ 200,000 L/kg</p> | <p>(a) Any tank other than a static storage tank,<br/>(b) A Major Hazard Facility under Schedule 3 of the <i>Sustainable Planning Regulation 2009</i>.</p>  |
| <p>Substances hazardous to the environment – DG class 9</p> | <p>PGII</p>          | <p>Any storage in a local government flood hazard area</p>           | <p>&gt; 2,500 L/kg</p>              | <p>No exclusions</p>  |
|   | <p>PGIII</p>         | <p>Any storage in a local government flood hazard area</p>           | <p>&gt; 10,000 L/kg</p>             |   |

Notes –

- L/kg = Litres for liquids and kilograms for solids;
- Gases and liquids are calculated based on the water capacity (WC) of each storage container;
- Section 14 of a hazardous chemical's Safety Data Sheet (SDS) will identify any applicable Dangerous Goods (DG) class and Packing Group (PG) and section 9 will identify any applicable flashpoint;
- Co-located means stored within a common spill compound or storage compound.

Table 9.4.4.3.c – assessable development thresholds

| Hazardous chemical                            | PG or type      | Storage and handling type  | Threshold quantity | Exclusions (MHF Quantities)   |
|---|-----------------|--|--------------------|---|
| GTDTBT  | N/A             | Any  | > 500 L/kg         | A Major Hazard Facility under Schedule 3 of the <i>Sustainable Planning Regulation 2009</i> |
| Toxic gases – DG class 2.3                    | N/A             | Any  | > 500 L            |   |
| Flammable gases – DG class 2.1                | N/A             | Cylinder store with any of the following attributes: <ul style="list-style-type: none"> <li>contains aerosols with a WC &lt; 1 L</li> <li>co-located with other fire-risk hazardous chemicals that exceed minor storage</li> <li>mechanically ventilated, or</li> <li>located within or attached to a building.</li> </ul> | > 1,000 L          |   |
|   |                 | Any other aboveground storage or handling  | > 5,000 L          |   |
| Oxidising gases – DG class 2.2, sub risk 5.1  | N/A             | Cylinder store with any of the following attributes: <ul style="list-style-type: none"> <li>co-located with fire-risk hazardous chemicals above minor storage</li> <li>mechanically ventilated, or</li> <li>located within or attached to a building.</li> </ul>   | > 1,000 L          |   |
|   |                 | Any other cylinder store   | > 20,000 L         |   |
|   |                 | Aboveground tank(s)  | > 10,000 L         |   |
| Non-toxic, non-flammable gases – DG class 2.2 | N/A             | Any  | >200,000 L         |   |
| Flammable liquids – DG class 3                | PG I            | Any  | > 500 L            |   |
|   | PG II or PG III | Activities that involve: <ul style="list-style-type: none"> <li>elevated temperature or pressure, or</li> <li>chemical reactions that cause a temperature rise or generate a gas.</li> </ul>   | > 1,000 L          |   |
|   |                 | Storage areas with any of the following attributes: <ul style="list-style-type: none"> <li>co-located with fire-risk hazardous chemicals or toxic substances above minor storage</li> <li>mechanically ventilated, or</li> <li>located within or attached to a building.</li> </ul>  | > 10,000 L         |   |
|   |                 | Any other aboveground storage or handling  | > 60,000 L         |   |
| Combustible liquids with a flashpoint ≤ 93°C  | N/A             | Aboveground tank(s) within a multi-story building  | > 1,000 L          |   |
|   |                 | Storage areas with any of the following attributes: <ul style="list-style-type: none"> <li>co-located with fire-risk hazardous chemicals or toxic substances above minor storage</li> <li>mechanically ventilated</li> <li>located within or attached to a building, or</li> <li>tanks &gt; 6m in diameter.</li> </ul>     | > 10,000 L         |   |

| Hazardous chemical   | PG or type      | Storage and handling type  | Threshold quantity | Exclusions (MHF Quantities) |
|--|-----------------|--|--------------------|-----------------------------|
|  |                 | Any other package store  | > 100,000 L        |                             |
|  |                 | Any other aboveground storage or handling  | > 500,000 L        |                             |
| Flammable and reactive solids – DG classes 4.1, 4.2 or 4.3 | PG I            | All  | > 500 kg           |                             |
|  | PG II or PG III | Activities that involve: <ul style="list-style-type: none"> <li>elevated temperature or pressure, or</li> <li>chemical reactions that cause a temperature rise or generate a gas.</li> </ul>   | > 1,000 kg         |                             |
|  |                 | Storage areas with any of the following attributes: <ul style="list-style-type: none"> <li>co-located with fire-risk hazardous chemicals above minor storage</li> <li>mechanically ventilated, or</li> <li>located within or attached to a building.</li> </ul>  | > 2,500 kg         |                             |
|  |                 | Any other aboveground storage or handling  | > 10,000 kg        |                             |
| Oxidising substances – DG class 5.1                        | PG I            | All  | > 500 L/kg         |                             |
|  | PG II           | Activities that involve: <ul style="list-style-type: none"> <li>elevated temperature or pressure, or</li> <li>chemical reactions that cause a temperature rise or generate a gas.</li> </ul>   | > 1,000 L/kg       |                             |
|  |                 | Storage areas with any of the following attributes: <ul style="list-style-type: none"> <li>constructed of combustible materials</li> <li>a floor area &gt; 500 m<sup>2</sup></li> <li>co-located with fire-risk hazardous chemicals or corrosive substances above minor storage</li> <li>mechanically ventilated, or</li> <li>located within or attached to a building.</li> </ul> | > 10,000 L/kg      |                             |
|  |                 | Solids stored in silos, bunkers or stock piles   | > 20,000 L/kg      |                             |
|  |                 | Any other aboveground storage or handling  | > 50,000 L/kg      |                             |
|  | PG III          | Activities that involve: <ul style="list-style-type: none"> <li>elevated temperature or pressure, or</li> <li>chemical reactions that cause a temperature rise or generate a gas.</li> </ul>   | > 1,000 L/kg       |                             |
|  |                 | Storage areas with any of the following attributes: <ul style="list-style-type: none"> <li>constructed of combustible materials</li> <li>a floor area &gt; 500 m<sup>2</sup></li> <li>co-located with fire-risk hazardous chemicals or corrosive substances above minor storage</li> <li>mechanically ventilated, or</li> <li>located within or attached to a building.</li> </ul> | > 20,000 L/kg      |                             |
|  |                 | Solids stored in silos, bunkers or stock piles   | > 20,000 L/kg      |                             |

