



UP

Elasto-Clamp®

Property of Ultrapharma BV

PATENTED

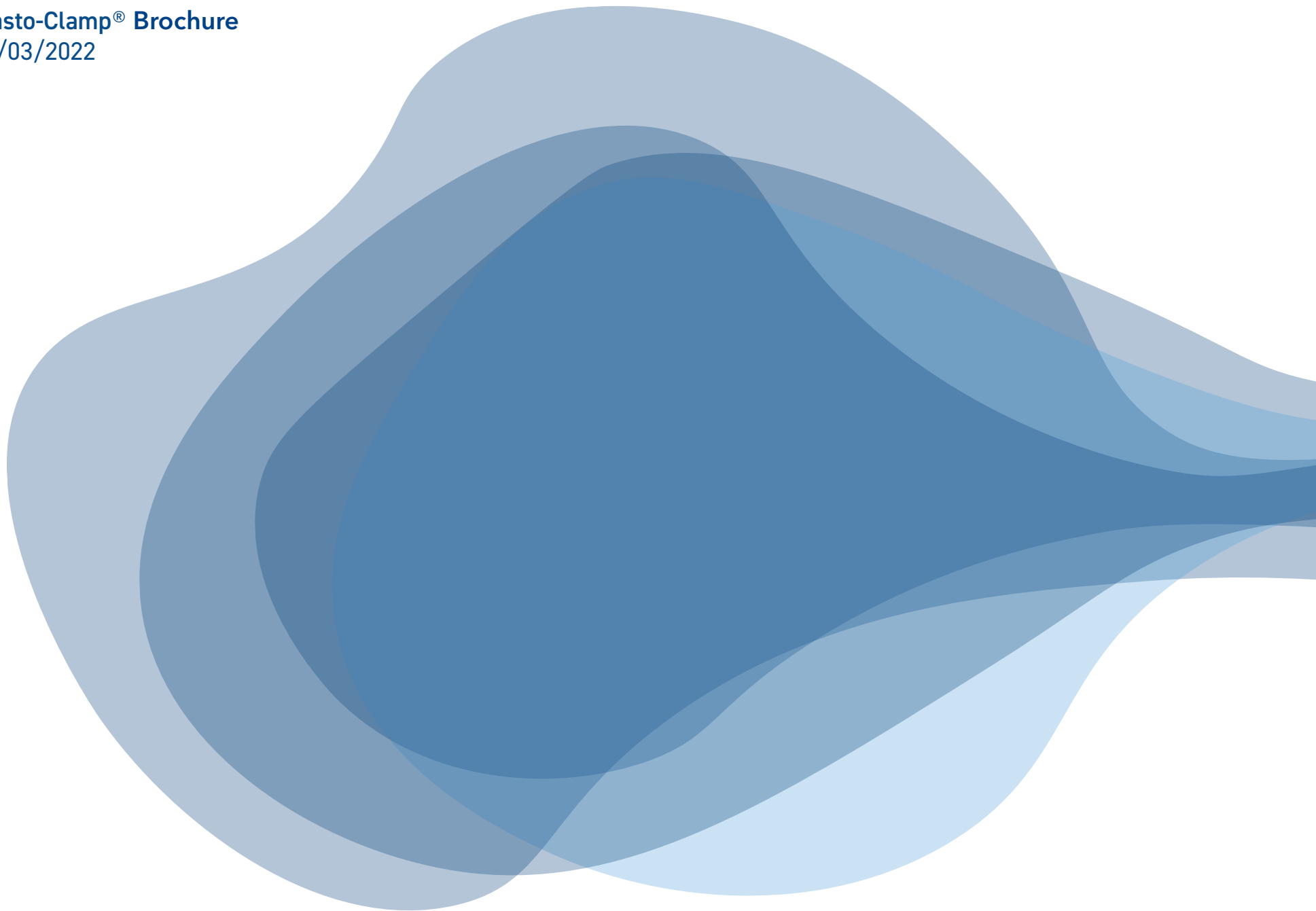


Table of Contents

1. The problem	4
2. The solution	6
3. The results.....	6
4. The side effect.....	10
5. Things you should know	10

1. The problem

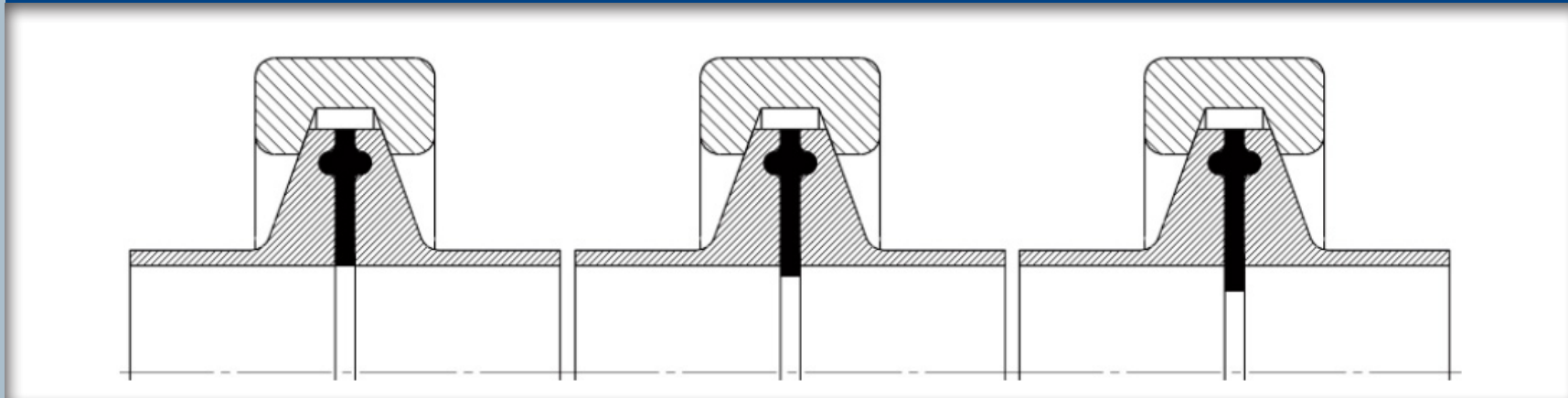


Fig. 1

Fig. 2

Fig. 3

In our opinion, the Elasto-Clamp® is a revolutionary discovery as it does something we never thought could be done. The elastomeric gasket in all its varieties is still the preferred gasket in our industry because it is flexible and it always seals. We all know that elastomeric seals create problems inside the pipeline. The gasket is pushed inside the flow path because of over-compression and expansion. This problem is even worse after steaming in place (SIP), not to mention after repetitive steam cycles (Fig. 3). After each steam cycle, the gasket is pushed in further and further. If the rubber is exposed inside the flow path it becomes vulnerable. Water (media) passing the gasket at a high velocity can be very abrasive, causing parts of rubber to break out eventually.

