How to measure and specify the correct Tri-Clamp® sanitary gasket

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Sanitary fittings are an essential part of process pipework that is used in many food, beverage, and pharmaceutical plants. To achieve efficient sealing, the perfect sized gasket must be selected, and this is where things can become tricky. Differences in clamp standards around the world and incorrect measuring of fittings can result in the wrong gaskets being used, which leads to leakage, contamination and costly downtime.

What are the standard sanitary clamp sizes?

There are a range of standards for hygienic unions across the globe, depending on your industry and country the sizes of each standard may be slightly different.

The most common standards to be aware of are:

• BS4825-3:1991 - the British Standard for stainless steel tubes and fittings for the food industry and other hygienic applications (inch sizes).

• ISO2852:1993 - the International Standard for stainless steel clamp pipe couplings for the food industry (metric sizes).

• DIN32676 - the German Standard (Deutsche Norm) detailing fittings for the food, chemical and pharmaceutical industries and clamp connections for stainless steel tubes, including weld-on type (metric and inch sizes).

• ASME BPE - the international Standard for Bioprocessing Equipment published by the American Society of Mechanical Engineers (inch sizes).

If you are not sure which fittings you are currently using, check the ferrule, they are often labelled with the standard and size, which will help you determine which size gasket you need.

Figure 1 - Size marking on ferrule

When is a 1” gasket not a 1” gasket?

Out of the four sanitary clamp standards listed above, three of them include inch sizes, so it’s important to know which one you have. There are additional standards not listed here (such as BS Schedule 5) that also include inch sizes and there are slight differences between them all. Table 1 below shows the differences in dimensions between all the 1” size gaskets. With this in mind, when ordering or specifying gaskets it is not enough to simply ask for “1 inch gaskets”, you must be clear about which standard they are, otherwise you could get any one of the sizes below, which may not be compatible with your fittings.

Standard	ID (inch)	ID (mm)	OD (inch)	OD (mm)
ASME BPE	0.85	21.70	1.34	34.00
ASME BPE	0.85	21.70	1.98	50.40
DIN 32676	0.88	22.30	1.99	50.50
BS 4825-3	0.90	22.80	1.99	50.50
BS Sch 5	1.20	30.50	1.99	50.50

Table 1 - Comparison of 1” gasket dimensions from various standards

PPE’s HyClamp look-up tool covers several common standards and can help you find the which gasket you will need for your sanitary fitting.

How to measure clamp fittings?

When determining the correct gasket size to use with a sanitary fitting it is important to remember to measure the outside diameter (OD) of the tubing, which can sometimes be confused with the outside diameter of the ferrule.

Figure 2 - Measuring the outside diameter of the tube on a 1½" ferrule

All sanitary fittings are measured by tube OD not the size of the ferrule sealing face. Confusion often occurs between the 1", 1½" and 2" fittings because the outside diameters of the 1" and 1½" ferrule faces measure approximately 2". To the uninitiated this can result in 2" gaskets being ordered for 1" and 1½" fittings.

Similar mistakes occur between 1" and 1½" gaskets because the ferrule faces are the same size. When placed side by side the difference between the two ferrules is obvious. The internal diameter of a 1" ferrule measures approximately 0.870" and a 1½" ferrule measures approximately 1.370".

1" and 1½" gaskets are almost the same apart from the size of the hole in the centre. They will fit both ferrules, but you wouldn't want to get them mixed up. Putting a 1" gasket in a 1½" fitting will create an obstruction that restricts flow of product through the pipe. Conversely putting a 1½" gasket in a 1" fitting will create a void in the pipe that can result in bug traps leading to difficulty cleaning and contamination.

