# 3.0 STAIRWAYS, RAMPS, STILES, WALKWAYS, AND PLATFORMS

## 3.1 SECTION CONTENTS

This section provides guidance for the design and use of stairways, ramps, walkways, and platforms. Designs for both steel and wood construction are included in this section. Steel construction is preferred and should be considered first. Use of wood should be minimized. See Section 1.5 for additional guidelines.



**NOTE:** An asterisk (*) after a section of text indicates that the information in that section is new or revised as of September 1996.

**Fed-OSHA 1910.24**

# 3.2 GENERAL REQUIREMENTS FOR STAIRWAYS

## A. CONDITIONS WHICH REQUIRE FIXED STAIRWAYS AS ACCESS

1. Fixed stairways are required:
   - for access from one structure level to another where operations necessitate regular travel between levels
   - for access to operating platforms at any equipment which requires attention routinely during operations
   - when access to elevations is daily or at least once each shift for activities such as gaging, inspection, regular maintenance, where
     - such work may expose workers to acids, caustics, gases or other harmful substances
     - the carrying of tools by hand is normally required
2. The use of fixed ladders is not precluded for access to tanks, towers and similar structures where the use of fixed ladders is common practice.
3. Spiral stairs are not permitted except for special limited usage and secondary access situations where it is not practical to provide conventional stairs.
4. Winding stairs may be installed on tanks and similar round structures where the diameter of the structure is not less than 5 feet.

### Chevron Guidelines

**1.** Stairways are required for access to and egress from elevated work platforms, walkways, and other elevated work areas where the frequency of use is daily.

**2.** Stairways should be provided for access to elevated platforms, walkways, and other elevated work areas where the frequency of use is less than daily:
   - if material, tools or other equipment must be carried for operating or maintenance requirement, or
   - if there is a potential for exposure to injurious chemicals or materials at the elevated location.

**3.** Refer to the discussion in Section 1.4 B regarding secondary means of egress.

# 3.3 DESIGN REQUIREMENTS FOR STAIRWAYS

## A. GENERAL REQUIREMENTS FOR STAIRWAYS

1. Fixed stairs shall be designed and constructed to carry a load of 5 times the normal load anticipated, but never of less strength than to carry safely a moving concentrated load of 1,000 lbs.
2. All treads shall be reasonably slip resistant and the nosing shall be of non-slip finish.

**OSHA Interpretation**

Each tread and top landing of a stairway, where risers are used, should have a nosing which extends 1/2 - 1 inch beyond the face of the lower riser. Noses should have an even leading edge. [ANSI A64.1-1968 incorporated by reference 1910.24]

*(continued next page)*

### Chevron Guidelines

**1.** The recommended maximum rise height in a stairway or stile is 8 inches, except for a single step riser which may have a 12-inch maximum rise height.

**2.** The recommended minimum tread run in a stairway or stile is 9-1/2 inches.

**3.** The greatest rise height within any flight of stairs shall not exceed the smallest by more than 3/8 inch.

**4.** The largest tread run within any flight of stairs shall not exceed the smallest by more than 3/8 inch (see *Figure 3.1)*.

**5. Design Load:**

Stairways shall be built to carry 5 times the normal anticipated live load, but not less than a 1000 lbs. moving concentrated load.

**6. Landings:**

Coordinate layout of stair landings for tanks and vessels during foundation design to avoid interferences. See Section 3.3 D.

**7. Intermediate Landings:**

Recommended vertical rise between landings on a stairway is maximum 24 risers or 16 feet 0 inches. Occasional use stairways may not require intermediate landings.

**8. Clear Pathway:**

30 inch minimum width is required for egress stairways and stiles.

**9. Treads:**

All steel stairs should have treads made of **serrated** grating.* (Refer to *Figure 3.7.*)

**10. Nosing:**

Treads shall have an even leading edge and be of non-slip design. Nosing shall extend 1/2 inch to 1 inch over risers.

**11. Overhead Clearance:**

7 feet 0 inches minimum vertical clearance shall be provided from the top of each tread at the leading edge, including platform edge.

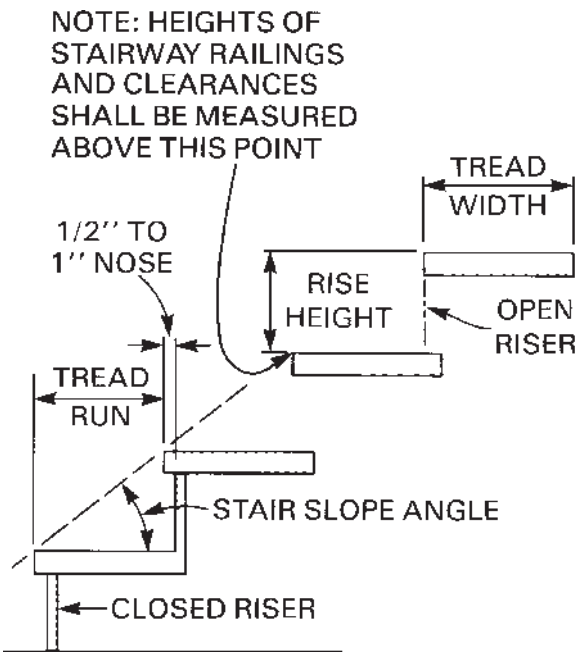



*Figure 3.1 Stairway Terms*

## Fed-OSHA 1910.24

**OSHA Interpretation**

Avoid long flights of stairs, unbroken by landings or intermediate platforms. [ANSI A64.1-1968 incorporated by reference 1910.24]

3. Welded bar grating treads without nosing are acceptable provided the leading edge can be readily identified by personnel descending the stairway and provided the tread is serrated or is of definite non-slip design.

**OSHA Interpretation**

Stairs having less than 9-inch width should have open risers. [ANSI A64.1-1968 incorporated by reference 1910.24]

4. Rise height and tread width shall be uniform throughout any flight of stairs, including any foundation structure used as one or more treads of the stairs.

**Chevron Interpretation**

This means that treads and risers shall deviate no more than 3/8 inch in uniformity throughout any flight of stairs.

**Note:** Uniformity is extremely critical at the top step of a long flight of stairs.

5. Fixed stairs shall have a minimum width of 22 inches.
6. Stairway platforms shall be no less than the width of a stairway and a minimum of 30 inches in the direction of travel.
7. Standard railings shall be provided on the open sides of all exposed stairways and stair platforms. Handrails shall be provided on at least one side of closed stairways, preferably on the right side descending.

**Note:** Refer to Section 2.2 C.

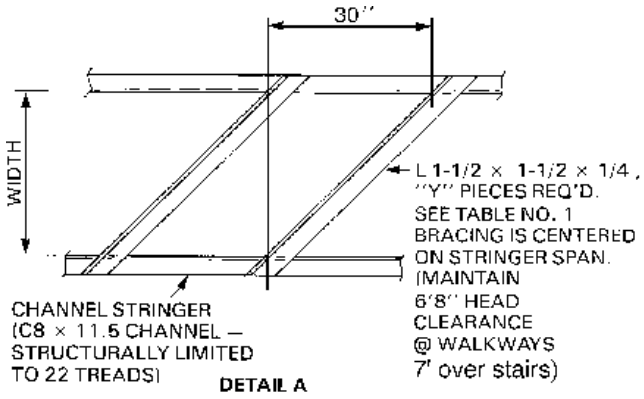
8. Vertical clearance above any stair tread to an overhead obstruction shall be at least 7 feet, measured from the leading edge of the tread.

**Cal-OSHA 3234**

1. The maximum variations in the height of risers or the width of treads in any one flight shall be 1/4 inch.

## Suggested Fabrication Detail

**12.** *Figures 3.2* and *3.7* provide suggested fabrication details for steel stairs.




| TABLE NO. 1 | |
|---|---|
| NO. TREADS | Y |
| 1 TO 13 | 0 |
| 14, 15 | 1 |
| 16, 17 | 2 |
| 18, 19 | 3 |
| 20, 21, 22 | 4 |
| 23, 24 | 5 |
| 25, 26, 27, 28 | 6 |
| 29, 30, 31 | 7 |

**Diagonal Bracing on Bottom of Stringers** Ref. Std. Dwg. GD-M13966

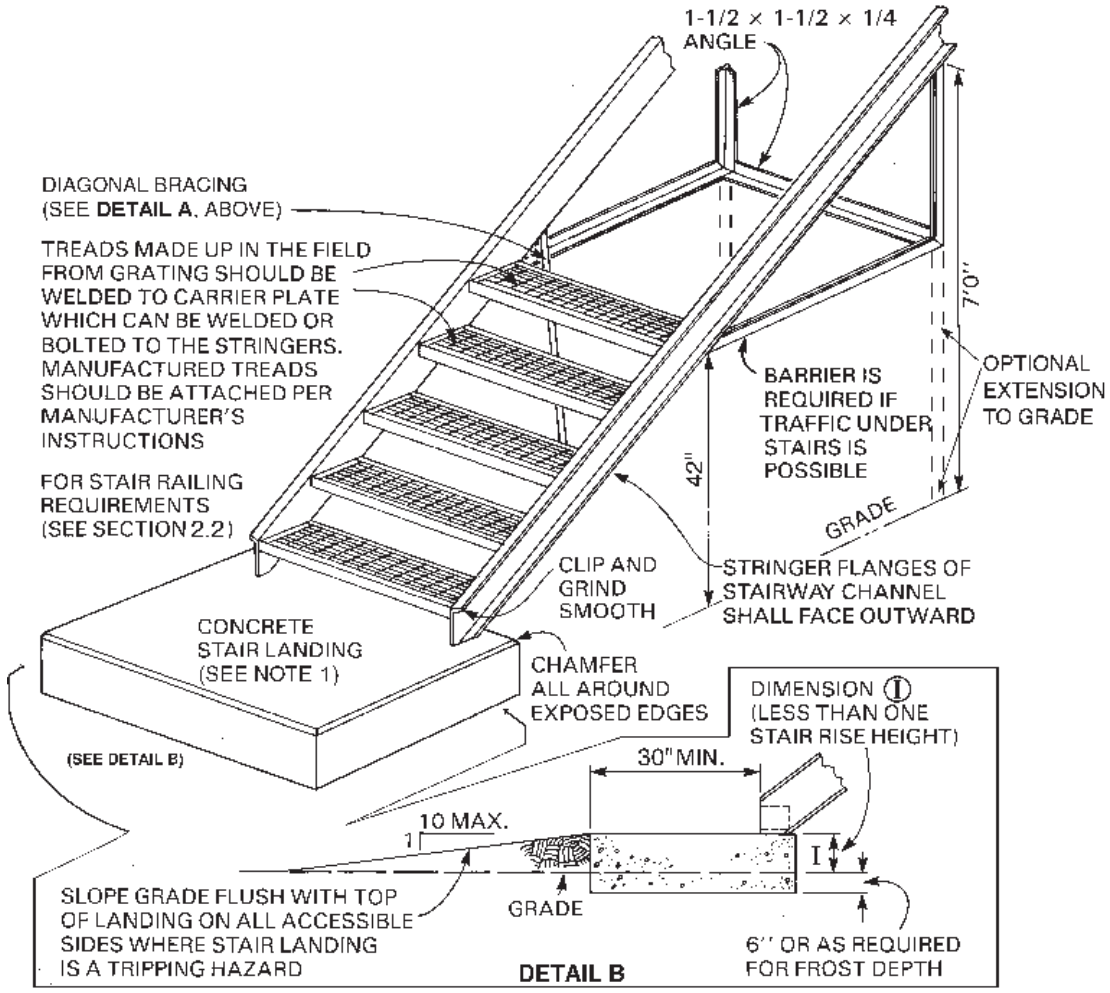



***Figure 3.2 Steel Stairway and Stair Landing***

Note 1: See Section 3.3 D-2.

## B. SUMMARY OF HANDRAIL & GUARDRAIL REQUIREMENTS FOR STAIRS AND PLATFORMS

### Chevron Guidelines

**1.** *Figure 3.3* provides a summary of the requirements for stairways and platforms.

| STAIR OR PLATFORM TYPE | STAIR RAIL HANDRAIL | PLATFORM GUARDRAIL | PLATFORM TOEBOARD | INTERMEDIATE LANDING |
|---|---|---|---|---|
| 1. Single Riser | None | Note 1 | Note 1 | None |
| 2. Two to three risers and platform heights less than 30" | Note 1 | Note 1 | Note 1 | None |
| 3. Four or more risers or platform heights 30" to 48" | Required | Required for open sides | Note 1 | None |
| 4. Platform Heights 48" or greater | Required | Required for open sides | Required for open sides | Note 2 |

***Figure 3.3 Stair and Platform Requirement Summary***

NOTE 1: Required for special hazards only (see Section 2.2 A)

NOTE 2: Intermediate landings are recommended for stairway to platform heights 16'0" or greater. In some jurisdictions, Intermediate landings are required for stairway to platform heights 12'0" or greater. Intermediate landings may not be required for occasional use stairways.

## C. STAIR SLOPE

### Chevron Guidelines

**1.** Stair slopes should have angles to the horizontal of between 30° and 40°.

**2.** The recommended standard or rise height / tread run of new stair construction is 7-3 / 4 inches / 9-3 / 4 inches (stair slope = 38°29'). This rise height / tread run may be adjusted so that the rise height between top or bottom tread and platform or floor conforms with the uniform rise height between treads on a flight of stairs.

**3.** Whenever possible, maintain a uniform slope of all stairways in a plant or area. See *Figures 3.4* and *3.5* for details.

