

<b><i>HEALTH AND SAFETY MANUAL</i></b>		
Title: Industrial Stairs		
Approved by: Greg Savoy		Rev. 1/1/08

1 Purpose/Scope:

This program contains specifications for the safe design and construction of fixed general industrial stairs. This classification includes interior and exterior stairs around machinery, tanks, and other equipment, and stairs leading to or from floors, platforms, or pits.

All facilities and all work platforms that are engineered, manufactured and installed on any of the Company's compressor units shall follow the guidelines set forth by this program. This program does not apply to stairs used for fire exit purposes, to construction operations on private residences, or to articulating 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.

2 Definitions/Responsibilities:

2.1 Definitions:

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

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

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

2.1.3 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.

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

2.1.6 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.

2.1.7 Tread - The horizontal member of a step.

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

## 2.2 Responsibilities:

### 2.2.1 Management and Supervisors:

- Ensure all fixed stairways are properly installed and in good condition.
- Determine when and where elevated walking/working surfaces shall be installed on units and then engineer, manufacture and install fixed stairs to the elevated walking/working surfaces.

### 2.2.2 Employees:

- Continuously evaluate the work environment including stairways to improve working conditions and reduce work place hazards.

## 3 Requirements:

3.1 Fixed stairs shall 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.

3.2 Fixed stairs shall also be provided where access to elevations is daily or at each shift for such purposes as gauging, inspection, regular maintenance, etc., where such work may expose employees to acids, caustics, gases, or other harmful substances, where the carrying of tools or equipment by hand is normally required.

3.3 Fixed stairways shall 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.

3.4 Fixed stairways shall have a minimum width of 22 inches.

3.5 Fixed stairs shall be installed at angles to the horizontal of between 30 degrees and 50 degrees

3.5.1 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.

3.5.2 Exhibit I-3.1 gives rise/tread dimensions, which will produce a stairway within the permissible range, stating the angle to the horizontal produced by each combination. The rise/tread combinations are not limited to those given in Exhibit I-3.1.

3.6 All treads shall be reasonably slip-resistant and the nosings shall be of non-slip finish.

- 3.6.1 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 non-slip design.
- 3.6.2 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.
- 3.7 Stairway platforms shall be no less than the width of a stairway and a minimum of 30 inches in length measured in the direction of travel.
- 3.8 Standard railings shall be provided on the open sides of all exposed stairways and stair platforms.
  - 3.8.1 Handrails shall be provided on at least one side of closed stairways preferably on the right side descending.
  - 3.8.2 Stair railings and handrails shall be installed by a competent person familiar with construction requirements.
  - 3.8.3 Vertical clearance above any stair tread to an overhead obstruction shall be at least 7 feet measured from the leading edge of the tread.

3.9 Training:

The proper use of Industrial Stairs shall be included in the annual training of Slips, Trips and Falls.

4 References:

29 CFR 1910.24 Fixed Industrial Stairs

5 Exhibits:

I-3.1 Rise and Tread Chart

**EXHIBIT I-3.1 – Rise and Tread Chart**

Angle to horizontal	Rise in inches	Tread run in inches
30 degrees 35[min]	6 ½	11
32 degrees 08[min]	6 ¾	6 ¾
33 degrees 41[min]	7	10 ½
35 degrees 16[min]	7 ¼	10 ¼
36 degrees 52[min]	7 ½ 10	10
38 degrees 29[min]	7 ¾	9 ¾
40 degrees 08[min]	8	9 ½
41 degrees 44[min]	8 ¼	9 ¼
43 degrees 22[min]	8 ½	9
45 degrees 00[min]	8 ¾	8 ¾
46 degrees 38[min]	9	8 ½
48 degrees 16[min]	9 ¼	8 ¼
49 degrees 54[min]	9 ½	8