

OIL FIRING TECHNICAL ASSOCIATION

TI/136

THE FIRE PROTECTION OF OIL STORAGE TANKS CONTAINING DISTILLATE HEATING OILS AND SIMILAR OIL PRODUCTS

Oil in storage is not a fire hazard in itself. It has, however, to be protected from a fire that may occur externally to the tank containing the oil. To achieve this protection, it is recommended that installations comply with the requirements of BS 5410:Parts 1 and 2. These requirements are summarised in this Technical Advice Note, but installers should also study the original documents.

The Classes of oil storage covered by this advice are:

Oil Storage Class

- | | |
|----------|---|
| 1 | Single Family Dwellings

Single family dwellings and similar buildings where the heating system output does not exceed 45kW and storage does not exceed 3500 litres – see Technical Information Note TI/131. |
| 2 | Large Dwellings and Commercial/Industrial Buildings

Buildings that are not of the single family dwelling type, as defined above, or large buildings or places of public entertainment or assembly. |
| 3 | Large Buildings and Places of Public Entertainment or Assembly |

Note: A Large Building is defined as being:

- (a) A building with a height exceeding 24 meters if it also has an area exceeding 390m² on any floor.
- (b) Any building with a height of more than 30 meters.
- (c) Any building used for trade or manufacture with a cubic content exceeding 7000m².

Annex A covers the constructional requirements of screen wall.

Annex B covers the construction requirements of tank chambers.

Annex C covers means of escape, accessibility, ventilation, fire extinguishing requirements and electrical equipment for tank chambers.

This advice covers the storage of the following types of oil as defined in BS 2869:1998:

C1, C2, D, E, F, G, H

Please note that insurance companies may request additional protection to that indicated here. They and the relevant Fire Service Authority should be contacted in all cases.

1. Single Family Dwellings

Single family dwellings are mostly covered by oil storage Class 1, but those with large boiler and storage come within a Class 2.

1.1 **Class 1 dwellings** are those with boilers having an output of no more than 45kW or oil storage of more than 3500 litres. See Technical Information Note TI/131.

1.2 **Class 2 dwellings** are those with either a boiler having an output of more than 45kW or oil storage of more than 3500 litres. The tanks require:

1.2.1 Fireproof base extending at least 300mm outside the tank, including the bund where tanks are integrally bunded, on all sides except a side next to an approved type of building or boundary wall, or a fire screen wall.

1.2.2 If oil storage is of no more than 3500 litres and is located more than 2 meters from a building or boundary - no other protection.

If oil storage is of no more than 3500 litres and is located less than 2 meters from a building or boundary, the following protection is required:

(a) A type B screen wall.

(b) Ensure that the walls of any building on the same site within 1.8 meters in any direction from any part of the tank have 60 minutes standard of fire resistance and do not have openings such as doors or windows, or provide a type B screen wall between the tank and the building.

1.2.3 If oil storage is of more than 3500 litres and is more than 6 meters from a building or boundary - no other protection is required.

If oil storage is of more than 3500 litres and is less than 6 meters from a building or boundary, the following protection is required:

(a) A type C screen wall.

(b) Ensure that the walls of any building on the same site within 6 meters in any direction from any part of the tank have 120 minutes standard of fire resistance and are imperforate where they are within 1.8 meters of the tank. In addition, any openings such as doors and windows between 1.8 meters and 6 meters from the tank are to be of the 60 minutes self-closing type and be fitted with minimum 60 minutes fire resistant glazing.

1.2.4 If storage is internal, provide the following protection:

(a) Tank capacity not exceeding 1250 litres
Tank Chamber Type B1

(b) Tank capacity exceeding 1250 litres, but not exceeding 3500 litres
Tank Chamber Type B3

(c) Tank capacity exceeding 3500 litres
Tank Chamber B3+

2. Commercial/Industrial Buildings

Oil Storage in commercial/industrial buildings is covered by Oil Storage Class 2. This class includes all buildings other than those covered by Oil Storage Class 1 and Oil Storage Class 3. The tanks require the following protection:

- 2.1 Fireproof base extending at least 300mm outside the tank, including the bund where tanks are integrally bunded, on all side next to an approved type pf building or boundary - no other protection.
- 2.2 If oil storage is of no more than 3500 litres and is located more than 2 meters from a building or boundary - no other protection.

