Agenda Item: 650-1136

Title: **Stairs, Walkways and Platforms**

Date: 05/05/2026

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Source: OSHA updates requiring alignment with API dimensions and terminology

Revision: 0

Impact: Improve alignment with OSHA Federal Regs

Rationale: Engagement with OSHA providing guidance to current and future interpretations and terminology. Also aligning with recent changes in guardrail and handrail requirements.

Proposal:

Note, the changes listed below with track changes formatting shown are changes to current API-650 content. A new Annex Z will also be a part of this agenda item. The new Annex Z is shown at the end of this agenda item without using track changes formatting since all of that content is new. Page numbering restarts for the Annex Z content.

5.8.10 Platforms, Walkways, and Stairways

~~a)~~ Platforms, walkways, and stairways shall be in accordance with ~~Table 5.17 and Table 5.18~~Annex Z unless more demanding rules are provided by the applicable national safety standards for the location., such as OSHA 29 CFR 1910, Subpart D, or equivalent. Where no local safety standards are mandated, the requirements of OSHA are recommended.

~~b) For details on guardrails, handrails, and tread rise/run, follow OSHA 29 CFR 1910, Subpart D, or equivalent national standard.~~

~~c) The completed structure must also be designed for the loads listed in OSHA, or an equivalent national safety standard.~~

~~d) For examples of acceptable details, see Process Industry Practices standard details PIP STF05501, PIP STF05520, and PIP STF05521 (see www.pip.org).~~

~~e) Unless declined on the Data Sheet, Line 24, a roof edge landing or gauger's platform shall be provided at the top of all tanks.~~

~~Table 5.17—Requirements for Platforms and Walk~~

~~1.~~	~~All parts shall be made of metal, unless an alternate material is specified by the Purchaser.~~
~~2.~~	~~The minimum width of the walkway shall be 610 mm (24 in.), after making adjustments at all projections.~~
~~3.~~	~~Flooring shall be made of grating or nonslip material.~~
~~4.~~	~~The completed structure shall be capable of supporting a moving concentrated load of 4450 N (1000 lbf).~~
~~5.~~	~~Guardrails shall be on all exposed sides of the platform, but shall be discontinued where necessary for access.~~
~~6.~~	~~At guardrail openings, any space wider than 150 mm (6 in.) between the tank and the platform should be floored.~~
~~7.~~	~~A tank runway that extends from one part of a tank to any part of an adjacent tank, to the ground, or to another structure shall be supported so that free relative movement of the structures joined by the runway is permitted. This may be accomplished by firm attachment of the runway to one tank and the use of a slip joint at the point of contact between the runway and the other tank.~~

~~Table 5.18—Requirements for Stairways~~

~~1.~~	~~All parts shall be made of metal, unless an alternate material is specified by the Purchaser.~~
~~2.~~	~~The minimum width of the stairs shall be 710 mm (28 in.).~~
~~3.~~	~~The nose of the treads shall align or overlap the back edge of the tread below. For spiral stairs, the minimum stair run shall be 190 mm (7.5 in.) measured at 300 mm (12 in.) radially from the tread edge nearest the shell. Riser height shall be uniform throughout the height of the stairway.~~
~~4.~~	~~Treads shall be made of grating or nonslip material.~~
~~5.~~	~~The top railing shall join the platform handrail without offset, and the height measured vertically from tread level at the nose of the tread shall be 1070 mm (42 in.). If OSHA is applicable, a separate handrail shall be provided from 760 mm to 970 mm (30 in. to 38 in.).~~
~~6.~~	~~The completed structure shall be capable of supporting a moving concentrated load of 4450 N (1000 lbf).~~
~~7.~~	~~Guardrail systems shall be on both sides of straight stairs; guardrail systems shall also be on both sides of spiral stairs when the clearance between the tank shell and the stair stringer exceeds 200 mm (8 in.).~~
~~8.~~	~~Spiral stairways shall be supported on the shell of the tank, and the ends of the stringers shall be clear of the ground. Stairways shall extend from the bottom of the tank (or ground) up to a roof edge landing or gauger's platform.~~
~~9.~~	~~The minimum vertical clearance is 2030 mm (80 in.) above any stair tread to any overhead obstruction as measured from the leading edge of the tread.~~

Editing note, Renumber remaining tables in Section 5 including references and table of contents table list.