1. Fixed stairs shall be installed at angles to the horizontal of between 30° and 50°. Any uniform combination of rise/tread dimensions may be used that will result in a stairway at an angle to the horizontal within the 30° and 50° range.

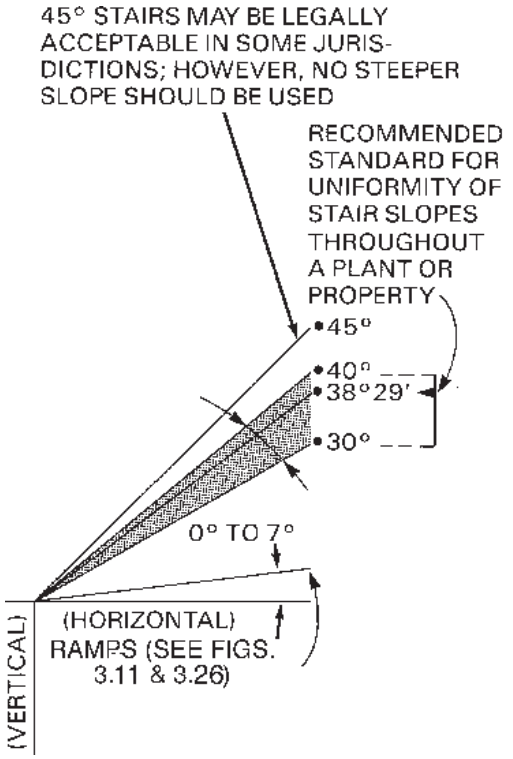



***Figure 3.4 Range of Slopes for Stairs and Ramps***

Ref. Std. Dwg. GD-M13966

**WHICH WILL BE LEGALLY ACCEPTABLE IN MOST JURISDICTIONS**

| RISE HEIGHT (INCHES) | TREAD RUN (INCHES) |
|---|---|
| 6 1/2 | 11 |
| 6 3/4 | 10 3/4 |
| 7 | 10 1/2 |
| 7 1/2 | 10 |
| 7 3/4 | 9 3/4 |
| 8 | 9 1/2 |

***Figure 3.5 Typical Rise/Run Combinations for Stair Slopes 30° to 40°***

(Recommended Tread Run + Rise = 17 1/2")

Ref. Std. Dwg. GD-M13966

## D. STAIR LANDINGS

1. Stairway platforms shall be no less than the width of a stairway and a minimum of 30 inches in length in the direction of travel.

### Chevron Guidelines

**1.** 30 x 30 inch minimum landing area is required for the base and top of stairways and stiles and for intermediate landings.

**2.** Use of separate landing pads should be avoided where possible. However, where stairways lead to an uneven grade, or where it is infeasible to adjust stair slope for the requirement of uniform stair risers in a flight of stairs, a minimum 30 x 30 inch stair landing may be installed so that a uniform stair riser is provided between the tread and stair landing.

**3.** The stair landing is built up from grade to make up the height of any uneven or non-uniform rise (see Detail A in *Figure 3.2*).

## E. DOORS AND LANDINGS FOR ACCESS/EGRESS OF BUILDINGS (INCL. PORTABLE BUILDINGS FOR OFFICE USE)

### Chevron Guidelines

1. See Section 3.3 A for guidelines for stair slopes and dimensions for risers and treads.
2. Stairway landings at outwardly swinging doors should have a minimum 30 x 30 inch landing area which is clear of the swing of the door. In some jurisdictions, the landing shall have minimum length of 5 feet 0 inches.
3. Stairway landings shall be no more than 1 inch lower than the threshold of the doorway (may be more stringent for handicapped access - see *Figure 9.4*).
4. Railings shall be provided on open sides of stairs which have four or more risers.
5. Stairways parallel to the building are preferred. See *Figure 3.6* for details.

**Fed-OSHA 1910.23**

1. Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width to less than 20 inches.

**Fed-OSHA 1910.37**

**Note:** An exit or exit access door swinging into an aisle or passageway shall not restrict the effective width thereof at any point during its swing to less than the minimum widths specified in 1910.37.

**Cal-OSHA 3235**

1. Width and height. Every required exit doorway shall be of a size that permits the installation of a door not less than 3 feet wide and not less than 6 feet 8 inches high. When installed in exit doorways, exit doors shall be capable of opening at least 90 degrees and shall be mounted so that the clear width of the exitway is no less than 32 inches. In computing the exit width required, the net dimension of the exitway shall be used.

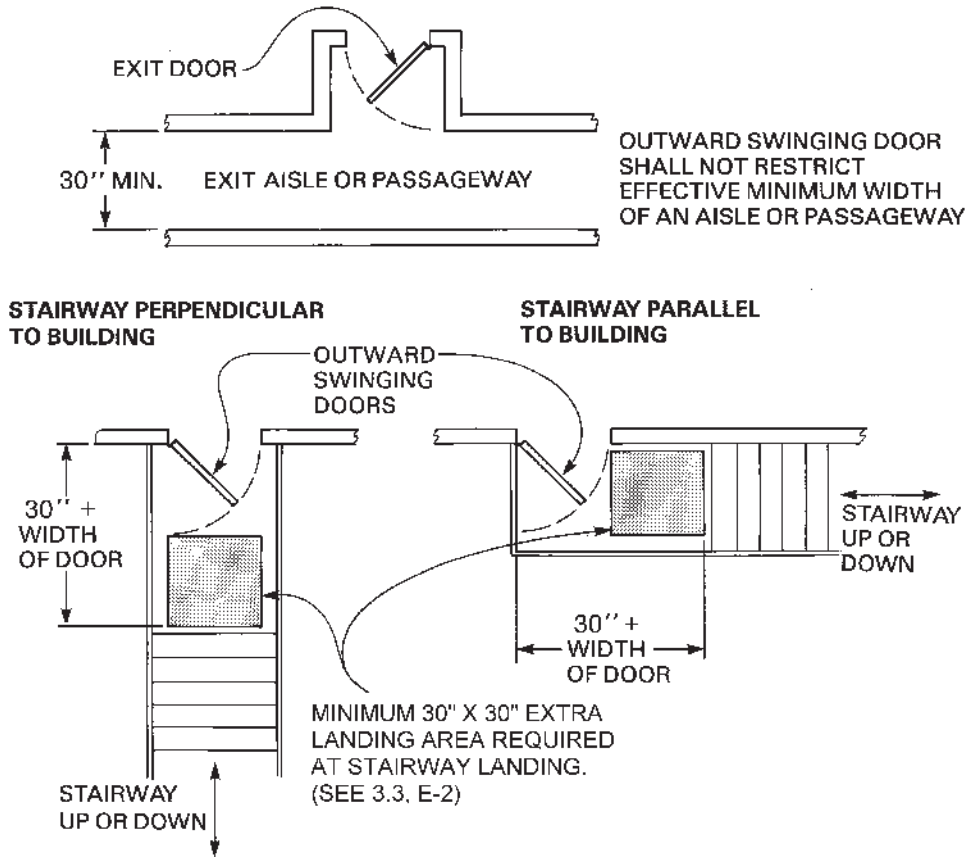



*Figure 3.6 Landings at Outwardly Swinging Doors*

**Cal-OSHA 3214**

1. Stairs that follow the contour of tanks or other cylindrical structures where the construction requires the inside clearance between the inside stair stringer and wall or tank side to be 8 inches or less, shall not be considered to be an "open side."

## F. CIRCUMFERENTIAL STAIRWAYS FOR CYLINDRICAL TANKS

### Chevron Guidelines

1. Circumferential stairs ascending clockwise are preferred. A stair rail is also required between the tank and stairs if the gap between the tank/tank insulation and stairs is greater than 6 inches.*
2. All treads should be constructed from steel grating. See *Figure 3.7* for details.
3. See *Figure 3.15* for details of gaging platform for cone roof tanks.
4. See *Figures 3.16* through *3.19* for details of gaging platform for floating roof tanks.
5. **Intermediate landings are not required on circular stairways.***

## G. CIRCUMFERENTIAL STAIRWAYS FOR SPHERICAL TANKS

### Chevron Guidelines

1. All treads should be constructed from steel grating. See *Figures 3.2, 3.7, 3.8,* and *3.9* for details.
2. Upper run of stairway may follow contour of tank.
3. Provide unobstructed **30 x 30 inch** clear landing at base of stairway.*
4. Intermediate platform is not required for circular stairways. See *Figure 3.10* for details.