Let's go back to the accumulation of rubber pushing inside the flow path, and why this is happening. When parts are heated, they will expand. Stainless steel piping is expanding at a certain rate but the elastomer is expanding at a greater rate, the expansion coefficient is x-times higher than it is for steel. Here is a conflict that causes the elastomer to move up into the flow path (Fig. 2). The rubber cannot go anywhere else but inside the pipeline, and of course to the outside of the ferrule. The fact itself that the rubber moves inside the pipe is not a problem because we expect the rubber to retract again after the cool-down cycle. This is the point where things are drastically going wrong.

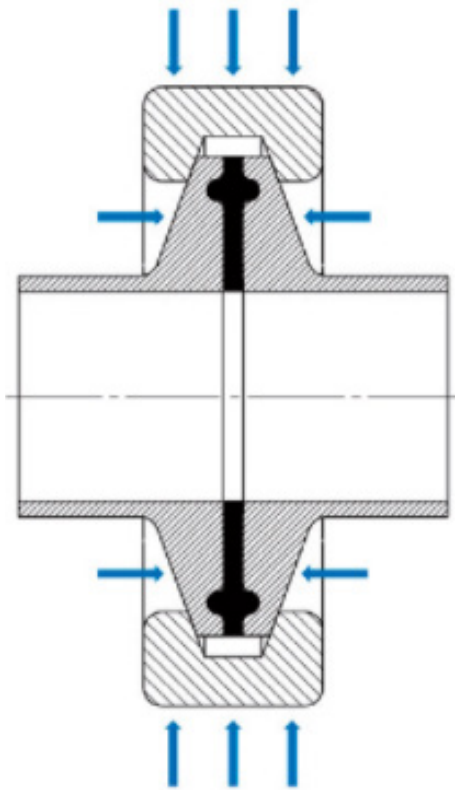


Fig. 4

The typical shape of the Tri-Clamp and the ferrules are designed for them to match. Both components have a built-in 20° angled surface so when the wing nut is tightened, the clamp slides over the surface of the ferrule compressing the gasket in the axial direction. In theory, until the gasket is flush with the internal diameter of the pipe; illustrated in figure 4.

