

# State code 21: Hazardous chemical facilities

## 21.1 Purpose statement

The purpose of this code is to ensure that, so far as is **reasonably practicable**:

1. any off-site physical or chemical hazards and risks associated with a **hazardous chemical facility** are identified and managed appropriately in order to protect human health and safety, proportionate to the sensitivity of the surrounding land uses and zones
2. the design and siting of a **hazardous chemical facility** provides adequate protection from the harmful effects of:
  - a. an off-site **hazard scenario** at an existing **hazardous chemical facility**
  - b. any **natural hazards** applicable for the location.

Note: Further information regarding **hazardous chemical facilities**, and guidance on how to demonstrate compliance with the performance outcomes of this state code, is available in the Planning guideline – State code 21: Hazardous chemical facilities, Queensland Treasury, 2017.

## 21.2 Performance outcomes and acceptable outcomes

Development that is a material change of use for a **hazardous chemical facility** should demonstrate compliance with the relevant provisions of table 21.2.1.

**Table 21.2.1: Material change of use**

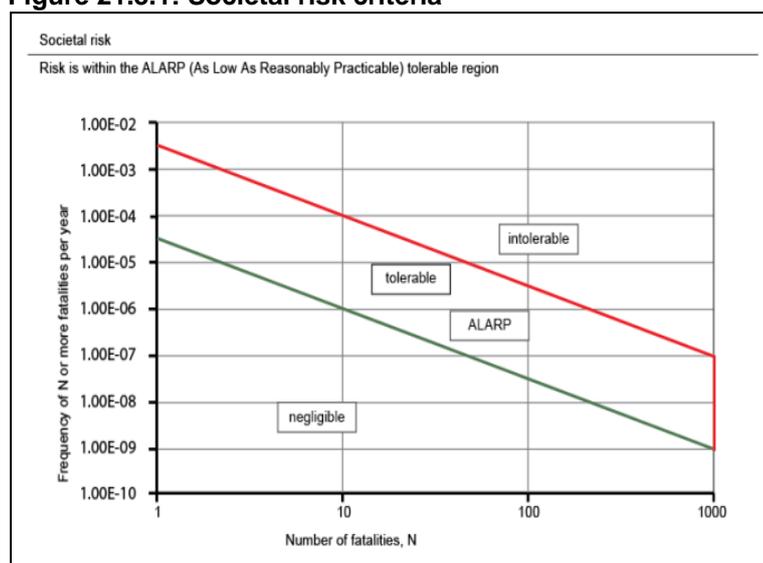
Performance outcomes	Acceptable outcomes
<p><b>PO1</b> Any risk created by a <b>hazardous chemical facility</b> (including increasing an existing risk) is proportionate to the sensitivity of the surrounding land uses or zones.</p>	<p><b>AO1.1</b> Any off-site impact from a <b>hazard scenario</b> shall not exceed, at the boundary of any <b>vulnerable land use</b> or zone:</p> <ol style="list-style-type: none"> <li>1. a <b>dangerous dose to human health</b>; or</li> <li>2. if the above criteria cannot be achieved:           <ol style="list-style-type: none"> <li>a. an <b>individual fatality risk level</b> of <math>0.5 \times 10^{-6}</math>/year</li> <li>b. the societal risk criteria in figure 21.3.1.</li> </ol> </li> </ol> <p>AND</p> <p><b>AO1.2</b> Any off-site impact from a <b>hazard scenario</b> shall not exceed, at the boundary of any <b>sensitive land use</b> or zone:</p> <ol style="list-style-type: none"> <li>1. a <b>dangerous dose to human health</b>; or</li> <li>2. if the above criteria cannot be achieved:           <ol style="list-style-type: none"> <li>a. an <b>individual fatality risk level</b> of <math>1 \times 10^{-6}</math>/year</li> <li>b. the societal risk criteria in figure 21.3.1.</li> </ol> </li> </ol> <p>AND</p> <p><b>AO1.3</b> Any off-site impact from a <b>hazard scenario</b> shall not exceed, at the boundary of any <b>commercial or community activity land use</b> or zone:</p> <ol style="list-style-type: none"> <li>1. a <b>dangerous dose to human health</b>; or</li> <li>2. if the above criteria cannot be achieved:</li> </ol>

