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The use of fire rated walls to provide separation for liquid oxygen (LOX) tanks

Separation requirements for stationary tanks containing liquid oxygen, a class 5.1.2A substance, are given in regulations 12.9 and 12.12 of the Health and Safety (Hazardous Substances) Regulations 2017 (the HS Regulations).

Regulation 12.9 sets out the duty of a PCBU to reduce the likelihood of unintended ignition where class 5.1.1 and 5.1.2 substances are present at a hazardous substance location, and regulation 12.12 sets out the duty of a PCBU to control the adverse effects of unintended combustion or explosion.

Both regulations provide that a wall can be used to meet the separation distances set out in Table 3 or Table 4 of Schedule 10 of the HS Regulations.

If a wall is to be used to achieve separation, regulation 12.9(1)(b)(i) requires, it must:

1. have a minimum fire-resistance rating (FRR) of 120/120/120 minutes, and
2. be constructed to prevent a fire on one side of the wall from coming into contact with any incompatible substances on the other side of the wall.

To comply with these two requirements, the PCBU will need to consider:

1. the distance from the stationary tank, measured as the shortest path around the ends of the wall in a horizontal plane, is at least as long as the prescribed distance from Table 3 or Table 4 of Schedule 10, and
2. the height of the wall is suitable for the location.

When considering the suitability of a wall, guidance is provided by *AS 1894:2025 The storage and handling of non-flammable cryogenic and refrigerated liquids*. How high the wall has to be will depend on a number of factors, including:

- i. the capacity of the LOX tank
- ii. the dimensions of the tank
- iii. the position (height) of any valves or other release points on the tank
- iv. the environment in which the tank is located – whether there are any building(s) within the prescribed separation distance (in which case the height of the building is a consideration), or whether the tank is located in an open area away from any buildings.
- v. the safety limits that may apply around the valves/release points

The standard provides more detail in section 5.3.

A wall should not have openings in it if those openings compromise the 120/120/120 minutes FRR. Consideration can be given to penetrations through the wall (for example, for pipework), provided those penetrations are sealed to achieve an equivalent level of fire protection. There may be situations where an emergency door is located in the wall and in such situations the door would have to meet the required 120-minute rating for a fire door.

If there is any uncertainty around the height of the wall and whether it is suitable for the location, the PCBU should undertake a risk assessment to consider the specific situation and layout of their site.

Regulation 12.4 specifies that a reinforced concrete wall 100 mm thick is a means of achieving a FRR of 120/120/120 minutes.

The standard also provides that an LOX tank can be installed under a roof. Such roof and associated walls must have a construction of at least 240/240/240 minutes FRR.

For an LOX tank installed under building eaves, consideration should be given to preventing any debris from falling onto the tank, for example, the tank is roofed over with a 240/240/240 minutes FRR.

Useful illustrations are provided in *AS 1894:2025*.