



## Fixed Industrial Stairs: OSHA Standard 1910.24 <sup>1</sup>

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### The Impact of Safety on Florida Agriculture

Florida agriculture, including forestry and seafood, made an annual economic impact of \$53 billion in 1998. More than 81,000 people work on the 40,000 farms in the state, and more than 50,000 are employed in other activities related to agriculture. The state's agricultural enterprises range from large citrus, vegetable and cattle operations to small family-operated farms.

Over the past 10 years, there have been approximately 240 deaths related to agriculture in Florida, according to data compiled by the Deep South Center for Agricultural Health and Safety. In addition, agriculture has one of the highest injury and death rates among U.S. industries.

Safety in Florida agriculture is challenging because:

- the state's agricultural enterprises are diverse,
- safety knowledge among workers varies,

- manual labor is used extensively,
- the climate creates year-round heat stress.
- Therefore, it is vital to assist the public in learning about OSHA documents related to agriculture. More related information is available at the Florida AgSafe Web site and at the OSHA regulations Web site .

### Overview

This is a condensation of Standard 1910.24 of the Occupational Safety and Health Act. This standard contains specifications for the safe design and construction of fixed general industrial stairs, including interior and exterior stairs around machinery, tanks and other equipment, and stairs leading to or from floors, platforms or pits. This standard does not apply to:

- stairs used for fire exit purposes,
- construction operations to private residences, or
- articulated stairs, such as may be installed on floating roof tanks or on dock facilities, the angle of which changes with the rise and fall of the base support.

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This document is not intended to be totally inclusive but rather to highlight the information and requirements in the complete OSHA standard that owners and managers of agricultural businesses should understand.

## Definitions

**Handrail** . A single bar or pipe supported on brackets from a wall or partition to provide a continuous handhold for persons using a stair.

**Nose, nosing** . That portion of a tread projecting beyond the face of the riser immediately below.

**Open riser** . The air space between the treads of stairways without upright members (risers).

**Platform** . An extended step or landing breaking a continuous run of stairs.

**Railing** . A vertical barrier erected along exposed sides of stairways and platforms to prevent falls of persons. The top member of railing usually serves as a handrail.

**Rise** . The vertical distance from the top of a tread to the top of the next higher tread.

**Riser** . The upright member of a step situated at the back of a lower tread and near the leading edge of the next higher tread.

**Stairs, stairway** . A series of steps leading from one level or floor to another, or leading to platforms, pits, boiler rooms, crossovers, or around machinery, tanks, and other equipment that are used more or less continuously or routinely by employees, or only occasionally by specific individuals. A series of steps and landings having three or more risers constitutes stairs or stairway.

**Tread** . The horizontal member of a step.

**Tread run** . The horizontal distance from the leading edge of a tread to the leading edge of an adjacent tread.

**Tread width** . The horizontal distance from front to back of tread including nosing when used.

## Where Fixed Stairs are Required

Fixed stairs must be provided for access from one structure level to another where operations necessitate regular travel between levels, and for access to operating platforms at any equipment which requires attention routinely during operations. Fixed stairs must also be provided where access to elevations occurs daily--or at each shift--for such purposes as inspection, regular maintenance, etc., where such work may expose employees to acids, caustics, gases or other harmful substances, or for which purposes the carrying of tools or equipment by hand is normally required. (It is not the intent of this standard to preclude the use of fixed ladders for access to elevated locations where the use of fixed ladders is common practice.)

Spiral stairways are not permitted except for special limited usage and secondary access situations where it is not practical to provide a conventional stairway. Winding stairways may be installed on tanks and similar round structures where the diameter of the structure is not less than five feet.

## Stair Strength

Fixed stairways must be designed and constructed to carry a load of five times the normal live load anticipated but never of less strength than to carry safely a moving concentrated load of 1,000 pounds.

## Stair Width

Fixed stairways must have a minimum width of 22 inches.

## Angle of Stairway Rise

Fixed stairs must be installed at angles to the horizontal of between 30 degrees and 50 degrees. Any uniform combination of rise/tread dimensions may be used that will result in a stairway at an angle to the horizontal within the permissible range. Table 1 gives rise/tread dimensions which will produce a stairway within the permissible range, stating the angle to the horizontal produced by each combination. However, the rise/tread combinations are not limited to those given in Table 1.

## **Stair Treads**

All treads must be reasonably slip-resistant and the nosings must be of nonslip finish. Welded bar grating treads without nosings are acceptable providing the leading edge can be readily identified by personnel descending the stairway and provided the tread is serrated or is of definite nonslip design. Rise height and tread width must be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs.

## **Stairway Platforms**

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

## **Railings and Handrails**

Standard railings must be provided on the open sides of all exposed stairways and stair platforms. Handrails must be provided on at least one side of closed stairways preferably on the right side descending. Stair railings and handrails must be installed in accordance with the provisions of the document Guarding Floor Wall Openings and Holes: OSHA Standard 1910.23.

## **Vertical Clearance**

Vertical clearance above any stair tread to an overhead obstruction must be at least seven feet measured from the leading edge of the tread.

**Table 1.**

<b>Table 1.</b> Tread Rise and Run in inches for various stairway angles.		
Angle to Horizontal	Rise (in.)	Run (in.)
30 degrees	6-1/2	11
32 degrees	6-3/4	10-3/4
33 degrees	7	10-1/2
35 degrees	7-1/4	10-1/4
36 degrees	7-1/2	10
38 degrees	7-3/4	9-3/4
40 degrees	8	9-1/2
41 degrees	8-1/4	9-1/4
43 degrees	8-1/2	9
45 degrees	8-3/4	8-3/4
46 degrees	9	8-1/2
48 degrees	9-1/4	8-1/4
49 degrees	9-1/2	8