PROCESS INDUSTRY PRACTICES

COMPLETE REVISION
May 2017

Machinery

PIP RESP002
Design of *ASME B73.1* and General Purpose Pump Baseplates

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.

PUBLISHING HISTORY

February 1996	*Issued*
January 2004	*Complete Revision*
May 2004	*Technical Correction*
October 2010	*Complete Revision*
May 2017	*Complete Revision*

Not printed with State funds

PIP RESP002
Design of *ASME B73.*1 and General Purpose Pump Baseplates

Table of Contents

1. Scope 2

2. References 2
2.1 Process Industry Practices 2
2.2 Industry Codes and Standards 2

3. Definitions 2

4. Requirements 3
4.1 General 3
4.2 Grouted Baseplates 4
4.3 Free-Standing Baseplates (Non-Grouted) 6
4.4 Pre-Cast Polymer Baseplates/Bases 11

Data Forms
RESP002-DM – Data Sheet for Pump Baseplates – SI Units
RESP002-D – Data Sheet for Pump Baseplates – US Customary Units

1. Scope

This Practice provides the minimum requirements for *ASME B73.1* pump baseplates and baseplates for general purpose pumps.

Comment: The function of a baseplate is to provide a structure under a pump and its driver that maintains alignment between the two components while accepting published piping loads. A pump properly supported and installed improves pump reliability and extends the operating life of such components as bearings, couplings, and seals.

This Practice describes minimum requirements for horizontal pump baseplates that are not covered in the API standards.

2. References

Applicable parts of the following Practice and industry 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 are used herein where appropriate.

2.1 Process Industry Practices (PIP)

- PIP RESP73H - *Application of* ASME B73.1 *Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process*
- PIP REIE686A - *Recommended Practice for Machinery Installation and Installation Design (Supplement to PIP REIE686/API RP686)*
- PIP CTCE1000 - *External Coating Systems Selection Criteria*
- PIP CTSE1000 - *Application of External Coatings*

2.2 Industry Codes and Standards

- American Society for Mechanical Engineers (ASME)
  - ASME B73.1 - *Specification for Horizontal End Suction Centrifugal Pumps for Chemical Process*
- Steel Structures Painting Council (SSPC)
  - SSPC SP 6 - *Commercial Blast Cleaning*

3. Definitions

purchaser: The party who awards the contract to the supplier. The purchaser may be the owner or the owner's authorized agent.

supplier: The party responsible for furnishing general purpose pump baseplates

4. Requirements

4.1 General

4.1.1 The style of baseplate and other purchaser options are provided on the purchaser's *PIP RESP002-DM* or *PIP RESP002-D* Data Sheet.

4.1.2 Baseplate dimensional requirements shall be in accordance with *ASME B73.1* except for free-standing baseplate designs and general purpose pump baseplates that are not in accordance with *ASME B73.1* design.

4.1.3 If a dimensional conflict occurs between this Practice and *ASME B73.1*, this Practice shall take precedence.

4.1.4 The baseplate shall be stiff enough to resist distortion and deflection at the equipment mounting pad through installation and after curing of the grout. Baseplates shall be sufficiently rigid to attain and maintain pump and driver alignment specified in *PIP REIE686A.*

Comment: Caution is required if applying stilt support style base plates in brittle pipe service (e.g., FRP, thermoplastic) because the support may not be rigid enough to prevent breakage of the pipe. If the suction centerline is significantly elevated above grade, excessive stilt height can result in a less stable installation.

4.1.5 If specified, a drain rim shall be provided to route liquid to a low-point drain.

4.1.6 If the process fluid is corrosive or reactive, protection of the baseplate shall be specified.

4.1.7 Final machining of the mounting pads shall be performed in a manner to ensure that all pump mounting pads are co-planar within 0.05 mm (0.002 inch), that all driver mounting pads are co-planar within 0.05 mm (0.002 inch), and that the baseplate is in a free and undistorted position.

4.1.8 The driver and pump mounting pads shall be flat and parallel within 0.15 mm/m (0.002 inch per foot).

4.1.9 Mounting surfaces shall be machined to a 3.20 microns (125 microinch) mm_s roughness R_a or better finish.

4.1.10 To ensure flexibility in achieving the final alignment after baseplate installation, the final machined height of the driver mounting pads shall allow for the installation of a 3 mm thick (1/8 inch) shim pack. The shim pack shall be full bearing, 300 series stainless steel, and the quantity of shims in each pack shall be five or less. The shim packs shall be slotted to allow installation and removal without removing the fasteners.

4.1.11 Before shipment, the pump and driver shall be pre-aligned to within 0.38 mm (0.015 inch) parallel offset and 0.003 mm/mm (0.003 inch/inch) angular offset. The bolts shall be centered in their holes. Shims are not permitted under the pump.