If oil storage is of no more than 3500 and is located less then 2 meters from a building or boundary, the following protection is required:

- (a) A Type B Screen wall.
 - (b) Ensure that the walls of any building on the same site within 1.8 meters in any direction from any part of the tank have a 60 minutes standard of fire resistance and do not have openings such as doors and windows, or provide a type B screen wall between the tank and the building.
- 2.3 If oil storage is of more then 3500 litres and is more than 6 meters from a building or boundary- no other protection.

If oil storage is of more than 3500 litres and is less than 6 meters from a building or boundary, the following protection is required:

- (a) A Type C screen wall.
 - (b) Ensure that the walls of any building on the same site within 6 meters in any direction from any part of the tank have 120 minutes standard of fire resistance and are imperforate where they are within 1.8 meters of the tank. In addition, any openings such as doors and windows between 1.8 meters and 6 meters from the tank are to be of the 60 minutes self-closing type and be fitted with minimum 60 minutes fire resistant glazing.
- 2.4 If storage is internal, provide the following protection:

- (a) Tank capacity not exceeding 1250 litres
Tank Chamber Type B1
- (b) Tank capacity exceeding 1250 litres but not exceeding 3500 litres
Tank Chamber Type B3
- (c) Tank capacity exceeding 3500 litres
Tank Chamber Type B3+

3. Large Buildings and Places of Public Entertainment or Assembly

3.1 Fireproof base extending at least 300mm outside the tank, including the bund where tanks are integrally banded, on all sides except a side next to an approved type of building or boundary wall, or a fire screen wall.

3.2 If oil storage is of no more than 3500 litres and is located more than 2 meters from a building or boundary - no other protection.

If oil storage is of no more than 3500 litres and is located less than 2 meters from a building or boundary, the following protection is required:

(a) A type B screen wall.

(b) ensure that the walls of any building on the same site within 1.8 meters in any direction from any part of the tank have a 60 minutes standard of fire resistance and do not have openings such as doors or windows, or provide a type B screen wall between the tank and the building.

3.3 If oil storage is of more than 3500 litres and is more than 6 meters from a building or boundary - no other protection.

If oil storage is of more than 3500 litres and is less than 6 meters from a building or boundary, the following protection is required:

(a) A type C screen wall.

(b) Ensure that the walls of any building on the same site within 6 meters in any direction from any part of the tank have 120 minutes standard of fire resistance and are imperforate where they are within 1.8 meters of the tank. In addition, any openings such as doors and windows between 1.8 meters and 6 meters from the tank are to be of the 60 minutes self-closing type and be fitted with minimum 60 minutes fire resistant glazing.

3.4 If storage is internal, provide the following protection:

(a) Detached chamber within 6 meters of a building
Install tank in a Tank Chamber Type C detached

(b) Tank external to but adjoining the main building
Install tank in a Tank Chamber Type C adjoining

(c) Tank within a main building
Install tank in a Tank Chamber Type C internal

(d) Tank on roof or within topmost storey of a building
Install tank in a Tank Chamber Type C roof.

**SCREEN WALLS FOR THE FIRE PROTECTION OF
OIL STORAGE TANKS**

Type A Screen Wall

30 minutes non-combustible construction, prevent the passage of direction radiated heat and extend not less than 300mm beyond the top and ends of the tanks (BS 5410:Part 1:1997).

NOTE: Type A screen walls used only for Oil Storage Class 1.

Type B Screen Wall

60 minutes of fire resistance and extend not less than 900mm beyond the top and ends of the tank.