| Hazardous chemical               | PG or type      | Storage and handling type  | Threshold quantity | Exclusions (MHF Quantities) |
|----------------------------------|-----------------|--|--------------------|-----------------------------|
|                                  |                 | Any other aboveground storage or handling  | > 250,000 L/kg     |                             |
| Organic Peroxides – DG class 5.2 | All             | Any  | > 500 L/kg         |                             |
| Toxic substances – DG class 6.1  | PG I            | Any  | > 500 L/kg         |                             |
|                                  | PG II or PG III | Activities that involve: <ul style="list-style-type: none"> <li>elevated temperature or pressure, or</li> <li>chemical reactions that cause a temperature rise or generate a gas.</li> </ul>   | > 1,000 L/kg       |                             |
|                                  |                 | Storage areas with any of the following attributes: <ul style="list-style-type: none"> <li>co-located with fire-risk hazardous chemicals above minor storage</li> <li>mechanically ventilated, or</li> <li>located within or attached to a building.</li> </ul>  | > 10,000 L/kg      |                             |
|                                  |                 | Any other aboveground storage or handling  | > 500,000 L/kg     |                             |
| Corrosive substances             | PGI             | Any  | > 500 L/kg         |                             |
|                                  | PG II or PG III | Activities that involve: <ul style="list-style-type: none"> <li>elevated temperature or pressure, or</li> <li>chemical reactions that cause a temperature rise or generate a gas.</li> </ul>   | > 1,000 L/kg       |                             |
|                                  |                 | Storage areas with any of the following attributes: <ul style="list-style-type: none"> <li>co-located with oxidising substances above minor storage</li> <li>spill compounds that contain two or more corrosive substances that may react dangerously with each other</li> <li>mechanically ventilated, or</li> <li>located within or attached to a building.</li> </ul> | > 10,000 L/kg      |                             |
|                                  |                 | Any other aboveground storage or handling  | > 200,000 L/kg     |                             |

Notes –

- L/kg = Litres for liquids and kilograms for solids;
- Gases and liquids are calculated based on the water capacity (WC) of each storage container;
- Section 14 of a hazardous chemical’s Safety Data Sheet (SDS) will identify any applicable Dangerous Goods (DG) class and Packing Group (PG) and section 9 will identify any applicable flashpoint; Co-located means stored within a common spill compound or storage compound.

**Table 9.4.4.3.d – Self-assessable criteria for Hazardous chemicals**

| Gases in cylinders  |             |                              |                         |                        |
|---|-------------|------------------------------|-------------------------|------------------------|
| General requirements – Cylinder   |             |                              |                         |                        |
| (1) All separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development;<br>(2) Separation distances shall be measured laterally from the outermost cylinder to any area to be protected. Cylinder stores (areas of stored cylinders) shall be located outdoors and used to store closed cylinders only. Toxic gases are not permitted within a cylinder store;<br>(3) LPG decanting cylinders are not permitted in cylinder stores;<br>(4) Gas cylinders shall be stored in the upright position only unless specified by the cylinder's manufacturer. 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;<br>(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;<br>(3) The floor of a cylinder store shall not be capable of pooling liquid;<br>(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 $\geq 1$ m from building openings. 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;<br>(2) Any two cylinder stores can be considered separate stores if they are separated from each other by $\geq 3$ m or the same distance required between the largest store and a property boundary, whichever is greater;<br>(3) Cylinder stores shall be separated from UN1075 (LPG) decanting cylinders or filling points by $\geq 6.5$ m;<br>(4) Cylinder stores shall be separated from property boundaries by $\geq$ Table CS1;<br>(5) Cylinder stores shall be separated from on-site protected places by $\geq$ Table CS2;<br>(6) 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 $\geq$ Table CS3;<br>(7) Gas cylinders shall be segregated by $\geq 3$ m 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;<br>(8) Gases shall be segregated from any other substance they may react dangerously with by $\geq 5$ m. |             |                              |                         |                        |
| Table CS1   |             |                              |                         |                        |
| Aggregate capacity  | UN1075 only | Class 2.1, other than UN1075 | Class 2.2, sub-risk 5.1 | Class 2.2, no sub-risk |
| 1000-2000L  | 3m          | 3m                           | 3m                      | 1m                     |
| 2000-2500L  | 3m          | 6m                           | 5m                      | 5m                     |
| 2500-5000L  | 4.5m        | 6m                           | 5m                      | 5m                     |
| 5000-20,000L  |             |                              | 5m                      | 5m                     |

|          |                     |                     |                     |    |
|----------|---------------------|---------------------|---------------------|----|
| >20,000L | Not self-assessable | Not self-assessable | Not self-assessable | 5m |
|----------|---------------------|---------------------|---------------------|----|