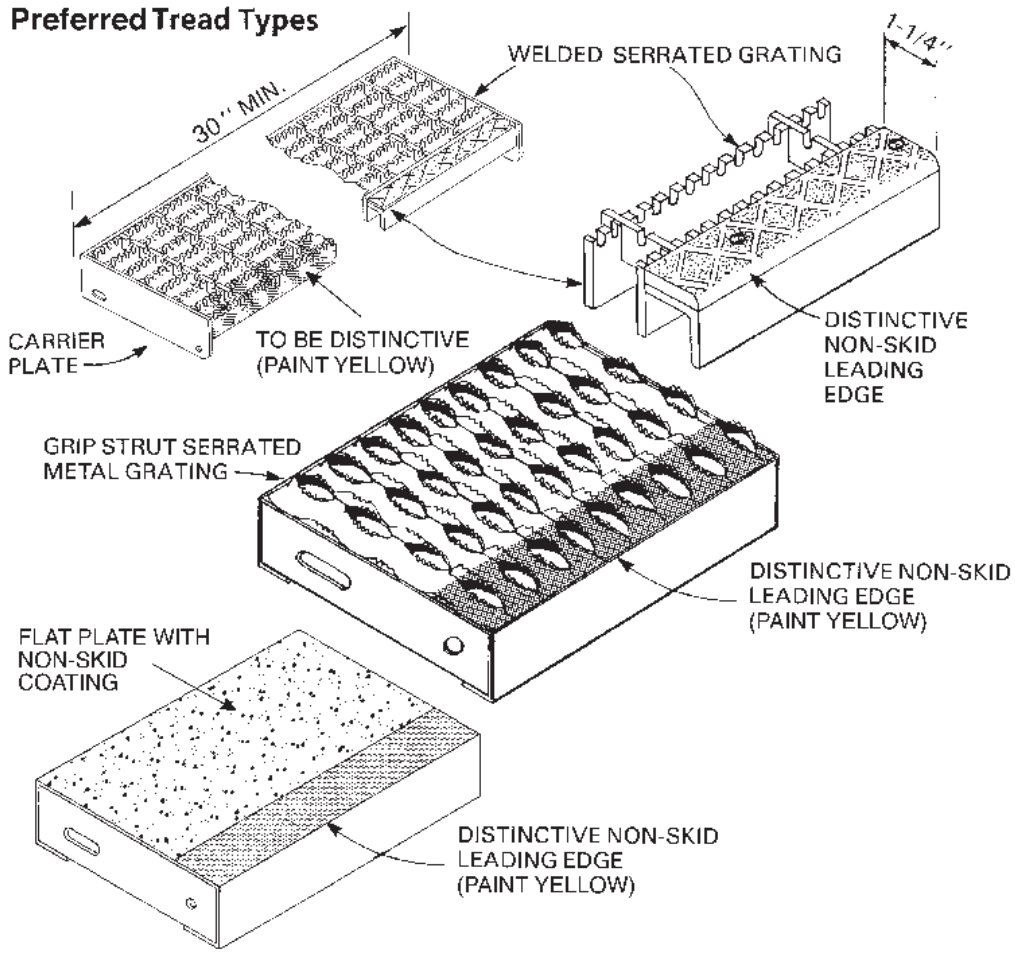



*Figure 3.7 Steel Stairway Details*

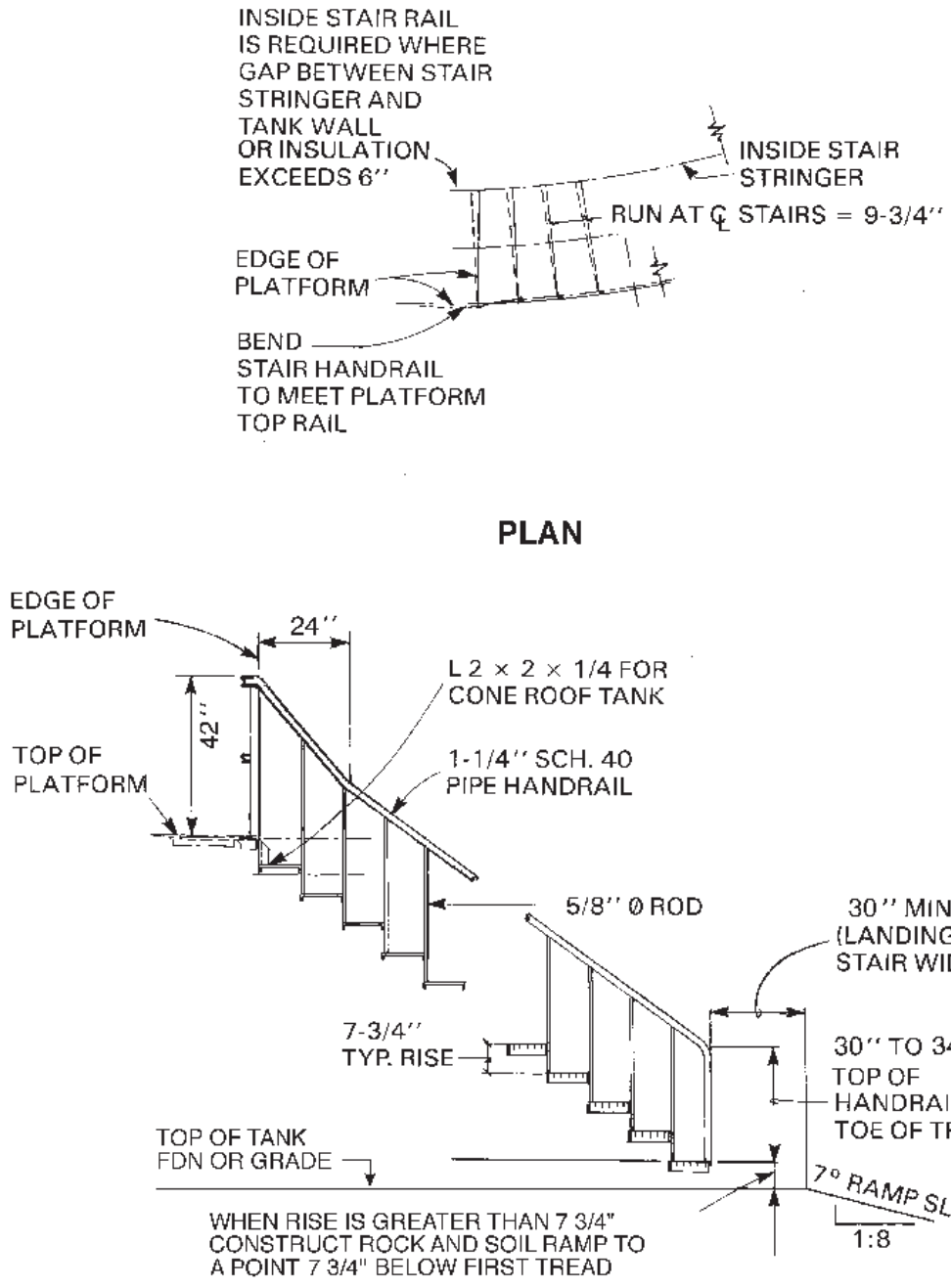



***Figure 3.8 Typical Circular Stair*** Ref. Std. Dwg. GF-D99639

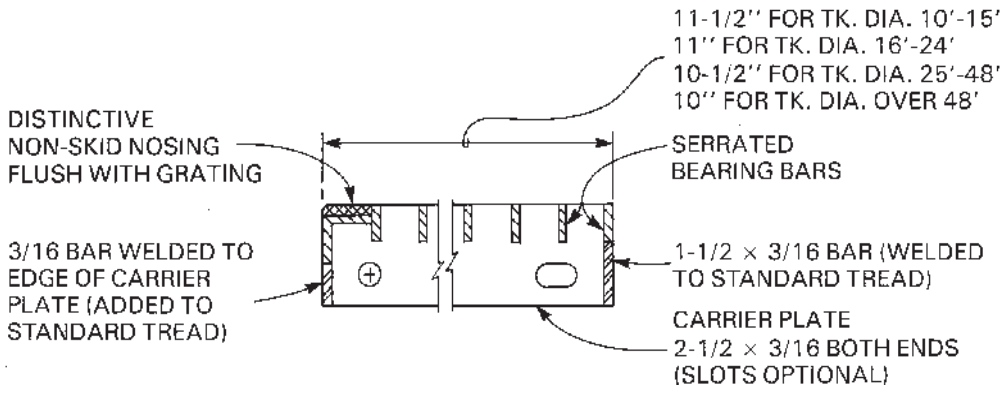



***Figure 3.9 Stair Tread Detail***

(Modified for support from tank shell.) See *Figure 3.8* for plan arrangement.

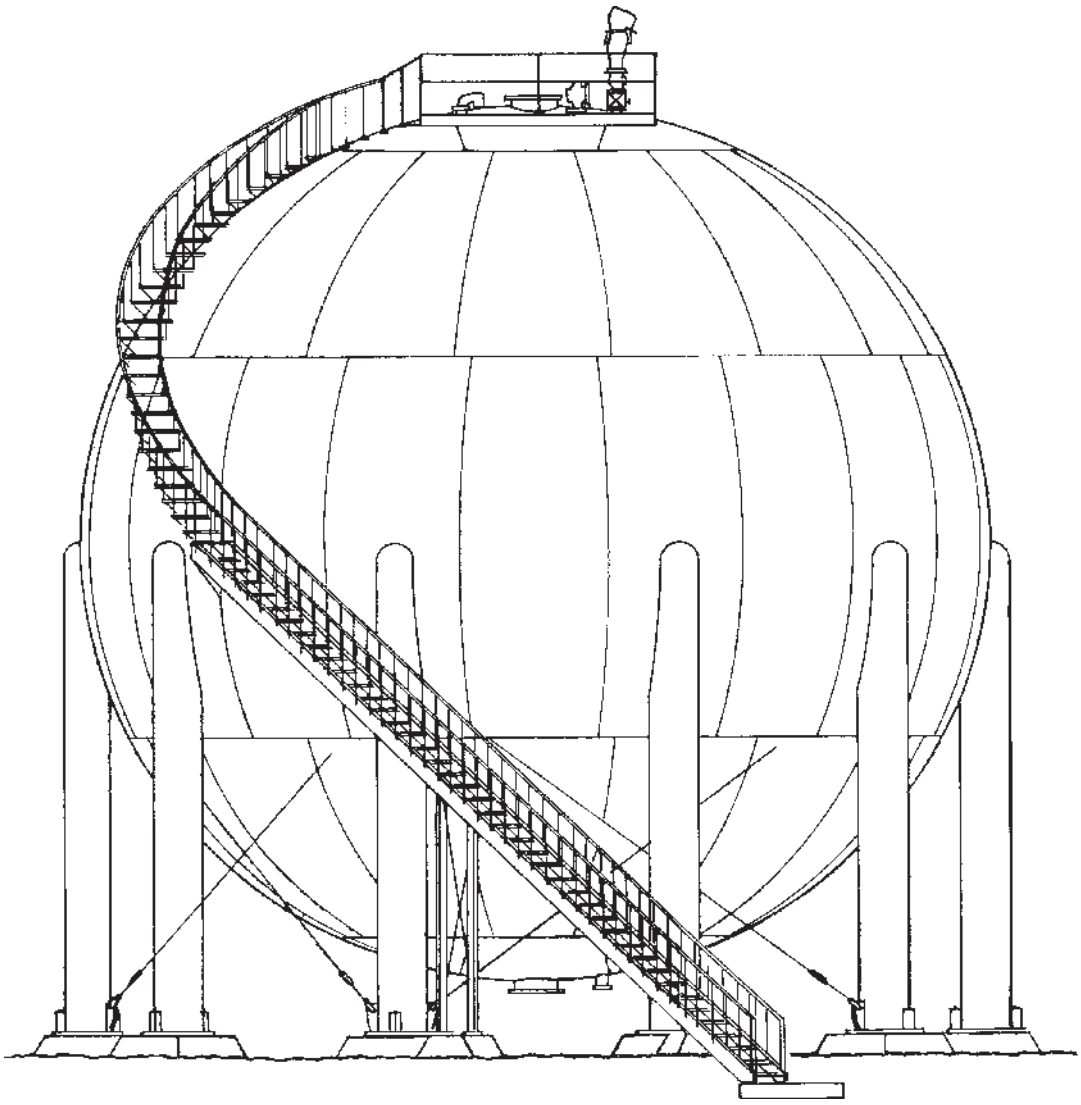


***Figure 3.10 Spherical Tank***

# 3.4 GENERAL REQUIREMENTS FOR STEEL RAMPS, STILES, WALKWAYS AND PLATFORMS

**CAL-OSHA 3233.**

1. The slope of the ramp shall not exceed 1 vertical to 8 horizontal, except ramps used for powered industrial trucks shall not exceed 1 vertical to 3 horizontal.
2. Ramps more than 30 inches above the adjacent ground or floor shall be provided with guardrails. Guardrails shall be continuous from the top of the ramp to the bottom of the ramp.
3. The surface of the ramp shall be roughened or shall be non-slip material.

## A. GENERAL REQUIREMENTS FOR RAMPS

### Chevron Guidelines

**1.** 7° (1 to 8) is the maximum slope of ramps.

**2.** See Section 2.3 A-2 for railing requirements. **Note that in California, when a guardrail is required, the height of the top rail from the ramp is 42 inches. A handrail may also be required depending on ramp slope.***

**3.** Exit ramps which have slopes greater than 3.5° (1 to 16) require handrails, landings at top (5 feet long) and bottom (6 feet long), and one intermediate landing (5 feet long) for each 5 feet of rise.

## B. STEEL RAMPS

### Suggested Fabrication Details

**1.** Install L 1-1/2 x 1-1/2 x 1/4 inch under each joint between floor plates.

**2.** If bolted connections are required all holes shall be 9/16 inch for 1/2 inch bolts.

**3.** See *Figure 3.11* for typical arrangement.

## C. STEEL STILES

### Chevron Guidelines

**1.** Length of stile walkway shall be not less than 30 inches and shall not exceed 9 feet 6 inches (structural limit for minimum loading - 75 psf live load) unless intermediate supports are provided or a larger channel member is used. Also structural limit for stair stringer plate is 6 risers maximum.

