The Environmental Risk Management Authority
P O Box 131
WELLINGTON

Code of Practice for

Above Ground Stationary Tanks with Integral Secondary Containment

Approved Code of Practice Under the Hazardous Substances and New Organisms (HSNO) Act 1996

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Code of Approval: **HSNOCOP 24-1**
Version **03-08**
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Preface

This Code of Practice entitled Above Ground Stationary Tanks with Integral Secondary Containment is approved as a Code of Practice No. HSNO COP 24-1 Version 03-08 pursuant to Sections 78 and 79 of the Hazardous Substances and New Organisms Act. The Environmental Risk Management Authority has delegated the power to approve Codes of Practice to the Chief Executive of ERMA New Zealand, and this code is approved in accordance with that delegation. It is confirmed that the requirements of Sections 78 and 79 have been met.

This publication is approved as a means of compliance with the requirements of Schedule 9 Clause 3 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended).

The intended publication date in the Gazette for the Notice of Approval of this Code of Practice is 3 April 2008.

Pursuant to Section 80 (1) (a) of the Act, a copy of this Code of Practice may be inspected at the Wellington office of ERMA New Zealand.

Pursuant to Section 80 (1) (b) of the Act, a copy of this Code of Practice is available from the ERMA New Zealand website.

Approved this 26 March 2008.

Rob Forlong
Chief Executive
ERMA New Zealand

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ABOVE GROUND STATIONARY TANKS WITH INTEGRAL SECONDARY CONTAINMENT

1. INTRODUCTION

Improper handling of hazardous substances may cause injury, ill health, property, or environmental damage. These may result when such substances are accidentally released to the environment.

The purpose of this code of practice for Above Ground Stationary Tanks with Integral secondary Containment (the Code) is to ensure that bulk liquids with a 3.1 flammable classification stored in above ground stationary tanks with integral secondary containment are securely contained, thereby reducing the risks and preventing damage or injury to people, property and the environment.

This code provides a means of compliance with the requirements of Schedule 9 clause 3 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended). This code of practice provides a practical means of installing tanks with integral secondary containment without the need to make an application under Schedule 9 clause 3 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended). The ability to make applications under this clause still remains as a means for addressing situations that are not encompassed by this code of practice.

1.1 Scope

This code applies to the design and construction of above ground stationary tanks that:

i) have integral secondary containment which encapsulates the stationary tank, and

ii) have secondary containment capacity of not less than 100% of the stationary tank capacity, and

iii) contain hazardous liquids with class 3.1 flammable classification, and

iv) are constructed as vertical cylindrical tanks, horizontal cylindrical tanks, or rectangular tanks, and

v) have primary and secondary containment, and

vi) are constructed subsequent to the date of issue of this Code and

vii) are located in accordance with the provisions a Schedule 10 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended).

This Code is not intended to apply to stationary tanks located in buildings.

1.2 References

Hazardous Substances and New Organisms Act 1996

Hazardous Substances (Emergency Management) Regulations 2001.

Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended) (the Transfer Notice).

UL 2085: Protected Aboveground Tanks for Flammable and Combustible Liquids.

SWRI 93-01: Testing Requirements for Protected Aboveground Flammable Liquid/Fuel Storage Tanks

SWRI 95-03: Testing Requirements for Multi-Hazard Protected Aboveground Flammable Liquid/Fuel Storage Tanks

AS1692: Steel Tanks for Flammable and Combustible Liquids.

1.3 Definitions

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Area of High Intensity Land Use

As defined in clause 2 Schedule 10 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended), i.e.:

(a) includes—
  (i) an area of regular habitation; and
  (ii) a structure made of or containing combustible materials that would sustain a significant fire; and
  (iii) a high density traffic route; but
(b) does not include a small office constructed of non-combustible materials associated with a hazardous substance location that is used by persons authorised to be at the location by the person in charge of that location

Area of Low Intensity Land Use

As defined in clause 2 Schedule 10 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended), i.e.:

(a) includes—
  (i) an area where any person may be legally present occasionally; and
  (ii) a public park or reserve; and
  (iii) a traffic route of low or medium traffic density; but

(c) does not include an area of regular habitation

Area of Regular Habitation

As defined in regulation 3 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001 i.e.:

includes any dwelling, hospital, school, airport, commercial premises, office, or other area where people regularly congregate.

Bulk Fuel Storage and Distribution Sites

includes a site that is used for the storage and distribution of fuels in bulk. These are typically sites that have a storage quantity in excess of 2,000,000 litres.