G.7 Platforms, Walkways, and Handrails

Platforms, walkways, and handrails shall conform to ~~5.8.10~~Annex Z except that the maximum concentrated load on walkways or stairways supported by the roof structure shall be 4450 N (1000 lbf). When walkways are specified to go across the exterior of the roof (to the apex, for example), stairways shall be provided on portions of walkways whose slope is greater than 20 degrees. Walkways and stairways may be curved or straight segments.

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Annex L content …

24. Platform, Stairway and Railing: See ~~5.8.10~~Annex Z and C.3.14.6.
    - — Galvanizing Required? (Yes/No)*: Examples are stairways, platforms, and handrails to be galvanized. Identify components in Remarks, Line 23. See S.2.1.3.
    - — Stairway Style*: Specify whether straight ~~along a radius or helical~~or winding.
    - — Walking Surface Type*: Describe type of walking surface on platform and stairs (e.g. diamond-checkered pattern plate, bar and rod grating, expanded metal grating, fiberglass reinforced plastic, carbon fiber, or other nonmetallic composites, etc.).
    - — Handrail height*: If required, specify a separate handrail height from 760 mm to 970 mm (30 in. to 38 in.).
    - — Tread rise/run*: Specify tread rise and run for the stairway.
    - — Stairway and Walkway Clear Width*: See 5.9.5.~~56, Table 5.17, and Table 5.18~~ or Annex Z.
    - — National Safety Standards*: Indicate all standards that shall be observed for ladders, stairs, walkways, platforms, and other architectural/structural items (e.g. OSHA 1910).
    - — Architectural/Structural Specification*: Provide details for material (fiberglass reinforced plastic, carbon fiber, steel specification, shapes, fasteners, coating, etc.). When specifying a nonmetallic composite material as a structural component (e.g. stairway, platform, walkway, handrail), consider its fire rating.
    - — Gauger's Platform Required? (Yes/No).
    - — Quantity of Gauger's Platforms Required, or if intermediate winding stair landings are required*.
    - — Per Specification*: Refer to any supplemental specification, if gauger's platform specification differs from the architectural/structural reference specification above.

Revision History:

Annex Z

(normative)

Walkways, Stairways and Platforms

Z.1 General

Z.1.1 Walkways, stairways and platforms addressed in this specification shall be predominantly constructed from prefabricated components designed to be field erected with API 650 tanks.

Z.1.2 Walkways and stairways must comply with the jurisdictional requirements where the walkway and stairway will be erected, such as OSHA (Occupational Safety and Health Administration) 29 CFR Part 1910.

Z.1.3 All steel components shall be galvanized, painted, or provided with a finish specified by the purchaser.

NOTE The purchaser should consider alternate materials or finishes for corrosive service environments (e.g.,, exposure to saltwater or H_2S).

Z.2 Definitions

Z.2.1

Guardrail

The terms “guardrail” and “guardrail system” can be used interchangeably. The term “guardrail” is also commonly used to designate the top rail of the guardrail system.

Z.2.2

Guardrail System

A barrier erected along an unprotected or exposed side, edge or other area of a walking-working surface to prevent employees from falling to a lower level.

Z.2.3

Handrail

A rail used to provide employees with a handhold for support typically attached to our an element of a stair rail system.

Z.2.4

Platforms

Intermediate or top walking surfaces where operating or maintenance functions are expected to take place such as gauging or sampling.

Z.2.5

Riser Height

The vertical distance from the top surface of one tread to the top surface of the next sequential tread.

Z.2.6

Safety Gate

Self closing gate that protects access onto downward flights of stairs from a platform or a landing.

Z.2.7

Stairway Landing

Intermediate surfaces between adjacent flights of stairs.

Z.2.8

Stair rail

The terms “stair rail” and “stair rail system” can be used interchangeably. The term “stair rail” is also commonly used to designate the top rail of the stair rail system.

