



## INDUSTRY STANDARDS AND SPECIFICATIONS

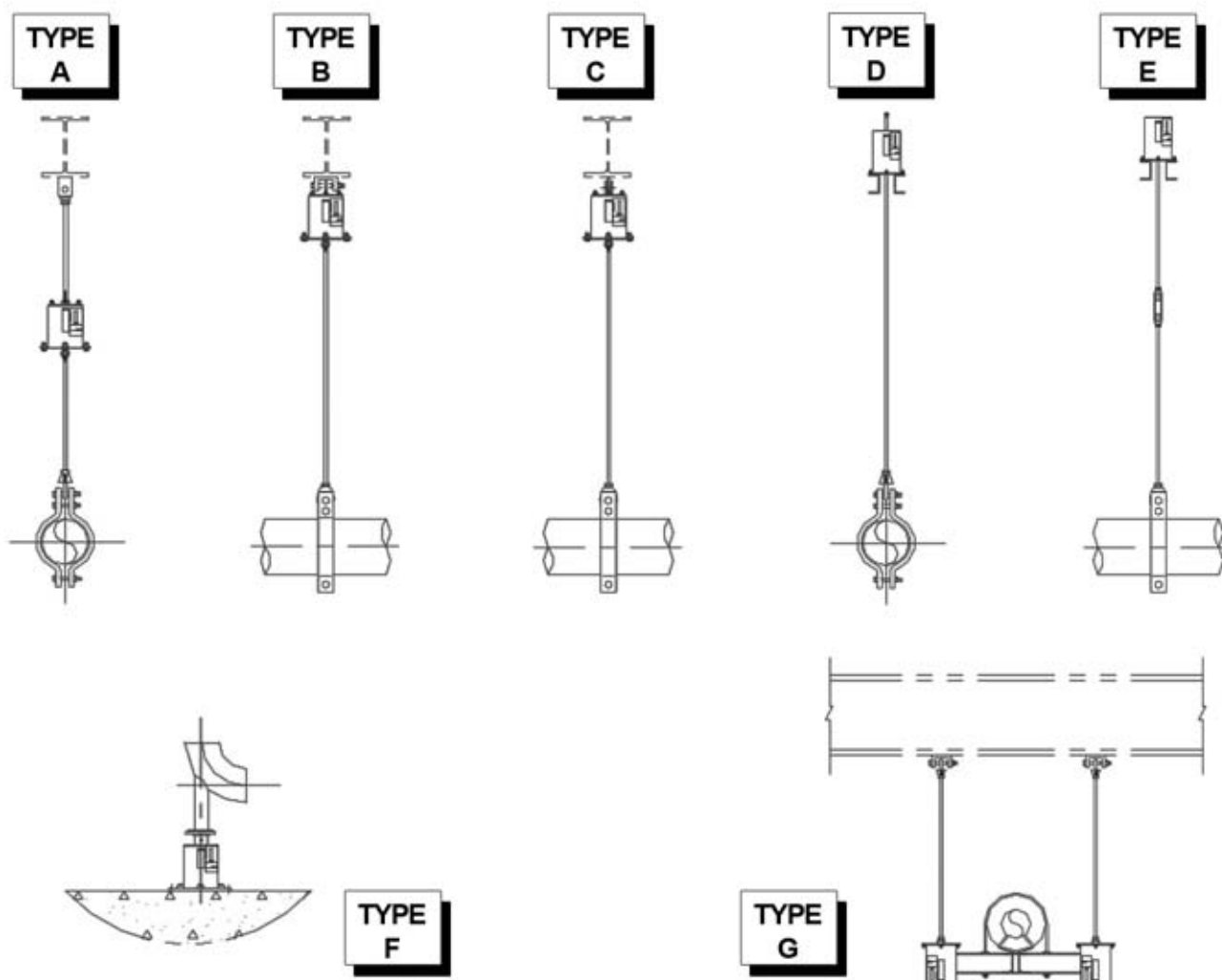
The Manufacturers Standardization Society (MSS) has standard practices SP-58 and SP-69 which are widely used in our industry. ASME B31.1 and B31.3 are important standards for piping in the power and petrochemical industries. Moreover, many of our customers have their own standards and designs for pipe supports. At Piping Technology & Products, Inc., we always keep these guidelines in mind and manufacture your supports to their strict specifications. In this section, you will find our standard variable and constant pipe supports.

