



Assets Planning and Delivery Group
Engineering

HA-ST-05

Electrical Equipment in Hazardous Areas (EEHA) Inspection Standard

VERSION 1
REVISION 5

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FOREWORD

Electrical Equipment in Hazardous Area (EEHA) Standards are prepared to ensure that the Water Corporation's staff, consultants and contractors are informed as to the Water Corporation's EEHA standards and recommended practices. EEHA standards are intended to promote uniformity so as to simplify selection, installation and maintenance practices; their ultimate objective is to provide safe and functional plant, at minimum whole of life cost.

The Water Corporation EEHA standards and recommended practices described in this EEHA standard have evolved over a number of years as a result of capital project delivery, plant operation and maintenance experience gained through the selection, installation and maintenance of electrical equipment in our hazardous area facilities.

Deviation, on a particular project, from the EEHA standards and recommended practices maybe permitted in special circumstances but only after consultation with and endorsement by the Senior Principal Engineer, Mechanical & Electrical Assets, Engineering.

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)

Users are invited to forward submissions for continuous improvement to the Senior Principal Engineer, Mechanical & Electrical Assets who will consider these for incorporation into future revisions.

Head of Engineering

This document is prepared without the assumption of a duty of care by the Water Corporation. The document is not intended to be nor should it be relied on as a substitute for professional engineering design expertise or any other professional advice.

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Any interpretation of anything in the Standards/Specifications that deviates from specific Water Corporation Project requirements must be referred to, and resolved by, reference to and for determination by the Water Corporation's project manager and/or designer for that particular Project.

REVISION STATUS

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

| REVISION STATUS | | | | | | |
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HA-ST-05

Electrical Equipment in Hazardous Areas (EEHA)

Inspection Standard

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1 INTRODUCTION

1.1 Scope

This Standard specifies the inspection requirements for fixed and portable explosion-protected electrical equipment installed or used in hazardous areas on Water Corporation facilities, to ensure its safe use. The intention of this Standard is to expand upon the requirements of AS/NZS60079.17, and to specify additional Water Corporation requirements.

This Standard applies to the inspection of existing and new installations. It covers the initial inspection of new installations, planned periodic inspections of existing installations, and inspection after maintenance.

The requirements of this Standard are in addition to the general requirements for inspection of electrical installations.

1.2 Exclusions

Nil.

1.3 Abbreviations

EEHA Electrical Equipment in Hazardous Areas
TIC Technical Integrity Custodian

1.4 Technical Integrity Custodian

The Technical Integrity Custodian (TIC) for this Standard is the Senior Principal Electrical Engineer, Mechanical & Electrical Assets.

1.5 Referenced Documents

The following documents are referenced in this Standard. If a referenced standard has been superseded, the user shall notify the TIC and utilize the latest edition of the standard unless advised otherwise in writing by the TIC.

| | |
|---------------------|---|
| AS/NZS60079.14 2022 | Explosive atmospheres Part 14: Electrical installations design, selection and erection |
| AS/NZS60079.17 2017 | Explosive atmospheres Part 17: Electrical installations inspection and maintenance |
| HA-ST-04 | Electrical Equipment in Hazardous Areas (EEHA) - Competency Standard |
| HA-ST-10 | Electrical Equipment in Hazardous Areas (EEHA) – Hazardous Area Verification Dossier Standard |
| HA-WI-01 | Initial and Periodic Ex Equipment Inspection Work Instruction |
| HA-FM-01 | Ex Inspection Form |
| WC-OSH 135 | Working in a Flammable Gas Area |
| WC-OSH 109 | Tagging and Isolation Procedure |

1.6 Definitions

For the purpose of this Standard, the definitions below apply:

| | |
|---------------------|--|
| Inspection | An action comprising careful scrutiny of an item carried out either without dismantling or with partial dismantling as required, supplemented by means such as measurement, in order to arrive at a reliable conclusion as to the condition of an item. |
| Close Inspection | An inspection which encompasses those aspects covered by a visual inspection and, in addition, identifies those defects, such as loose bolts, which will be apparent only by the use of access equipment, such as steps (where necessary) and tools. Close inspections do not normally require the enclosure to be opened or the equipment to be de-energised. This inspection shall be carried out within arms reach or the distance at which a person would read a newspaper or book, illuminated as necessary by torch or other light source. |
| Visual inspection | An inspection which identifies, without the use of access equipment or tools, those defects, such as missing bolts, which will be apparent to the eye. This may entail the visual examination of an item as a whole and at a distance. |
| Detailed Inspection | An inspection which encompasses those aspects covered by a close inspection and in addition, identifies those defects such as loose terminations which would only be apparent by opening the enclosure, and using (where necessary) tools and test equipment. |
| Initial Inspection | An inspection of all electrical equipment, systems and installations before they are brought into service. |
| Periodic Inspection | An inspection of all electrical equipment, systems and installations carried out on a routine basis. |
| Sample Inspection | An inspection of a proportion of the electrical equipment, systems and installations. |

2 GENERAL REQUIREMENTS

Electrical installations in a hazardous area on Water Corporation facilities and portable explosion-protected electrical equipment shall be inspected in accordance with the requirements of AS/NZS60079.17 and this Standard.

Explosion-protected electrical equipment deployed in a non-hazardous area (with the exception of associated apparatus, e.g. a Zener barrier) is not required to be inspected in accordance with this Standard.

