Health and Safety at Work (Hazardous Substances—Polyethylene Above Ground Stationary Tanks for Diesel Fuel) Safe Work Instrument 2017

This safe work instrument is approved under section 227 of the Health and Safety at Work Act 2015 by the Minister for Workplace Relations and Safety, being satisfied that –

(a) appropriate consultation has been carried out under section 227(3) of that Act; and

(b) for the purposes of clauses 21 to 24, 26, 27 and 31, compliance with the provisions of the Regulations that apply to stationary tanks will not appropriately control risk associated with stationary tanks; and

(c) for the purposes of clauses 29 and 30, compliance with the provisions of the Regulations that apply to separation distances will not appropriately control risk associated with separation distances.

Contents

Safe Work Instrument

1 Title

This is the Health and Safety at Work (Hazardous Substances—Polyethylene Above Ground Stationary Tanks for Diesel Fuel) Safe Work Instrument 2017.

2 Commencement

This safe work instrument comes into force on 1 December 2017.

Part 1

Preliminary provisions

3 Overview

In this safe work instrument,—

(a) this Part provides for preliminary matters:

(b) clauses 6 to 10, 12, and 14 to 20 set requirements for the design and construction of a tank (including its integral secondary containment system) for the purposes of regulation 17.6(1)(k) of the Regulations:

(c) clause 11 sets requirements relating to the venting of a tank for the purposes of regulation 17.7(3)(c) of the Regulations:

(d) clause 13 sets requirements for the design and construction of a liquid level indicator for the purposes of regulation 17.12(3) of the Regulations:

(e) clause 25 sets requirements for the marking of a tank for the purposes of regulation 17.76(1)(b)(ii) of the Regulations:

(f) clauses 26 and 27 set out additional requirements that apply to the installation of a tank and state which PCBUs are required to comply with each additional requirement for the purposes of regulation 17.105(4) of the Regulations:

(g) clauses 28 and 29 state which provisions of the Regulations are to apply in a way that is modified by this safe work instrument, for the purposes of regulation 11.39(4)(c) of the Regulations:

(h) clauses 21 to 24, and clause 30 set out an additional requirement that applies to the testing of a tank and state which PCBUs are required to comply with those requirements for the purposes of regulation 17.105(4) of the Regulations.

4 Interpretation

(1) In this safe work instrument, unless the context otherwise requires,—

Act means the Health and Safety at Work Act 2015

AS/NZS 4766 means the standard AS/NZS 4766:2006 Polyethylene storage tanks for water and chemicals

BS EN 13341 means the British Standard BS EN 13341:2005+A1:2001 Static thermoplastic tanks for above ground storage of domestic heating oils, kerosene and

diesel fuels — Blow moulded and rotationally moulded polyethylene tanks and rotationally moulded tanks made of anionically polymerized polyamide 6 — Requirements and test methods

design life means the period of time for which a tank is expected by its designers to work within the parameters specified for the tank in this safe work instrument

diesel fuel means diesel fuel (automotive gas oil and marine diesel fuel), HSNO approval number HSR 001441

industrial locality means a locality used for—

(a) industrial or trade purposes; or

(b) the storage, transfer, treatment, or disposal of waste materials.

ISO 9001 means the standard ISO 9001:2015 Quality Management Systems—Requirements

isolated refuelling facility means a facility—

(a) where diesel fuel is stored and vehicles are refuelled; and

(b) that abuts an area of low intensity land use, even if a high density traffic route abuts the facility

refuelling facility means a facility—

(a) where diesel fuel is stored and vehicles are refuelled; and

(b) that is in a rural locality or an industrial locality

rural locality means a locality other than an urban locality or industrial locality

tank means a tank to which this safe work instrument applies.

(2) A term or expression that is defined in the Act or the Regulations and used, but not defined, in this safe work instrument has the same meaning as in the Act or the Regulations.

5 Application

This safe work instrument applies to an above ground stationary tank that—

(a) is made of polyethylene; and

(b) operates at atmospheric pressure; and

(c) has a water capacity of not less than 250 L and not more than—

(i) 5 000 L, if the tank has an integral secondary containment system that is also made of polyethylene; or

(ii) 999 L, if the tank is a vertical single-walled tank; and

(d) used to store diesel fuel; and

(e) located at a farm of not less than 4 ha or refuelling facility.

Part 2

Design and construction requirements

6 Specified standard for design and construction

(1) A relevant PCBU must ensure that a tank (including its integral secondary containment system, if applicable) is designed and constructed in accordance with BS EN 13341.

(2) The provisions of BS EN 13341 are subject to the provisions of this Part (except subclause (1)).