In the stage that all components are hot and expanded, we know that the gasket is pushed inside the flow path (Fig. 2). When cooling down, we expect the gasket to retract again to its original position (Fig. 1) before we started the SIP cycle. This is not what happens. The elastomer is not able to fully retract itself in between the two ferrules, the rigid clamp and ferrule connection does not allow movement in the axial direction, it is in a solid-state and has locked itself. Because of its greater expansion rate, the elastomer has moved more material in comparison with the stainless steel parts. If we want the elastomer to retract to its original position, we have to loosen the wing nut to allow more space between the two ferrules. This is not done as it will break the integrity of the sterile system.

2. The solution

The Elasto-Clamp® has an elastomeric bonded liner at the V-groove surfaces. This elastomeric section allows for expansion and retraction movement, and for maintaining sufficient force to keep the gasket closed (10 Bar @ 1.5Nm). With this new clamp mounted in the above setting, we learned that the gasket does retract to its original position, time after time. The simple explanation is that the two elastomers, the gasket and the elastomeric liner inside the clamp, have identical expansion rates and keep this movement well balanced. Truly amazing.

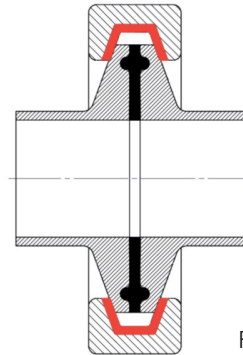


Fig. 5

3. The results

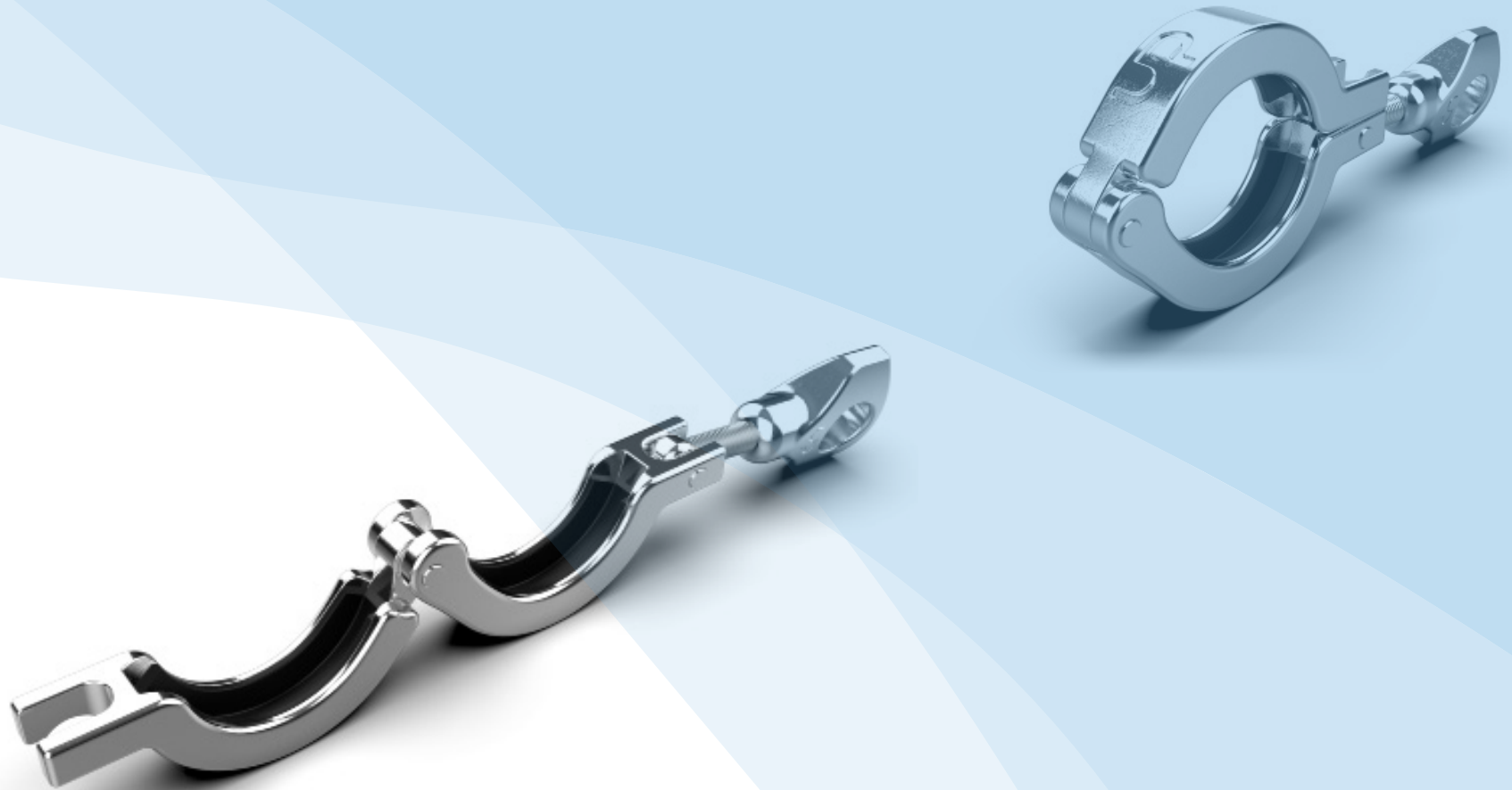


Photo 1



Photo 2

