PIP STF05511
Fixed Industrial Stairs
PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

This Practice is subject to revision at any time.

© Process Industry Practices (PIP), Construction Industry Institute, The University of Texas at Austin, 3925 West Braker Lane (R4500), Austin, Texas 78759. PIP Member Companies and Subscribers may copy this Practice for their internal use. Changes or modifications of any kind are not permitted within any PIP Practice without the express written authorization of PIP. Authorized Users may attach addenda or overlays to clearly indicate modifications or exceptions to specific sections of PIP Practices. Authorized Users may provide their clients, suppliers and contractors with copies of the Practice solely for Authorized Users’ purposes. These purposes include but are not limited to the procurement process (e.g., as attachments to requests for quotation/purchase orders or requests for proposals/contracts) and preparation and issue of design engineering deliverables for use on a specific project by Authorized User’s client. PIP’s copyright notices must be clearly indicated and unequivocally incorporated in documents where an Authorized User desires to provide any third party with copies of the Practice.

PUBLISHING HISTORY

April 2002    Issued
January 2017   Technical Correction

Not printed with State funds
Table of Contents

1. Scope ........................................... 2

2. References ................................. 2
   2.1 Process Industry Practices ................. 2
   2.2 Industry Codes and Standards ............. 2
   2.3 Government Regulations .................... 3

3. Design ....................................... 3

List of Details
   Plan at Landing .............................. 5
   Section A-A .................................. 6
   Section B-B .................................. 6
   Section C-C ................................... 7
   Detail 1 ...................................... 8
   Detail 2 ...................................... 8
   Detail 3 ....................................... 9
   Detail 4 ....................................... 9
   Section D-D ................................... 10
   Section E-E ................................... 10
   Detail 5 ...................................... 11
   Detail 6 ...................................... 11
1. **Scope**

This Practice provides the fabricator and erector with a standard fixed industrial stair design to be used in process industry facilities. This Practice also provides process industry companies with design guide information to be used in specifying and designing fixed industrial stairs.

This Practice contains the design details for fabrication and installation of typical OSHA-regulated stairs for open structures and miscellaneous platforms for regular operational access/egress. Details comply with NFPA 101 - *Life Safety Code for Industrial Occupancies*. These details are to be issued to fabricators supplying these stairs and to the erectors for use in installation.

Any conflicts or inconsistencies between this Practice and the design drawings or other contract documents shall be brought to the attention of the buyer for resolution.

*Comment:* As of the effective date of January 17, 2017, this Practice is no longer fully compliant with new OSHA Regulations 29 CFR 1910 Subpart D – *Walking-Working Surfaces* that were published on November 18, 2016. This Practice will need to be supplemented or modified by the user to be in full compliance with the new OSHA regulations until the complete revision of this Practice incorporating the changes is published by PIP.

2. **References**

Applicable requirements in the following PIP Practices, codes, and standards shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles will be used herein when appropriate.

2.1 **Process Industry Practices (PIP)**

- PIP STS05120 - *Fabrication of Structural and Miscellaneous Steel Specification*
- PIP STS05130 - *Erection of Structural and Miscellaneous Steel Specification*
- PIP STF05520 - *Pipe Railing for Walking and Working Surface Details*
- PIP STF05521 - *Angle Railing for Walking and Working Surface Details*

2.2 **Industry Codes and Standards**

- American National Standards Institute (ANSI)/American Society of Safety Engineers (ASSE)
  - ANSI A1264.1 - *Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems*

- American Society of Testing and Materials (ASTM)

- National Fire Protection Association (NFPA)
  - NFPA 101 - *Life Safety Code*
2.3 Government Regulations

Federal standards and instructions of the Occupational Safety and Health Administration and any additional requirements by state or local agencies that have jurisdiction where the stairs are to be installed shall apply. The user should determine whether local codes exist that should be applied to this Practice.

- U.S. Department of Labor, Occupational Safety and Health Administration (OSHA)
  - OSHA 29 CFR 1910, Subpart D - Walking-Working Surfaces

3. Design

3.1 The project design drawings and data sheets specify the location, orientation, and arrangement of stairs for regular operational use, special fabrication details, and any changes to the requirements of this Practice.

3.2 All structural material shall be steel and shall comply with PIP STS05120 unless noted otherwise.

3.3 All welds shall be smooth, continuous, and sealed. Fabrication shall comply with PIP STS05120.

3.4 Stair design is based on a moving 1000-lbs (4.5-kN) concentrated live load applied to the stair stringers or a uniform load of 100 psf (4.8 kPa) applied to the stair assembly. Stair treads shall resist a 300-lbs (1.33-kN) concentrated load applied at mid span.

3.5 Maximum height between landings shall not exceed 12.0 feet (3.7 m).

3.6 Stair width shall be 30 inches (75 cm) unless noted otherwise. The engineer shall check the stair width against NFPA 101 requirements according to total occupant load served by the stairway. NFPA 101 has the following requirements:

- For 20 people or fewer, the minimum width shall be 22 inches (56 cm).
- For 21 to 49 people, the minimum width shall be 36 inches (91 cm).
- For 50 or more people, the minimum width shall be 44 inches (112 cm).