## VARIABLE SPRING SUPPORTS

Variables use coiled springs to support a load and allow movement. The resistance of the coil to a load changes during compression, which is why these devices are called “variables”. There are many different designs for variable supports and a particular nomenclature used to identify them.

### TYPES OF VARIABLE SUPPORTS

The term “type” is used with an alphabetical designation (A-G) to describe seven different physical connections to the supporting structure. The figure below illustrates the applications and the physical connections for each type. Hangers are suspended from structural members while base supports (Type F) rest on a supporting surface.



<b>TYPE A</b>	The spring support is furnished with a threaded bushing in the top plate, providing for a simple rod attachment for the upper connection.
<b>TYPES B and C</b>	The spring supports are furnished with one or two lugs welded to the top cap plates of the casing.
<b>TYPE D</b>	The spring support permits adjustment from the top, by turning the nuts on the hanger rod against a piece of tubing. The tubing is securely welded to the spring cap. In the type D, the spring is set above the supporting steel.
<b>TYPE E</b>	The spring support permits rod adjustment from either above or below the spring. The type E spring is set above the supporting steel or can be welded directly to the supporting steel from below.
<b>TYPE F</b>	<p>The spring support is designed to support piping from below, directly from the floor or supporting steel. Adjustment is made by inserting a bar into holes in the load column and turning the load column as a jack screw. The base plate is bolted to the case and has four holes for fastening.</p> <p>The installed height of the base (F-type) spring should be specified as follows:</p> <ul style="list-style-type: none"> <li>• With upward movement from cold to hot position: The installed height should be the midpoint between the minimum and maximum "X" dimension plus the thickness of the load flange.</li> <li>• With downward movement from cold to hot position: The installed height should be midpoint between the minimum and maximum "X" dimension plus the load flange thickness plus the amount of the vertical movement.</li> </ul>
<b>TYPE G</b>	The spring support assembly is formed by welding two standard spring assemblies to the ends of a pair of channels. Type G assembly can accommodate unusually heavy loads, and is especially adaptable for avoiding interference in spaces where headroom is limited. The assembly can be furnished with center-to-center dimensions, as specified by the purchaser. When ordering Type G, divide the total pipe load in half to select the proper spring size. The travel range of the springs remains unchanged.

The way a variable spring support responds to an applied load depends on the coil or coils inside the casing. Each coil arrangement has a spring rate expressed in units of pounds/inch (or kilograms/millimeters) of compression. The required coil size is determined by load while the required number of coils (length) is determined by the anticipated range of movement. A longer coil or coils placed in series will provide greater travel for similar loads. Manufacturers use their figure numbers to designate the coil arrangements which provide greater movement. At Piping Technology & Products, Inc., we use PTP-1, PTP-2, PTP-4, PTP-6, and PTP-8 to designate the five standard coil arrangements we employ to increase the working range of travel of variable supports. The Load and Travel Tables on Pages 19 and 20 are color-coded to identify the travel and spring rates for each PTP figure number. These tables can be used to select the PTP figure number and size required for a particular application.



## LOAD AND TRAVEL TABLE

The twenty-three columns designed 00, 10, 20, ..., 220 identify the size and spring rate of coils used in the variables. The larger numbers have higher spring rates and are used to support greater loads. The recommended working range of loads for each size is shown between the red lines in the tables. The center of the working range is colored blue. Selecting variables with the loads within the working range provides a reserve above and below to insure the coil can function inside the casing.