4.1.12 Pump mounting surface shall be drilled and tapped. The useable tapped depth shall not be less than one and one-half times the bolt diameter. Through bolting of pump feet shall not be permitted.

4.1.13 Driver feet may be through bolted if mounted on a raised, preformed, fabricated superstructure where the nut can be reached with ordinary hand tools. If the superstructure is solid blocks, the mounting surface shall be drilled and tapped, the tapped depth being not less than one and one-half times the bolt diameter.

4.1.14 Horizontal driver positioning screws for the transverse direction shall be supplied for all drivers in excess of 20 kg (40 pounds). If specified on the purchaser's *PIP RESP002-DM* or *PIP RESP002-D* Data Sheet, horizontal positioning screws for the axial direction shall also be supplied. The driver positioning device above the plane of the mounting surface shall be removable without cutting, burning, or grinding.

4.1.15 A minimum of two grounding lugs should be provided on diagonally opposite corners of the base plate.

4.2 Grouted Baseplates

4.2.1 See Figure 1 for a typical PIP baseplate.

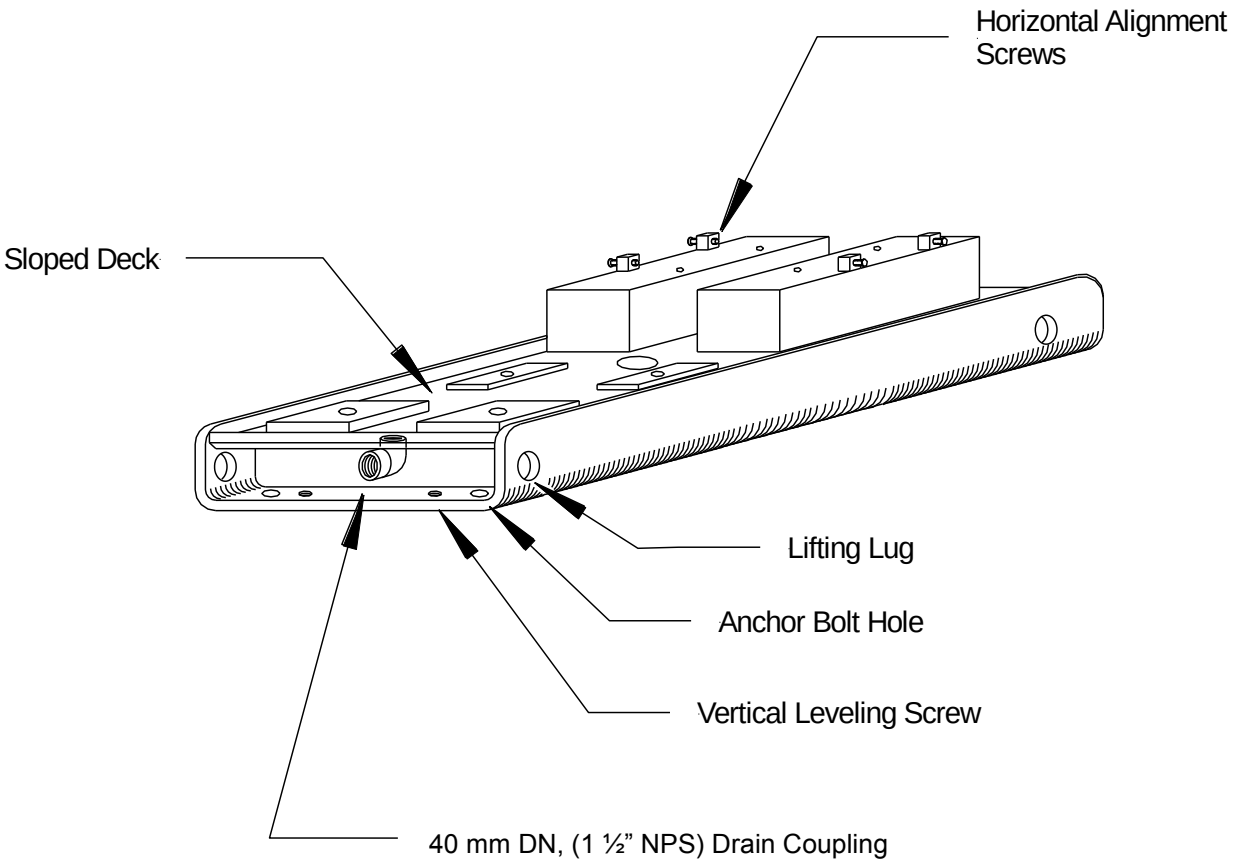

Figure 1. Typical Fabricated PIP Baseplate

4.2.2 Unless otherwise specified on the purchaser's *PIP RESP002-DM* or *PIP RESP002-D* Data Sheet, carbon steel shall be the material of construction.