Performance outcomes	Acceptable outcomes
	<p>a. an <b>individual fatality risk level</b> of 5 x 10<sup>-6</sup>/year</p> <p>b. the societal risk criteria in figure 21.3.1.</p> <p>AND</p> <p><b>AO1.4</b> Any off-site impact from a <b>hazard scenario</b> shall not exceed, at the boundary of any <b>open space land use</b> or zone:</p> <ol style="list-style-type: none"> <li>1. a <b>dangerous dose to human health</b>; or</li> <li>2. if the above criteria cannot be achieved: <ol style="list-style-type: none"> <li>a. an <b>individual fatality risk level</b> of 10 x 10<sup>-6</sup>/year</li> <li>b. the societal risk criteria in figure 21.3.1.</li> </ol> </li> </ol> <p>AND</p> <p><b>AO1.5</b> Any off-site impact from a <b>hazard scenario</b> shall not exceed, at the boundary of any <b>industrial land use</b> or zone:</p> <ol style="list-style-type: none"> <li>1. a <b>dangerous dose to the built environment</b>; or</li> <li>2. an <b>individual fatality risk level</b> of 50 x 10<sup>-6</sup>/year.</li> </ol>
<p><b>PO2</b> The location and siting of a <b>hazardous chemical facility</b> considers and responds to any off-site effects from a <b>hazard scenario</b> at any existing <b>hazardous chemical facility</b> in the vicinity.</p>	<p>No acceptable outcome is prescribed.</p>
<p><b>PO3</b> <b>Storage and handling areas</b> for <b>fire risk hazardous chemicals</b> are provided with control measures to identify a fire situation and trigger an emergency response.</p>	<p><b>AO3.1</b> <b>Storage and handling areas</b> for <b>fire risk hazardous chemicals</b> are provided with a 24 hour monitored fire detection system that has the ability to detect a fire in its early stages and notify an <b>emergency responder</b> at all times.</p>
<p><b>PO4</b> <b>Storage and handling areas</b> for liquid or solid <b>fire risk hazardous chemicals</b> are provided with a spill containment system which:</p> <ol style="list-style-type: none"> <li>1. has a working volume capable of containing any reasonably foreseeable spill or leak within the boundaries of the development, including any resultant effluent generated in response to an emergency</li> <li>2. ensures that any <b>prescribed hazardous chemicals</b> that, if in contact with each other, may react to produce a fire, explosion or other harmful reaction, or a flammable, toxic or corrosive vapour, are not brought together.</li> </ol>	<p><b>AO4.1</b> <b>Storage and handling areas</b> for <b>packages</b> of liquid or solid <b>fire risk hazardous chemicals</b> are provided with a spill containment system with a working volume capable of containing a minimum of 100 percent of all <b>packages (prescribed hazardous chemicals and/or non-hazardous chemicals)</b> within the area plus the output of any <b>fixed firefighting system</b> provided for the area over a minimum of 90 minutes.</p> <p>AND</p> <p><b>AO4.2</b> <b>Storage and handling areas</b> for liquid or solid <b>fire risk hazardous chemicals in tanks</b> are provided with a spill containment system with a working volume capable of containing a minimum of:</p> <ol style="list-style-type: none"> <li>1. 110 percent of the largest <b>tank</b> within a spill compound or 25 percent of the aggregate where multiple <b>tanks</b> are located within a spill compound, whichever is the greater</li> <li>2. the output of any <b>fixed firefighting system</b> provided for any bulk <b>tank</b> within a spill compound over a minimum of 90 minutes.</li> </ol> <p>AND</p>