Subpart 1—Design requirements

Tanks

7 General design

A relevant PCBU must ensure that a tank is designed—

(a) to have a minimum design life of 25 years; and

(b) to have an in-service temperature range from -18^0C to $+50^0$C; and

(c) so that water cannot pond on the upper surface of the tank.

8 Location of tank openings

A relevant PCBU must ensure that every opening in a tank is above the maximum safe fill level of the tank.

9 Location of tank openings: tanks with water capacity of more than 3 500 L

(1) A relevant PCBU must ensure that a tank with a water capacity of more than 3 500 L has—

(a) an opening that allows the interior of the tank to be inspected and that is—

(i) at least 100 mm in diameter; and

(ii) is able to be secured; and

(b) an opening that enables the tank to be drained of any water or sludge.

(2) The requirements of subclause (1)(a) and (1)(b) may be met by means of the same opening.

10 Tank gauge

A relevant PCBU must ensure that a hole for the installation of a gauge on a tank is made in the position and manner specified in the design for the tank.

11 Vent pipe

A relevant PCBU must ensure that a tank has a vent pipe or fitting that—

(a) is not less than 1.5 times the diameter of the fill pipe; and

(b) is not less than 150 mm from the top of the tank and extends no more than 0.5 m above the height of the tank; and

(c) terminates in a manner that prevents the entry of water or other foreign material (for example, with a return bend or protective fitting).

12 Fill pipe

A relevant PCBU must ensure that a tank is fitted with a corrosion-resistant fill pipe that—

(a) is able to disperse liquid at the maximum flow rate used during filling; and

(b) extends to within one pipe diameter of the tank bottom; and

(c) enters the tank at a point that is above the maximum fill level; and

(d) is situated so that any fluid spilled during filling drains into the tank's integral secondary containment system (if applicable); and

(e) is fitted with a 50 mm Camlock coupling which has a secure cover to prevent the ingress of foreign material.

13 Measurement of tank contents

(1) A relevant PCBU must ensure that the liquid level indicator for a tank—

(a) indicates the actual liquid level in relation to the safe fill level; and

(b) is designed, constructed, and installed to resist heat and impact to which it may be subjected in any reasonably foreseeable situation; and

(c) is not a glass level indication gauge.

(2) If a liquid level indicator is a dipstick, a relevant PCBU must ensure that—

(a) a durable strike plate is fitted at the bottom of the tank where the dipstick strikes the tank; and

(b) a guide pipe with a pressure-equalising hole at the top is provided; and

(c) the opening for the dipstick is provided with a cap that is fitted when the opening is not in use.

Integral secondary containment systems

14 General design

A relevant PCBU must ensure that an integral secondary containment system is designed—

(a) to have a minimum design life of 25 years; and

(b) to have an in-service temperature range from -18ºC to +50ºC; and

so that—

(i) water cannot pond on the upper surface of the integral secondary containment system; and

(ii) it is enclosed with a cover that prevents rainfall and any other material from entering the integral secondary containment system; and

(iii) the wall of the integral secondary containment system is no less thick than the wall of the tank; and

(iv) any liquid in the integral secondary containment system can be removed.

Subpart 2—Construction requirements

Quality management system

15 Quality management system for construction of tanks

A relevant PCBU must ensure that a tank is constructed under an ISO 9001 quality management system using the following provisions of BS EN 13341:

(a) section 4.1 and table 1 (material requirements):

(b) section 4.2 (design):

(c) section 5.1s and 5.2 (tank type testing requirements):

(d) section 5.3 (factory production testing):

(e) table 5 (requirements for rotationally-moulded polyethylene tanks):

(f) section 7 (durability):

(g) section 8 (marking):

(h) Annex A2 (Rotomould material test requirements):

(i) Annex B1-8 (test methods for determining the tank characteristics).

16 Quality management system for integral secondary containment systems

A relevant PCBU must ensure that an integral secondary containment system is constructed under an ISO 9001 quality management system using the following provisions of BS EN 13341:

(a) section 4.1 and table 1 (material requirements (excluding the resistance to weathering requirements)):

(b) section 5.1s and 5.2 (tank type testing requirements):

(c) section 5.3 (factory production testing):

(d) table 5 (requirements for rotationally-moulded polyethylene tanks (excluding pressure resistance requirements)):

(e) section 7 (durability):

(f) section 8 (marking):

(g) Annex A2 (Rotomould material test requirements (excluding A2.5)):

(h) Annex B1-8 (test methods for determining the tank characteristics).

Construction method and materials

17 Construction method

A relevant PCBU must ensure that a tank (including its integral secondary containment system, if applicable) is constructed by rotational moulding from polyethylene resins.