Type C Screen Wall

120 minutes of fire resistance and extend not less than 900mm beyond the top and ends of the tank (BS 5410:Part 2:1978).

TANK CHAMBERS FOR THE FIRE PROTECTION OF OIL STORAGE TANKS

Tank chambers are fully enclosed construction.

TYPE A TANK CHAMBER

1. Fully enclosed structure with fire resisting construction of not less than 60 minutes. The entrance should not make an opening in any bund incorporated in the chamber. The door should have an equal fire resistance to the walls, should open outwards and be openable from the inside without the use of a key.
2. The chamber should incorporate a bund capable of containing 110% of the contents of the oil storage tank or else the tank should be of the integrally banded type.
3. The chamber should be ventilated to the outside, preferably by natural means, sufficiently to prevent stagnation.
4. Sufficient space should be provided inside the chamber for the maintenance of the tank, and mountings and the fittings.
5. Any electric lighting should be of the bulkhead type with switching externally to the chamber.

NOTE: Type A chambers are used only for Oil Storage Class 1 installations.

TANK B TANK CHAMBER

Storage not exceeding 1250 litres – Tank Chamber B1

1. External walls imperforate except for access and ventilation openings.
2. Roof of concrete with 60 minutes fire resistance imperforate except for access and ventilation openings.
3. Doors and openings in external walls and roofs imperforate except for ventilation openings.
4. Walls and floors separating the chamber from the rest of the building, including the boiler room, to have 60 minutes fire resistance and to be imperforate except for access doors.
5. Doors in internal walls separating the chamber access doors from the rest of the building, including the boiler room, to have 30 minutes fire resistance and to be kept shut and bolted.

Storage exceeding 1250 litres but not exceeding 3500 litres – Tank Chamber B3

1. External walls imperforate except for access and ventilation openings and with a 60 minutes fire resistance.
2. Roof or concrete with 60 minutes fire resistance, imperforate except for access and ventilation openings.
3. Doors and openings in external in external walls and roofs having a 30 minutes fire resistance, imperforate except for ventilation openings, and kept shut and bolted.
4. Walls and floors separating the chamber from the rest of the building, including the boiler room, to have 120 minutes fire resistance and to be imperforate except for access doors.
5. Doors in internal walls separating the chamber from the rest of the building, including the boiler room, to have 60 minutes fire resistance and to be kept shut and bolted.

Storage exceeding 3500 litres – Tank Chamber B3+

1. External walls imperforate except for access and ventilation openings and with a 120 minutes fire resistance.
2. Doors and openings in external walls and roofs having a 60 minutes fire resistance, imperforate except for ventilation openings, kept shut and bolted, and marked:

OIL STORE – THIS DOOR TO BE KEPT SHUT

3. walls and floors separating the chamber from the rest of the building, including the boiler room, to have 240 minutes fire resistance and be imperforate except for access doors.
4. Doors in internal walls separating the chamber from the rest of the building, including the boiler room, to have 120 minutes fire resistance, and be kept shut and bolted, and marked:

OIL STORE – THIS DOOR TO BE KEPT SHUT

Outer and inner doors to be provided.

Type C Tank Chamber

Chamber detached but within 6 meters of the main building – Tank Chambers Type C detached

1. External walls imperforate except for access and ventilation openings and constructed of bricks, blocks or concrete.
2. Roof of concrete with 60 minutes fire resistance, imperforate except for access and ventilation openings.
3. Doors and openings in external walls and roofs, imperforate except for ventilation openings, having a 120 minutes fire resistance and being self-closing.