**Table CS2**

| Aggregate capacity | UN1075 only         | Class 2.1, other than UN1075 | Class 2.2, sub-risk 5.1 | Class 2.2, no sub-risk |
|--------------------|---------------------|------------------------------|-------------------------|------------------------|
| 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                     |

**Table CS3**

| Aggregate capacity | UN1075 only         | Class 2.1, other than UN1075 | Class 2.2, sub-risk 5.1 | Class 2.2, no sub-risk |
|--------------------|---------------------|------------------------------|-------------------------|------------------------|
| 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  $\geq 3$  m from any incompatible gases or substances and any other substance they may react dangerously with by  $\geq 5$  m;
- (3) The centre point of any LPG decanting cylinder shall be a located to achieve the following minimum separation distances:
  - (a) 6.5 m to any boundary
  - (b) 6.5 m to any on-site protected place
  - (c) 6.5 m to any aboveground LPG storage tank
  - (d) 6.5 m to any fire-risk dangerous goods or combustible materials stored above ground
  - (e) 4.5 m to any fuel dispenser for a flammable or combustible material
  - (f) 4.5 m to any non fire-risk dangerous goods stored above ground
  - (g) 4.5 m to any entrance to any drain, pit or basement
  - (h) 3.5 m to any opening into a building
  - (i) 3.5 m to any structure that limits egress past the cylinder
  - (j) 2.5 m to any fill or dip cap of any underground storage tank

Note – these separation distances are inclusive of a maximum hose length of 1.5m.

**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 per cent of its area as openings;
  - (4) A vent means an opening in an external wall with a minimum free surface area of  $\geq 0.1 \text{ m}^2$ . 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
    - (c) 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 2 m 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;
  - (b) Platform  $\geq 900$  mm above the ground level where motor vehicles can operate/manoeuvre;
  - (c) 1.2 m high x 75 mm wide core filled metal bollard buried a minimum of 500 mm deep and located either side of any point a motor vehicle can access or exit the store;
  - (d) Concrete kerb a minimum of 190 mm high located a minimum of 2 m 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:
    - (iv) minimum of 1.2 m high x 75 mm wide; and
    - (v) buried a minimum of 500 mm deep below ground; and
    - (vi) spaced at a maximum of 1.3 m between any 2 posts or bollards required to separate a cylinder from a vehicle access area; and
    - (vii) a minimum of 1.5 m away from the side of the cylinder; or
  - (b) Metal guardrail a minimum of 700 mm high with posts buried a minimum of 500 mm deep and located a minimum of 1.5 m from any cylinder; or
  - (c) A chain-wire metal fence a minimum of 1.8 m high with a minimum of 50 mm steel posts buried a minimum of 600 mm deep and located a minimum of 3 m from the cylinder; or
  - (d) A concrete or masonry kerb a minimum of 190 mm high located a minimum of 5 m from a cylinder.

#### Fire safety

- (1) Cylinder stores shall have  $>1$  x hose reel and  $>1$  x 9 kg ABE extinguisher within 10 m but not closer than 3 m;
- (2) Decanting cylinders shall have  $>1$  x 9 kg ABE extinguisher within 10 m but not closer than 3 m. Where  $>2$  decanting cylinders are stored  $<6.5$  m from each other, a hose reel shall also be provided within 10 m but not closer than 3 m 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**

- (1) 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 >2,500 L of PGII or >10,000 L 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  $\geq$ Table FL1;
- (2) Flammable and combustible liquids shall be segregated from any other substance that it may react dangerously with by  $\geq$ 5 m and stored in separate spill compounds;
- (3) Package stores shall be separated from any decanting area for flammable or combustible liquids by  $\geq$ 6 m;
- (4) Package stores shall be separated from aboveground tanks containing flammable liquids by  $\geq$ 6 m or the diameter of the tank up to a maximum of 15 m, whichever is greatest;
- (5) Package stores shall be separated from aboveground tanks containing combustible liquids by  $\geq$ 3 m or the diameter of the tank up to a maximum of 7 m, 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 |
|--------------------------------------|--------------------------------|-----------------------|-----------------------------|
| 1 000L                               | 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                              |                                |                       | 13m                         |



|  |                                  |     |
|--|----------------------------------|-----|
| 60 000L  |                                  | 14m |
| <p>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.</p>   |                                  |     |
| <b>Spill containment</b>   |                                  |     |
| <p>(1) Spill containment systems shall not bring together two or more hazardous chemicals that are not compatible (including common drains);</p> <p>(2) Package stores shall be provided with a spill compound (e.g. bund) that complies with all of the following:</p> <ul style="list-style-type: none"> <li>(a) is impervious;</li> <li>(b) constructed of a fire resistant material(s);</li> <li>(c) capable of holding liquid when full;</li> <li>(d) sloped to a low point or sump;</li> <li>(e) provided with a means of being emptied;</li> <li>(f) free from any other dangerous goods;</li> <li>(g) provided with restraints or barriers to prevent packages falling outside of the bund if packages are positioned closer than 600 mm from a bund wall;</li> <li>(h) has a minimum internal volume as per Table FL2.</li> </ul> |                                  |     |
| <b>Table FL2</b>   |                                  |     |
| 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                          |     |
| <b>Ventilation</b>   |                                  |     |
| <p>(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;</p> <p>(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 per cent of its area are openings;</p>   |                                  |     |

- (3) A vent means 2 x openings in an external wall with a minimum free surface area of 0.15 m<sup>2</sup> 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. 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 3 m; or
  - (d) A minimum of two opposite walls provided with vents a minimum of every 3 m; or
  - (e) For package stores longer than 6m but no wider than 5m, vents in the longest wall minimum of every 1.4 m.