18 Construction materials: tanks

(1) A relevant PCBU must ensure that—

(a) the materials used in the construction of a tank—

(i) are new; and

(ii) are non-reactive with diesel fuel; and

(iii) have been tested in accordance with, and meet the requirements of Annex A.2 and table 1 of BS EN 13341:; and

(iv) have a proven in-service history of the storage of diesel fuel for at least 3 years; and

(b) the polyethylene compound used in the construction of a tank contains 2.25 ± 0.25% by mass of carbon black, with an average particle size of less than 25 nm.

(2) In this clause and clause 19, **non-reactive** means–

(a) the materials are chemically inert when in contact with the hazardous substances carried in the tank at the range of temperatures and pressures at which the contact may occur; or

(b) if the materials chemically react with the hazardous substances carried in the tank,—

(i) the reaction does not cause or contribute to a fire or an explosion, or generate a substance of a different hazardous property, nature, or degree; and

(ii) continuous or repeated exposure to the reaction does not soften, weaken, or otherwise affect the materials to the extent that the tank (including its integral secondary containment system) fails to meet any of the design or construction requirements specified in this safe work instrument.

19 Construction materials: integral secondary containment systems

A relevant PCBU must ensure—

(a) that the materials used in the construction of an integral secondary containment system—

(i) are non-reactive with diesel fuel; and

(ii) have a proven in-service history with the storage of diesel fuel; and

(b) if the integral secondary containment system is made of material that is not black in colour, the colouring material must be compounded into the polymer in a way that meets the ultraviolet light requirements of AS/NZS 4766.

20 Polyethylene resin

(1) A relevant PCBU must ensure that—

(a) the polyethylene resin used in the construction of a tank (including its integral secondary containment system, if applicable) is—

(i) based on at least a C_6 (hexene) copolymer; and

(ii) pre-compounded before moulding; and

(b) any pigment (unless it is carbon black) comprises not more than 2% of the total mass of the polyethylene resin; and

(c) the base polyethylene resin of a tank (including its integral secondary containment system, if applicable) has—

(i) an $ESCR_{100}$ of F_{50} not less than 1 000 hours; and

(ii) if $ESCR_{100}$ data is not available, an $ESCR_{10}$ value of F_{50} not less than 200 hours.

(2) In subclause (1)(c), unless the context otherwise requires,—

ASTM D1693-15 means ASTM standard ASTM D1693-15 Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics

ESCR means environmental stress cracking resistance

$ESCR_{10}$ or **$ESCR_{100}$**, means the accelerated tests for ESCR (at concentrations of 10% and 100% respectively) of the active surfactant in accordance with the procedures contained in ASTM D1693-15

F_{50} means a failure rate of 50%.

Testing

21 Polymer testing

A PCBU who constructs a tank must ensure that the polymer used in the construction of a tank (including its integral secondary containment system, if applicable) is subjected to a—

(a) light-penetration test performed as a material type test in accordance with AS/NZS 4766; and

(b) dispersion test performed as a material quality control test in accordance with AS/NZS 4766.

22 Impact strength test

(1) A PCBU who constructs a tank must ensure that the impact strength test specified in table A1 of AS/NZS 4766 is performed on a tank (including its integral secondary containment system, if applicable).

(2) The impact strength test is in addition to the tests specified in BS EN 13341.

23 Integral secondary containment system deformation test

(1) A PCBU who constructs a tank must ensure, in addition to the deformation tests specified in BS EN 13341, the deformation of an integral secondary containment system is tested according to the following procedure:

(a) locate the integral secondary containment system on a flat surface with a measuring grid:

(b) assemble the tank and its integral secondary containment system and leave them at 23 ± 2^0C for 48 hours:

(c) measure the length, width, and diameter of the integral secondary containment system while the tank and its integral secondary containment system are empty:

(d) cut a 50 mm hole in the base of the tank:

(e) fill the tank with a volume of water at ambient temperature that equates to 110% of the water capacity of the tank, and measure the length and width of the integral secondary containment system:

(f) measure the diameter of the integral secondary containment system at a point on the side of the tank that is 25% of the total height of the tank from the base of the tank:

(g) measure the length, width, and diameter of the integral secondary containment system for the tank after 5, 10 and 15 days.

(2) The maximum increase in deformation of any these measurements must not be more than 2.5%.

24 Integral secondary containment system overflow test

(1) A PCBU who constructs a tank must ensure that, in addition to the relevant overflow tests specified in BS EN 13341, the integral secondary containment system is tested according to the following procedure:

(a) assemble the tank and its integral secondary containment system, and cover:

(b) fill the tank with a volume of water at ambient temperature that equates to 110% of the water capacity of the tank at a rate of between 380 L and 420 L per minute through a 50 mm diameter hose connected through the tank fitting:

(c) allow overflowing water to pass through the tank vent into its integral secondary containment system:

(d) no water must escape from the integral secondary containment system.