Performance outcomes	Acceptable outcomes
	<b>AO4.3</b> The <b>hazardous chemical facility</b> does not store or handle any <b>prescribed hazardous chemicals</b> that, if in contact with each other, may react to produce a fire, explosion or other harmful reaction, or a flammable, toxic or corrosive vapour.
<b>PO5</b> The <b>hazardous chemical facility</b> is located and/or designed to minimise any adverse consequence of: <ol style="list-style-type: none"> <li>1. flood</li> <li>2. bushfire</li> <li>3. erosion or storm tide inundation</li> <li>4. landslide</li> </ol> on a <b>storage and handling area</b> .	<b>AO5.1 Storage and handling areas</b> are located outside of: <ol style="list-style-type: none"> <li>1. a <b>flood hazard area</b></li> <li>2. a <b>bushfire prone area</b></li> <li>3. an <b>erosion prone area</b> or <b>storm tide inundation area</b></li> <li>4. a <b>landslide hazard area</b>.</li> </ol>
<b>PO6</b> The <b>hazardous chemical facility</b> is located and/or designed to minimise any adverse consequence of a <b>natural hazard</b> such as an earthquake or <b>wind action</b> on a <b>storage and handling area</b> .	No acceptable outcome is prescribed.

## 21.3 Figures

Figure 21.3.1: Societal risk criteria



## 21.4 Reference documents

Queensland Treasury 2017, [Planning guideline – State code 21: Hazardous chemical facilities](#)

## 21.5 Glossary of terms

**AEGL** means Acute Exposure Guidelines Level which identifies threshold exposure limits for the general public and are applicable to emergency exposure periods ranging from 10 minutes to eight hours as published by the United States Environmental Protection Agency.

**AEGL-2** means the airborne concentration (expressed as ppm or mg/m<sup>3</sup>) of a substance above which it is predicted the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

**Bushfire prone area** see glossary in the State Planning Policy.

Note: **Bushfire prone area** means an area that is:

1. shown on the State Planning Policy interactive mapping system as a **bushfire prone area**; or
2. identified by a local government in its planning scheme as a **bushfire prone area**, based on a localised bushfire study, prepared by a suitably qualified person.

**Commercial or community activity land use** means any of the following as defined in the Planning Regulation 2017:

1. shopping centre
2. shop
3. office
4. major sport, recreation and entertainment facility
5. market
6. showroom
7. tourist attraction
8. entertainment facility
9. place of worship
10. community use
11. theatre

**Dangerous dose to human health** means:

1. for fire or explosion – an effect that equals or exceeds the following:
  - a. 4.7 kilowatts per square metre for heat radiation; or
  - b. 7 kilopascals for explosion overpressure
2. for toxic or corrosive gases – an effect that equals or exceeds the following:
  - a. **AEGL-2** (60 minutes); or
  - b. where a corresponding **AEGL** is not available – **ERPG-2**; or
  - c. where a corresponding **ERGP-2** is not available – a concentration that is likely to produce the following effects:
    - i. severe distress to almost all people; or
    - ii. a substantial proportion of people require medical attention; or
    - iii. some people are seriously injured, requiring prolonged treatment; or
    - iv. highly susceptible people might be fatally injured.

**Dangerous dose to the built environment** means an effect from fire or explosion that equals or exceeds the following:

1. 12.6 kilowatts per square metre for heat radiation; or
2. 14 kilopascals for explosion overpressure.

**Emergency responder** means a person capable of assessing the severity of an emergency situation and providing a response or requesting assistance.

Note: An **emergency responder** includes a person employed by or on behalf of a **hazardous chemical facility** or Queensland Fire and Emergency Services.

**Erosion prone area** means an area declared to be an erosion prone area under section 70(1) of the *Coastal Protection and Management Act 1995*.