**2.** See *Figure 3.12* for typical arrangement.

**3.** See *Figure 3.14* for recommended walking surfaces.

### Suggested Fabrication Details

**4.** Install L 1-1/2 x 1-1/2 x 1/4 inch under each joint between floor plates.

**5.** Width shall not be less that 30 inches.

**6.** Drill 1/2-inch diameter weep holes in floor plate where necessary.

**7.** See Section 2.0 for guardrail and stair rail requirements.

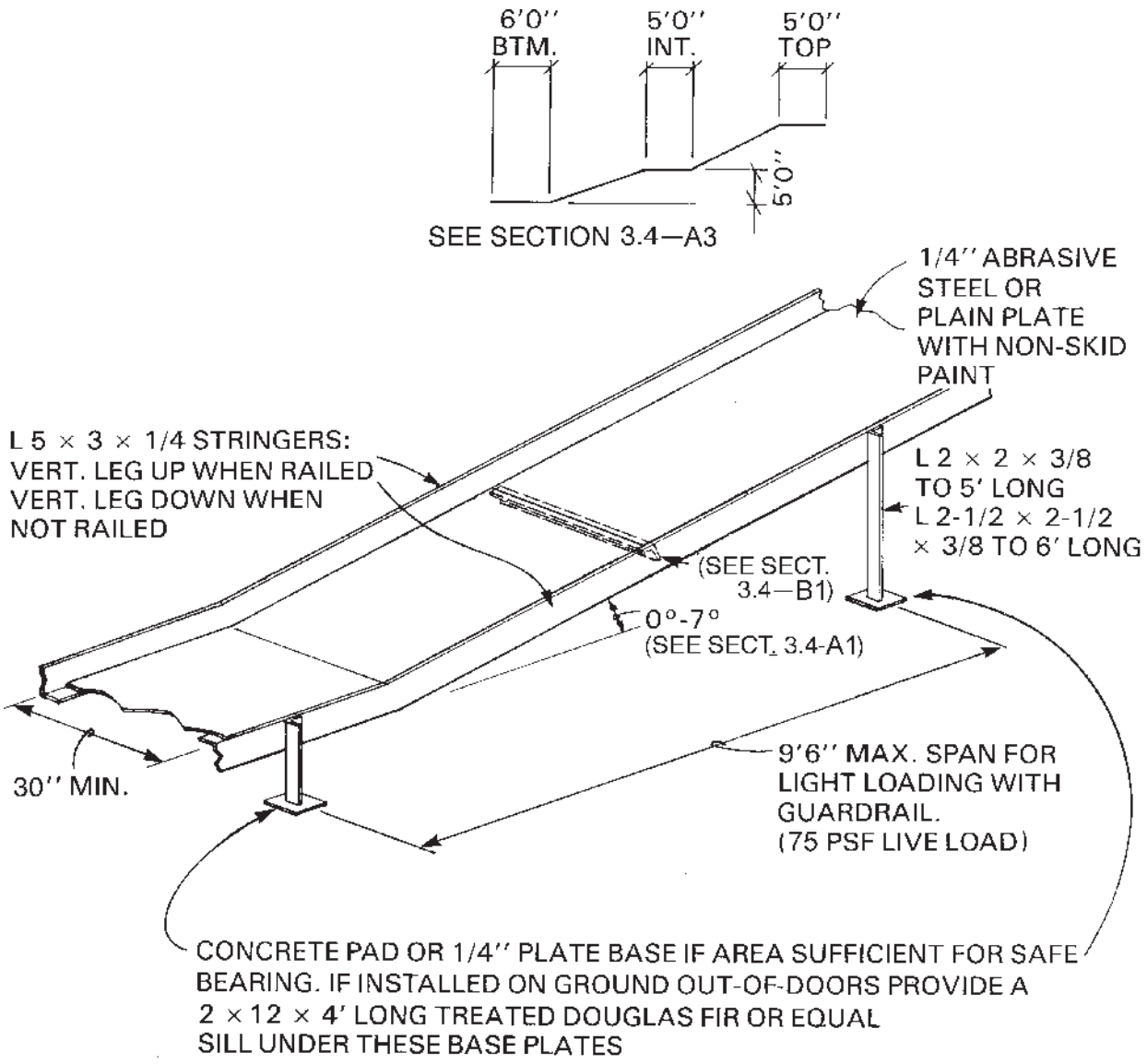



*Figure 3.11 Steel Ramp*

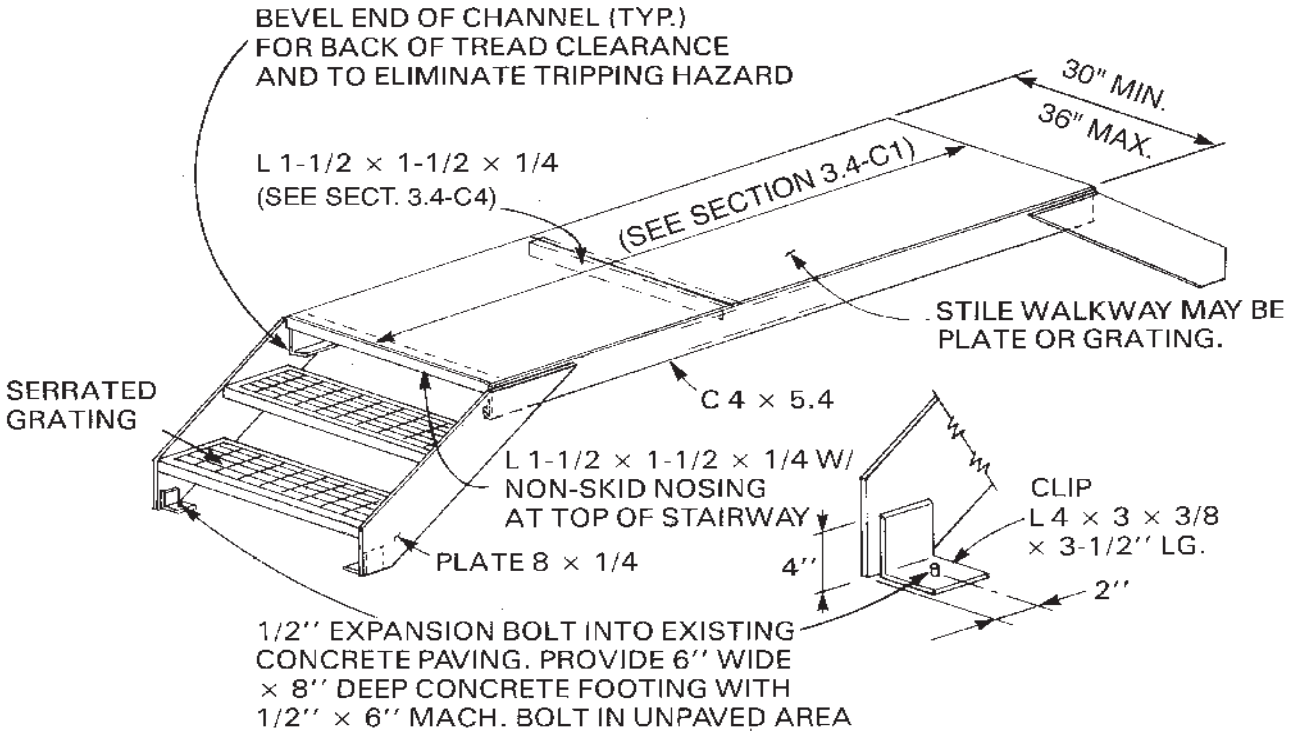



***Figure 3.12 Steel Stile***

The requirement for uniform tread rise height (see Section 3.3-A) applies to rise from floor or lower platform to first tread and rise from top tread to top platform. See Ref. Std. Dwg. GA-M1001 for single riser stile.

Ref. Std. Dwg. GB-M1002

## D. STEEL WALKWAYS AND PLATFORMS

### Chevron Guidelines

1. See *Figure 3.14* for recommended walking surfaces.
2. Where floor plate is used, drill 1/2-inch diameter weep holes for drainage where necessary.
3. Walks or platforms not provided with railing (less than 30 inches high) shall have guardrail at any sharp change of direction (L or T shaped), such stop railings being at least as wide as the walkway.
4. The design load for walkways and platforms should be the maximum probable loads produced by the intended use. The design load shall be increased as necessary for any machinery or equipment which may add to the live load.
5. Steel plate with a non-skid coating is generally recommended for walkway and platform surfaces (refer to CRTC *Civil and Structural Manual*, Section 343). However, serrated steel grating or grip strut grating should be used in the following situations:

- platform where operating conditions make steel plate with non-skid coating ineffective; such as areas where liquid spillage is expected
- in wet and cold climates where precipitation and ice commonly create walkway hazards
- for platforms, walks and stiles less than six feet from grade
- for platforms where there is a need to "see through" such as on furnace firing platforms and on plot limit block valve manifolds
- for stair treads (see *Figure 3.7* for design details)

**Suggested Fabrication Details**

**6.** Install L 1-1/2 x 1-1/2 x 1/4 inch under floor plate joints.

**7.** All holes shall be 11/16 inch for 5/8-inch bolts. See *Figure 3.13* for details.

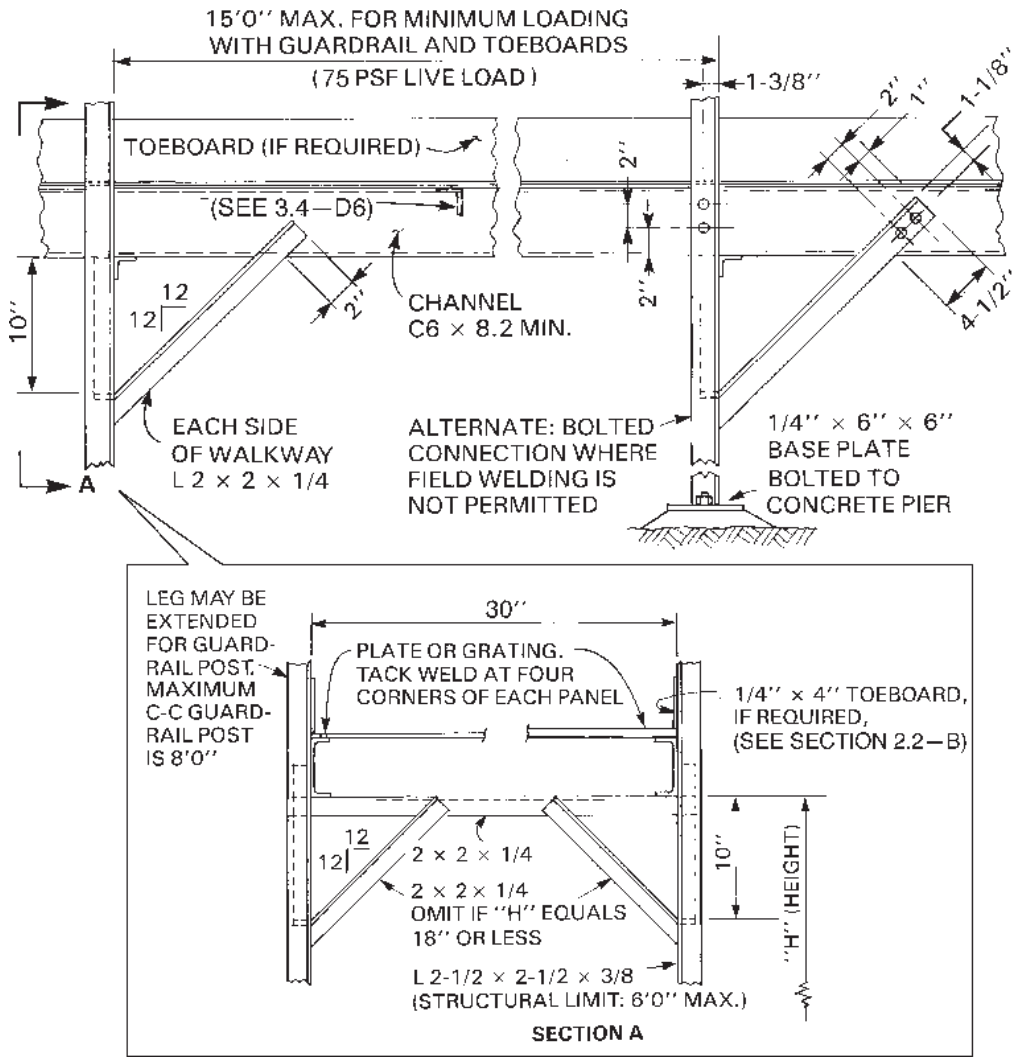



***Figure 3.13 Steel Walkways*** Ref. Std. Form CIV-EF-632

## E. STEEL SERRATED GRATING FOR WALKWAYS AND PLATFORMS

### Chevron Guidelines

1. Grating used in coastal areas should be galvanized; for inland areas (non-corrosive atmospheres), steel grating may be painted.
2. Some plants have special problems which may warrant the use of aluminum or stainless steel grating, or the application of special coatings to retard corrosion.
3. The use of pre-stressed concrete or fiberglass gratings requires applicable design specifications from the appropriate engineering group. Fiberglass grating may be prohibited. Also, see Section 1.5.
4. All cross bars shall be flush or lower than the bearing bar. Some manufacturers of serrated steel grating currently allow a tolerance of plus or minus 1/16 inch between bearing bar and cross bar. Care must be taken when ordering to insure an even or negative tolerance. The following serrated gratings are presently acceptable for use within the Company (Specification CIV-EG-398):

   **Metal Bar Grating**

   - IKG Borden Grating Type W/B
   - Gary Type GW
   - Blaw-Knox Electroforged
   - Klemp KW-19-4

   **Expanded Metal Grating**

   - US Gypsum Serrated Grip Strut Grating
   - US Gypsum Heavy Duty Grip Strut Safety Grating

   See *Figure 3.14* for details.

## F. NON-PERMITTED WALKING SURFACES

### Chevron Guidelines

1. Mechanically locked grating and non-serrated steel grating are not permitted for walking surfaces.
2. Checkered steel plate for use in stair treads is not permitted. Checkered steel plate is not normally recommended, but is acceptable where its common use has proven to be reliable and safe and provided a non-skid coating is applied.

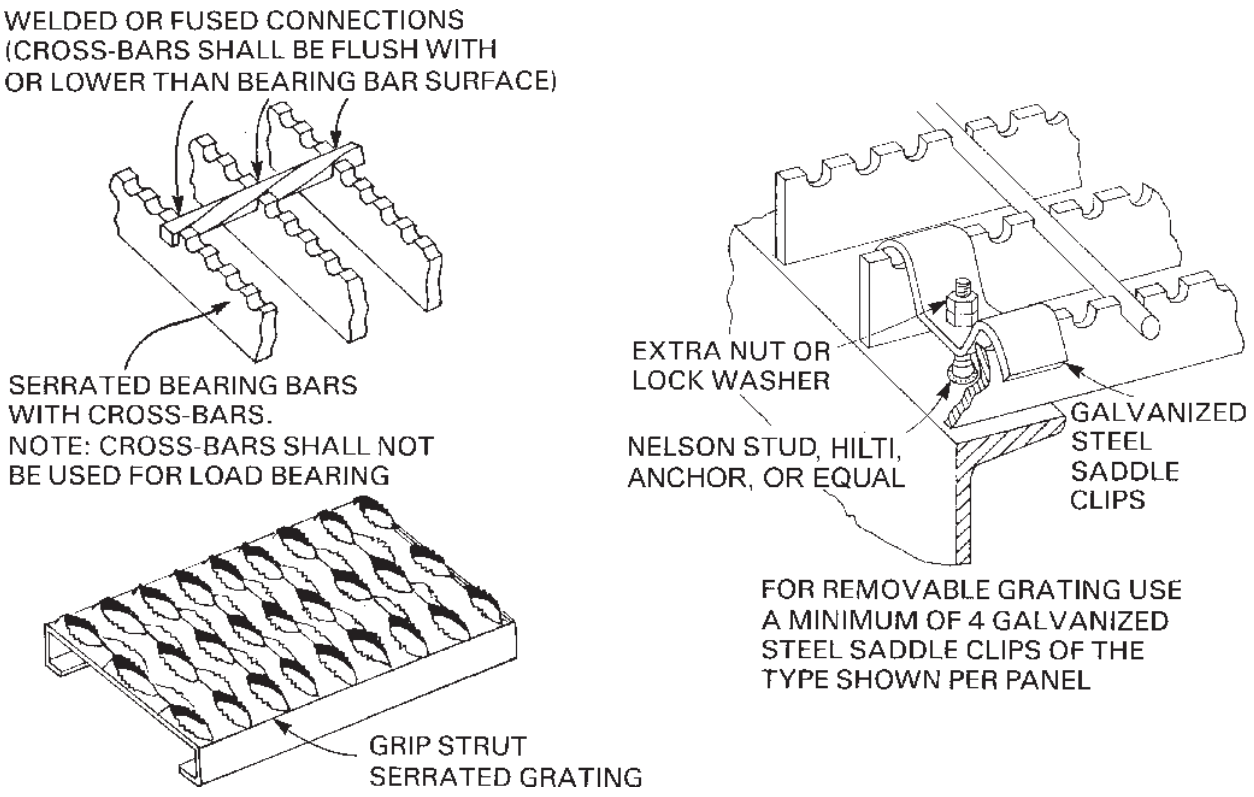



***Figure 3.14 Types of Grating and Attachments***

## 3.5 TYPICAL STEEL TANK GAGING PLATFORMS

### A. CONE ROOF TANKS

**Chevron Guidelines**

1. Circumferential stairs ascending clockwise are preferred.
2. A stair rail is also required between the tank and stairs if the gap between the tank/tank insulation and stairs is greater than 6 inches (see *Figure 3.15*).
3. Provide 2 foot minimum clearance around gage and sample hatches so gager can always work upwind of hatch.
4. See Section 3.4 E for recommended walking surface.
5. All platform legs resting on tank roof shall be at tank roof support locations or at adequately reinforced locations.