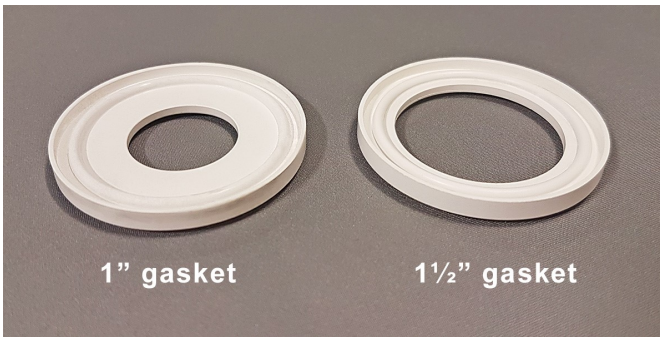


Figure 4 - Comparison of 1" and 1½" gaskets

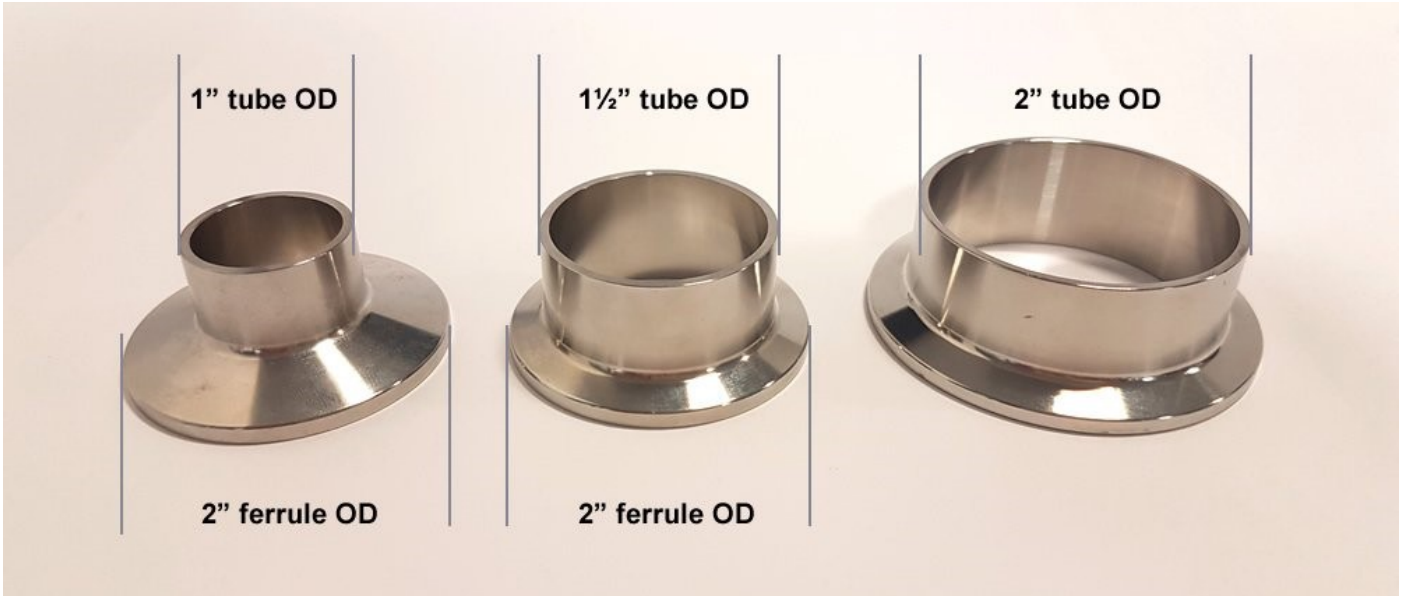
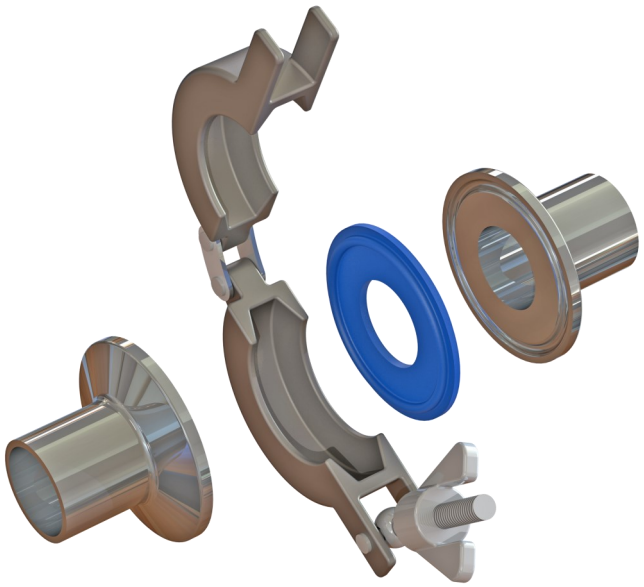


Figure 3 - Comparison of 1", 1½" and 2" ferrules

In summary, when it comes to selecting the correct sanitary gaskets for your process lines there are two points to remember. Firstly, make sure you know exactly which standard of fittings you are using; and secondly, measure the OD of the tube. These two rules will prevent the wrong gaskets being used and avoid potential leaks, contamination and costly downtime.



Precision Polymer Engineering (PPE) manufactures HyClamp™ sanitary gaskets to BS, ISO and DIN standard sizes, in a range of elastomer materials including EPDM, Silicone, white FKM and white FFKM, plus x-ray/metal detectable grades. Materials are compliant with industry requirements such as FDA, 3A 18-03, USP Class VI and EC1935/EC2023. Each elastomer material provides unique benefits to suit a variety of applications based on chemical resistance and temperature capability. You can compare materials using PPE's material chemical compatibility guide or obtain more information on the range of HyClamp™ sanitary gaskets on the PPE website: www.prepol.com

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