

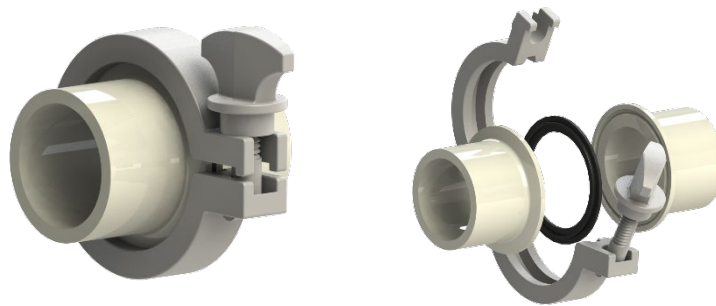
High Purity Piping Sanitary Adapter & Hygienic Clamp Connections Best Practices Guide

INTRODUCTION:

High purity sanitary adapters are commonly used in many pharmaceutical and life science applications. Sanitary adapters are held together with hygienic clamps (sanitary clamps) and a gasket to ensure a smooth seal. These mechanical connections help make routine work such as cleaning and sterilization a quick and easy process.

Sanitary adapters play a critical role in ensuring a sterile environment for application processes. Poor installations of sanitary adapters can compromise the integrity of a process, which can result in cross contamination, loss of batch, possible injury to workers, and bacteria infestations. Improper connections risk an opportunity for bacteria to grow in crevices or cause leakage between the connections. Working personnel who interact with these systems must know the importance of having the correct parts, tools, and training to connect and disconnect piping systems without issue.

This best practices guide will provide thorough instructions and answer common questions about proper material selection and installation of Asahi/America's high purity sanitary adapters.



MATERIALS:

Purad® PVDF (Polyvinylidene Fluoride)

Purad® UHP PVDF is the premier product for high purity water systems. The SOLEF™ PVDF resin we carefully selected and our stringent cleanroom manufacturing process provides the cleanest piping material available. Purad® is the best choice for systems with critical requirements for water quality and the prevention of product manufacturing impacts.

PolyPure® PPn & PP-Pure® PP (Polypropylene – Natural & Pigmented)

PolyPure® PPn systems provide excellent high purity performance and cost-effective installation. PolyPure® systems are specified and installed with confidence for a variety of high purity applications including USP purified water, institutional laboratory, deionized water and RO water systems.

PolyPure® is fully pressure rated up to 150psi across the entire size range and does not de-rate in larger diameters like competitive systems.

PP-Pure® pigmented polypropylene systems provide a wide size range and the best cost savings on large scale water systems up to 12". This system is commonly considered for large diameter non-critical UPW lines for the semiconductor and photovoltaic industries.

NYLON AND STAINLESS STEEL APPLICATIONS:Nylon

Unlike stainless clamps, nylon clamps with thermoplastic sanitary adapters provide a corrosion resistant solution to hygienic clamps. In addition, they are best used as a quick application because they allow for easy clamping and maintenance. Using nylon clamps on natural PP or PVDF will also limit wear on the sanitary ferrule as opposed to stainless clamps.

Stainless steel

Stainless steel clamps are best at keeping a seal for long periods of time. With more torque being applied than a nylon clamp, these clamps are designed to withstand the harsh conditions. However, the maintenance takes slightly longer because it requires a torque wrench for recommended installation.

Asahi/America provides the following solutions for clamp assemblies.

Asahi/America Sanitary Material & Size Selection	
Fitting Material	PVDF, PPn, PP
Gasket Material	EPDM & FKM
Clamp Material	Stainless steel, Nylon
Sizes	20-63mm pressure rated to 120psi; 75-160mm non-rated

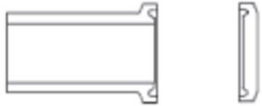
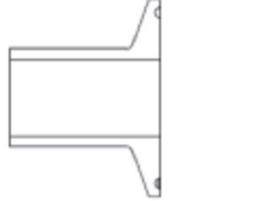
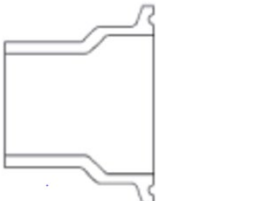

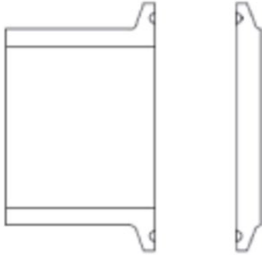
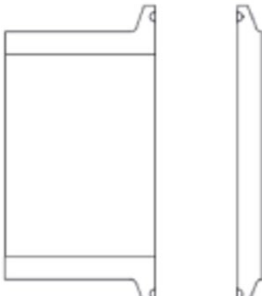
Pipe OD	Cap	Clamp Size	Gasket Size
20mm		3/4" Mini	3/4"
25mm		1-1/2"	1"
32mm		1-1/2"	1-1/2"
40mm		1-1/2"	1-1/2"
50mm		2"	2"
63mm		2-1/2"	2-1/2"

Table 1: Tri-clamp compatibility chart for flange, gasket, and clamp sizes

INSPECTION AND INSTALLATION:

Inspecting the parts that compose sanitary adapter mechanical connections is imperative to avoid bacteria buildup and prevent leaks that lead to process failure. Follow the inspection and installation steps for the best results.

