



Assets Planning and Delivery Group
Engineering

DESIGN STANDARD DS 70-05

Chlorine Container Floor Scales Standard

VERSION 1
REVISION 4

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FOREWORD

The intent of Design Standards is to specify requirements that assure effective design and delivery of fit for purpose Water Corporation infrastructure assets for best whole-of-life value with least risk to Corporation service standards and safety. Design standards are also intended to promote uniformity of approach by asset designers, drafters and constructors to the design, construction, commissioning and delivery of water infrastructure and to the compatibility of new infrastructure with existing like infrastructure.

Design Standards draw on the asset design, management and field operational experience gained and documented by the Corporation and by the water industry generally over time. They are intended for application by Corporation staff, designers, constructors and land developers to the planning, design, construction and commissioning of Corporation infrastructure including water services provided by land developers for takeover by the Corporation.

Nothing in this Design Standard diminishes the responsibility of designers and constructors for applying the requirements of the Western Australia's Work Health and Safety (General) Regulations 2022 to the delivery of Corporation assets. Information on these statutory requirements may be viewed at the following web site location:

[Overview of Western Australia's Work Health and Safety \(General\) Regulations 2022 \(dmirs.wa.gov.au\)](https://dmirs.wa.gov.au)

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Head of Engineering

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REVISION STATUS

The revision status of this standard is shown section by section below:

REVISION STATUS						
SECT.	VER./REV.	DATE	PAGES REVISED	REVISION DESCRIPTION (Section, Clause, Sub-Clause)	RVWD.	APRV.
1	1/0	30.06.05	All	New Version	NH	GM
1	1/1	30.04.14	5	Section 1.2, 1.3.4 amended	SZ	NH
1	1/2	29.06.17	5	Sections 1.2. & 1.3.3 (minor)	SZ	DH

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3	1/3	08/07/20	7	Sections 3.1 & 3.3 (minor)	SZ	DH

4	1/0	30.06.05	All	New Version	NH	GM
4	1/2	29.06.17	8	Section 4.1 (minor)	SZ	DH
4	1/3	08/07/20	8	Sections 4.1 & 4.2 (minor)	SZ	DH
4	1/4	20.09.23	All	Section 4.1 remove requirement for multi-channel	SZ	BM

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Chlorine Container Floor Scales Standard

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1 Preliminaries

1.1 Scope

The scope of this Specification consists of the design factors required by the Water Corporation for the effective use of chlorine container scales.

1.2 References

This Specification may be subject to the following current Standards:

AS/NZS

2927	The storage and handling of liquefied chlorine gas
4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS	
2865	Confined spaces
2030.1	Gas cylinders – General requirements

1.3 Definitions

1.3.1 Chlorine

Elemental chlorine in its gaseous or liquid form.

1.3.2 Container

Anything in which the chlorine is wholly or partly contained including cylinders and drums.

1.3.3 Drum

A cylindrical steel container having a water capacity of 500-1000 L, which can be fitted into a protective cradle for storage and transport. The water capacity of a 920kg drum is 789L.

1.3.4 Cylinder

A rigid packaging which is designed in accordance with AS 2030.1 as a portable pressure vessel for the storage of chlorine, and has only one cylinder valve, at one end, used for the withdrawal of chlorine gas. The water capacities of the cylinders are 29 L for 33 kg and 59 L for 70 kg.

1.3.5 Installation

All facilities on a site that are related to the storage, handling and use of chlorine.

1.3.6 Shall

Indicates the statement is mandatory, and thus must be carried out.

1.3.7 Should

Indicates the statement is a recommendation.

2 Design Factors for Chlorine Drum Floor Scales

2.1 Description

Chlorine Drum Floor Scales are fully electronic, portable, low-profile steel structures designed for weighing a liquefied chlorine drum. These scales have a minimum support capacity of 2000kg and shall have a minimum warranty of one year on all parts.

