

Sanitary Hose Assemblies: What is Minimum Bend Radius and Live Length?

Tri-Canada assembles, tests and ships custom sanitary hose assemblies every day. We offer sanitary hose assemblies in a wide variety of materials, including Teflon, Platinum-cured USP Class VI Silicone, and Food Grade Rubber (FGR). Whether it is to unload a truck, transfer process fluids, serve as a jumper on a hot water jacket, or connect to a load cell, sanitary hose assemblies are used everywhere in fluid handling applications.

After selecting the correct material and specifying your end connections, your next decision is hose length. There's more to this decision than you might think. This Tri-Canada Technical Article will take a closer look at two important factors when specifying a hose: minimum bend radius and live length.

Minimum Bend Radius

Minimum bend radius is the minimum radius at which a hose can bend without kinking, damaging, or shortening the life of the hose. The minimum bend radius is measured from the inside curvature of the hose and the smaller the bend radius, the greater the hose's flexibility. The minimum bend radius is the radius below which a hose should not be bent.

The minimum bend radius is largely determined by two factors – diameter and hose material. Smaller diameter hose assemblies will have smaller minimum bend radii than larger hoses. For instance, Saint Gobain's SBP sanitary hose has a minimum bend radius of 1.55" in the ¼" ID size, while it has a 4" bend radius in the 1" size.

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The second most critical factor in minimum bend radius is material. Silicone hoses tend to be more flexible than Teflon hoses. Hoses that do not have a wrap or braid tend to be more flexible than hoses that do include a braided cover. There are exceptions to this rule, however. Standard stainless steel braided Teflon hose usually has a minimum bend radius about 12” in the 1” size. Aflex’s innovative, market leading BioFlex hose with a SS braid has a minimum bend radius of 2.75”, which is even more flexible than some silicone hoses.

Minimum bend radius is a crucial factor when deciding the length of the hose that you need to accommodate directional changes in your process. If you’re just looking for a straight transfer sanitary hose, anything that is compatible with your fluid will work. However, if you need a minimal amount of hose for a tight corner or U-bend, check the minimum bend radius before specifying a hose.

Live Length

The live length of hose is the amount of hose that falls between the two crimp collars, as opposed to the overall length (OAL). Because the crimp collars and fittings are made from stainless steel, the live length of hose is the only part of a flexible hose assembly that will actually flex. While collar length will vary with both hose type and size, it’s important to remember that for a hose to be sufficiently flexible, it needs to be long enough for your application.

Another issue that is related to the live length issue of a hose is the “force to bend”. While two different sanitary hose materials may have similar bend radii, one may take greater effort to actually bend the hose. This can make a difference in functionality. A short sanitary hose with a high force to bend may not be suitable for some load cell isolation applications. Hoses with high force to bend requirements may prove more difficult in applications where operators are having to re-attach the hose on a frequent basis.

Sanitary hose assemblies are used everywhere in BioPharm, Fine Chemical and Food & Beverage fluid handling applications. While material compatibility is important, overall length and flexibility are also critical. Double check your hose’s minimum bend radius and make sure you have enough live length to avoid ending up with a rigid spool.

If you have any questions about your sanitary hose assemblies, please contact your Tri-Canada Sales Representative by phoning **905-677-9000** or emailing **sales@tricanada.com**.