In using the Load and Travel Table to choose the proper variable support, it is best to have the operating (hot) load and an amount and direction of expected movement. Variability is a key criterion in selecting the figure number and size. Variability is the percentage of change in the supporting force between the operating (hot) and installed (cold) positions calculated as shown:

$$\text{VARIABILITY} = \frac{\text{SPRING RATE} \times \text{MOVEMENT}}{\text{OPERATING LOAD}}$$

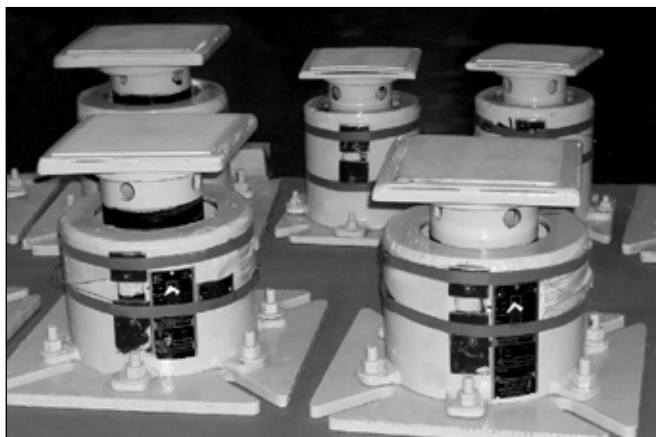
Good practice, as specified by MSS SP-58, is to choose a support with variability less than or equal to 25%.

Always try to choose a variable with the operating (hot) load near the center line (blue) of the working range in the Load and Travel Table. If you have a situation in which you cannot select a standard variable which has both the operating load and the installed load within the working range, contact us and we will help you determine alternatives.

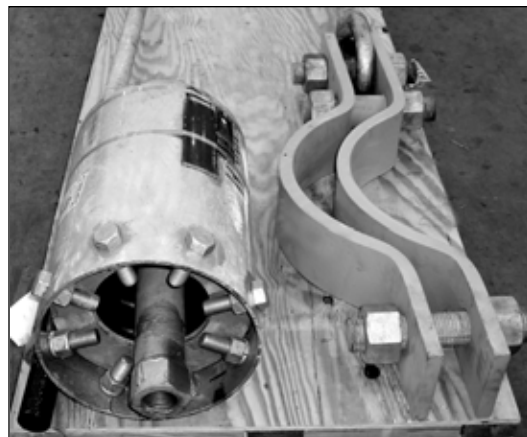
The quality of the spring coil is very important to performance. Piping Technology buys coils from major suppliers with automated production facilities and Quality Assurance programs to provide the highest quality at competitive prices. We keep an extensive inventory of coils at all times so we can respond to the emergency requirements of our customers.

Most of our customers request neoprene coating for their spring coils, which we do in our facility. Neoprene protects the spring coil from many corrosives without affecting the flex life of the coil. In some cases, such as in a furnace installation, temperatures are too high for neoprene. We apply paint or other types of coatings for this situation. Neoprene is recommended only for operating temperatures up to 255 °F.

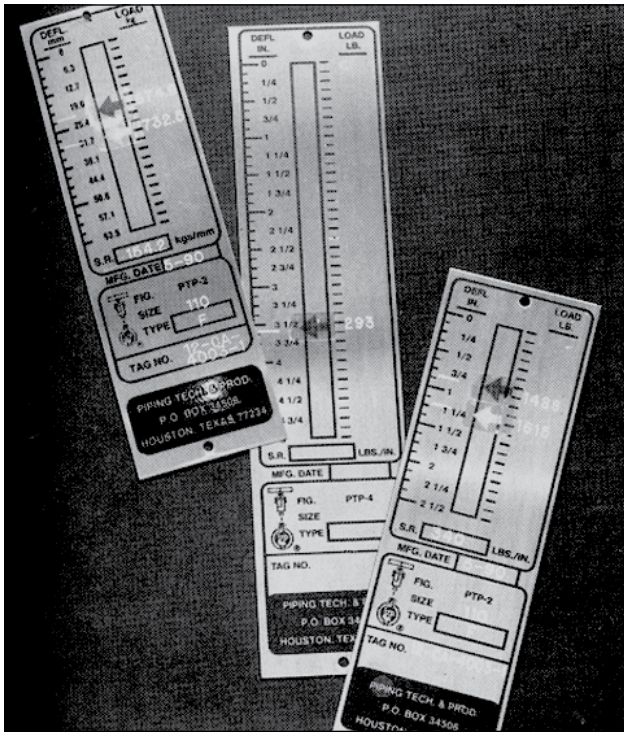
Each variable spring we build is placed in a load cell and calibrated to the design load and movement. The name plates (as shown on Page 17) show the position where the pressure plate meets the coil at the operating (hot) load and the installed (cold) load positions. The name plate also shows PTP's figure number, size, spring rate, and the customer's designated mark or tag number.