Note: Asahi/America recommends performing inspection prior to installation for all field installations.

Inspection:

1. Ferrule:
 - a. Check alignment by visually verifying that the two ferrule faces are flush with one another.
 - b. Check surface face for imperfections, cracks, deformations, or sharp edges. If an imperfection like this is apparent, do not use it and replace it.
 - c. Check that no residue is on the surface face of the ferrule. Clean the surface face and gasket if this is the case to avoid contamination.
2. Gasket
 - a. Check for cracks, rips, and imperfections as each of these could compromise a proper seal.
 - b. Check elasticity. Old gaskets may become brittle and crack after long periods of time. If this is the case, use a new gasket to avoid leakage.
 - c. Confirm gasket size is correct for ferrules (Table 1).
3. Clamp
 - a. Visually verify the inner face has no sharp edges or deformations.
 - b. Check threads on the clamp so it can be tightened properly.
 - c. Confirm clamp size is correct for application (Table 1).

Installation:

Note before installation: Metal clamps use torque value in Nm and nylon clamps use distance in mm. Hence, Asahi/America recommends using a torque wrench for tightening metal clamps and a caliper for measuring proper distance for the nylon clamps. Reference figure 2 and figure 3 for proper installation features.

1. Place gasket between the sanitary faces.
2. Align the ferrules so the gasket sits flush between the grooves of the ferrule faces. If the gasket does not sit properly, it may result in leakage.
3. Place clamp over ferrules and gasket. Tighten only until slight resistance.
4. Inspect the assembly to confirm that the clamp was installed correctly so that there are no gaps and the gasket sits flush with the ferrule faces.
5. Tighten the clamp to its proper distance or torque value based on clamp type and size. See figure 2 & figure 3 for proper values.

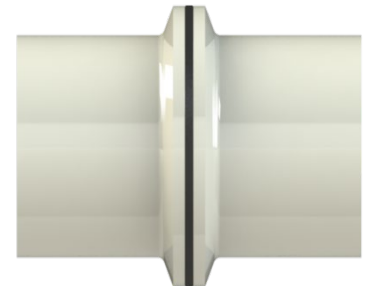
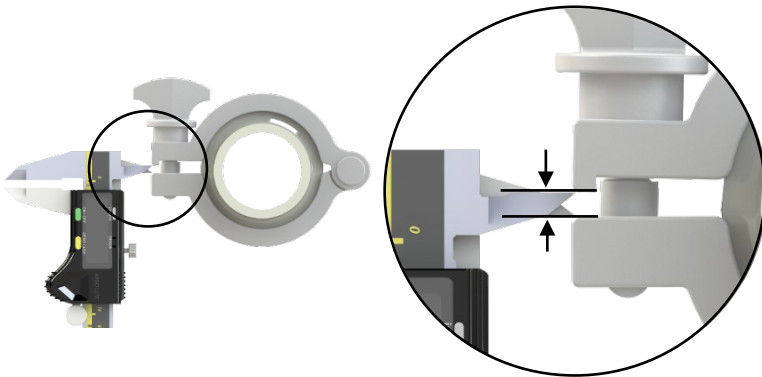


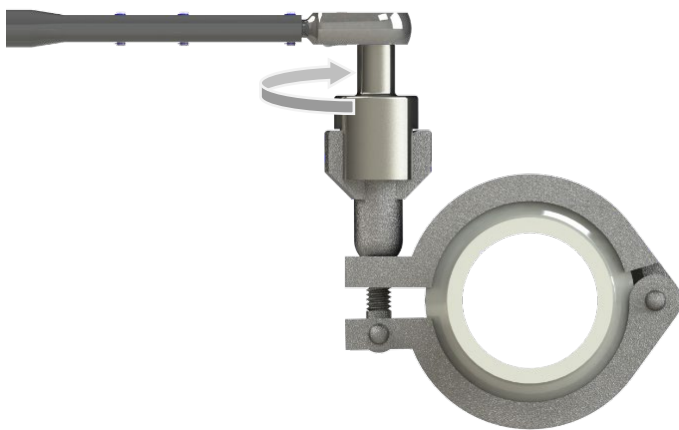
Figure 1: Proper Sealing Face

Note: For maximum angular and axial mis alignment, see common errors in installation.



Flange Size	<u>Nylon</u> Clamp Distance (mm)
20mm (1/2")	3 ± 2
25mm (3/4")	3 ± 2
32mm (1")	3 ± 2
40mm (1-1/4")	3 ± 2
50mm (1-1/2")	3 ± 2

Figure 2: Proper Distance Measurement for Nylon Clamp



Flange Size	<u>Stainless</u> Clamp Torque Value (Nm)
20mm (1/2")	2
25mm (3/4")	2 – 4
32mm (1")	2 – 4
40mm (1-1/4")	2 – 4
50mm (1-1/2")	2 – 4

Figure 3: Applied Torque Values for Stainless Clamp

EFFECTS OF NOT USING PROPER TORQUE/ DISTANCE VALUE FOR INSTALLATION:

The purpose of tightening the nylon and stainless clamps to their designated value is to provide the optimal seal. If the worker assembles it outside these parameters, the clamps may become overtightened or under tightened.