Double Skin Stationary Tank

A stationary tank constructed with a primary (inner) steel tank and a secondary (outer) steel tank that fully envelops the primary tank. It may or may not be mounted on a frame. An interstitial space that is capable of being monitored exists between the inner and outer tank. It may take the form of two cylindrical tanks, one inside the other, or a cylindrical tank inside a rectangular tank (PUF tank). The primary and secondary tanks are to be constructed in accordance with:

(a) the provisions of AS1692 with the thickness of the secondary tank not less than the thickness of the primary tank, or

(b) the provisions of UL 2085 with the thickness of the secondary tank not less than the thickness of the primary tank. The stationary tank is not necessarily tested in accordance with the following clauses:

i. clause 20 (vehicle impact test), or
ii. clause 21 (projectile test).

Farm

means an area of land that is not less than 4 hectares in size used principally for the purpose of agriculture. This does not include golf courses.

High Density

in relation to a public traffic route means greater than medium density, that is, greater than on an average per 24 hours of—

(a) 5 000 vehicles on a road; or

(b) 250 rail wagons on a railway; or

(c) 1 800 people on a waterway; or

(b) 900 people on a public right of way.

Isolated Logistic Facility, Truck Stop, Construction Site, Forestry Site, Mining Area, Rural Locality, Industrial Locality and Airfield

means logistic facility (including transport yard, port and railway facility) truck stop, construction site, forestry site and mining area that is located in rural or industrial localities and airfields. A rural locality is a locality which is a country locality or a non urban locality, which may be designated for the production of primary products (agricultural, pastoral, horticultural, forestry etc), as a reserve, or such similar activities. An industrial locality is a locality designated for industrial or trade purposes, or a locality used for the storage, transfer, treatment, or disposal of waste materials or for other waste-management purposes, or used for composting organic materials. An airfield is a defined area of land or water intended or designed to be used, whether wholly or partly, for the landing, departure, movement, or servicing of aircraft but excludes that part of the area that is within 100 metres of an Area of High Intensity Land Use.

Isolated Place

means a place that is typically (but not exclusively) an Isolated Logistic Facility, Truck Stop, Construction Site, Forestry Site, Mining Area, Rural Locality, Industrial Locality and Airfield and which abuts an area of low intensity land use, except that the traffic route which abuts the place may be high density.

Multi Hazard Rated Stationary Tank – 2 Hour

A stationary tank constructed with a primary (inner) steel tank and a secondary (outer) tank that fully envelops the inner tank. It may or may not be mounted on a frame. An interstitial space that is capable of being monitored exists between the inner and outer tank. The stationary tank is to be:

1) constructed in accordance with UL 2085 and is to be tested in accordance with:

(a) clause 20 (vehicle impact test), or
(b) clause 21 (projectile test), or

2) constructed with a primary (inner) steel tank constructed in accordance with the provisions of AS 1692 and a secondary (outer) tank that fully envelops the inner tank. The stationary tank must be constructed and tested in accordance with the provisions of SWRI 93-01, including impact protection as though impact protection is not provided by guard posts.

Multi Hazard Rated Stationary Tank – 4 Hour

A stationary tank constructed with a primary (inner) steel tank constructed in accordance with the provisions of AS 1692 and a secondary (outer) tank that fully envelops the inner tank. It may or may not be mounted on a frame. An interstitial space that is capable of being monitored must exist between the inner and outer

tank. The stationary tank must be constructed and tested in accordance with the provisions of SWRI 95-03.

Shall, Must, Should, May

The words "shall" and "must" are to be understood as mandatory and the word "should" as advisory. "May" means that discretion can be used.

The Authority

The Environmental Risk Management Authority of New Zealand.

1.4 The HSNO Act and the Place of Codes of Practice

The HSNO regulations are largely performance based, that is, they specify a desired outcome without necessarily prescribing how to achieve it. They do not require that a single specific means be used to comply with any regulation and this allows for variations in the method used for compliance.

The HSNO Act provides for Codes of Practice to be approved by the Authority to identify acceptable solutions to comply with the specified regulatory requirements. An Approved Code of Practice provides users with a method of meeting the control requirements with a degree of prescription and assistance.

In addition, specific provisions of the HSNO regulations and Transfer Notices permit Codes of Practice to be approved by the Authority as alternatives to other specified requirements provided they can be shown to provide an equivalent level of safe management.

1.5 Means of Compliance

This code provides a means of compliance with Clause 3, Schedule 9 of the Transfer Notice.

1.6 Threshold Quantities for Secondary Containment

The regulations made under the HSNO Act establish the following thresholds for secondary containment of petrol and diesel.

- Petrol (not on a farm) 1000 litres
- Petrol (on a farm) 2000 litres
- Diesel (not on a farm) 1000 litres
- Diesel (on a farm) 2000 litres

2 SPECIFICATIONS

2.1 Secondary Containment

2.1.1 The secondary skin of a Double Skin Stationary Tank, Multi Hazard Tank – 2 Hour or Multi Hazard Tank – 4 Hour may be the secondary containment system provided that the secondary tank has a capacity at least 100% of the primary tank.