PTP-1 TYPE F VARIABLE SPRINGS WITH PTFE, 25% GLASS FILLED SLIDE PLATES



B-TYPE VARIABLE SPRING AND CLAMP ASSEMBLIES



VARIABLE SPRING NAME PLATES

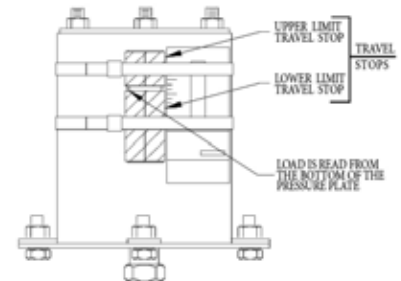


PTP-6 F-TYPE VARIABLE SPRING SUPPORTS

## PHYSICAL DIMENSIONS

The physical dimensions of variables are different depending on the figure number and size you have selected. The following pages provide drawings and dimensions for every combination of PTP's standard variable supports. If you have a requirement for which you do not have clearance for the standard spring, please contact us about a modification to satisfy your requirement.

During assembly the coils are pre-compressed and travel stops, which are painted red, are installed and banded in place with steel bands as shown in the figure to the right. Any load, such as in hydro-testing of the pipe, applied to the variable spring prior to removing the travel stops will not be applied to the coil. When installation is complete, the travel stops must be removed so the variable spring can function properly.



VARIABLE SPRING ASSEMBLIES WITH BEAM ATTACHMENTS



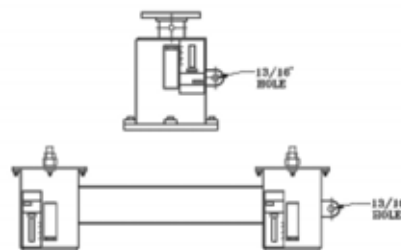


## FINISH

Galvanizing provides the most cost-effective finish for use in corrosive environments. Because the majority of our customers specify galvanized finish, we maintain a large inventory of galvanized components which enables us to assemble and ship variables very quickly. A longer delivery time may be required when finishes other than galvanized are specified.

## SPECIAL FEATURES

Special features can be provided with the PT&P standard variables when required. For example, lifting lugs, such as those shown in the figure on the right, can be helpful for installing large hangers. Other special features include upper and lower limit stops, guided load columns, jacking bolts, PTFE 25% glass filled slide plates, collars or extended load columns. Special features may increase the price and the time required for delivery.



33,723 LB. LOAD F-TYPE VARIABLE SPRINGS WITH FULLY ADJUSTABLE TRAVEL STOPS



PTP-4 TYPE A VARIABLE SPRINGS WITH A DOWNWARD TRAVEL OF 1.375"

## FEATURES

1. Precompression - precompressing the spring coil into the hanger casing saves headroom and erection time.
2. Slots in the casing at two locations 180 degrees apart allowing for complete in-service visual inspection of the spring coil and other internal components.
3. For each series, there is a reserve travel at the upper and lower limits of the working range of the hanger, and any travel beyond this reserve travel becomes either free up movement or a limit stop for downward travel.
4. The allowable stress of the coil spring conforms to MSS SP-58.
5. All-steel construction-spring and casing are fabricated of steel and are rugged and compact.
6. Anti-corrosive material (stainless steel) is used for the name plate.
7. Load Indicators are clearly visible in the slot and are easily readable.
8. The piston plate serves as a centering device or guide, maintaining spring concentricity under eccentric loads.
9. Finish - hot dipped galvanized, or other, as specified.
10. All F-type supports are supplied with a load flange.