Z.2.9

Stair rail system

A barrier erected along the exposed or open side of stairways to prevent employees from falling to a lower level. The terms “stair rail” and “stair rail system” can be used interchangeably.

Z.2.10

Tread Depth

The horizontal dimension of a tread taken perpendicular to the front edge (square nose) of the installed tread.

Z.2.11

Tread Run

The horizontal dimension from the front edge (square nose) of a tread to the front edge (square nose) of the next sequential tread taken in a direction that is perpendicular to the edge of the first tread. Note that the Tread Run of a Winding Stair varies as the measurement point moves across the Tread Width.

Z.2.12

Tread Width

The horizontal dimension of a tread taken parallel to the front edge (square nose) of the installed tread.

Z.2.13

Walkway

A horizontal surface primarily used for walking to gain access to a work area, stair or platform.

Z.2.14

Winding Stair

A standard stair as defined by OSHA that curves as it rises or descends. A stair that follows the curvature of a round structure of at least 1.5 m (5 ft) in diameter or larger is considered a winding stair.

Z.3 Structure Design

Z.3.1 General

Walkways and stairways shall be designed by a competent person with appropriate qualifications in the jurisdiction where they will be installed, or as otherwise specified by the purchaser.

Z.3.2 Roof Access

Walkways and stairways shall be provided for personnel to access devices on the tank roof. Platform layout shall allow for arms reach access to all roof devices. These structures are not intended to provide access onto the roof itself, unless specified by the purchaser.

Z.3.3 Manufacturing and Handling

The design of the walkways and stairways shall take into account lifting and rigging the walkway and stairway components into place. Walkway and stairway components shall be designed so they can be adequately disassembled and secured for transportation and quickly and easily be reassembled.

Z.3.4 Overhead Clearance

The purchaser should consider clearance to overhead structures in the overall design of the system. Adequate head clearance between personnel and overhead structures such as piping should be accounted for. The minimum distance between the top of the walkway surface and the overhead obstruction shall be no less than 2.00 m (6 ft, 8 in.).

Z.4 Walkways

Z.4.1 General

Z.4.1.1 Walkways consist of a walkway decking and a guardrail system which includes posts, guardrail, mid-rail, and toe-boards (see Figure Z.1).

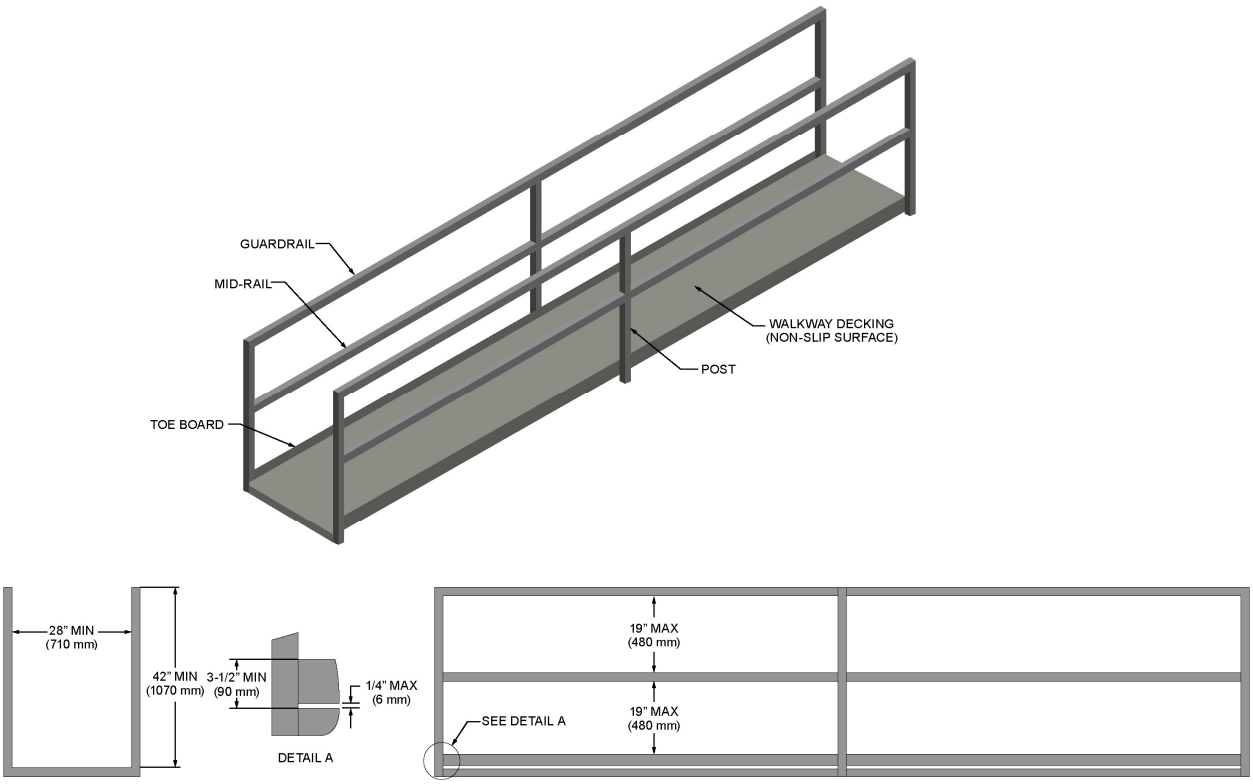
Z.4.1.2 Each unsupported span of a walkway shall be designed and assembled to support a minimum uniform live load of 244 kg/m^2 (50 lb/ft^2) over its whole surface without deflecting more than 1/240 of the span length.