3.7 Stairs shall be installed at angles to the horizontal plane of between 30 deg. and 42 deg.

3.8 Minimum tread depth shall be 10 inches (25.4 cm). Maximum riser height shall be 9 inches (22.9 cm). Some rise/tread combinations within the permissible range are as follows:

<table>
<thead>
<tr>
<th>Angle to Horizontal (deg.)</th>
<th>Rise (inches [cm])</th>
<th>Tread Depth (inches [cm])</th>
<th>Nominal Tread Width (inches [cm])</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.6</td>
<td>6.5 (16.5)</td>
<td>11 (27.9)</td>
<td>12 (30.5)</td>
</tr>
<tr>
<td>32.5*</td>
<td>7 (17.8)</td>
<td>11 (27.9)</td>
<td>12 (30.5)</td>
</tr>
<tr>
<td>35.5</td>
<td>7.5 (19.1)</td>
<td>10.5 (26.7)</td>
<td>12 (30.5)</td>
</tr>
<tr>
<td>38.7</td>
<td>8 (20.3)</td>
<td>10 (25.4)</td>
<td>11 (27.9)</td>
</tr>
<tr>
<td>40.4</td>
<td>8.5 (21.6)</td>
<td>10 (25.4)</td>
<td>11 (27.9)</td>
</tr>
<tr>
<td>42</td>
<td>9 (22.9)</td>
<td>10 (25.4)</td>
<td>11 (27.9)</td>
</tr>
</tbody>
</table>

* A minimum tread depth of 11 inches (27.9 cm) and a maximum rise height of 7 inches (17.8 cm) shall be used where stairs service areas other than industrial equipment access or where more than 20 people will use the stairs as a means of egress.
3.9  Stair railing shall comply with the requirements of *PIP STF05520* or *PIP STF05521*.

3.10 Stair assemblies shall be coated after fabrication in accordance with the design drawings and the specifications governing the project. Galvanizing (when required) shall be done after fabrication and in accordance with *PIP STS05120*.

3.11 Erection of stairs shall comply with *PIP STS05130*. 
NOTE: HANDRAILS NOT SHOWN FOR CLARITY

PLAN @ LANDING

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.

Comment: As of the effective date of January 17, 2017, this Practice is no longer fully compliant with new OSHA Regulations 29 CFR 1910 Subpart D - Walking-Working Surfaces that were published on November 18, 2016. This Practice will need to be supplemented or modified by the user to be in full compliance with the new OSHA regulations until the complete revision of this Practice incorporating the changes is published by PIP.
Comment: As of the effective date of January 17, 2017, this Practice is no longer fully compliant with new OSHA Regulations 29 CFR 1910 Subpart D - Walking-Working Surfaces that were published on November 18, 2016. This Practice will need to be supplemented or modified by the user to be in full compliance with the new OSHA regulations until the complete revision of this Practice incorporating the changes is published by PIP.
PROCESS INDUSTRY PRACTICES
FABRICATION/INSTALLATION DETAILS

FIXED INDUSTRIAL
STEEL STAIRS

SECTION C–C
PAGE 5

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.

Comment: As of the effective date of January 17, 2017, this Practice is no longer fully compliant with new OSHA Regulations 29 CFR 1910 Subpart D - Walking-Working Surfaces that were published on November 18, 2016. This Practice will need to be supplemented or modified by the user to be in full compliance with the new OSHA regulations until the complete revision of this Practice incorporating the changes is published by PIP.
FINISH GRATING EDGES AT STAIRWAY WITH EMBEDDED GRIT ABRASIVE NOSING FLUSH WITH GRATING SURFACE

TOP OF CHK'D PL OR GRT'G

WORK POINT

NOSING LINE

Comment: As of the effective date of January 17, 2017, this Practice is no longer fully compliant with new OSHA Regulations 29 CFR 1910 Subpart D - Walking-Working Surfaces that were published on November 18, 2016. This Practice will need to be supplemented or modified by the user to be in full compliance with the new OSHA regulations until the complete revision of this Practice incorporating the changes is published by PIP.

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.
FINISH GRATING EDGES AT STAIRWAY WITH EMBEDDED GRIT ABRASIVE NOSING FLUSH WITH GRATING SURFACE

WORK POINT

TOP OF CHK'D PL OR GRIT'G

2 1/2 (63) MIN.
SEE DESIGN DRAWING

NOSING LINE

COMMENT: As of the effective date of January 17, 2017, this Practice is no longer fully compliant with new OSHA Regulations 29 CFR 1910 Subpart D - Walking-Working Surfaces that were published on November 18, 2016. This Practice will need to be supplemented or modified by the user to be in full compliance with the new OSHA regulations until the complete revision of this Practice incorporating the changes is published by PIP.

CONCRETE PAD NOT IN STAIR FABRICATORS
SCOPE OF WORK

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.
Comment: As of the effective date of January 17, 2017, this Practice is no longer fully compliant with new OSHA Regulations 29 CFR 1910 Subpart D - Walking-Working Surfaces that were published on November 18, 2016. This Practice will need to be supplemented or modified by the user to be in full compliance with the new OSHA regulations until the complete revision of this Practice incorporating the changes is published by PIP.
Comment: As of the effective date of January 17, 2017, this Practice is no longer fully compliant with new OSHA Regulations 29 CFR 1910 Subpart D - Walking-Working Surfaces that were published on November 18, 2016. This Practice will need to be supplemented or modified by the user to be in full compliance with the new OSHA regulations until the complete revision of this Practice incorporating the changes is published by PIP.