Chamber external to but adjoining the main building – Tank Chamber Type C adjoining

1. External walls imperforate except for access and ventilation openings and constructed of bricks, blocks and concrete.
2. Roof of concrete with 60 minutes fire resistance, imperforate except for access and ventilation openings.
3. Doors and openings in external walls and roofs, imperforate except for ventilation openings, having a 120 minutes fire resistance and being self-closing.
4. walls and floors separating chamber from the rest of building, including the boiler room, to have 240 minutes fire resistance.
5. Doors in internal walls separating the chamber from the rest of the building, including the boiler room, to consist of inner and outer doors having 120 minutes fire resistance or a single 120 minutes door incorporating material to limit the transmission of heat. Where a single door is used, it should be kept locked shut and be clearly marked on the outside:

OIL STORE – THIS DOOR TO BE KEPT LOCKED SHUT

Chamber within the main building – Tank Chamber Type C internal

1. External walls imperforate except for access and ventilation openings and constructed of bricks, blocks or concrete.
2. Doors and openings in external walls and roofs, imperforate except for ventilation openings, having a 120 minutes fire resistance and being self-closing.
3. Walls and floors separating chamber from the rest of building, including the boiler room, to have 240 minutes fire resistance (See Note 1)
4. Doors in internal walls separating the chamber from the rest of the building, including the boiler room, to consist of inner and outer doors having 120 minutes fire resistance or a single 120 minutes door incorporating material to limit the transmission of heat. Where a single door is used, it should be kept locked shut and be clearly marked on the outside:

OIL STORE – THIS DOOR TO BE KEPT LOCKED SHUT

NOTE 1: Where a tank chamber is within a building but projects partly out from it so that its ceiling becomes partly the underside of separating floor and partly the underside of a roof, the floor portion should have a 240 minutes standard of fire resistance and the roof portion should be of reinforced concrete not less than 100mm thick.

Chamber on roof within the top storey of a building – Tank Chamber Type C roof

Limited storage only allowed (See Note 2)

1. External walls imperforate except for access and ventilation openings and constructed of bricks, blocks or concrete.
2. Roof of concrete with 60 minutes fire resistance, imperforate except for access and ventilation openings.
3. Doors and openings in external walls and roofs, imperforate except for ventilation openings, having a 120 minutes fire resistance and being self-closing.
4. Walls and floors separating chamber from the rest of building, including the boiler room, to have 240 minutes fire resistance.
5. Doors in internal walls separating the chamber from the rest of the building, including the boiler room, to consist of inner and outer doors having 120 minutes fire resistance or a single 120 minutes door incorporating material to limit the transmission of heat. Where a single door is used, it should be kept locked shut and be clearly marked on the outside:

OIL STORE – THIS DOOR TO BE KEPT LOCKED SHUT

NOTE 2: Storage is to be limited to a daily service tank not exceeding 900 litres in capacity sited adjacent to and separated from the boiler room. Also, the supply pipe between the main storage chamber and the service tank should be within its own non-combustion 240 minutes duct.

TANK CHAMBER SERVICES

Means of Access

All large tank chambers, i.e. exceeding 6 meters in length or breadth, should be provided with two separate unobstructed means of escape in case of fire.

All doors should open outwards and be easily opened from inside the room without the use of a key.

The fire authority must be consulted in all cases.

Accessibility

Space must be provided within the chamber to give access to all pipe joints and fitting.

For steel tanks, space must be provided for painting the external surfaces.

Ventilation of tank chambers

Tank chambers should be ventilated to the open air sufficiently to prevent stagnation, independently of any other portion of the premises, preferably by natural means. Ventilation openings should not make any catchpit ineffective.

Ventilation openings should not be located within 3 meters of a final exit from a building.

Any ventilation shaft required should be enclosed separately from the rest of the building to the same standard as the tank chamber, or the rest of the building, which is the higher.

Automatic fire extinguishing installation and foam inlets.

When access or separation from the rest of the building is difficult, a suitable fixed automatic fire extinguishing installation or foam inlet may be required by the Fire Authority.

Light and electrical equipment

Adequate permanent lighting fittings of the totally type, i.e. bulkhead or well glass, should be provided. Any other electrical equipment it is necessary to install in the chamber must be of the totally enclosed type.

Wiring should be enclosed in screwed metal conduits or be mineral insulated and metal sheathed.

The controls for electrical equipment in the tank chamber, including lighting, should be installed outside the chamber.