## B. FLOATING ROOF TANKS

### Chevron Guidelines

1. Circumferential stairs ascending clockwise are preferred.
2. A stair rail is required between the tank and stairway if the gap between the tank/tank insulation and stairs is greater than 6 inches.
3. Provide 2 foot minimum clearance around gage and sample hatches so gager can always work upwind of hatch (see *Figure 3.16*).
4. See *Figure 3.14* for recommended walking surface.
5. Self-leveling treads are recommended for rolling ladders.
6. See *Figures 3.17, 3.18,* and *3.19* for details of tank platforms, stairs and rolling ladder.

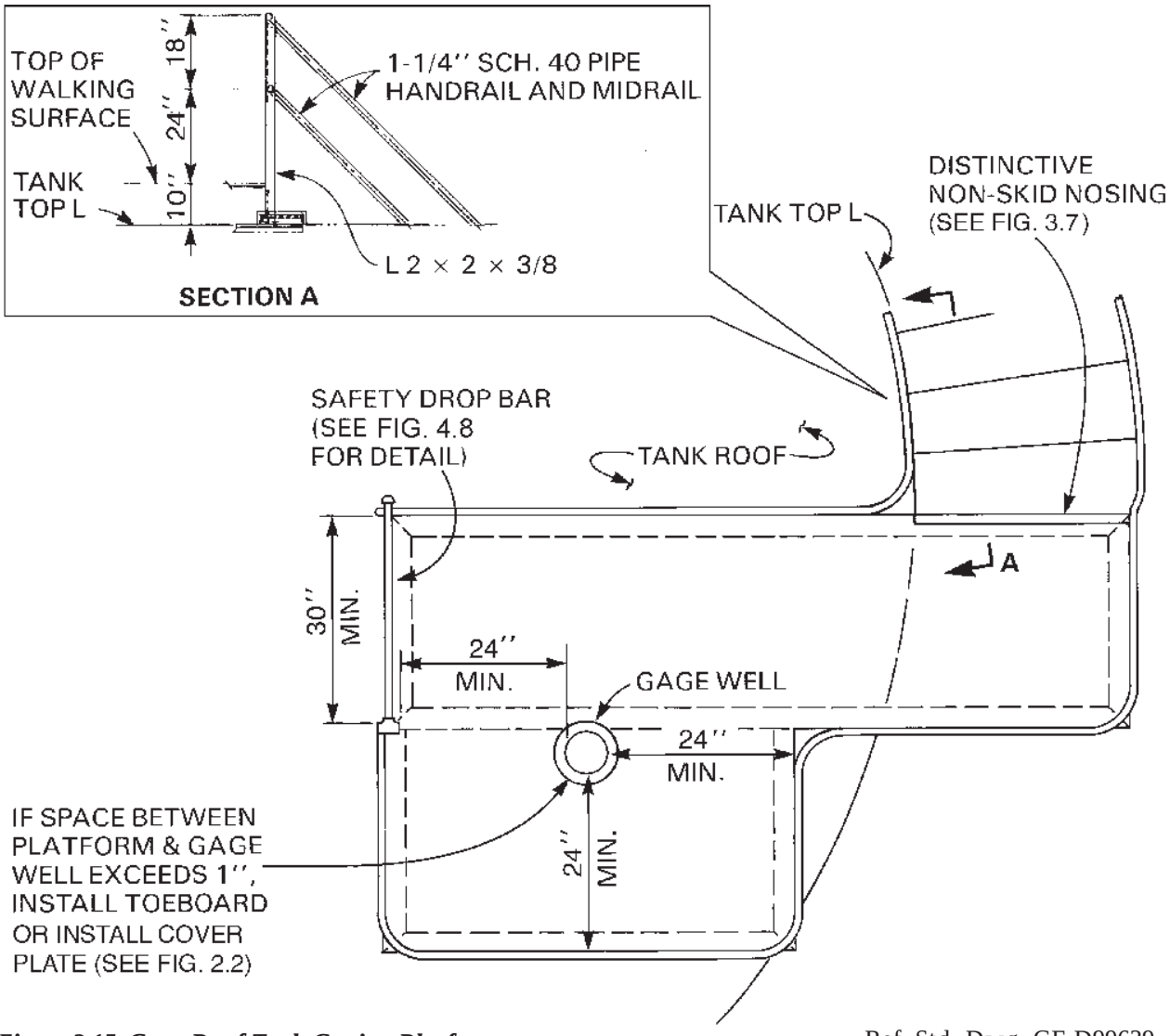



***Figure 3.15 Cone Roof Tank Gaging Platform***

Ref. Std. Dwg. GF-D99639

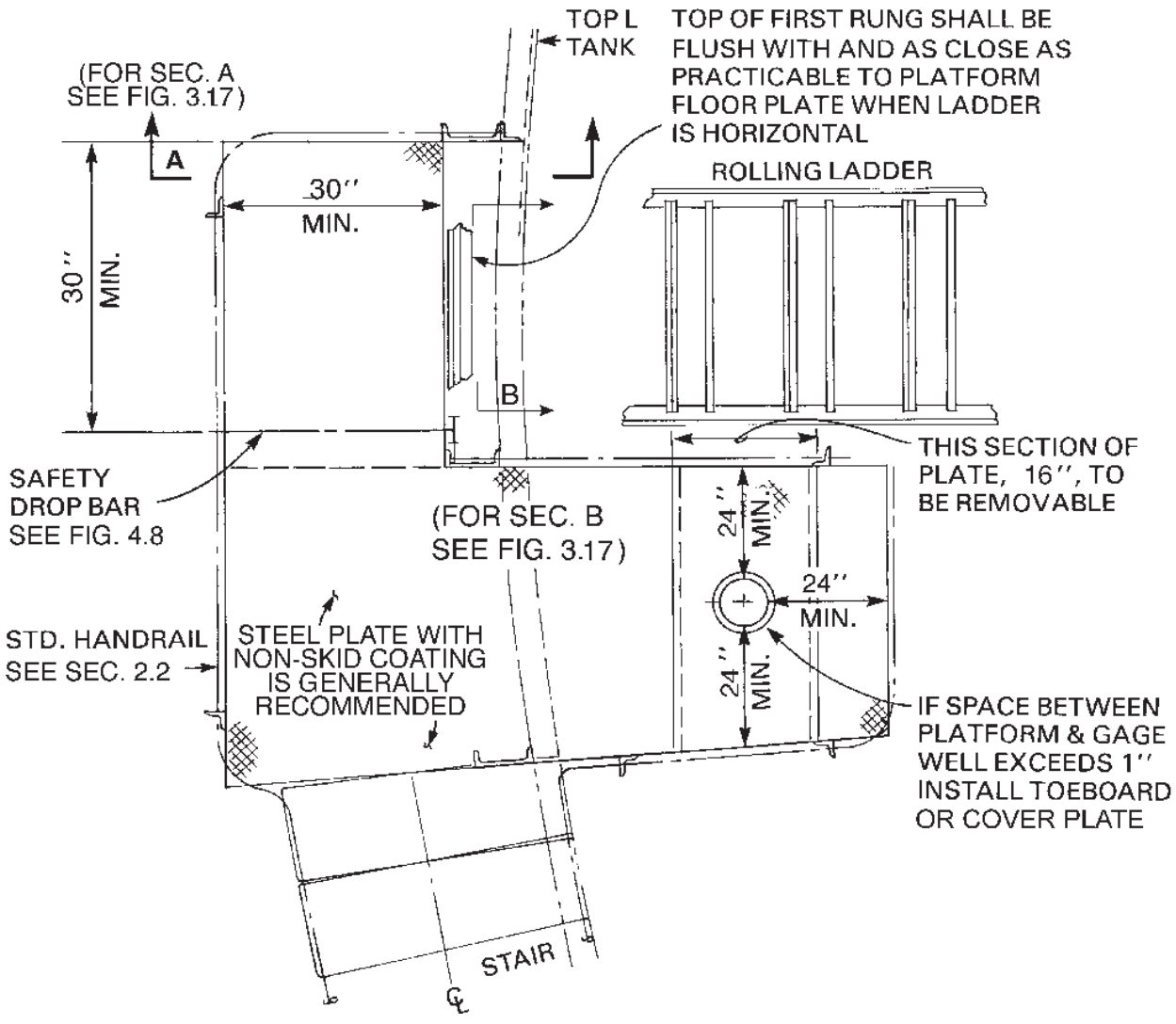



***Figure 3.16 Floating Roof Tank Gaging Platform*** Ref. Std. Dwg. GF-D99639

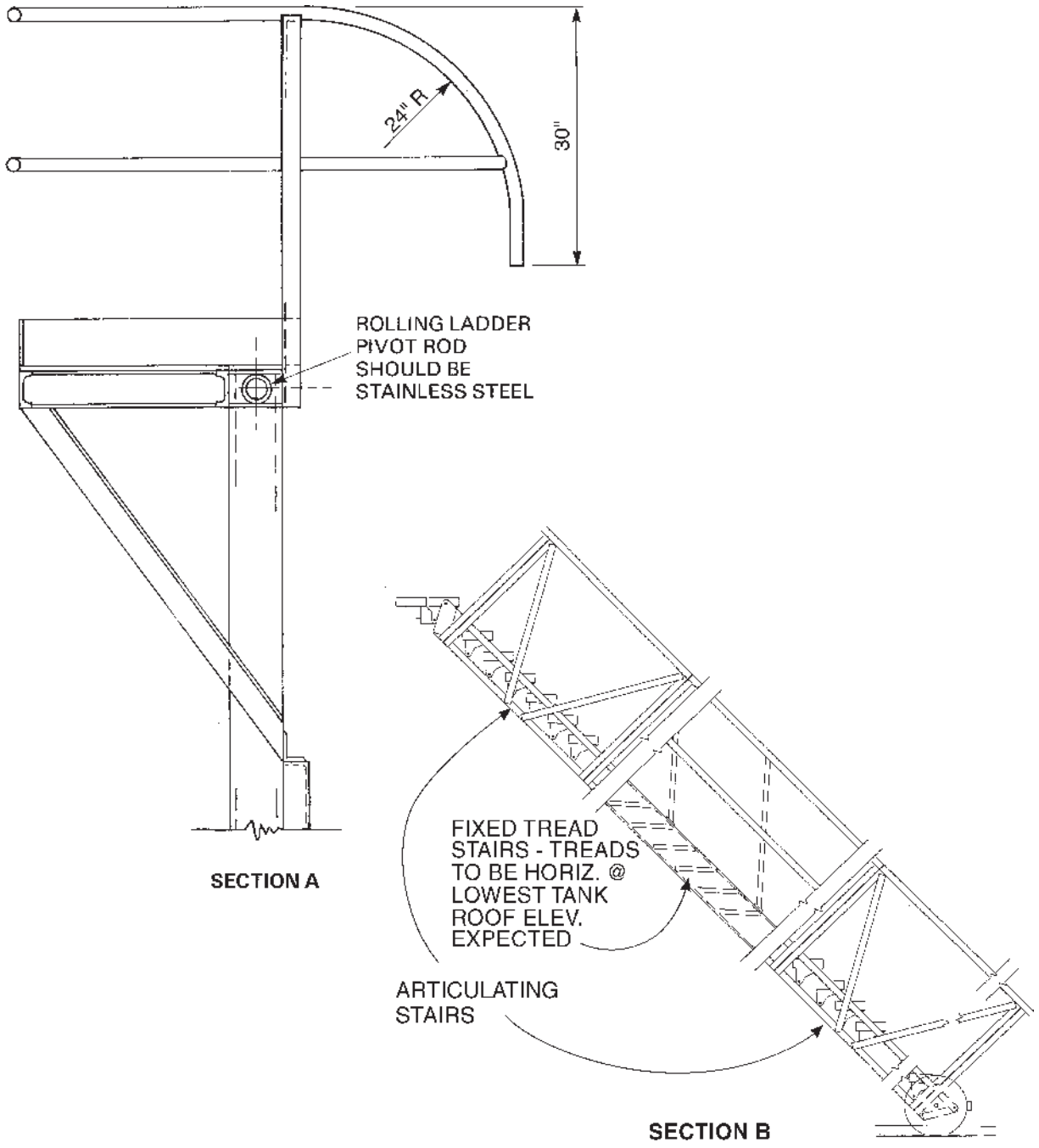



***Figure 3.17 Rolling Ladder Pivot Detail – Section A*** Ref. Std. Dwg. GF-D99639

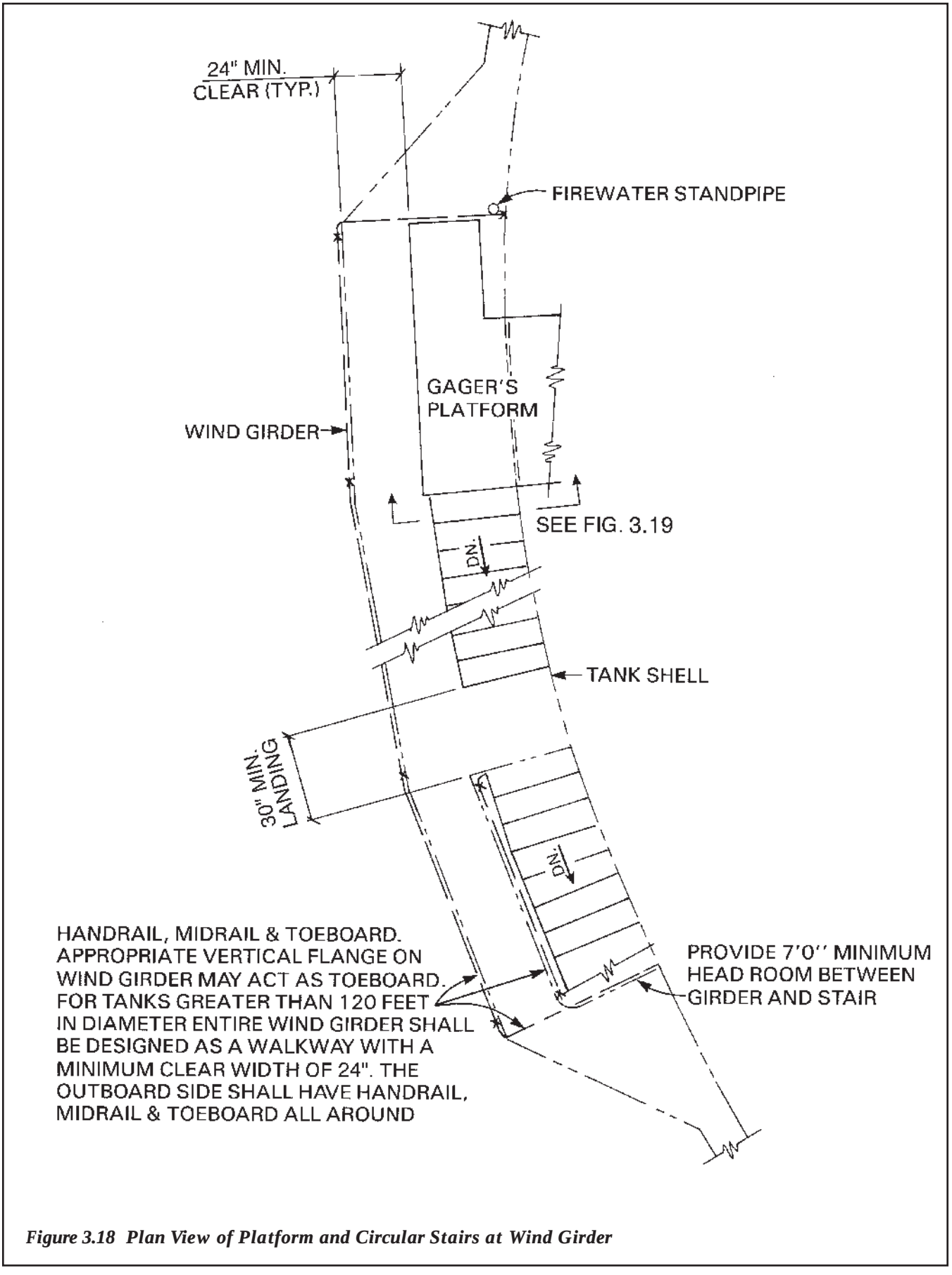



*Figure 3.18 Plan View of Platform and Circular Stairs at Wind Girder*

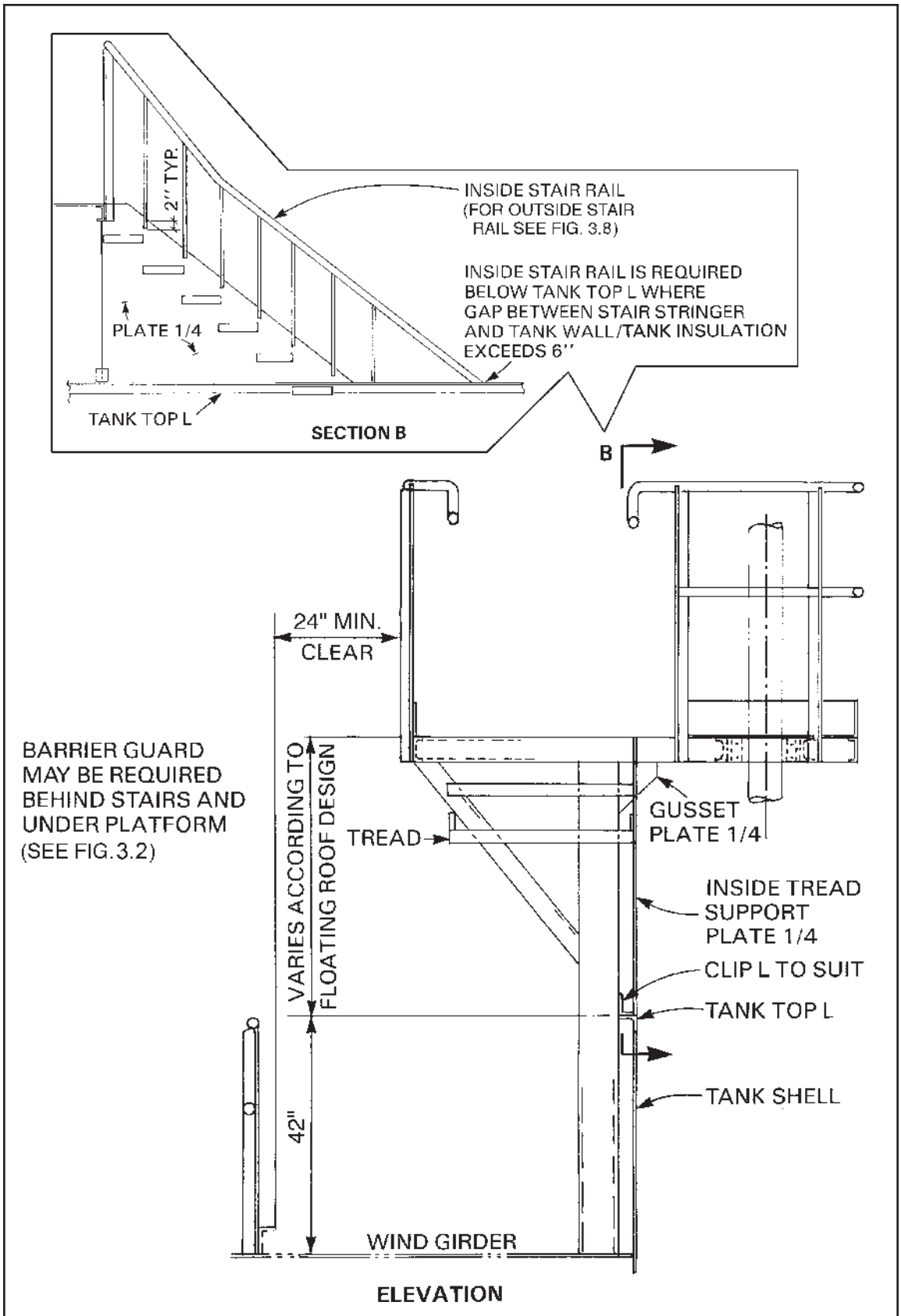



***Figure 3.19 Gaging Platform – Elevation View*** Ref. Std. Dwg. GF-D99639

# 3.6 GENERAL REQUIREMENTS FOR WALKWAYS AND PLATFORMS FOR TANKS

## A. WALKWAYS AND PLATFORMS FOR VERTICAL TANKS

### Chevron Guidelines

1. Tank tops that are insulated must have independent platforms and walkways or, where practical, side-of-tank platforms.
2. Independent platforms and walkways are preferred for all working and walking surfaces of tanks. However, tank roofs on non-insulated tanks may be used for these purposes if: the slope of the roof does not exceed 2 inches per foot, a non-skid surface is applied to and properly maintained on all working, walking surfaces, the tank roof is properly reinforced for live load floor support, and the tank content is non-corrosive material.
3. The walking surface shall be clearly defined by color contrast. The deck of the roof shall be at least 1/8-inch thick and structurally capable of supporting maximum probable live load and shall be inspected annually to assure its structural integrity (see CRTC Loss Prevention Guide No. 6).