2.2 Items applicable to Double Skin Stationary Tanks, Multi Hazard Rated Stationary Tanks – 2 Hour and Multi Hazard Rated Stationary Tanks - 4 Hour

2.2.1 The stationary tank shall be equipped with a calibrated liquid level indicator (e.g. dipstick or gauge). This must be available to the person delivering into the stationary tank.

2.2.2 Means shall be provided to prevent release of liquid by siphon flow from the stationary tank.

2.2.3 Piping connections to the stationary tank shall enter through the top of the tank.

2.2.4 The stationary tanks (or compartments of the same stationary tank) are not to be interconnected or manifolded unless provisions are made to prevent them from being overfilled.

2.2.5 An overfill protection device shall be provided with the flow of liquid stopped before the tank overflows. This shall not restrict or interfere with the proper functioning of the vents. Acceptable means of compliance include:

i. For stationary tanks that are filled directly by nozzle, a nozzle that is of a type which has an automatic shutdown device e.g. it senses the backpressure and closes when the backpressure rises as a consequence of an excessive liquid level, or

ii. For stationary tanks that are supplied by a transfer pump, the delivery system is shut down upon activation by a probe mounted inside the stationary tank above the safe fill level i.e. a high level probe, This is to be independent from the safe fill shut down, or

iii. For stationary tanks that are supplied by pump from the delivery tank wagon, a mechanical overfill protection valve.

In circumstances whereby an overfill protection device cannot be fitted there must be sufficient secondary containment, independent from the stationary tank, provided in a manner that will capture an overflow, with sufficient capacity to enable the source of the overflow to cease and the hoses drained e.g. 2 minutes pumping for a vehicle delivery plus hose and pipework volumes.

2.2.6 Apart from stationary containers that comply with the requirements of clause 2.2.6 (i) above, stationary tanks greater then 5000 litres capacity should be equipped with an overfill alarm, independent from the overfill protection, that is audible to the person delivering the hazardous substance into the stationary tank.

2.2.7 The fill point (or fill points) shall be provided with secondary containment in a manner where spills during delivery operations will be captured. This must be of sufficient capacity to contain the volume in the pipework and delivery hose in the event that the coupling is disconnected without the hose and pipework being drained free. The minimum capacity is to be 15 litres. In circumstances where dry break couplings are used, the minimum capacity of 15 litres is required.

2.2.8 Venting of the primary tank and the interstitial space shall comply with the requirements of Schedule 8, Clauses 9 and 10 of the Transfer Notice and shall be based on the lowest flash point substance in any of the compartments.

2.2.9 The fill point shall be tagged with a durable symbol identifying the hazardous substance stored in the tank.

2.2.10 A means to monitor the interstitial space, and thereby the integrity of the inner tank, shall be provided. This may be by means of a drain plug on the secondary containment, dipstick with water finding paste etc.

2.2.11 Where there could be a release of the flammable vapour or liquid from the primary tank or interstitial space, a hazardous atmosphere zone shall be established in accordance with regulation 58 of the Hazardous Substances (Classes 1 to 5 Controls) Regulations 2001.

2.3 Leakage Testing of Stationary Tanks Constructed to this Code

2.3.1 Each stationary tank installed in accordance with the provisions of this Code shall be tested for leakage prior to use.

The primary tank shall be leak tested by applying an internal air pressure of 35 kPa (5 psi). There shall be no evidence of leakage as witnessed by:

- no drop of air pressure during a period of at least one hour, and
- completion of a soap water test around all joints.

2.3.2 The secondary tank of steel construction shall be tested by one of the following methods:

i. The interstitial space is to be pressurized to 35 kPa whilst pressure is being maintained on the primary tank as per 3.3.1 above, or

ii. The interstitial space is to be vacuum tested for 12 hours to at least -35 kPa, or

iii. For PUF tanks only, the secondary tank may be tested by hydro test at the full head of the secondary tank.

There shall be no evidence of leakage.

2.3.3 In addition to the requirements of 2.3.2, the interstitial space may be under partial vacuum when dispatched from the fabricator. There is to be no evidence of leakage upon installation. Should evidence of leakage be apparent, the cause is to be remedied and the tank retested.