Z.4.1.3 Each unsupported span of a walkway shall be designed and assembled to support a minimum concentrated live load of 445 kg (1000 lbf) at any point without deflecting more than 1/240 of the unsupported span length.

Z.4.1.4 Walkways shall have a minimum clear width of 700 mm (28 in.) (see Figure Z.1). Guardrails, mid-rails, toe boards, hardware, and all other components shall not infringe on the clear width.

Z.4.1.5 A tank walkway that extends from one part of a tank to any part of an adjacent tank, to the ground, or to another structure shall be supported so that free relative movement of the structures joined by the

walkway is permitted. This may be accomplished by firm attachment of the walkway to one tank and the use of a slip joint at the point of contact between the walkway and the other tank.



Note – Example provided for clarity, other compliant configurations are allowed.

Figure Z.1—Walkway Dimensional Requirements

Z.4.2 Walkway Decking

Z.4.2.1 Walkway decks shall be made of grating, expanded metal or other material having a non-slip surface or as otherwise specified by the purchaser.

Z.4.2.2 Walkway decks shall be designed and assembled to support a minimum concentrated live load of 445 kg (1000 lbf) at any point.

Z.4.3 Guardrail System

Z.4.3.1 A guardrail shall be installed at a minimum height of 1070 mm (42 in.) above the walkway deck or walking – working surface. A handrail is not required on a walkway (see Figure Z.1).

Z.4.3.2 The guardrail shall be capable of withstanding a concentrated force of 890 N (200 lbf) applied in a downward or outward direction at any point. The top rail of the guardrail system must not deflect to a height of less than 990 mm (39 in.) above the walking-working surface.

Z.4.3.3 The edge of the walkway guardrail shall be smooth to prevent any snagging and injury.

Z.4.3.4 A mid-rail shall be installed at a height midway between the top edge of the guardrail and the walkway deck (see Figure Z.1).

Z.4.3.5 Openings between rails or between a rail and the toe board shall not exceed 483 mm (19 in.) wide in the vertical direction (see Figure Z.1) Additional mid-rails shall be required if the guardrail is elevated higher than the minimum requirement.

Z.4.3.6 Where mid-rails project into walkways, the ends shall be contoured to prevent snagging and injury to personnel.

Z.4.3.7 Mid-rails shall be capable of withstanding a concentrated force of 667 N (150 lbf) applied in a downward or outward direction at any point.