Overtightening the clamps will cause the gasket to over compress. Over compression may not only damage the ferrule faces, but may also cause the gasket to bulge into the medium inside the pipe. When this happens, it creates an area for bacteria to congregate.

Alternatively, under tightening the clamp will not compress the gasket. Under tightening results in gaps between the ferrule face and gasket. Gaps like this will cause the assembly to leak. Following the recommended values will prevent failure and yield the best results.

CLAMP MAINTENANCE:

Clamp maintenance is recommended regularly to ensure that the performance doesn't falter overtime. Inspections of the clamp, gasket, and ferrules should be performed during maintenance to identify possible defects and/or damage from wear. Clamp assemblies that endure high pressure changes and thermal cycling have the potential to damage the gaskets, ferrules, or weaken the clamp tightness. Changing gaskets when necessary and checking clamp torque/ distance will help keep the system safe and operational. Please consult with Asahi/America for recommended maintenance in specific applications.

COMMON ERRORS IN INSTALLATION:

1. Mis-Alignment

These instances commonly occur when the two ferrule faces do not match up. Errors in pipe installation or tolerancing may cause the ferrules to be angularly or axially mis aligned. The maximum angular misalignment allowed is 2 degrees. And ferrule faces have a maximum axial mis alignment of 1mm. Asahi/America does not recommend assembling hygienic clamp connections for anything beyond these conditions (Figure 3 and Figure 4).

In addition, under no circumstances should pipe be pulled into position to be clamped. This adds an additional stress on the system that may result in failure.

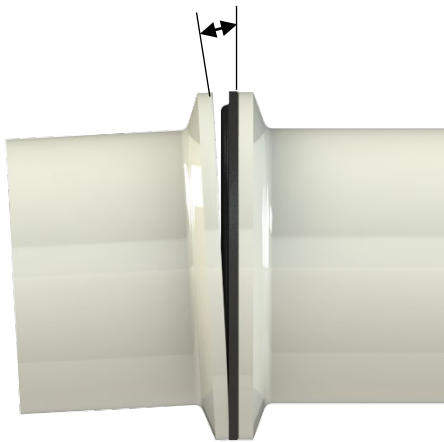


Figure 3: Angular Misalignment

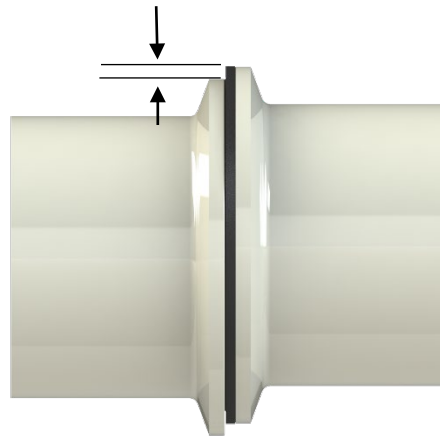


Figure 4: Axial Misalignment

2. Installation before Inspections

Installing hygienic clamp connections without inspecting the parts may lead to a variety of problems including leaks, cross contamination, and bacteria build up. Asahi/America always recommends inspection before installation even if the assembly is being re torqued.

ABOUT ASAHI/AMERICA, INC.

Asahi/America is the leading manufacturer and distributor of thermoplastic fluid flow solutions including valves, actuators and piping systems to industrial, chemical, wastewater treatment and high purity markets.

APPENDIX:

Sanitary Adapter Sizes & Part Numbers

Size			Purad®	PolyPure®	PP-Pure®
mm	inch	Sanitary Needed	Part #	Part #	Part #
20	1/2	3/4"	5445101	6360101	9145101
25	3/4	1"	5445131	6360131	9145131
32	1	1-1/2"	5445168	6360168	9145168
40	1-1/4	1-1/2"	5445212	6360212	9145212
50	1-1/2	2"	5445251	6360251	9145251
63	2	2-1/2"	5445292	6360292	9145292

Sanitary Clamp Sizes & Asahi Part Numbers

Description	Stainless Steel	Nylon
3/4" Sanitary Clamp	540920007	540920107
1-1/2" Sanitary Clamp	540920015	540920115
2" Sanitary Clamp	540920020	540920120
2-1/2" Sanitary Clamp	540920025	540920125
3" Sanitary Clamp	540920030	540920130
4" Sanitary Clamp	540920040	540920140

Sanitary Gasket Sizes & Part Numbers

Description	EPDM	FKM
3/4" TC Gasket	540920207	540920307
1" TC Gasket	540920210	540920310
1-1/2" TC Gasket	540920215	540920315
2" TC Gasket	540920220	540920320
2-1/2" TC Gasket	540920225	540920325
3" TC Gasket	540920230	540920330
4" TC Gasket	540920240	540920340