**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 those uprights positioned at aisle and gangway intersections;
  - (c) The upright protector shall be designed for energy absorption of  $\geq 400$  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 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**

- (1) Package stores shall be provided with a 24 hr monitored fire detection system and fire protection equipment  $\geq$ Table FL3.

**Table FL3**

| Storage type   | Fire protection   |
|--|---|
| Unroofed package store containing flammable liquids only.            | 4 x 9 kg ABE extinguishers, 2 x 9 kg foam extinguishers and 1 x hose reel able to reach all areas of the package store with a branch pipe.  |
| Roofed package store containing flammable liquids only.              | 1 x 9 kg 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 9 kg ABE extinguisher and 2 x 9kg foam extinguishers.   |
| Roofed package store containing combustible liquids only.            | 1 x 9 kg 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 9 kg ABE extinguishers, 2 x 9 kg foam extinguishers and 1 x hose reel able to reach all areas of the package store with a branch pipe.  |
| Roofed package store containing flammable and combustible liquids.   | 1 x 9 kg ABE extinguisher located at each doorway(s), 1 x 9 kg 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 <i>Work Health and Safety Act 2011</i> .   |   |
| <b>Access restriction</b>  |   |
| (1) Package stores shall be kept under lock and key.   |   |
| <b>Flammable and combustible liquids in tanks</b>  |   |
| <b>General requirements for tanks</b>  |   |
| <ol style="list-style-type: none"> <li>(1) Aboveground tanks, vents, fill points and dispensers shall be located outdoors only;</li> <li>(2) Separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development;</li> <li>(3) Separation distances for any tank, dispenser, pump, vent or fill point shall be measured from the outermost external surface;</li> <li>(4) Separation distances for any spill compound (bund) containing a flammable liquid tank shall be measured from the inside edge of the bund walls;</li> <li>(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;</li> <li>(6) Underground tanks shall be double walled with the outer wall constructed of corrosion resistant materials. Separation distances for spill compounds (bund) shall be measured from the inside edge of the bund walls. Tanks shall be located <math>\geq 1</math> m from any wall to allow access for inspection and maintenance;</li> <li>(7) Spill compounds and tank supporting structures shall be constructed of fire resistant materials only;</li> <li>(8) ADG Code compliant isotainers and intermodal tanks are considered tanks for the purposes of this code. Aboveground tanks, including isotainers or intermodal tanks shall not be stacked on top of each other. Where the base of any tank containing <math>&gt;2,500</math> L of PGII or <math>&gt;10,000</math> L 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.</li> </ol> |   |
| <b>Siting and separation – tanks not including fire-rated tanks</b>  |   |
| <ol style="list-style-type: none"> <li>(1) Aboveground tanks shall be separated from property boundaries by <math>\geq</math>Table FL4;</li> <li>(2) Aboveground flammable liquid tanks shall be separated from on-site protect places by <math>\geq</math>Table FL4;</li> <li>(3) Aboveground combustible liquid tanks shall be separated from on-site protect places by <math>\geq 50</math> per cent of Table FL4 or 7.5 m, whichever is less;</li> <li>(4) Spill compounds containing flammable liquid tanks shall be separated from property boundaries by <math>\geq 50</math> per cent of Table FL4;</li> <li>(5) Any two aboveground flammable and/or combustible liquid tanks shall be separated from each other by <math>\geq</math>Table FL5;</li> <li>(6) Flammable and/or combustible liquid tanks shall be segregated from substances they may react dangerously with by <math>\geq 5</math> m and be stored in separate spill compounds;</li> <li>(7) Aboveground flammable liquid tanks shall be separated from package stores and decanting areas for flammable or combustible liquids by <math>\geq 6</math> m;</li> <li>(8) Aboveground combustible liquid tanks shall be separated from package stores containing flammable or combustible liquids by <math>\geq 3</math> m or the diameter of the tank, whichever is greater.</li> <li>(9) Underground tanks shall be separated from property boundaries by <math>\geq 2</math> m.</li> </ol>   |   |
| <b>Siting and separation – fire-rated double walled tanks</b>  |   |
| (1) Aboveground fire-rated self-bunded tanks shall be separated from property boundaries and on-site protected places by $\geq 50$ per cent of Table FL4.  |   |
| <b>Siting and separation – tank openings, vents and fill points</b>  |   |

- (1) Fill points for flammable liquid tanks shall be located outside in open air  $\geq 4$  m from property boundaries and building openings;
- (2) Fill points for combustible liquid tanks shall be located outside in open air  $\geq 2$  m 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:
  - (d) 4 m aboveground or a minimum of 150 mm above the top of the tank or above the highest point of a refuelling vehicle, whichever is greater; and
  - (e) 4 m from any opening into a building (i.e. window, mechanical vent intake etc) for flammable liquids; 1.5 m from a property boundary for underground tanks and self-bunded tanks; or
  - (f) 3m from a property boundary for an aboveground tank.
- (5) Any vent discharge point for a combustible tank shall be located a minimum of:
  - (g) 4m above ground or a minimum of 150 mm above the top of the tank or above the highest point of a refuelling vehicle, whichever is greater; and
  - (h) 2 m from any opening into a building.

**Siting and separation – Dispensers**

- (1) Flammable liquid dispensers shall be separated from property boundaries by  $\geq 4$  m;
- (2) Flammable liquid dispensers shall be separated from aboveground non fire-rated tanks by  $\geq 8$  m.

