

# from experience

## The Science Behind Pipe Hanger Spacing Distance

Many decisions are made when designing and installing a piping system, including the pipe size, material of construction, and the route the piping will follow. Another important factor to consider is the spacing between pipe hangers or pipe supports. Properly installed, pipe supports maintain the desired pipe slope to maximize drainage while minimizing mechanical stress from pipe weight, movement and thermal expansion. Since hanging pipe supports can be both tedious and costly, it is important to space hangers at a distance where the acceptable conditions are met without being excessive. The ASME code for pressure piping, section B31.3 Process Piping, cites ANSI Standard Practice MSS SP-58 as the standard reference for materials, design and manufacture of pipe hangers and supports. This document provides hanger spacing and hanger design recommendations for many common pipe types and materials.

Another reference helpful to the piping system designer is the CASTI Guidebook series. Published for several decades by industry experts and code officials, the guidebook provides interpretation for the ASME codes. With respect to pipe support span, CASTI offers the following equation as one common technique to determine the pipe support span to achieve the pipe deflection intended.

$$L = \left[ \frac{yEI}{17.1W} \right]^{1/4}$$

Where:

L = pipe support spacing, in feet

y = permissible mid-span deflection, in inches

E = modulus of elasticity at design temperature, in lb/in<sup>2</sup>

I = moment of inertia of pipe =  $\frac{\pi(D_o^4 - D_i^4)}{64}$ , in<sup>4</sup>, where D<sub>o</sub> and D<sub>i</sub> are the Outside Diameter

(OD) and Inside Diameter (ID), in inches

W = weight of supported pipe, including pipe, contents, and insulation, in lb/ft.

Source: CASTI Guidebook to ASME B31.3 - Process Piping - 2nd Edition.

The equation provides the designer with a means to double-check support spans, in particular for cases where the piping weight may be unusually high due to product density (e.g., corn syrups), and insulation system or environmental factors (e.g., snow/ice load) that can increase the pipe weight and decrease the recommended spacing. Another useful application is when piping deflection must be strictly minimized, which also will reduce pipe spacing allowances.

### experience in brief

Below are spacing recommendations for Sch. 40, 316 SST pipes that are commonly used in food and beverage production facilities:

Pipe Size	MSS SP-58 Standard (ft)
0.5	7
0.75	7
1	7
2	10
3	12
4	14

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