Z.4.3.8 Guardrails shall be minimum 30 mm (1 in.) in diameter if made of pipe and a minimum thickness of 6 mm (1/4 in.) if made of angles, channels, or other similar structural sections.

Z.4.3.9 Mid-rails shall be minimum 30 mm (1 in.) in diameter if made of pipe and a minimum thickness of 6 mm (1/4 in.) if made of angles, channels, or other similar structural sections. Other sections may be considered if structurally equivalent.

Z.4.3.10 Consideration shall be given to environment of guardrail components regarding pipe potential to have undetected corrosion and trapped vapors.

Z.4.4 Toe Boards

Z.4.4.1 Toe boards shall be installed on all open sides (except at the entrance of stairways or ladders).

Z.4.4.2 The top edge of toe boards shall be a minimum of 88 mm (3.5 in.) above the walking surface (see Figure Z.1).

Z.4.4.3 The bottom edge of toe boards shall be a maximum of 6 mm (0.25 in.) above the walking surface (see Figure Z.1).

Z.4.4.4 Toe boards shall have no gaps along their length greater than 25 mm (1 in.).

Z.4.4.5 Toe boards shall be capable of withstanding a concentrated force of 222 N (50 lbf) applied in a downward or outward direction direction at any point.

Z.5 Stairways

Z.5.1 General

Z.5.1.1 Stairways shall consist of stair stringers, stair treads and a stair rail system comprising posts, handrails, mid-rails, and stair rails (see Figure Z.2).

Z.5.1.2 Each unsupported span of a stairway shall be designed and assembled to support a uniform load of 488 kg/m^2 (100 lb/ft^2) over its whole surface without deflecting more than $^1/_{240}$ of the span length.

Z.5.1.3 Each unsupported span of a stairway shall be designed and assembled to support a concentrated load of 445 kg (1000 lbf) at any point without deflecting more than 1/240 of the span length.

Z.5.1.4 Stairways shall have an angle between 30° and 50° from horizontal (see Figure Z.2).

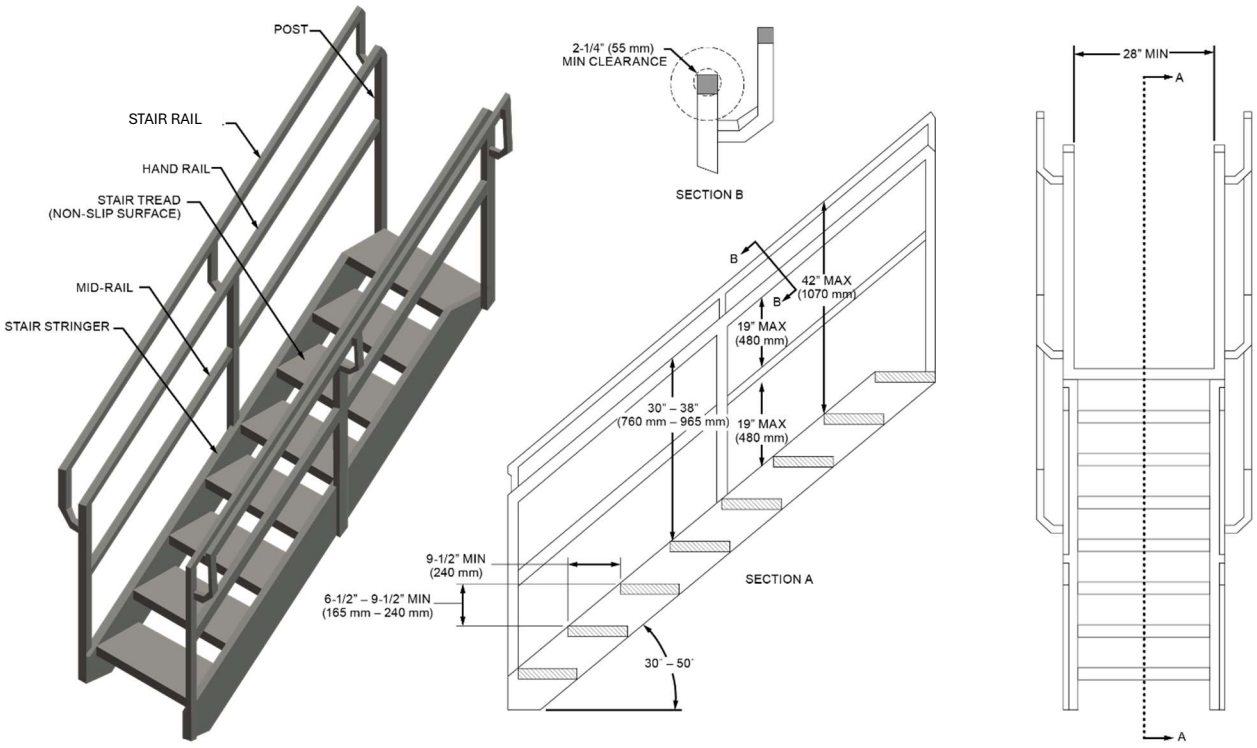
Z.5.1.5 Riser height shall be a minimum of 165 mm (6.5 in.), and a maximum of 240 mm (9.5 in.) (see Figure Z.2). The riser height shall be uniform throughout the run of the stairway with a maximum 6.5 mm (0.25 in) variance..