**Table FL4**

| PGII     | PGIII  | C1      | Minimum separation distance |
|----------|--------|---------|-----------------------------|
| 1 000L   | 2 500  | 10 000  | 3m                          |
| 2 000L   | 8 000  | 20 000  | 4m                          |
| 4 000L   | 16 000 | 40 000  | 5m                          |
| 7 000L   | 28 000 | 70 000  | 6m                          |
| 10 000L  | 40 000 | 100 000 | 7m                          |
| 14 000L  | 60 000 | 140 000 | 8m                          |
| 20 000L  |        | 200 000 | 9m                          |
| 26 000L  |        | 260 000 | 10m                         |
| 34 000L  |        | 340 000 | 11m                         |
| 42 000L  |        | 420 000 | 12m                         |
| 52 000 L |        | 500 000 | 13m                         |
| 60 000L  |        |         | 14m                         |

**Table FL5**

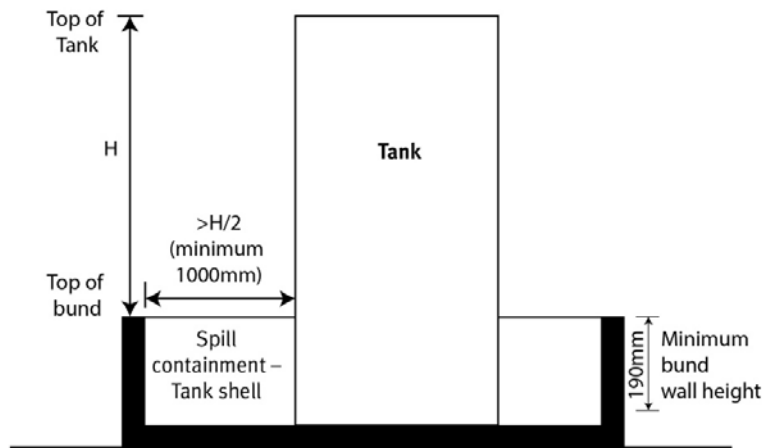
| Liquid type                                 | Vertical type  | Horizontal tanks                                  | Vertical and horizontal  |
|---|--|---|--|
| Flammable liquid tanks only $\geq 60,000$ L | $\geq 1$ m or 1/3 of the larger tank's diameter, whichever is greater. | $\geq 600$ mm and side to side, (not end-to-end). | $\geq 1$ m 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 <60,000 L            | ≥1 m   | ≥600 mm and side to side, (not end-to-end) | All tanks shall be separated from each other by 1 m and horizontal tanks cannot face vertical tanks  |
| A mix of flammable and combustible tanks <60,000 L | ≥1m or 1/3 of the diameter of the largest flammable liquid tank, whichever is greater. | ≥600 mm side to side, (not end-to-end).    | ≥1 m 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 >60,000 L | 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 1 m whichever is greater; (see figure T1.1 for guidance);
  - (h) has an internal volume ≥110 per cent of the largest tank within the compound. (Includes 10 per cent for fire water);

**Figure T1.1 An illustration of minimum bund wall height relative to tank height**



**Impact avoidance – above ground 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 1.2 m high x 75 mm wide; and

- (ii) buried a minimum of 500 mm deep below ground; and
- (iii) spaced at a maximum of 1.3 m between any 2 posts or bollards required to separate a tank from a vehicle access area; and
- (iv) a minimum of 1.5 m away from the side of the tank; or
- (b) metal guardrail a minimum of 700 mm high with posts buried a minimum of 500 mm deep and located a minimum of 1.5 m from the tank; or
- (c) a chain-wire metal fence a minimum of 1.8 m high with a minimum of 50 mm steel posts buried a minimum of 600 mm deep and located a minimum of 3 m from the tank; or
- (d) a concrete or masonry kerb a minimum of 190 mm high located a minimum of 5 m from the tank.

#### Impact avoidance – underground tanks

- (1) Underground tanks shall be buried a minimum of 300 mm belowground and provided with a reinforced concrete slab a minimum of 150 mm thick covering the tank storage area.

#### Impact avoidance – fill points

- (1) 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

- (1) 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 1.2 m high x 75 mm wide; buried a minimum of 500 mm deep;
  - (c) located at all 4 corners of a dispenser at a distance as wide as or wider than the dispenser;
  - (d) located a minimum of 500 mm from any side of a dispenser.

Note – Multiple dispensers in a row  $\leq 2$  m apart may be grouped together and considered as one individual dispenser.

#### Fire safety – storage tanks

- (1) Tanks shall be provided with fire protection equipment in accordance with Table T3 and all firefighting equipment shall be located outside of spill compounds and within 10 m.

#### Fire safety – dispensers

- (1) Dispenser shall have access to  $\geq 2$  x 9 kg ABE extinguishers within 10 m and one no closer than 3 m.

#### Fire safety – Tank fill points

- (1) Fill points shall have access to  $\geq 2$  x 9 kg ABE extinguishers with one extinguisher  $> 3$  m from the fill point.

#### Fire safety – transfer pumps

- (1) Transfer pumps shall have access to  $\geq 1$  x 9 kg ABE extinguisher within 10 m but not closer than 3 m.