4. In areas with significant snow, place stairway on sheltered side of tank if possible.
5. When two or more tanks are interconnected, a second means of egress shall be provided if a potential hazard or injurious chemical exposure can block access to the main egress. Tanks in water or other service which present no potential hazard exposure are exempt from this requirement. See *Figure 3.20*.
6. See *Figures 3.21* and *3.22* for details of walkways for tanks.

**Cal-OSHA 6803**

1. The roofs of tanks and reservoirs in service shall be externally inspected by a qualified person at intervals not to exceed one year. Where a roof has been found to be unsafe or has not been inspected, substantial barriers shall be erected to block off the entire roof or that portion which is unsafe. Legible signs shall be posted at all approaches to the tank or reservoir roof if the entire roof is blocked off, or on the barrier facing all approaches to the defective area if only a portion of the tank or reservoir roof is barricaded. These signs shall read: “DANGER - UNSAFE ROOF - KEEP OFF” or equivalent wording in letters at least 2 inches in height.
2. Where the means of access, the walkways, or the platforms of a group of two or more tanks are connected, there shall be provided sufficient unobstructed stairways, ramps, fixed ladders, slides, walkways or crosswalks to permit an employee to escape from the roof, walkway or platform of any tank in the group in the event the walkway or platform of any other tank in the group becomes impassable due to fire or other emergency. Provided, however, that this order shall not apply to tanks containing water or tanks containing petroleum products having an open cup flash point above 300°F as determined by A.S.T.M. Designation D92, or in the case of fuel oils by the A.S.T.M. Designation D93, and where such tanks are isolated from tanks, pipelines and other equipment containing liquids at a temperature above 150°F, gases, flammable liquids or corrosives.