Part 3

Other requirements for tanks

Tank markings

25 Tank markings

(1) A relevant PCBU must ensure that a tank is marked permanently and legibly with the following information, in addition to the information specified in regulation 17.76(1)(b)(i):

(a) the design life of 25 years:

(b) the limitation of use to diesel fuel:

(c) whether the tank has an integral secondary containment system or is a single-walled vertical tank.

(2) A relevant PCBU must ensure that the marking for the information specified in subclause (1)(b) is placed as close as is reasonably practicable to the fill point of the tank.

Installation requirements

26 General installation requirements

A PCBU who installs a tank must ensure that the tank is installed—

(a) on flat and level ground outdoors, and not on a stand or pedestal; and

(b) in accordance with the detailed installation instructions provided by the PCBU who constructed the tank.

27 Protection from impact

If there is a risk that a tank may be impacted by a moving vehicle, a PCBU who installs a tank must ensure that the tank is protected by a barrier that—

(a) is capable of withstanding a single impact of 2 500 kg of force at 5 m/s or equivalent impact energy (when applied across a width of 1 m at a height of 0.5 m above the ground); and

(b) prevents an impact of that magnitude from reaching the plan area of the tank.

Modified separation distances

28 Modified separation distances

(1) Regulation 11.9 of the Regulations applies to a tank in a way that is modified by clause 29 and 30 of this safe work instrument, in relation to a tank.

(2) Clause 29 and 30 of this safe work instrument apply, rather than regulation 11.9(1) and (2) of the Regulations, in relation to a tank.

29 Separation distances

Except as provided in clause 29, a PCBU with management or control of a tank must ensure that a tank that is located at a place listed in column 1 of the following table is separated from the place or items described in column 2 by (at least) the distance specified in column 3:

Column 1	**Column 2**	**Column 3**
Place where tank located	**Place or items**	**Distance (m)**
An isolated refuelling facility	An area of high intensity land use	45
Any place (other than a farm of not less than 4 ha or an isolated refuelling facility)	A boundary	20
A farm of not less than 4 ha	An area of high intensity land use	20

Column 1 Place where tank located	Column 2 Place or items	Column 3 Distance (m)
A farm of not less than 4 ha or an isolated refuelling facility	Combustible materials, fertilisers, poisons, ignition sources, a boundary or an area of low intensity land use	6
A farm of not less than 4ha or an isolated refuelling facility	Obstacles, obstructions, rubbish or vegetation cover	3

30 Reduced separation distances

(1) Despite clause 28 and subject to the condition in subclause (2), a tank may be installed with the separation distance between the building and the tank specified in column 1 of the table in subclause (2).

(2) The condition is that an intervening wall is constructed of durable materials with a minimum fire-resistance rating of 120/120/120 minutes in accordance with the minimum wing wall length (if applicable) specified in column 2, and the minimum parapet height (if applicable) specified in column 3, of the following table:

Column 1 Separation distance between building and tank (m)	Column 2 Minimum wing wall length (m)	Column 3 Minimum parapet height (m)
>45	No wall required	No wall required
>37 ≤ 45	0.2	0.2
>35 ≤ 37	0.5	0.5
>30 ≤ 35	1.1	2.1
>25 ≤ 30	1.6	2.6
>20 ≤ 25	2.4	3.4
>5 ≤ 20	Return walls and roof required	Return walls and roof required

(3) In this clause, unless the context otherwise requires,—

separation distance means the distance between the intervening wall and the area of high intensity land use or boundary

wing wall length means the length of the wall beyond the outer dimension of the tank

parapet height means the height of the wall above the height of the tank

return walls means walls no closer than 0.5 m to the sides of the tank and extending from the intervening wall to the front of the tank

roof means a roof no closer than 0.75 m to the top of the tank and extending from the intervening wall to the front of the tank.

Requirements for testing and inspection of tanks after installation

31 Inspection and testing after installation

(1) In each of the relevant periods, the PCBU who constructed the tank must test a sample of 15 installed tanks for—

(a) degradation of the material (including as a result of exposure to ultraviolet light), including stress cracking; and

(b) the circumference of the tank (including its integral secondary containment system, if applicable) when the tank is at least 50% full.

(2) The PCBU must supply the results of this inspection and testing to WorkSafe at the end of each relevant period.

(3) In this clause, the relevant periods are—

(a) each 12-month period commencing 5, 10, and 15 years after the manufacture of the tank (including its integral secondary containment system, if applicable); and

(b) 5 years after any change in the nature of the polyethylene resin used to construct the tank (including its integral secondary containment system, if applicable).

Dated at Wellington this [*date*] day of [*month*] [2017].

[*Name*],
Minister for Workplace Relations and Safety

Date of notification in *Gazette*:
This safe work instrument is administered by WorkSafe New Zealand