#### Table T3

| Storage type   | Storage capacity   | Fire protection   |
|--|--------------------|---|
| Aboveground flammable liquid tanks   | <30 000L           | 1 x 9 kg ABE extinguisher and 1 x 9 kg foam extinguisher.   |
|  | 30 000 – 60 000L   | 1 x 9 kg 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 – 500 000 L | 1 x 9 kg 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 a common spill compound | <30 000L           | 1 x 9 kg ABE extinguisher and 1 x 9 kg foam extinguisher.   |
|  | 30 000 – 60 000L   | 1 x 9 kg 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**

- (1) Above ground 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 >250 m<sup>2</sup> shall have a minimum of 2 egress points;
- (6) The lowest point of any package store containing >2,500 L of PGII or >10,000 L 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  $\geq$ Table OS1;
- (2) Oxidising substances shall be segregated from any other substance that it may react dangerously with by a minimum of 5 m 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 |                     | 8m |

**Storage in stacks**

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

**Table OS2**

| Stack size                    | PGII with or without PGIII | PGIII only |
|-------------------------------|----------------------------|------------|
| Involving combustible pallets | 20 000 kg                  | 20 000 kg  |
| No combustible pallets        | 20 000 kg                  | 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  $\geq 35$  per cent 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  $\geq 50$  per cent;
  - (h) the distance between the top of the highest IBC tank and the top of the closest bund wall; (See figure OS1.1 in section 4.5 for guidance. Impervious shields can be used to extend bund walls);
  - (i) provided with restraints or barriers to prevent packages falling outside of the bund if packages are positioned  $\leq 1$  m 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 per cent 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 0.1 m<sup>2</sup> 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. 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 3 m; or
- (d) Two opposite walls provided with vents a minimum of every 3 m; or
- (e) For package stores >6 m long and <5 m wide, vents in the longest wall  $\geq$  every 1.4 m.

#### 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  $\geq 400$  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

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

#### Security

- (1) 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. 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. Separation distances for spill compounds (bund) shall be measured from the inside edge of the bund walls;
- (4) Tanks shall be located  $\geq 1$  m from any wall to allow access for inspection and maintenance;
- (5) Spill compounds and tank supporting structures shall be constructed of fire resistant materials only;
- (6) ADG Code compliant isotainers and intermodal tanks are considered tanks for the purposes of this code. Aboveground tanks shall not be stacked on top of each other;
- (7) Hydrogen Peroxide tanks  $\geq 5,000$  L shall be fitted with an externally visible temperature measuring device;
- (8) Where the base of any tank containing >2,500 L of PGII or >10,000 L 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  $\geq$  Table OS3;
- (2) Tank bunds shall be separated from property boundaries and on-site protected place  $\geq 3$  m;
- (3) Tanks containing oxidising substances that are compatible with each other shall be separated by  $\geq 1$  m;

- (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 5 m 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  $\geq 3$  m from property boundaries or on-site protected places. Separation distances may be measured around an intervening screen wall provided it is  $\geq 1$  m 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.

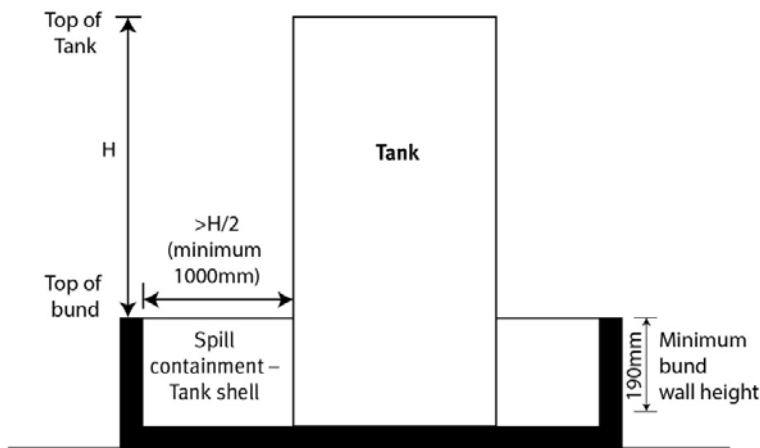
**Table OS3**

| Tank size         | PGII                | PGIII |
|-------------------|---------------------|-------|
| 2 500 – 10 000L   | 8m                  | 5m    |
| 10 000 – 20 000L  | 8m                  | 5m    |
| 20 000 – 50 000L  | Not self-assessable | 5m    |
| 50 000 – 250 000L |                     | 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  $\geq 50$  per cent the distance between the top of the tank and the top of the bund wall or 1m whichever is greater; (See figure OS1.1 for guidance. Impervious shields may be used to extend bund wall heights);
  - (h) has an internal volume  $\geq 110$  per cent of the largest tank stored within the compound.

**Figure OS1.1 An illustration of minimum bund wall height relative to tank height**



**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 1.2 m high x 75 mm wide; and
    - (ii) buried a minimum of 500 mm deep below ground; and
    - (iii) spaced at <1.3 m between any 2 posts or bollards required to separate a tank from a vehicle access area
    - (iv) a minimum of 1.5 m away from the side of the tank.
  - (a) metal guardrail a minimum of 700 mm high with posts buried a minimum of 500 mm deep and located a minimum of 1.5 m from the tank; or
  - (b) a chain-wire metal fence a minimum of 1.8 m high with a minimum of 50 mm steel posts buried a minimum of 600 mm deep and located a minimum of 3 m from the tank; or
  - (c) a concrete or masonry kerb a minimum of 190 mm high and a minimum of 5 m from the tank.

**Fire Safety**

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

**Security**

- (1) Tanks shall be kept under lock and key.

**Toxic substances in packages and IBC's****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. Package stores with a spill compound >25 m<sup>2</sup> shall have a minimum of 2 access points;
- (6) 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.
- (7) Decanting, blending or filling packages is not permitted in package stores containing toxic substances. The lowest point of any package store containing >2,500 L of PGII or >10,000 L of PGIII shall be higher than any relevant flood height level identified in an area's flood hazard area;
- (8) 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  $\geq$ Table TS1;
- (2) Separation distances between a package store and an on-site protected place shall be >50 per cent Table TS1;
- (3) Toxic substances shall be separated from any other substance that it may react dangerously with by a minimum of 5 m 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; and 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 may react violently with the toxic substances;
  - (f) has a minimum internal volume  $\geq 25$  per cent of the aggregate storage capacity;
  - (g) Where liquid IBCs are stored, the distance between a bund wall and the nearest IBC shall be  $\geq 50$  per cent the distance between the top of the highest IBC tank and the top of the closest bund wall. (See figure TS1.1 in section 4.7 for guidance. Impervious shields may be used to extend bund walls);
  - (h) provided with restraints or barriers to prevent packages falling outside of the bund if packages are positioned  $< 1$ m 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 per cent of its area are openings;
- (3) A vent means 2 x openings in an external wall with a minimum free surface area of  $0.1 \text{ m}^2$  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. 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 3 m; or
  - (d) Two opposite walls  $< 10$  m apart provided with vents a minimum of every 3 m; or
  - (e) For package stores  $\geq 6$  m long and  $\leq 5$  m wide, vents in the longest wall  $\leq$  every 1.4 m.