3 LOCATION

3.1 Location

Stationary tanks with integral secondary containment shall be located as follows:

Locality	Double Skin Stationary Tank	Multi Hazard Rated Stationary Tank – 2 Hour	Multi Hazard Rated Stationary Tank – 4 Hour
Located at a farm, or an Isolated Place or a Bulk Fuel Storage and Distribution Sites.	Not permitted for 3.1A, 3.1B or 3.1C. Maximum capacity 60,000 l for 3.1D, increased to 110,000 l if either tested in accordance with clauses 20 and 21 of UL 2085, or section 5.0 of SWRI 95-03, or if located in an area segregated from vehicle operations and other sources of possible impact.	Maximum capacity 60,000 l for 3.1A, 3.1B. Maximum capacity 110,000 l for 3.1C or 3.1D.	Maximum capacity 110,000 l for 3.1A, 3.1B, 3.1C and 3.1D.
Locations other than those above.	Not permitted for 3.1A, 3.1B, or 3.1C. Maximum capacity 30,000 l for 3.1D if either tested in accordance with clauses 20 and 21 of UL 2085, or section 5.0 of SWRI 95-03, or if located in an area segregated from vehicle operations and other sources of possible impact.	Not permitted for 3.1A, 3.1B or 3.1C. Maximum capacity 60,000 l for 3.1D.	Maximum capacity 60,000 l for 3.1A and 3.1B, and 3.1C Maximum capacity 110,000 l for 3.1D.

Note 1: This table is limited to stationary tanks with integral secondary containment.

Note 2: The stationary tanks shall be installed with separation distances in accordance with the provisions of the Transfer Notice.

Note 3: In situations whereby the stationary tank has multiple compartments, the location in Section 3 of this Code shall be determined on the basis of the aggregate volume of the total stationary tank. In situations whereby the stationary tank has different substances in these compartments, the location in Section 3 of this Code is to be determined by the lowest flash point substance.

Note 4: In relation to farms, these are in addition to the variation made to Regulation 25 of the Hazardous Substances (Emergency Management Regulations 2001) that was made in Schedule 6 of the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (as amended), i.e.

"At a farm of not less than 4 hectares, petrol, aviation gasoline, racing gasoline, kerosene or diesel fuel, in total quantities of less than 2000 litres and or located so that any spillage will not endanger any building, or flow into any stream, lake or natural water; or …"

Note 5: 110,000 litres is regarded as a maximum practical capacity for stationary tanks of these construction types.

3.2 Damage Avoidance

3.2.1 Multi Hazard Rated Stationary Tanks – 2 hour and Multi Hazard Rated Stationary Tanks – 4 hour are designed, constructed and tested to minimise structural damage of the stationary container that is, in accordance with the respective provisions of:

i) clauses 20 and 21 of UL 2085 for the Multi Hazard Rated Stationary Tank – 2 hour, or

ii) section 5.0 of SWRI 93-01 for the Multi Hazard Rated Stationary Tank – 2 hour, or

ii) section 5.0 of SWRI 95-03 for the Multi Hazard Rated Stationary Tank – 4 hour

3.2.2 Double Skin Stationary Tanks shall comply with and be tested in accordance with:

i) clauses 20 and 21 of UL 2085, or section 5.0 of SWRI 95-03,

ii) or must have a risk assessment undertaken to determine sources of possible impact. The results of this risk assessment are to be documented and a copy is to be retained with the on site records.

At locations where the risk assessment determines that an impact is considered possible, the stationary container is to be protected by the installation of protective facilities that will withstand the impact determined in the risk assessment. In circumstances where there are vehicle movements, the flow of traffic is to be taken into consideration. Where impact protection is required, it shall be installed at sufficient height and distance from the stationary tank to prevent the vehicle from reaching the plan area of the stationary tank.

At locations where impact from light[1] vehicles traveling at a speed up to 20 km/hr is considered a possible risk, a guardrail type system installed in accordance with Appendix A is deemed to meet this requirement.

[1] Up to and including 3.5 tonnes.

Appendix A Type G4 (W-beam) Barrier System

A barrier system of the Type G4 (W-beam) guardrail type highway crash barrier, installed in accordance with the supplier's instructions.

An example of such an installation would be a guardrail of at least 310 mm finished width and mounted with the top approximately 700 mm above ground. It is to be located with sufficient clearance from the stationary tank such that vehicles will not impact on the stationary tank. Where heavy vehicles maneouvre in close proximity, the location shall be determined after undertaking a risk assessment. The following may also apply:

i) Rails are grade 350 steel, manufactured from 2.7 mm plate and then galvanized.

ii) Block outs are the same sections as the posts and are optional.

iii) The guard rail may be secured with M16 bolts without washers to the C-section posts.

iv) Posts are either: 150 x 110 C-section posts rolled from plate at least 4.3 mm thick and then galvanized or 200 mm x 150 mm wooden posts. Posts are to be at no more than 2 m centres in augured holes of at least 900 mm depth with at least 150 mm of concrete between the post and surrounding soil.

v) The holes may be backfilled with concrete having a minimum compressive strength of 20 MPa.

vi) Where the soil into which the posts are placed is not natural, undisturbed soil, the soil may be compacted throughout the full depth of the posts and for a radius of at least 2 m surrounding each post. The compaction should achieve at least 95% of the maximum dry density obtained by the standard compaction test NZS 4402.4.1.1 Methods of testing soils for civil engineering purposes - Soil classification tests - Test 2.1 Determination of the water content.