All new explosion-protected electrical installations (new or used equipment) shall be inspected at a detailed grade prior to energisation, to ensure that they are correctly installed (AS/NZS60079.14 clause 4.1 and AS/NZS60079.17 clause 4.3.1). In addition, periodic in-service inspection of explosion-protection electrical installations is required to ensure that their safety features are not compromised due to 'wear and tear' (AS/NZS60079.17 clause 4.3.1). Inspection work instructions are contained in the Verification Dossier.

When equipment has been maintained or replaced it shall be inspected at a detailed grade prior to energisation (AS/NZS60079.17 clause 4.3.3).

Continuous supervision by skilled personnel utilizing the visual or close inspections, as appropriate and in accordance with AS/NZS60079.17 clause 4.5 may be deployed. Whether the installation falls within or outside the capability for continuous supervision by skilled personnel, it shall be subject to periodic inspection. Therefore, the use of continuous supervision by skilled personnel does not remove the requirement for initial and regular periodic inspections, but rather, will supplement the inspection requirements.

3 SAFETY DURING INSPECTIONS

3.1 General

To prevent safety being compromised during inspections they shall be performed in accordance with this Standard and the Water Corporation's Flammable Gas Area Procedure.

4 INSPECTIONS

To ensure that all electrical equipment in a hazardous area is inspected, all items must be tagged with a unique identifier and an Ex Register of all electrical equipment in a hazardous area shall be produced. Refer to the Water Corporation's [Electrical Equipment in Hazardous Areas \(EEHA\) – Hazardous Area Verification Dossier Standard: HA-ST-10](#).

4.1 Inspection of New Installations

All new hazardous area electrical installations shall have an initial inspection at a detailed grade in accordance with AS/NZS60079.14 clause 4.3.1.1. The inspection shall be recorded on the [Ex Inspection Checklist Form HA-FM-01](#) in accordance with the [Ex Inspection Work Instruction HA-WI-01](#).

All new portable explosion-protected electrical equipment shall have an initial inspection at a detailed grade in accordance with AS/NZS60079.14 clause 4.3.1.1 upon receipt at the facility.

4.2 Inspection after Maintenance

Immediately after maintenance, all explosion-protected electrical equipment located in a hazardous area, and all portable explosion-protected electrical equipment, shall be inspected at a detailed grade in accordance with AS/NZS60079.17 clause 4.3.1.1.

The inspection shall be recorded on the [Ex Inspection Checklist Form HA-FM-01](#) in accordance with the [Ex Inspection Work Instruction HA-WI-01](#). The inspection results obtained from breakdown maintenance opportunities shall be recorded in the Hazardous Area Verification Dossier.

4.3 Periodic Inspection of Existing Installations

4.3.1 Fixed Installation

Periodic in-service inspections of the fixed electrical installation shall be actioned to ensure its continuing compliance with the relevant standards. These inspections shall be undertaken on a program basis. The inspections shall be a combination of detailed and close inspections.

The inspection shall be recorded on the [Ex Inspection Checklist Form HA-FM-01](#) in accordance with the [Ex Inspection Work Instruction HA-WI-01](#). The completed checklists shall be placed in the hazardous area verification dossier.

The inspection grade for the periodic inspections of fixed installations shall be ‘close’ unless the equipment is not accessible from grade or a fixed platform. When the equipment is not accessible, a visual inspection shall be performed. In addition to the close inspections, a sample of approximately 10% of equipment inspected shall be inspected at a detailed grade. The detailed inspections shall cover a range of equipment and locations.

The periodic inspection frequencies for fixed installations have been set and are based upon experience obtained on the facilities. The first in-service frequency is four yearly for all equipment.

The frequency of subsequent periodic inspections may be adjusted based upon numerous factors including:

- The hazardous area zone
- The corrosiveness of the environment
- The impact risk of the location
- The vibration levels at the location
- Materials of construction
- Ongoing experience with the equipment

Changes to the periodic inspection frequency for fixed installations shall not result in the frequency exceeding four yearly, unless an independent engineering assessment is carried out and the justification is approved by the TIC. The justification shall be recorded in the Hazardous Area Verification Dossier.

4.3.2 Portable Explosion-Protected Equipment

Periodic in-service inspections of portable explosion-protected electrical equipment shall be undertaken to ensure its continuing compliance with the relevant standards. This type of equipment is particularly prone to damage or misuse, therefore the interval between periodic inspections shall not exceed one year. The grade of inspection shall generally be close. However, enclosures which are frequently opened (such as battery housings) shall be given a detailed inspection.

The inspection shall be recorded on the [Ex Inspection Form HA-FM-01](#) in accordance with the [Ex Inspection Work Instruction HA-WI-01](#).

4.4 Non-Conformances

Non-conformances identified during inspections shall be rectified during the inspection process whenever possible. If immediate rectification is not possible, the degree of risk shall be assessed. Depending upon the risk the equipment may have to be electrically isolated until a repair can be undertaken. Guidance for risk assessment is contained in the [Ex Inspection Work Instruction HA-WI-01](#).

4.5 Hazardous Area Verification Dossier

The inspection shall be recorded on the relevant checklist and the results placed in the Hazardous Area Verification Dossier - refer to Water Corporation’s [Electrical Equipment in Hazardous Areas \(EEHA\) Hazardous Area Verification Dossier Standard: HA-ST-10](#).

4.6 Competency

All personnel inspecting electrical installations in hazardous areas shall comply with the relevant requirements of the Water Corporation’s [Electrical Equipment in Hazardous Areas \(EEHA\) - Competency Standard: HA-ST-04](#).

END OF DOCUMENT