**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  $\geq 400$  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**

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

**Security**

- (1) 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. Separation distances for spill compounds (bund) shall be measured from the inside edge of the bund walls;
- (4) Tanks shall be located  $\geq 1$  m from any wall to allow access for inspection and maintenance;
- (5) Spill compounds and tank supporting structures shall be constructed of fire resistant materials only;
- (6) ADG code compliant isotainers and intermodal tanks are considered tanks for the purposes of this code. Tanks shall not be stacked on top of each other;
- (7) Where the base of any tank containing  $>2,500$  L of PGII or  $>10,000$  L 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  $\geq$ Table TS2;
- (2) Separation distances between tanks and on-site protected places shall be  $\geq 50$  per cent Table TS2;
- (3) Any two tanks containing toxic substances compatible with each other shall be separated by  $\geq 1$  m;
- (4) Toxic substances shall be separated from any other substance that it may react dangerously with by a minimum of 5 m 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**

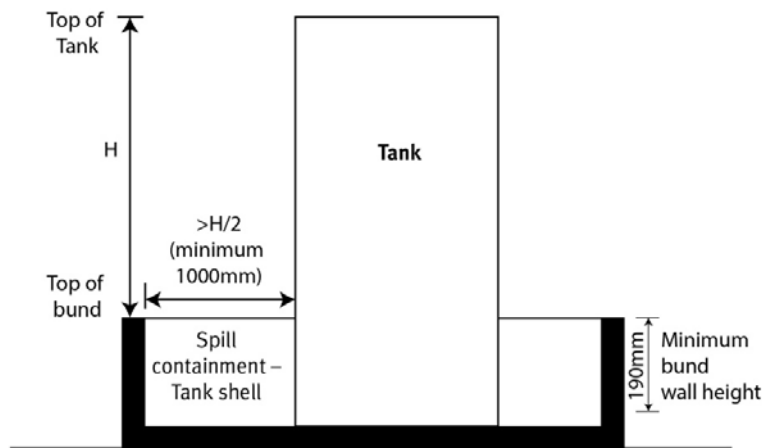
| Volume of tank (L/kg) | PGII              |                      | PGIII             |                      |
|-----------------------|-------------------|----------------------|-------------------|----------------------|
|                       | Inhalation hazard | No inhalation hazard | Inhalation 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  $\geq 50$  per cent the distance between the top of the tank and the top of the bund wall or 1m whichever is greater (see figure TS1.1 for guidance. Impervious shields can be used to extend bund wall heights);
  - (h) has an internal volume  $\geq 110$  per cent of the largest tank within the compound. (includes 500 L of fire water).

**Figure TS1.1 An illustration of minimum bund wall height relative to tank height.**



**Impact avoidance**

- (1) Tanks, other than those provided with masonry bunds >190 mm 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 1.2 m high x 75 mm wide; and
    - (ii) buried a minimum of 500 mm deep below ground; and
    - (iii) spaced at a maximum of 1.3 m between any 2 posts or bollards required to separate a tank from a vehicle access area; and
    - (iv) a minimum of 1.5 m away from the side of the tank; or
  - (b) metal guardrail a minimum of 700 mm high with posts buried a minimum of 500 mm deep and located a minimum of 1.5 m from the tank; or
  - (c) a chain-wire metal fence a minimum of 1.8 m high with a minimum of 50 mm steel posts buried a minimum of 600 mm deep and located a minimum of 3 m from the tank; or
  - (d) a concrete or masonry kerb a minimum of 190 mm high and a minimum of 5 m from the tank.

|   |                   |                           |
|---|-------------------|---------------------------|
| <b>Fire safety</b>  |                   |                           |
| (1) Tank shall have access to $\geq 1 \times 9$ kg ABE fire extinguisher, within 10 m but no closer than 3 m.   |                   |                           |
| <b>Security</b>   |                   |                           |
| (1) Aboveground tanks shall be kept under lock and key.   |                   |                           |
| <b>Corrosive substances in packages and IBCs</b>  |                   |                           |
| <b>General requirements</b>   |                   |                           |
| <p>(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;</p> <p>(2) Package stores within a building shall be located on a floor that has immediate access from outside the building;</p> <p>(3) All separation distances shall be achieved by open air only and measurement across a property boundary is not permitted for self-assessable development;</p> <p>(4) Separation distances shall be measured from the inside edge of any bund wall or natural vent opening to any areas to be protected;</p> <p>(5) Package stores shall be constructed from materials compatible with the corrosive substances to be stored. Package stores with a spill compound <math>&gt;25 \text{ m}^2</math> shall have a minimum of 2 access points;</p> <p>(6) The lowest point of any package store containing <math>&gt;2,500 \text{ L}</math> of PGII or <math>&gt;10,000 \text{ L}</math> 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.</p> |                   |                           |
| <b>Siting and separation</b>  |                   |                           |
| <p>(1) Package store shall be separated from property boundaries and on-site protected places by <math>\geq</math> Table CPS1;</p> <p>(2) Corrosive substances shall be separated from any other substance that it may react dangerously with by a minimum of 5 m and stored in separate spill compounds.</p>   |                   |                           |
| <b>Table CPS1</b>   |                   |                           |
| PGII with or without PGIII  |                   | PGIII only                |
| Open containers   | Closed containers | Open or closed containers |
| 5m  | 3m                | 3m                        |
| <b>Spill containment</b>  |                   |                           |
| <p>(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);</p> <p>(2) Package stores including those storing solids only shall be provided with a bund that complies with all of the following:</p> <ul style="list-style-type: none"> <li>(a) is impervious;</li> <li>(b) constructed or lined with a material that is compatible with the corrosive substance(s) to be stored;</li> <li>(c) capable of holding liquid when full;</li> <li>(d) sloped to a low point or sump;</li> <li>(e) provided with a means of being emptied;</li> <li>(f) has an internal volume <math>\geq 35</math> per cent of the aggregate storage capacity but need not exceed 5,500 L;</li> <li>(g) Where liquid IBCs are stored, the distance between a bund wall and the nearest IBC shall be <math>\geq 50</math> per cent the distance between the top of the highest IBC tank and the top of the closest bund wall. (See figure CS1.1 in section 4.9 for guidance. Impervious shields may be used to extend bund wall heights);</li> </ul>   |                   |                           |

