

**Health and Safety at Work (Hazardous Substances—Thermoplastic  
Stationary Tanks) 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 11 and 12, compliance with the provisions of the Regulations that apply to stationary tanks will not appropriately control risk associated with stationary tanks.

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## Safe Work Instrument

### 1 Title

This is the Health and Safety at Work (Hazardous Substances—Thermoplastic Stationary Tanks) Safe Work Instrument 2017.

### 2 Commencement

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

### 3 Overview

In this safe work instrument—

- (a) clauses 6 to 9 specify requirements relating to design and construction of a tank for the purposes of regulation 17.6(1)(k) of the Regulations;
- (b) clause 10 specifies requirements for the marking of a tank for the purposes of regulation 17.76(1)(b)(ii) of the Regulations;
- (c) clauses 11 and 12 set additional requirements that apply to the installation and operation of a tank and state which PCBUs are required to comply with those additional requirements for the purposes of regulation 17.105(4) of the Regulations;
- (d) clause 13 specifies the maximum period of validity for which a compliance certificate for a tank may be issued for the purposes of regulation 17.92(1)(a)(i)(E) 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 3845** means the Australian/New Zealand standard AS/NZS 3845:1999 *Road safety barrier systems*

**BS EN 1778** means the standard BS EN 1778:2000 *Characteristic values for welded thermoplastics constructions — Determination of allowable stresses and moduli for design of thermoplastics equipment*

**BS EN 12573-1** means the standard BS EN 12573-1:2000 *Welded static non-pressurized thermoplastic tanks – Part 1: General principles*

**BS EN 12573-2** means the standard BS EN 12573-2:2000 *Welded static non-pressurized thermoplastic tanks – Part 2: Calculation of vertical cylindrical tanks*

**BS EN 12573-3** means the standard BS EN 12573-3:2000 *Welded static non-pressurized thermoplastic tanks – Part 3: Design and calculation for single skin rectangular tanks*

**BS EN 12573-4** means the standard BS EN 12573-4:2000 *Welded static non-pressurized thermoplastic tanks – Part 4: Design and calculation of flanged joints*

**DVS 2203** means the Deutscher Verband für Schweißen und Verwandte Verfahren (German Association for Welding and Associated Procedures) standard DVS 2203 *Testing of welded joints between panels and pipes made of thermoplastics*

**Regulations** means the Health and Safety at Work (Hazardous Substances) Regulations 2017

**tank** means an above ground stationary tank to which this safe work instrument applies

- (2) Any 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 a vertical, cylindrical above-ground stationary tank that—

- (a) subject to clause 12(1), is used for the storage of a hazardous substance of class 5, 6, or 8 substance; and
- (b) has a capacity of not more than 60 000 L; and
- (c) is constructed from polypropylene or high-density polyethylene.

## 6 Design must be in accordance with specified standards

- (1) A relevant PCBU must ensure that a tank is designed and constructed in accordance with—
- (a) the provisions of BS EN 1778 relating to—
    - (i) the characteristic values for welded thermoplastic construction, including the determination of long-term allowable stresses, long-term elastic modulus values and the de-rating factors to be applied when materials are exposed to different chemicals; and
    - (ii) the exercising of judgement by engineers in making ‘fit for purpose’ decisions in relation to unusual plastic constructions; and
  - (b) the provisions of BS EN 12573-1 relating to the determination of allowable stresses including the calculation of cyclical loadings and combination loadings for tank designs detailed in BS EN 12573-2; and
  - (c) the provisions of BS EN 12573-2 relating to the design and calculation of welded, static, vertical, non-pressurised, cylindrical, flat-bottomed thermoplastic tanks, where applicable; and
  - (d) the provisions of BS EN 12573-3 relating to the construction of nozzles welded into thermoplastic vessels; and

- (e) the provisions of BS EN 12573-4 relating to the design and construction of flanged joints used when vertical thermoplastic vessels are constructed in sections and assembled on site.
- (2) A relevant PCBU must ensure that a tank is designed with a safety factor determined in accordance with clause 7 of BS EN 1778 of not less than 2.0.