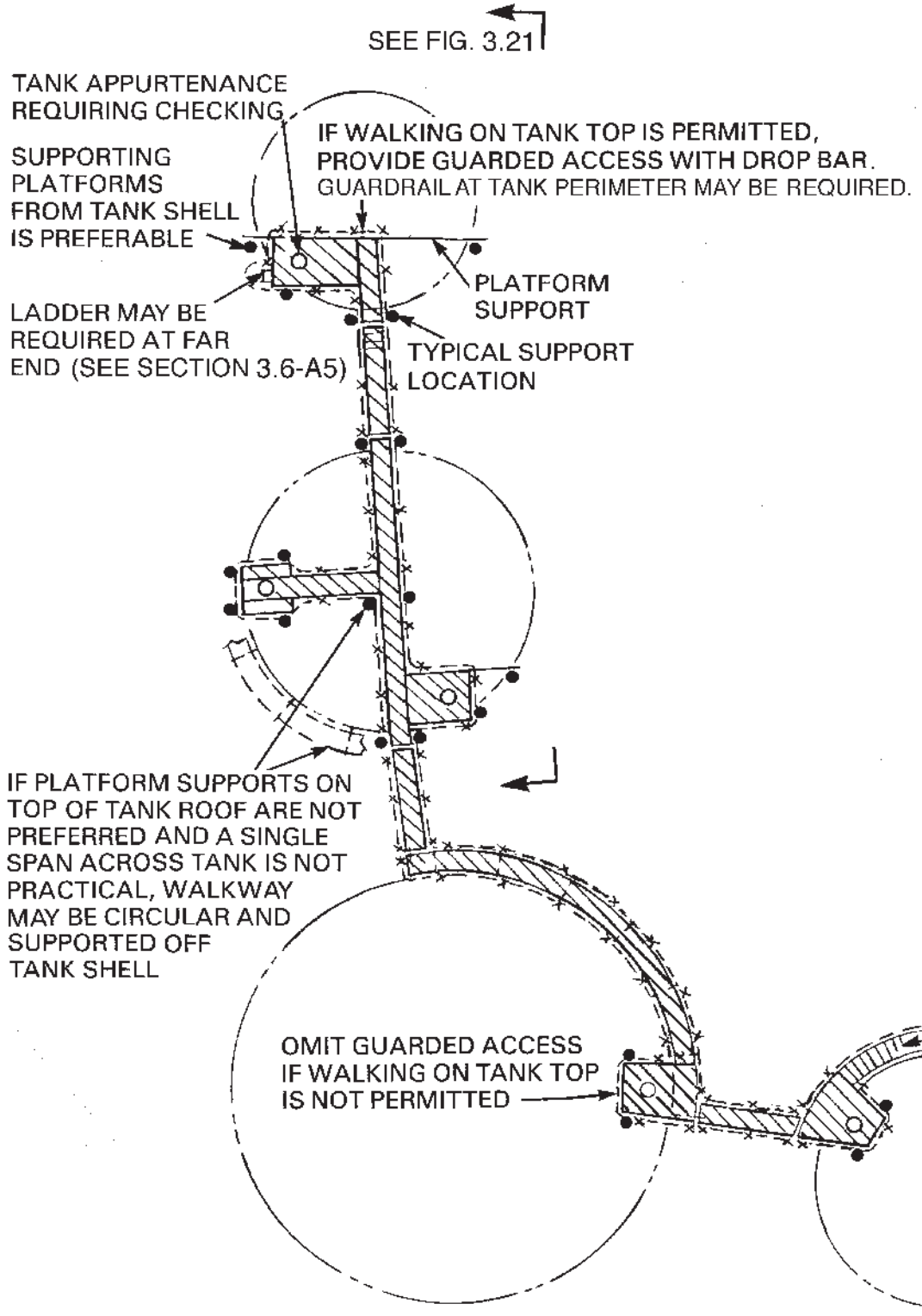



*Figure 3.20 Walkways for Tanks – Plan View*

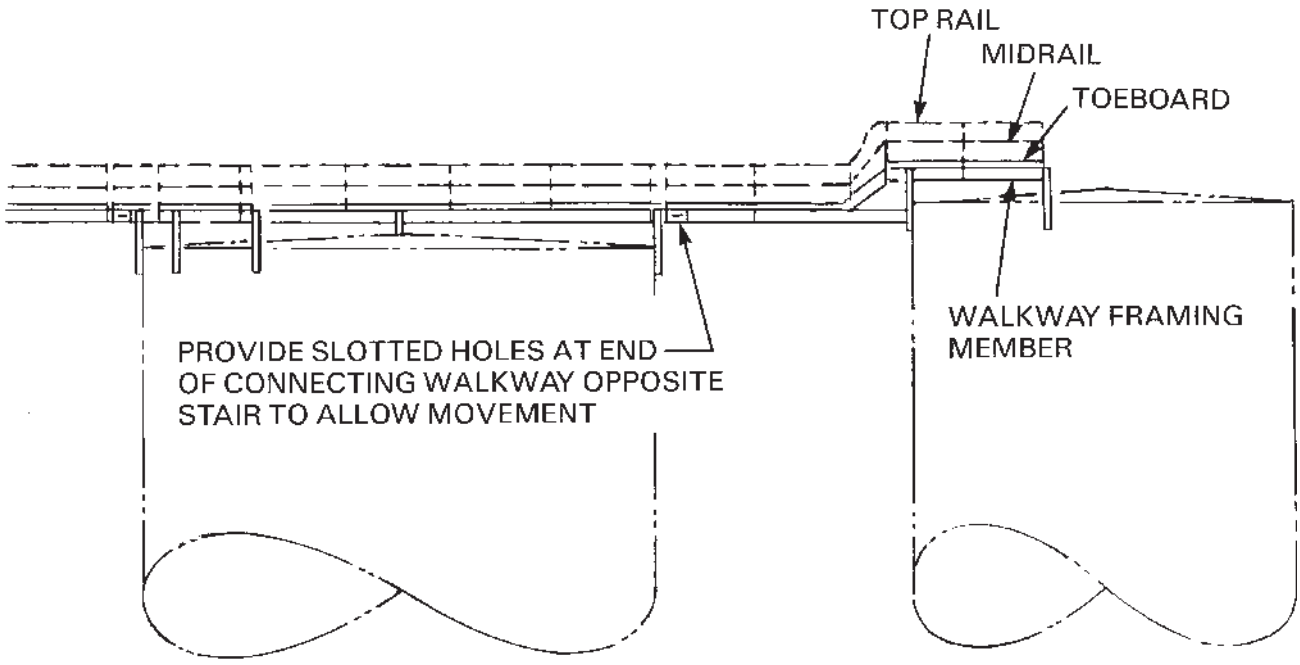



*Figure 3.21 Walkways for Tanks – Elevation View*

## B. WALKWAYS FOR SMALL DIAMETER TANKS

### Chevron Guidelines

**1.** Walkways should be designed for movement and settling of tanks. See *Figure 3.22* for details.

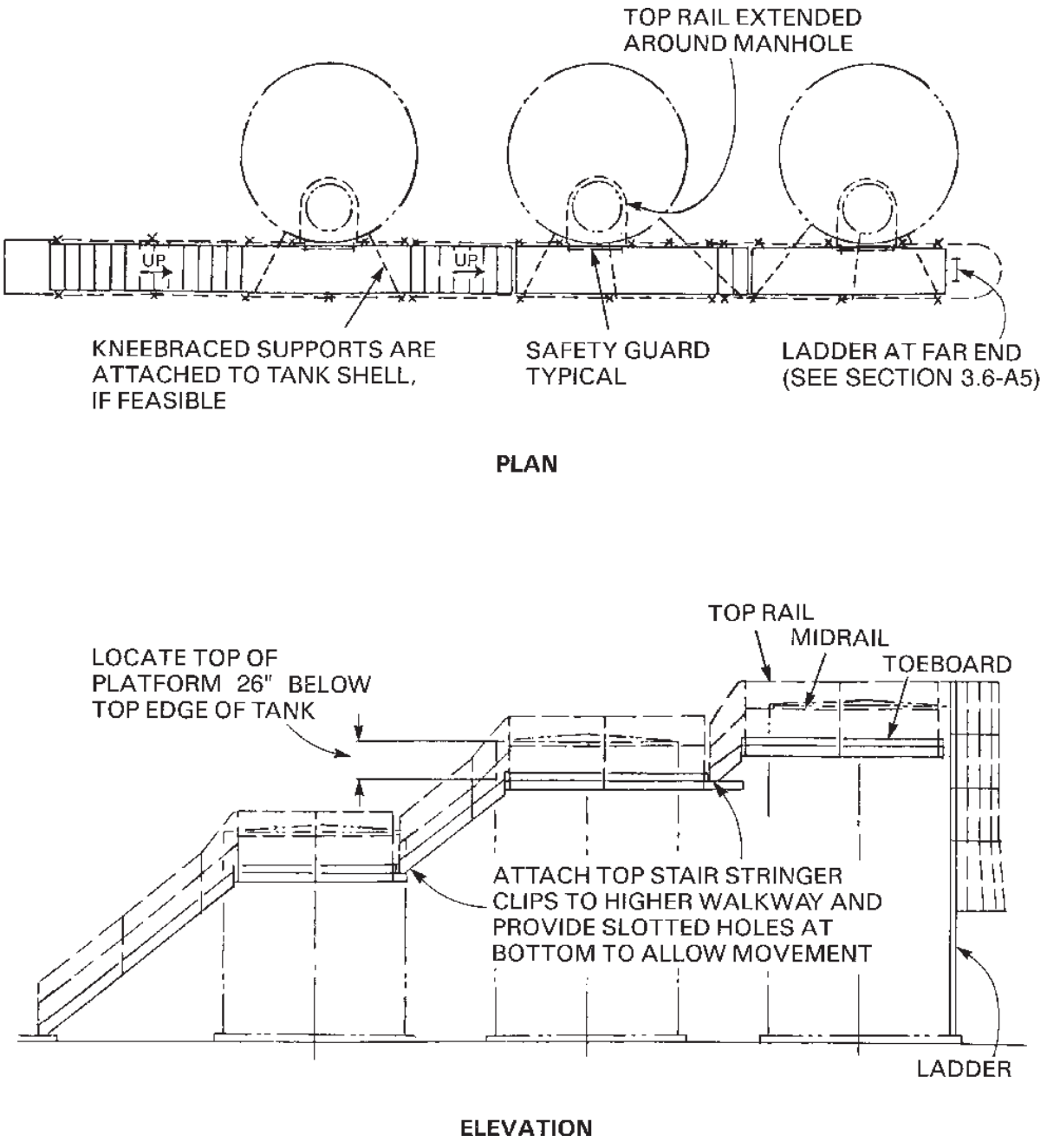



*Figure 3.22 Walkway Arrangement for Small Tanks – Plan and Elevation*

# 3.7 BOLTED STEEL STAIRWAYS AND WALKWAYS

## A. GENERAL REQUIREMENTS FOR BOLTED CONSTRUCTION

### Chevron Guidelines

1. For some remote locations such as production tank batteries, bolted stairways and walkways as defined in API, 12B Standard may be used. However, if they are subject to wear and tear of frequent use or to a severe or wet environment, frequent maintenance may be necessary and their use may not be appropriate. A safety engineer should be consulted to determine applicability and suitability. See *Figure 3.23.*

## B. DESIGN REQUIREMENTS FOR BOLTED CONSTRUCTION

### Chevron Guidelines

1. Railings are required to support 200 lbs. loading at any point and in any direction on top railing.
2. Stair slope should be uniform within an area or location and shall not exceed 45°.
3. Weather protection shall be provided. Galvanized parts are generally recommended. Grating is preferred for stair treads (see *Figure 3.14* for details).

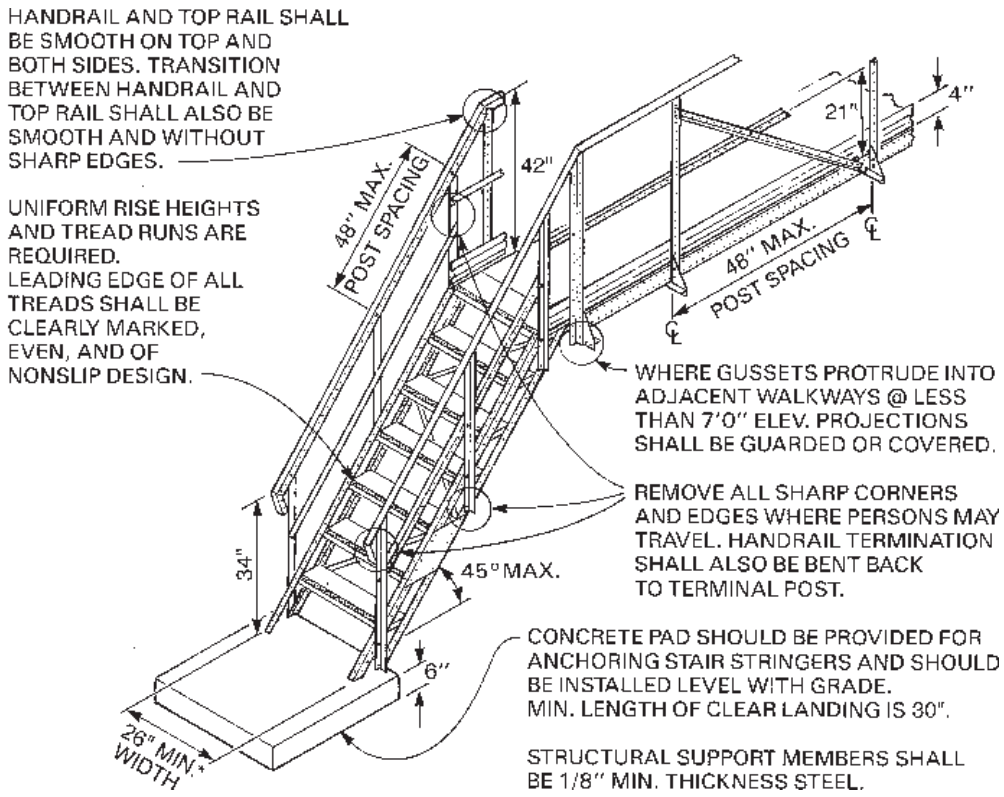



***Figure 3.23 Typical Bolted Stairway and Walkway Construction***

# 3.8 REQUIREMENTS FOR WOOD CONSTRUCTION

## A. GENERAL REQUIREMENTS FOR THE USE OF WOOD

### Chevron Guidelines

**1.** See Section 1.5 for requirements when using wood.

## B. GENERAL REQUIREMENTS FOR WOOD STILES

### Suggested Fabrication Details

**1.** Use only galvanized nails:

- Treads to stringer: 3 - 20d nails each end
- Cleats to stringer: 5 - 20d nails each end
- Plank to brace: 3 - 20d nails each end
- Stringer to plank: 3 - 20d nails each side

**2.** Treads and planks shall be rough cut.

**3.** Baseboards shall be treated Douglas fir or equal. All other lumber shall be construction grade Douglas fir, or equal, and surfaced 4 sides (S4S).

**4.** The wooden stile shown in *Figure 3.24* is designed for 75 PSF live load (acceptable for light duty use only). Structural limit for stair stringer is 3 risers maximum.

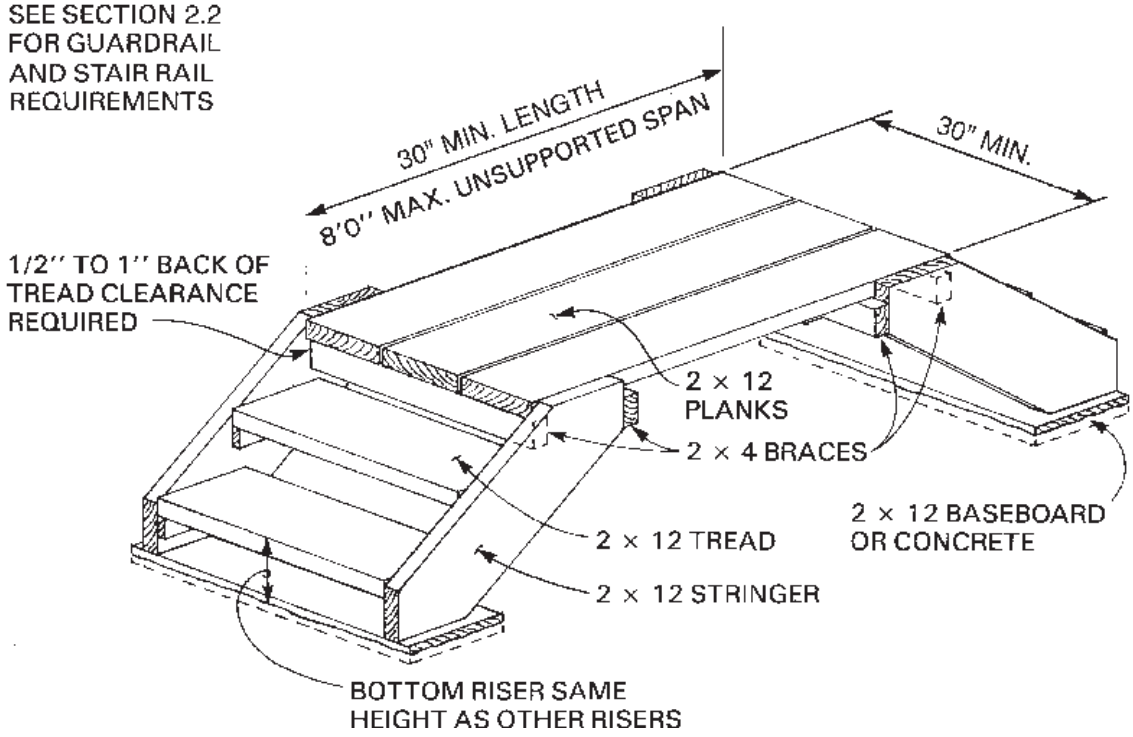



*Figure 3.24 Wooden Stile*

## C. GENERAL REQUIREMENTS FOR WOOD STAIRWAYS

### Chevron Guidelines

1. See *Figure 3.4* and *Figure 3.5* for general requirements for stair slope, tread run, and rise dimensions.
2. Baseboard sill shall be treated Douglas fir or equal.
3. All other lumber shall be construction grade Douglas fir or equal and surfaced 4 sides (S4S), except treads to be rough.