Z.5.1.6 Tread run shall be a minimum of 240 mm (9.5 in.) (see Figure Z.2). The tread run shall be uniform throughout the run of the stairway.

Z.5.1.7 An intermediate landing shall be supplied where the maximum continuous vertical height of a stairway exceeds 7.3 m (24 ft), or as otherwise specified by the purchaser, and in accordance with applicable code requirements.

Z.5.1.8 If an intermediate landing is required, the platform shall be in accordance with Section Z.7. The landing shall have a depth of not less than 760 mm (30 in.) as measured in the direction of travel.

Z.5.1.9 Stairways shall have a minimum width of 700 mm (28 in.) (see Figure Z.2) or greater as needed to provide a minimum clear width of 560 mm (22 in). Handrails, stair rails, mid-rails, hardware, conduit, piping, valves, appurtenances, and all other components shall not infringe on the clear width.



Note – Example provided for clarity, other compliant configurations are allowed.

Figure Z.2—Stairway Dimensional Requirements

Z.5.2 Stair Treads

Z.5.2.1 Stair treads shall be made of grating, expanded metal or other material having a non-slip surface. The stair nose shall have a non-slip finish.

Z.5.2.2 The stair tread width shall be sufficient to assure the clear stair width in Z.5.1.9 is maintained throughout the stairway.

Z.5.2.3 The stair tread depth shall be sufficient to assure the square nose of the tread aligns or overlaps the back edge of the tread below.

Z.5.2.4 The stair tread shall be designed and assembled to support a minimum concentrated live load of 445 kg (1000 lbf) at any point.

Z.5.3 Stair Rails and Handrails

Z.5.3.1 Stairways shall have dedicated stair rail systems and handrails (see Figure Z.2). Stairs with a width less than 1100 mm (44 in) shall have at least one handrail. Stairs with a width of 1100 mm (44 in) to 2200 mm (88 in) shall have a handrail on each side.

Z.5.3.2 Stair rails shall have a minimum height of 1070 mm (42 in), shall be installed on both sides of stairways and be able to withstand 890 N (200 lbf) force at any point along the top rail.

Z.5.3.3 Handrails shall not be less than 760 mm (30 in.) or more than 965 mm (38 in.) above the stair nose. (see Figure Z.2).

Z.5.3.4 Clearance between the handrail and the stair rail supports for finger clearance shall be at least 55 mm (2 1/4 in.) (see Figure Z.2).

Z.5.3.5 Openings in the stair rail system shall not exceed 483 mm (19 in.) wide in the vertical direction (see Figure Z.2).

Z.5.3.6 The edge of stair rails and handrails shall be smooth to prevent any snagging of clothing, catching, or possible injury from sharp non smooth edges, splinters, or anomalies.

Z.5.3.7 No part of the stair rail shall be removable during normal service.

