

ZG 301 General Equipment Base and Enclosure Requirements

1. Scope

This specification outlines the minimum requirements for concrete and non-concrete equipment bases and enclosures to be used in conjunction with PacifiCorp owned primary-rated equipment. The specification applies whether the equipment base or enclosure is to be installed by company personnel, contractors, customer, or the supplier.

2. Applicable Documents

The latest revisions of the documents, codes standards, and requirements listed in 2.1, PacifiCorp Documents, and 2.2, Codes and Standards, in effect on the date of invitation to bid are applicable to the extent specified herein.

2.1. PacifiCorp Documents

ZG 311, Concrete Requirements
ZG 321, Non-Concrete Requirements

2.2. Codes and Standards

NESC
IEEE C57.12.28

3. General

3.1. Application Information

This specification states general requirements which are applicable to all equipment bases or enclosures. Requirements which are applicable to concrete bases or enclosures only or non-concrete bases only, or which are applicable to specific equipment bases or enclosures are stated in separate specifications.

3.2. Authorized Material Specification

This material specification is not considered valid until each page contains the approval signature or initials of the persons named in the title blocks.

4. Design and Manufacturing Requirements

The purpose of an equipment base is to support the weight of primary-rated padmount equipment. Enclosures (manholes and vaults) are used to contain primary rated equipment below grade or provide an area for cable pulling or splicing.

4.1. Environmental Effects

Equipment bases and enclosures must not be affected by exposure to asphalt, road salts, fertilizers, transformer oil, other common chemicals, weather, sunlight, or other normal service conditions.

4.2. Reinforcement

The supplier shall determine the proper placement of reinforcement to ensure compliance with strength and deflection requirements.

4.3. Cabinet Base Security Requirements

An equipment base must provide a flat surface for placement of padmounted cabinets, and must transfer and disperse the weight to the soil. The pad must minimize stresses to cabinet seams, welds, hinges, and latching components due to uneven earth settlement. An equipment base must not provide any point for wire entry or circumvention of the wire probe test defined in IEEE C57.12.28, concerning the security of padmounted equipment enclosures. Test frames shall reflect the size of the equipment to be mounted.

4.4. Below-Grade Box or Vault Strength Requirements

Below-grade boxes and vaults shall meet ASTM C857, unless higher ratings are stated in the specification or work order.

4.5. Miscellaneous Requirements

4.5.1. Dimensions

All dimensions must comply with those shown in the individual equipment base and enclosure specifications.

4.5.2. Bearing Surface

The "foot print" or base of box pads and padvaults shall have adequate surface area to support the equipment

4.5.3. Metallic Surfaces

All exposed metallic surfaces, including threaded inserts, shall be corrosion -resistant stainless steel. Plastic or nylon may be substituted if the material provides the strength required.

4.5.4. Lifting Attachments

All parts of equipment bases and enclosures weighing over forty pounds shall be supplied with enough appropriately sized lifting attachments to safely install the piece. The vendor shall supply drawings, details, and certified test data on the attachments to be provided.

4.5.5. Mounting Hardware

Equipment bases are to be supplied with either composite plastic boards or enough threaded inserts for attaching the equipment to the base. Exact mounting locations are detailed in the specifications for each equipment base.

4.5.6. Freezing

Equipment bases shall be designed and constructed so that it, and any mounting hardware used, will not trap or hold water, and it will be able to withstand repeated freezing and thawing.

4.5.7. Color

The color used in manufacture of equipment bases may be non-fading black, dark green, gray, or natural concrete. Enclosures shall be natural concrete.

4.5.8. Temperature Limits

Equipment bases shall be capable, with equipment installed, of withstanding temperature variations of -40°C to $+65^{\circ}\text{C}$ without cracking, splitting, or deforming.

4.5.9. Identification

All equipment bases and enclosures shall be permanently marked with the manufacturer's name, catalog number, and month and year of manufacture. On equipment bases, this identification should be located so as to be obtainable with the equipment installed.

5. Testing Requirements for Concrete and Non-Concrete Products

5.1. Impact Resistance Test

5.1.1. Impact Resistance Requirement

Equipment bases and enclosures shall be able to withstand transportation, handling, and installation without chipping, warping, or puncturing.

5.1.2. Impact Resistance Test Requirements

Equipment bases and enclosures shall be able to withstand a right angle impact of 50 foot-pounds, using a weight having a C-tup dimension as per ASTM Guide 24-44. The equipment base or enclosure shall be constructed to withstand an impact anywhere on the top or sides. Cracking or puncturing shall result in failure of the test. Denting or deformation at the point of impact shall not be considered as failure as long as moisture cannot penetrate into the equipment base or enclosure. The test shall be run at -25°C , plus or minus 2°C .

5.2. Loading Test

Each type of equipment base and enclosure shall be tested to ensure that it meets the loading which is anticipated. Loading test requirements for specific pieces are explained in the individual

equipment base and enclosure specifications.

5.3. Deflection and Security Test

Each type of equipment base shall be tested to ensure that it is not compromised by an uneven site. Deflection and and security test requirements for individual equipment bases and enclosures are explained in the individual equipment base specifications. Specific test requirements for each type of base are given in the individual equipment base specifications.

5.4. Threaded Insert Pullout Test

Equipment bases shall contain a specified number of 3/8"-16UNC threaded inserts to be used as equipment hold-downs. The insert locations are described in the individual equipment base specifications. Inserts shall be tested and shown to withstand a 250 pound straight pullout force, a 500 pound shear force at the equipment base surface, and a 36 foot-pound torque.

6. Product Certification

6.1. Initial Certification

The following information and certification shall be supplied to PacifiCorp as part of a supplier's request to be placed on PacifiCorp's Approved Manufacturer List.

6.1.1. Description

The supplier shall provide a description of the equipment base or enclosure, including a detailed description of construction, materials used, number and type of threaded inserts, and reinforcement.

6.1.2. Drawings and Structural Design

The supplier shall provide submittal drawings, with details and structural design calculations signed and stamped by a registered professional engineer, for all components of a given equipment base or enclosure.

6.1.3. Test Documentation

For any equipment base or enclosure, the supplier shall provide certified test results for the tests described this specification and any other applicable PacifiCorp specification required.

6.1.4. Warranty

The supplier shall provide a copy of the supplier's written warranty.

6.2. Recertification

If any changes are made to the design, materials, or manufacturing procedure after a product has been approved, the supplier shall resubmit product certification documentation, as outlined in 7.1, Initial Certification.

6.3. Loss of Certification

Failure of any equipment base or enclosure during the expected service life due to manufacturing defects, or lack of adherence with this or other applicable specifications, may result in the supplier being removed from PacifiCorp's Approved Manufacturer List. To be reinstated, the manufacturer must identify the cause of failure or noncompliance, provide proof to PacifiCorp that the defect has been corrected, and recertify compliance with this specification.

7. Issuing Department

The transmission and distribution standards engineering department of the company authored this document, and may be contacted regarding its content. Questions regarding editing, revision history, and document output may be directed to engineering publications at eampub@pacificorp.com. This handbook document shall be used and duplicated only in support of company projects.

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