### Suggested Fabrication Details

4. For bolted construction use 5/8-inch galvanized carriage bolts with steel cut washers and two nuts.
5. For nailed construction use only galvanized nails:
   - Cleat to stringer: 5-8d nails (min.)
   - Tread to stringer: 3-20d nails each end (min.)
6. Stairways shall be built to carry a load of five times normal anticipated live load but not less than a 1000 pound moving concentrated load. See *Figure 3.25* for details.

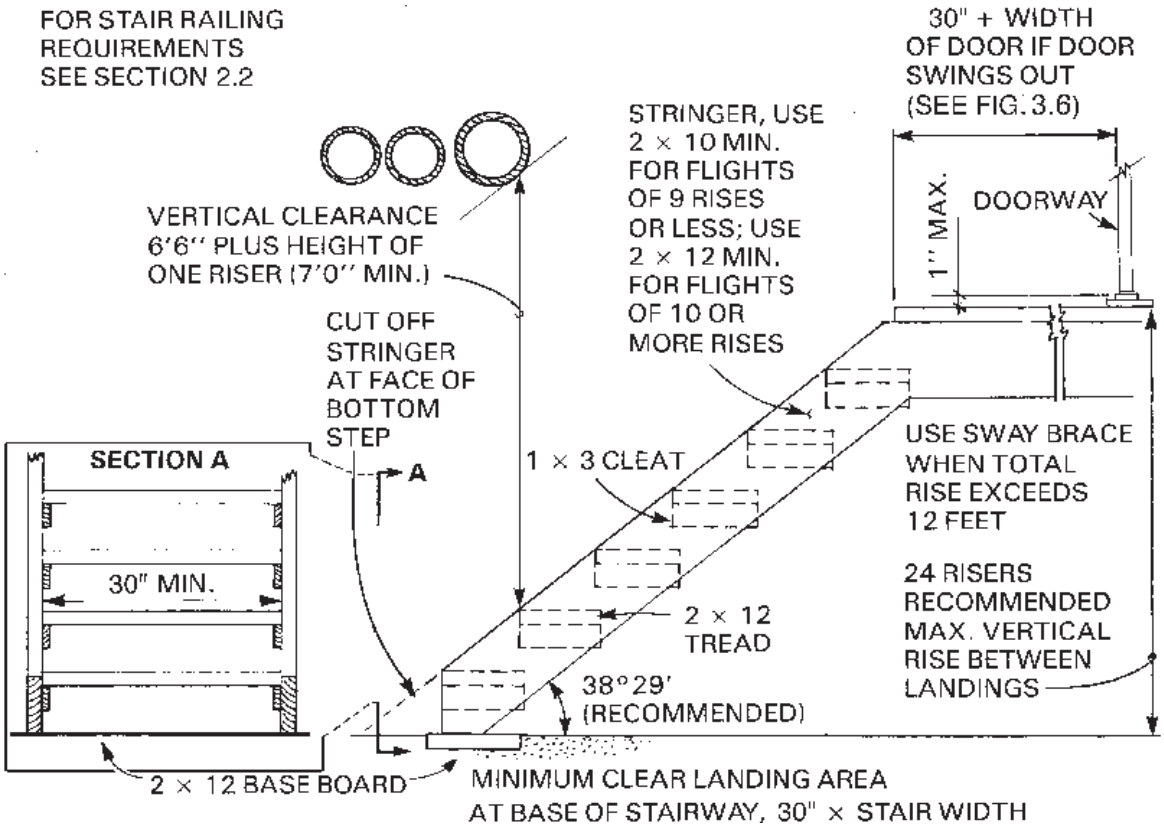



*Figure 3.25 Wooden Stairway*

## D. GENERAL REQUIREMENTS FOR WOOD RAMPS

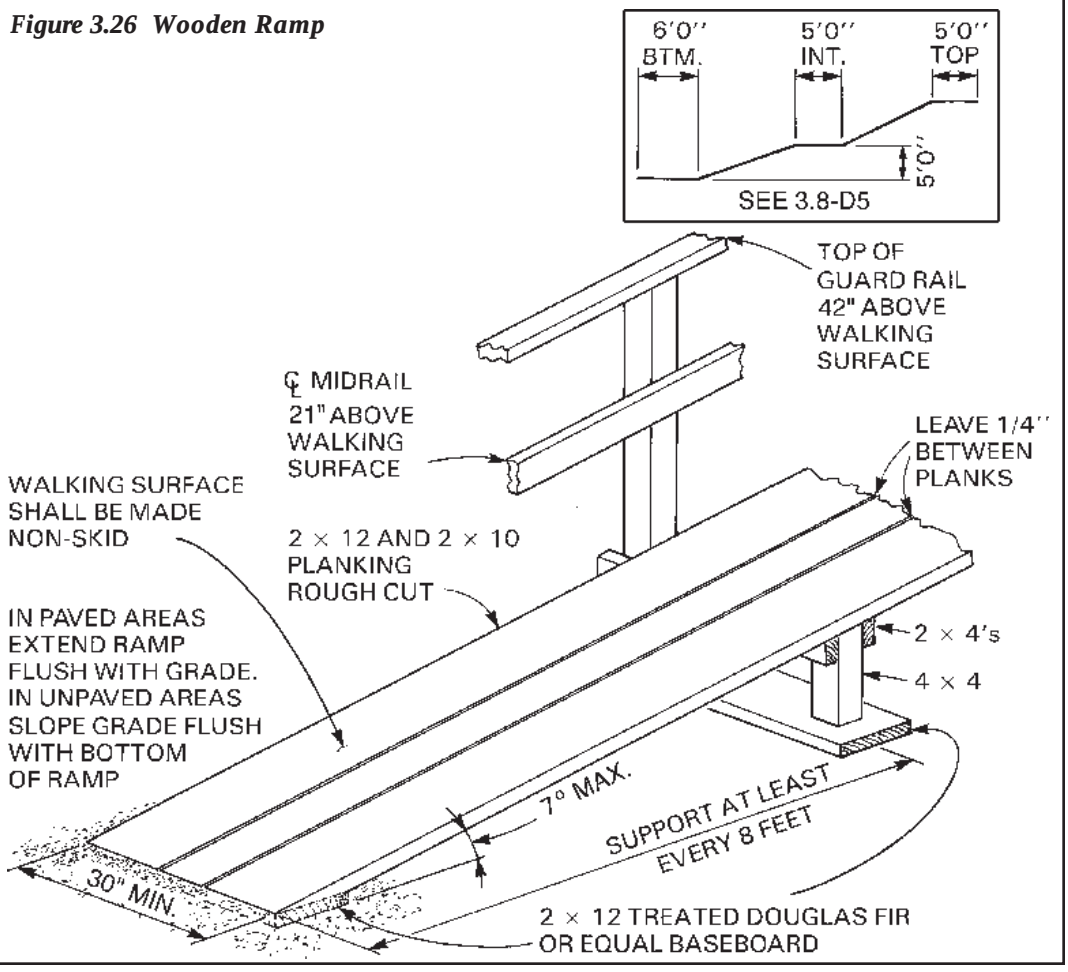
### Chevron Guidelines

1. 7° (1 to 8) is the maximum slope of ramps.
2. All lumber shall be construction grade Douglas fir, or equal. **Top rail shall be surfaced 4 sides (S4S).***
3. See Section 2.2 for railing requirements. Note that ramps may require both guardrail and handrail.
4. The wooden ramp in *Figure 3.26* is designed for 75 PSF live load (acceptable for light duty use only).
5. Ramps used for exits that have slopes greater than 3.5° (1 to 16) require a handrail, landings at top (5 feet long), and bottom (6 feet long), and one intermediate landing for each 5 feet of rise.

### Suggested Fabrication Details

6. All nails shall be galvanized:
   - Cleat to plank: 3 - 8d nails each plank
   - Plank to support: 3 - 20d nails each plank

*Figure 3.26 Wooden Ramp*



## E. GENERAL REQUIREMENTS FOR WOOD WALKWAYS

### Chevron Guidelines

1. All planking shall be construction grade Douglas fir, rough cut. **Top rail shall be surfaced 4 sides (S4S).***
2. Walks or platforms not provided with handrails (less than 30 inches high) shall have stop railings at any sharp change of direction (L or T shaped), such railings being at least as wide as the walkway.
3. The wooden walkway below is designed for 75 pounds per square foot live load (acceptable for use in light duty applications only). See *Figure 3.27* for details.

### Suggested Fabrication Detail

4. All nails to be galvanized:
   - Cleat to plank: 5 - 8d nails each plank
   - Plank to stringer joist: 5 - 20d nails each end
5. For bolting use 5/8-inch galvanized machine bolts with steel cut washers.

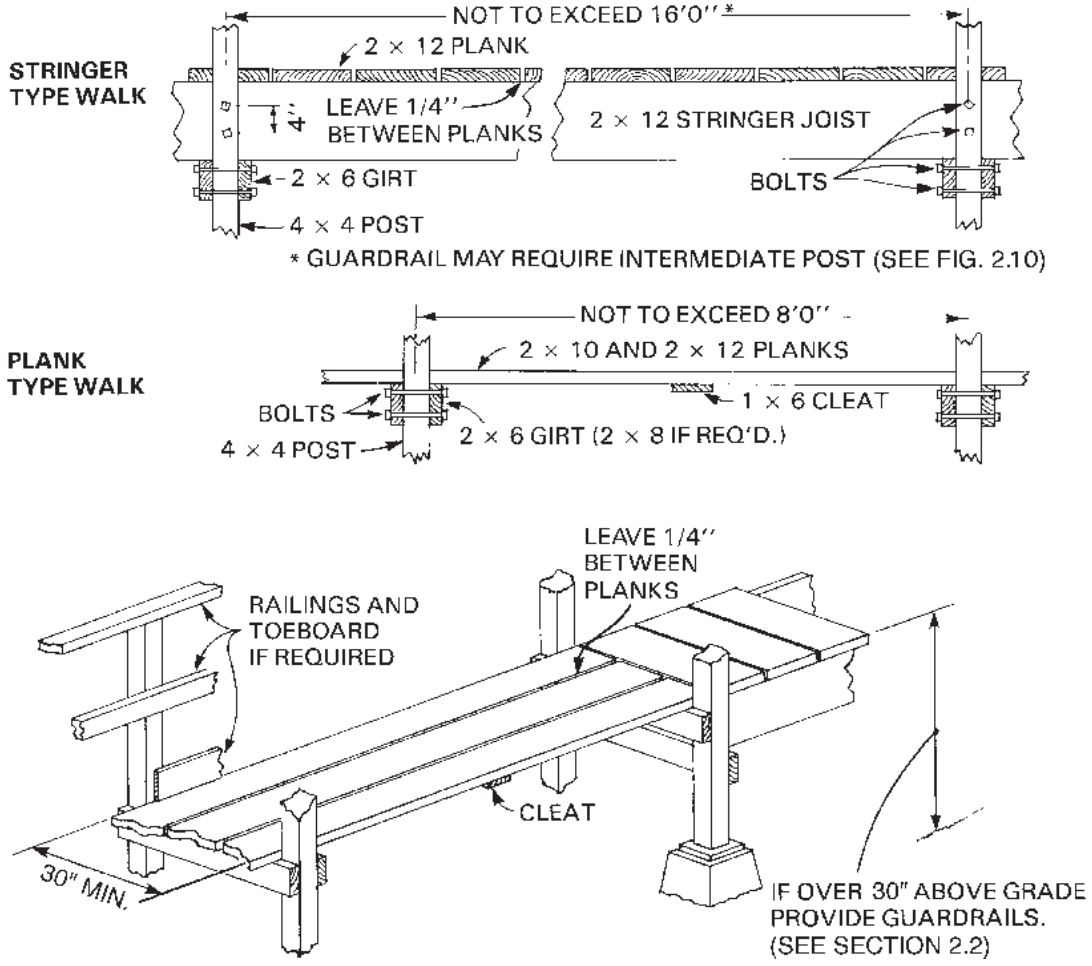



*Figure 3.27 Wooden Walkway*

## 3.9 NOTES AND REFERENCES

### OTHER GUIDES

**24 Cal Code of Regs. 2-3305 & 3306 State Building Code**
"Stairways" and "Ramps"

**Uniform Building Code Section 3306**
"Stairways"

**A64.1-1968 USA Standard**
"Requirements for Fixed Industrial Stairs"

**API Standard Spec. 12B**
"Specification for Bolted Tanks for Storage of Production Liquids"

**Chevron Corporation Loss Prevention Guide No. 6**
"Accessing Tank Roofs"

### ADDITIONAL REFERENCES

***CRTC Civil and Structural Manual***
Section 300

**CRTC Engineering Standards:**
Form CIV-EF-632 - "Low Walks"
Drawing GA-M1001 - "Standard Stile, Type 1"
Drawing GB-M1002 - "Standard Stile, Type 2"
Drawing GD-M13966 - "Standard Steel Stairs"
Drawing GF-D99639 - "Circumferential Stairways and Platforms for Tanks"
Drawing GF-M99931 - "Platforms for Vertical Vessels"
Specification CIV-EG-398 - "Steel Fabrication"