

SCOPE

- I 1.1 This practice covers the design of structural supports for piping. It does not cover dummy pipe supports, or other structural members that are integrally connected to piping.
- I 1.2 **An asterisk (*) indicates that additional information from the Owner, or approval by the Owner is required.**

SUMMARY OF ADDITIONAL REQUIREMENTS

- I 2.1 **Table 1** lists the specifications and standard which shall be used with this practice.

TABLE 1

SPECIFICATIONS AND STANDARD	
ACI Standard	
318	Building Code Requirements for Reinforced Concrete
AISC Specifications	
	Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design
	Load and Resistance Factor Design Specification for Structural Steel Buildings

- I * 2.2 **Local codes and standards** may be substituted for the ones referenced herein provided the following provisions are met.
- The resultant design meets the safety and serviceability criteria attained through this practice.
 - Substitution is accepted by the authorities where the facility is to be located and by the Owner's Engineer.

DEFINITIONS

- I * 3.1 **Abnormal conditions**, as related to requirements for piping anchor design, refer to conditions encountered in pipe lines during:
- A loss of cooling medium flow.
 - Cessation of process flow while line heating facilities remain operative.
 - Anticipatable startup and shutdown, including steam out and process upsets causing temperature fluctuations.
- I ↗ 3.2 The purpose of **Figure 1** is to define terminology used in this IP and not to recommend a conceptual layout.

MATERIALS

- R 4.1 **Pipe supports** shall be constructed of steel structural shapes, steel pipe, or concrete.

DESIGN

- I * 5.1 **The number of pipe support levels shall be based** on pipe layout considerations and on future additions as specified by the Owner's Engineer.
- I 5.2 All pipe support levels shall have the load carrying capacity to support pipes across the entire width.
- R 5.3 Pipe supports shall be designed for piping loads resulting from changes in line temperature due to normal and abnormal conditions.
- O 5.4 **Top of concrete piers for pipe supports** shall be a minimum of 8 in. (200 mm) above finished grade or high point of paving.

- R 5.5 **Piping anchor structures** (or supports) shall be designed for the forces developed under normal and abnormal conditions. The design of structures anchoring more than one line shall accommodate the most stringent combination of forces due to abnormal conditions on the following basis:

TOTAL NO. OF LINES RESISTED BY THE STRUCTURE THAT COULD HAVE ABNORMAL CONDITIONS	PERCENT OF LINES UNDER ABNORMAL CONDITIONS TO BE USED IN DESIGN ⁽¹⁾
1	100%
2 - 4	50%
Over 4	25%

Note:

- (1) Round up fractions of lines to the next whole number of lines. Generally select largest lines, providing thrust loads are in the same direction.

Longitudinal struts and bracing members shall be designed to resist the cumulative friction forces from piping thermal growth, equal to 2.5% of the total pipe weight plus the load from any pipe anchors.

For the purpose of design of **individual piping supports**, **longitudinal forces** due to thermal growth shall be equal to 7.5% of the weight of the supported pipe and are additive to piping anchor forces. See [Figure 1](#).

- R,M 5.6 Adequate means shall be provided to minimize moisture retention and subsequent pipe corrosion at all support members.
- M 5.7 **Supports** that are made of **steel pipe** shall have the ends sealed to prevent internal corrosion.
- O 5.8 **The minimum vertical clearances** between finished grade, paving or top of floor plate, and the bottom of the piping, insulation or support beam (whichever controls) are as follows:

LOCATION	MINIMUM CLEARANCE	
	ft	mm
a. Above major roads open to unrestricted traffic (such as periphery of process unit area limits)	20 ft	6100
b. Within process unit areas: Above internal roadways provided for access of maintenance and fire fighting equipment	16 ft	4880
Under pipeways where access is:		
1. required for vehicular equipment	12 ft	3660
2. required only for portable (temporary service equipment)	10 ft	3050
c. Above walkways and elevated platforms	6 ft 9 in.	2050
d. Under any low level piping in paved or unpaved areas.	1 ft ⁽¹⁾	305

Note:

- (1) Measured to bottom of pipe disregarding flanges and insulation.

- R 5.9 **Spring type supports and hangers** shall be calibrated for both load and travel and shall be provided with a load indicator. **Calibration plates** shall be made of metal and shall be permanently fastened to the spring housing. A marker shall be provided on spring support load indicators to show both cold and hot spring settings.
- S 5.10 A fireproofed "catch" beam shall be installed beneath the piping containing flammable material where such piping is **hung by rods or spring type supports** from a fireproofed pipe support cross beam.
- R 5.11 If struts are expected to support pipes, they should be designed for pipe loads.
- R 5.12 Pipe supports should be designed for a load not less than 40 psf (192 kg/m²).