## **7 Requirements relating to service life and materials**

- (1) A relevant PCBU must ensure that a tank is designed for a service life of at least 25 years.
- (2) A relevant PCBU must ensure that a tank installed in a position where it is exposed to direct ultraviolet light is constructed of material stabilised against ultraviolet degradation with a minimum carbon black content of 2%.
- (3) A relevant PCBU must ensure that, if secondary containment is required for the tank with a capacity greater than 20 000 L, the secondary containment system is constructed independently of the tank and from material that is not the same as the material used to construct the tank.

## **8 Welding of tank during construction**

- (1) A relevant PCBU must ensure that, during construction of a tank, a worker who welds the tank has received, or works under the direct supervision of a worker who has received, appropriate training.
- (2) A relevant PCBU must ensure that, during construction of a tank, a worker who welds the tank has welded test samples passed in accordance with relevant sections of DVS 2203 at intervals not exceeding 12 months, where the samples were of the same types of welds as those used in the fabrication of the tank.

## **9 Testing to be conducted by PCBU**

- (1) A relevant PCBU must ensure that—
  - (a) during construction of a tank, electronic spark testing is carried out of all welds to check for leaks; and
  - (b) if any leaks are detected, that the tank is repaired and re-rested until no further leaks are detected.
- (2) During construction of a tank, a relevant PCBU must ensure a hydrostatic test is conducted on the tank by completely filling the tank with water and applying a hydrostatic pressure at least equal to the specific gravity of the substance to be stored in the tank plus 10%.
- (3) The hydrostatic test required by subclause (2) must be of at least 8 hours' duration.
- (4) If any leaks are detected during the hydrostatic test, a relevant PCBU must ensure that the tank is repaired and further hydrostatic tests are conducted in accordance with subclauses (2) and (3) until no further leaks are detected.
- (5) A relevant PCBU must ensure that, in the case of a tank with a capacity greater than 20 000 L—

- (a) at the conclusion of the hydrostatic test, the tank circumference is measured 200 mm above the base of the tank; and
- (b) the measurement is recorded and retained by the PCBU for the design life of the tank.

## 10 Marking

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

- (a) the design life of the tank:
- (b) the substances the tank is designed to contain:
- (c) the relevant reduction factor specified in BS EN 1778:
- (d) whether the tank has been designed and constructed for use in a position where it may be exposed to direct ultraviolet light.

## 11 Installation

- (1) If there is a risk that a tank, once installed, may be impacted by a moving vehicle, a PCBU with management or control of a tank must ensure a barrier is installed at a height above the ground and at a distance from the tank to prevent the vehicle from reaching the plan area of the tank.
- (2) Where any reasonably foreseeable impact is from a vehicle travelling at a speed not exceeding 20 km per hour, a Type G4 (W-beam) guardrail highway crash barrier that complies with AS/NZS 3845 meets the requirements of subclause (1).

## 12 Operation

- (1) A PCBU with management or control of a tank may not use the tank for the storage of—
  - (a) a class 1, 2, 3.1 or 4 substance; or
  - (b) sulphuric acid at a concentration greater than 80%; or
  - (c) nitric acid at a concentration greater than 10%; or
  - (d) hydrogen peroxide at a concentration greater than 20%.
- (2) A PCBU with management or control of a tank must ensure that any hazardous substance contained in a tank is non-reactive with the material used in the construction of the tank.
- (3) A PCBU with management or control of a tank with a capacity of more than 20 000 L must ensure, so far as is reasonably practicable, that two or more hazardous substances that are not compatible are not mixed in the tank.
- (4) In subclause (2), **non-reactive** means—
  - (a) the materials used in the construction of the tank 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 used in the construction of the tank 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 used in the construction of the tank to the extent that the tank fails to meet any of the design or construction requirements specified in this safe work instrument.

### **13 Maximum period of compliance certificate**

For the purposes of regulation 17.92(1)(a)(i)(E), the maximum period of validity of a compliance certificate issued under regulation 17.91 for a stationary container system that includes a tank is 5 years.

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.