Z.5.3.8 Where mid-rails project into stairways, the ends shall be contoured to prevent snagging and injury to personnel.

Z.6 Winding Stairways

Z.6.1 General

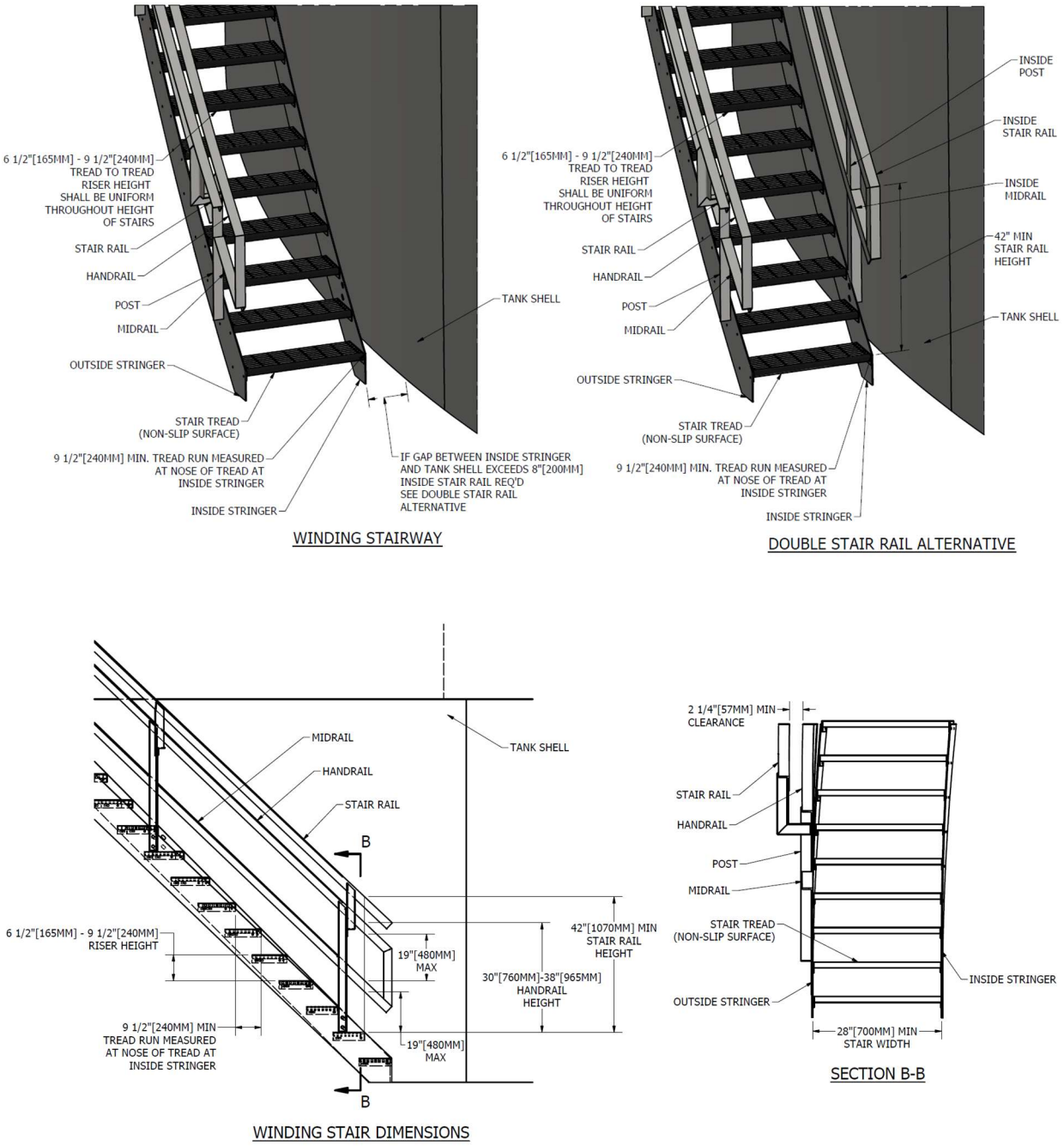
Z.6.1.1 Winding stairways shall meet all of the requirements of stairways listed in Section Z.5 as modified in Section Z.6. These modifications are to address the unique geometry and features of a winding stair that follows the curvature of a tank shell.