2.2 Materials of Construction

The scale frame and weighing platform parts shall be constructed of high strength and impact resistant materials that are either resistant to corrosion by trace levels of chlorine (as may typically be encountered) or protected by coating(s) that are resistant to corrosion by trace levels of chlorine. Coatings used shall not readily be damaged or compromised by scoring due to impact by the drum cradle. The materials and any coatings shall meet the following design requirements:

- a) Steel that is hot dip galvanized, as per AS/NZS 4680, after fabrication and weld cleaning. Hot zinc repairs may be carried out for minor defects only, if required; OR
- b) Steel with a suitable corrosion resistant finish, such as a two-part epoxy paint (yellow); OR
- c) Stainless steel – minimum grade 316

Any moving parts shall be constructed of stainless steel (minimum grade 316).

2.3 Floor Scale Design

The floor scale shall have the following design considerations when used in Water Corporation chlorine facilities:

- a) The electronic load cells shall be installed on the side of the platform for easy access when maintenance and testing are required.
- b) Swivel foot suspension for easy installation and leveling of scale(s) on uneven floors.
- c) Low profile platform design that is safer and makes drum handling easier.
- d) The platform shall have dual or quad load cells or be of such a design that use of a single load cell shall not compromise accuracy of measurement. For example, measurement accuracy shall not be compromised by poor placement of drum, later corrosion of platform pivot points, etc.

3 Design Factors for Chlorine Cylinder Floor Scales

3.1 Description

Chlorine Cylinder Floor Scales are fully electronic, portable, low-profile structures designed for weighing liquefied chlorine cylinders. These scales have a minimum support capacity of 150kg and shall have a minimum warranty of one year on all parts.

3.2 Materials of Construction

The scale frame and weighing platform parts shall be constructed of high strength and impact resistant materials that are either resistant to corrosion by trace levels of chlorine (as may typically be encountered) or protected by coating(s) that are resistant to corrosion by trace levels of chlorine. Coatings used shall not readily be damaged or compromised by scoring due to impact by the cylinder cradle. The materials and any coatings shall meet the following design requirements:

- a) Steel that is hot dip galvanized, as per AS/NZS 4680, after fabrication and weld cleaning. Hot zinc repairs may be carried out, for minor defects only, if required; OR
- b) Steel with a suitable corrosion resistant finish, such as a two-part epoxy paint (yellow); OR
- c) Stainless steel – minimum grade 316
- d) 100% PVC with minimum 2mm protective coating; OR
- e) Molded fiberglass reinforced thermoplastic

Any moving parts shall be constructed of stainless steel (minimum grade 316).

3.3 Floor Scale Design

The floor scale shall have the following design considerations when used in Water Corporation chlorine facilities:

- a) The electronic load cell shall be installed for easy access, when maintenance and testing are required.
- b) Low profile platform (max. height 42mm) design that makes cylinder handling easier.
- c) Minimum of two independent weighing platforms and load cells.
- d) Platform-mounted level adjuster for uneven floors
- e) A non-slip surface.
- f) Mounted bracket and restraining chains for securing the cylinders in the upright position.

4 Design Factors for the Electronic Scale Controller

4.1 Electronic Scale Controller design

Scale electronics shall be housed in a NEMA 4X or IP66 rated fibreglass or structural foam enclosure to provide protection from its chemical environment. The platform junction box shall be constructed of stainless steel (minimum 316) or approved plastics to protect the analog summing circuit board from moisture, dirt and dust ingress. Each scale controller design shall have:

- a) A digital liquid crystal display designed to provide good viewing in either sunny or dark conditions;
- b) The weight indicator for the containers to be integral OR remote mounted up to 20metres away from the scales;
- c) Readout in kilograms with a standard resolution of 0.1 kg;
- d) High accuracy of reading ($\pm 0.5\%$);
- e) A 4-20mA output signal for permanent recording of each container being weighed;
- f) A self-locking knob or similar for adjusting tare weight;
- g) A Gross weight function – total weight including container;
- h) A Tare weight function – weight of container for each or all of the scales;
- i) A Net weight function – weight of contents of container(s) on each scale;
- j) An Amount used function – amount used since container was tared;
- k) Comprehensive O&M manual describing the functions available in the equipment.

4.2 Battery Backup

Scales shall be designed with full time power supply from a local battery or other power source (e.g. local UPS) with a minimum current supply at full load for up to 12 hours. The power supply shall be charged continuously from the mains supply. Water Corporation experience in remote locations is that power supply can be subject to frequent disruption or spiking. As a result, scales shall be designed to retain data over a short period in the event of a power outage.

END OF DOCUMENT