Note: **Erosion prone areas** are identified in accordance with the methodology set out in the Coastal hazard technical guide, Department of Environment and Heritage Protection, 2013 and use the following factors to account for the projected impacts of climate change by the year 2100:

1. a sea level rise factor of 0.8 metres
2. an increase in the maximum cyclone intensity by 10 percent.

**ERPG** means the Emergency Response Planning Guidelines developed by the American Industrial Hygiene Association and includes **ERPG-2**.

**ERPG-2** means the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.

**Fire risk hazardous chemical** see schedule 19 of the Work Health and Safety Regulation 2011.

Note: **Fire risk hazardous chemical** means a **prescribed hazardous chemical** that:

1. is any of the following:
  - a. a flammable gas
  - b. a flammable liquid (hazard category 1 to 3)
  - c. a flammable solid

- d. a substance liable to spontaneous combustion
  - e. a substance which, in contact with water, emits flammable gases
  - f. an oxidizing substance
  - g. an organic peroxide
2. burns readily or supports combustion.

**Fixed firefighting system** means any water-supplying engineering control such as a drencher system, sprinkler system, foam making system, cooling ring, fire hydrant, hydrant monitor or hose reel that has been installed for a prescribed hazardous chemical storage and handling area for the purposes of mitigating fire hazards associated with that area. It does not include any fixed or portable firefighting system located outside the boundaries of the development.

**Flood hazard area** see glossary in the State Planning Policy 2017.

Note: **Flood hazard area** means an area that is:

1. shown on the State Planning Policy interactive mapping system as a **flood hazard area**; or
2. identified by a local government in its planning scheme as a **flood hazard area**, based on a localised flood study that is prepared by a suitably qualified person using the revised climate change factor for increased rainfall intensity in the Australian Rainfall and Runoff projections.

**Hazard scenario** means a reasonably foreseeable scenario involving **prescribed hazardous chemicals** resulting in an uncontrolled fire or explosion, or release of corrosive or toxic vapours, dusts or gases from the development.

**Hazardous chemical facility** see the Planning Regulation 2017.

Note: **Hazardous chemical facility** means the use of premises for a facility at which a **prescribed hazardous chemical** is present or likely to be present in a quantity that exceeds 10 percent of the chemical's threshold quantity under schedule 15 of the Work Health and Safety Regulation 2011.

**Individual fatality risk level** means the risk of death to a person at a particular point.

**Industrial activity** see the Planning Regulation 2017.

Note: **Industrial land use** means any of the following:

1. a warehouse
2. a low impact industry
3. a medium impact industry
4. a high impact industry
5. a special industry
6. an extractive industry
7. a marine industry
8. a research and technology industry
9. a service industry

**Landslide hazard area** see glossary in the State Planning Policy.

Note: **Landslide hazard area** means an area that is:

1. identified by a local government in its planning scheme as a **landslide hazard area**, based on a localised landslide study prepared by a suitably qualified person; or
2. if the local government has not identified **landslide hazard areas** in its planning scheme in accordance with point 1 above - land with a slope greater than or equal to 15 percent.

**Natural hazard** see glossary in the State Planning Policy.

Note: **Natural hazard** means a naturally occurring situation or condition, such as a flood, bushfire, landslide, coastal erosion or storm-tide inundation, with the potential for loss or harm to the community, property or environment.

**Open space land use** means any of the following as defined in the Planning Regulation 2017:

1. outdoor sport and recreation (not including sporting stadiums)
2. park
3. environment facility
4. rural industry.

**Package** means a transportable container designed to contain a **prescribed hazardous chemical** that has a water capacity:

1. not exceeding 500 litres; or
2. exceeding 500 litres and is an intermediate bulk container (IBC) as defined by the ADG Code.

**Placard quantity** means a **placard quantity** for a **prescribed hazardous chemical** or group of **prescribed hazardous chemicals** as per schedule 11 of the Work Health and Safety Regulation 2011.