Z.6.1.2 Winding stairways shall be supported on the shell of the tank and the ends of the stringers shall be clear of the ground. Winding stairways shall extend from the bottom of the tank up to a landing or tank top platform.

Z.6.1.3 Winding stairways do not require intermediate platforms as they rise from grade to the top of the tank. These intermediate platforms may be used when specified by the purchaser. An intermediate platform may be requested by the purchaser for locations along the winding stairway where operations and maintenance activities are expected such as gauging or sampling. If used, intermediate platforms shall comply with Z.7.

Z.6.1.4 The tread run of a winding stairway varies across the horizontal radial width of the tread. The winding stairway tread run must meet or exceed the required minimum tread run of a standard stair. The minimum winding stairway tread run shall be 240 mm (9.5 in) measured at the inner radius edge of the tread nearest to the tank shell (See Figure Z.3).

Z.6.1.5 Winding stairways shall have an angle between 30° and 50° from horizontal (see Figure Z.3). These angles shall be met at both the inner and outer stringer.



Note – Example provided for clarity, other compliant configurations are allowed.

Figure Z.3—Winding Stairway Dimensional Requirements

Z.6.2 Winding Stair Treads

Z.6.2.1 Stair treads for winding stairways may utilize rectangular shaped treads that meet the requirements of Z.5.2.

Z.6.2.1 Stair tread depth requirements in Z.5.2.3 must be met along the full width of the tread. A rectangular shaped tread with a tread nose that aligns with or overlaps the back edge of the tread below at the outer radius edge of the tread will meet this requirement.

Z.6.3 Winding Stair Rail Systems and Handrails

Z.6.3.1 Winding stairways shall have dedicated stair rail systems and handrails along the outer radius of the stair (see Figure Z.3).

Z.6.3.2 Winding stairways with a gap greater than 205 mm (8 inches) measured between the inner radius stringer and the tank shell shall have a dedicated stair rail system along the inner radius of the stair (see Figure Z.3 Double Stair Rail View).

Z.6.3.3 Winding stairs shall have two handrails when required by Z.5.3.1 or when specified by the purchaser.

Z.6.3.4 When stair rail systems and/or handrails are provided along the inside radius of the winding stair (nearest the tank shell), they shall be supported off the stair stringer so as to limit welded connections to the tank shell.

Z.7 Landings and Platforms

Z.7.1 General

Z.7.1.1 Stairway landings and platforms shall meet the requirements of walkways in Section Z.4. This includes minimum applied loads, decking, guardrail and toe board requirements. The purchaser shall specify if additional requirements are needed for maintenance or operating conditions such as equipment material laydown areas which could impact platform sizes and loading criteria.

Z.7.1.2 Unless declined on Data Sheet, Line 24, a gauger's platform shall be provided at the top of all tanks.

Z.7.1.3 Stairway landings and platforms shall be the width of the connecting stairway at a minimum and at least 760 mm (30 inches) in depth, as measured in the direction of travel.

Z.7.1.4 Doors or gates accessed by a stairway must open at a platform. The swing of the door or gate shall not reduce the platform's effective depth to less than 560 mm (22 inches).

Z.7.1.5 When platforms are provided for operations and/or maintenance activities, the purchaser may specify the use of a safety gate to protect personnel from the descending stairs connected to the platform. If used, safety gates shall be installed so as to restrict opening in the direction of the descending stairs. Safety gates can be freely swung open when traversing stairs in the upward direction. Safety gates typically have a top and mid rail in similar positions as the guard rail system of the platform or landing. Platforms shall be sized for expected activities including needed gate clearance from those activities.

Z.7.1.6 Guardrail systems shall be on all exposed sides of the platform, but shall be discontinued where necessary for access.

Z.7.1.7 At guardrail system openings, any space wider than 50 mm (2 in) between the tank and the platform shall be floored.