- (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 per cent of its area are openings;
- (3) A vent means 2 x openings in an external wall with a minimum free surface area of 0.1 m<sup>2</sup> 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. 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 3 m; or
  - (d) two opposite walls provided with vents a minimum of every 3m; or
  - (e) for package stores >6 m long and <5 m wide, vents in the longest wall ≤every 1.4 m.

**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 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**

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

**Security**

- (1) 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. Separation distances for spill compounds (bund) shall be measured from the inside edge of the bund walls. Tanks shall be located ≥1 m from any wall to allow access for inspection and maintenance;
- (4) Spill compounds and tank supporting structures shall be constructed of fire resistant materials only;
- (5) ADG Code compliant isotainers and intermodal tanks are considered tanks for the purposes of this code. Aboveground tanks shall not be stacked on top of each other;



- (6) Where the base of any tank containing >10,000 L 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  $\geq$  Table CS2;
- (2) Fire-rated self banded tanks shall be separated from property boundaries and on-site protected places by  $\geq$ 50 per cent Table CS2;
- (3) Tank bunds shall be separated from property boundaries and on-site protected places by  $\geq$ 3 m;
- (4) Any two tanks containing corrosive substances compatible with each other shall be separated by  $\geq$ 600 mm;
- (5) Corrosive substances shall be segregated from any other substance that it may react dangerously with, including another corrosive substance, by a minimum of 5 m and stored in separate spill compounds;
- (6) Any fill or dispensing point for a corrosive tank containing PGII shall be located  $\geq$ 5 m from property boundaries and on-site protected places;
- (7) Fill and dispensing points for corrosive tanks containing PGIII shall be located >3 m 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.

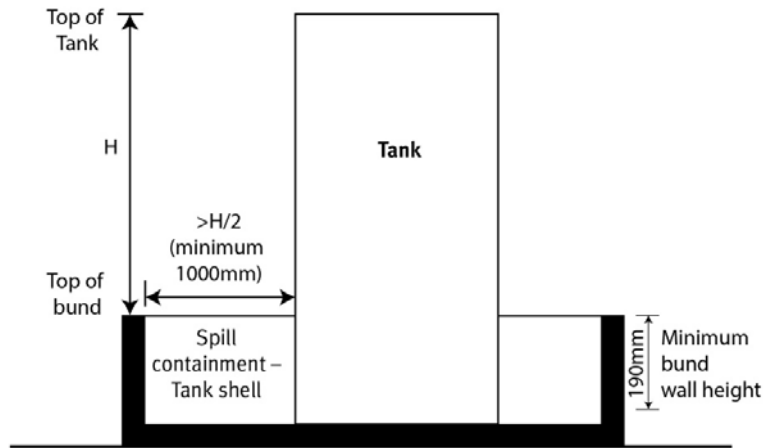
**Table CS2**

| Tank size       | PGII or PGIII |        |
|-----------------|---------------|--------|
|                 | Solid         | Liquid |
| 2 500 – 3000L   | 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 banded 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  $\geq$ the distance between the top of the tank and the top of the bund wall or 1m, whichever is greater. (See figure CS1.1 for guidance. Impervious shields may be used to extend bund wall heights);
  - (h) has an internal volume equal to or greater than 110 per cent of the largest tank within the compound.

**Figure CS1.1 An illustration of minimum bund wall height relative to tank height.**



### Impact avoidance

- (1) Tanks, other than those provided with masonry bunds >190 mm 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 1.2 m high x 75 mm wide; and
    - (ii) buried a minimum of 500 mm deep below ground; and
    - (iii) spaced at a maximum of 1.3 m between any two posts or bollards required to separate a tank from a vehicle access area; and
    - (iv) a minimum of 1.5 m away from the side of the tank; or
  - (b) metal guardrail a minimum of 700 mm high with posts buried a minimum of 500 mm deep and located a minimum of 1.5 m from the tank; or
  - (c) a chain-wire metal fence a minimum of 1.8 m high with a minimum of 50 mm steel posts buried a minimum of 600 mm deep and located a minimum of 3 m from the tank; or
  - (d) a concrete or masonry kerb a minimum of 190 mm high and a minimum of 5 m from the tank.

### Security

- (1) 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 >2,500 L of PGII or >10,000 L 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 >2,500 L of PGII or >10,000 L 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.