

# PENFLEX

## ENGINEERING BULLETIN #154

### The Difference Between Penflex P3 and P4 Series Hoses

Penflex provides a unique breadth and depth of durable metal hose products, though cost-competitive, lighter-weight options are also available. The P3 and P4 Series Stainless Steel Hoses are two of our most popular products and a comparison between them hints at our range of offerings.

Both hoses use a rotating die process to form corrugations gradually from the inside out. This ensures a highly uniform hose, the insides of which remain free of surface effects that can result from forming corrugations from the inside out.

P3 and P4 are available in 321 or 316L with one or two layers of 316L or 304L braid. The hoses come in standard pitch, but we also offer compressed pitch versions for applications requiring a more flexible hose.



*See how easy it is to bend this piece of ½" P3 Compressed!*

As laid out above, there are many similarities between these Series, but there are also some key differences. The main distinctions to be made revolve around wall thickness, hose geometry and size.

### **P3 HOSE: A THINNER WALL FOR INCREASED FLEXIBILITY**

The metal strip used to make P3 is thinner than that used to make P4. This makes P3 a lighter hose and, given the lower metal component, a more economical hose.

It's also the reason why P3 is our most flexible hose, and one of the most flexible hoses on the market. A thinner piece of metal is inherently easier to bend than a thicker piece of metal. Thus, a thinner wall hose will be more flexible than a heavier wall hose, other factors remaining the same.

When it comes to the geometry of Penflex's P3 hose, we designed the Series with a lower corrugation height to allow higher working pressures. While this can reduce the hose's flexibility, we compensated for this by increasing the number of convolutions per foot. A higher corrugation count will ensure a more flexible hose.

We can compress P3 even further, in which case we end up with a hose that is extremely flexible, kind of like a Slinky™.



*Comparison of P3 and P4 1/2" Hoses in Standard and Compressed pitch.*

## P4 HOSE: A HEAVIER WALL FOR INCREASED CORROSION RESISTANCE

Made from heavier strip, P4 is a thicker wall hose with better corrosion resistance. It's a more durable hose, though in applications where corrosion resistance or lifespan are not top priorities, that may be an unnecessary attribute.

Increased corrosion resistance through the use of thicker strip comes at the expense of flexibility. Penflex P3 and P4 Series demonstrate this inverse relationship well.

However, in designing P4, we were able to overcome some of this. We increased the number of corrugations per foot and raised the height of the corrugation to bring some flexibility back.

As noted earlier, lower convolution height allows for higher working pressures, so to compensate for lower flexibility, we "lost" some of the working pressure potential. Thus, while P4 often has higher working pressures than P3, that is not always the case. Both Series offer competitive working pressures and to pick between the two based solely on such criteria would mean overlooking the real distinctions between P3 and P4.

The hoses differ as well in the sizes available. We currently run P4 from ¼" to 4" while P3 is only available up to 2".

### A NOTE ON HOSE CERTIFICATIONS

All sizes of P3 and sizes up to 2" P4 are in accordance with sections of ISO 10380 and all sizes of both Series have weld seams that are PED certified. For more information about our hose certifications, [please click here](#).

Penflex also produces a range of heavy wall hoses, exceeding the capabilities of the P4. Any questions regarding P3, P4 or our other heavy wall hoses, [please contact us](#).