**Prescribed hazardous chemical** means any of the following:

1. a chemical listed in schedule 11 of the Work Health Safety Regulation 2011; or
2. a chemical classified as explosives under the ADG Code or GHS; or
3. a chemical classified as hazardous to the aquatic environment under the ADG Code or GHS.

**Reasonably practicable** see section 18 of the *Work Health and Safety Act 2011*.

Note: **Reasonably practicable**, in relation to a duty to ensure health and safety, means that which is, or was at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters including:

1. the likelihood of the hazard or the risk concerned occurring
2. the degree of harm that might result from the hazard or the risk
3. what the person concerned knows, or ought reasonably to know, about:
  - a. the hazard or the risk
  - b. ways of eliminating or minimising the risk
4. the availability and suitability of ways to eliminate or minimise the risk
5. after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

**Sensitive land use** means any of the following as defined in the Planning Regulation 2017:

1. community residence
2. dual occupancy
3. dwelling house
4. educational establishment
5. multiple dwelling
6. relocatable home park
7. residential care facility
8. rooming accommodation
9. short-term accommodation
10. tourist park.

**Storage and/or handling** means storing, processing, generating, using, transferring or unloading activities, but does not include transporting **prescribed hazardous chemicals** by road, rail, sea or air if the transport is regulated under the:

1. *Explosive Act 1999*; or
2. *Transport Operations (Marine Safety) Act 1994*; or
3. *Transport Operations (Road Use Management) Act 1995*; or
4. *Transport (Rail Safety) Act 2010*.

**Storage and handling area** means any area designed for the **storage and/or handling** of a particular **prescribed hazardous chemical** or group of **prescribed hazardous chemicals** in a quantity that exceeds a **placard quantity** and includes any separation distances, barriers and spill containment systems required to adequately isolate the area.

Note: Multiple **storage and handling areas** located within a development's boundaries may be considered individual **storage and handling areas** where, after taking account of the chemical(s) within the area, each area is adequately isolated and provided with a self-contained spill compound. For example, where a **storage and handling area** for flammable liquids in **packages** and a **storage and handling area** for corrosive substances in **tanks** are located within the same facility, each area may be considered a separate **storage and handling area** provided it is appropriately isolated from the other and provided with a self-contained spill compound. However, if an area contained **packages** and/or **tanks** of flammable liquids, toxic liquids and corrosive solids all within the same spill compound; such an area is to be considered a single **storage and handling area**.

**Storm tide inundation area** see glossary in the State Planning Policy.

Note: **Storm tide inundation area** means the area of land determined to be inundated during a defined storm tide event that is:

1. identified by a local government in its planning scheme as a **storm tide inundation area**, on the basis of a localised study prepared by a suitably qualified person; or
2. if the local government has not identified **storm tide inundation areas** in its planning scheme in accordance with paragraph 1 above; identified on the SPP interactive mapping system as a **storm tide inundation area**.

**Tank** means any container (e.g. tank, vessel or drum) designed to contain a **prescribed hazardous chemical** that has a water capacity exceeding 500 litres, however, does not include an intermediate bulk container (IBC) as defined by the ADG Code.

**Vulnerable land use** means any of the following as defined in the Planning Regulation 2017:

1. childcare centre
2. community care centre

3. educational establishment
4. health care service
5. hospital
6. retirement facility.

**Wind action** means the influences of site wind speeds, design wind speeds, design wind pressures and distributed forces as described in the Australian and New Zealand Standard AS/NZS1170.2: Structural design actions: Part 2, Wind actions.

## 21.6 Abbreviations

**ADG Code** – [Australian code for the transport of dangerous goods by road and rail](#) as published by the National Transport Commission

**AEGL** – Acute Exposure Guidelines Level

**ERPG** – Emergency Response Planning Guidelines

**GHS** – Globally Harmonised Classification System as referenced in the Work Health and Safety Regulation 2011