Extensive testing has been conducted with different settings. Gaskets were tested with standard clamps and with the Elasto-Clamp® side by side. Gaskets were tested under different torque conditions. We wanted to see if over-compression with the Elasto-Clamp® had any negative effect and if it was even possible to do without destroying the elastomeric liner. The results were even more encouraging. When gaskets are over-compressed with a standard clamp (4-6 Nm), evidence can be found by looking through the fitting showing the excess of rubber pushing inside the flow path. See photo 1. When the same is done with the Elasto-Clamp® you will not see any rubber in the flow path. See photo 2. The starting point with the Elasto-Clamp® is much better, the gasket is flush with the pipe internal diameter. The next page contains photos of different gasket settings during the tests.





This is an 1" EPDM gasket CMD-1004

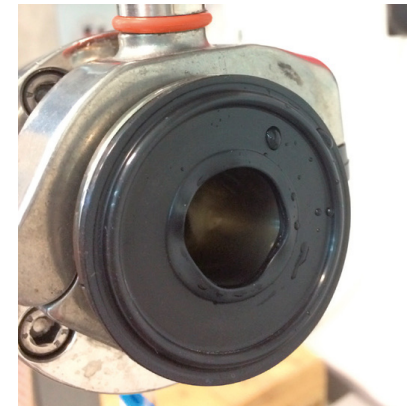
Assembled with 1.5 Nm

Standard stainless steel single hinge clamp

Exposed to 50 hours steam in 10 cycles for 5 hours

Small ridge visible on the inside ± 1.00 mm

ID has become 1-2 mm smaller.



This is an 1" EPDM gasket CMD-1004

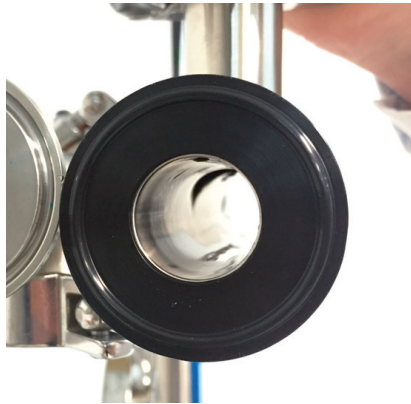
Assembled with 4 Nm (over-compressed)

Standard stainless steel single hinge clamp

Exposed to 50 hours steam in 10 cycles for 5 hours

Excessive material on the ID ± 2.50 mm

ID has become 5-6 mm smaller.



This is an 1" EPDM gasket CMD-1004

Assembled with 1.5 Nm

New Patented Elasto-Clamp[®]

Exposed to 50 hours steam in 10 cycles for 5 hours

No ridge visible, looks like a new gasket (!)

ID is the same as a new gasket (!)



This is an 1" EPDM gasket type-II CMD-1004

Assembled with 4 Nm (over-compressed)

New Patented Elasto-Clamp[®]

Exposed to 50 hours steam in 10 cycles for 5 hours

No ridge visible, looks like a new gasket. (!)

ID is the same as a new gasket (!)

4. The side effect



In the process of developing the Elasto-Clamp®, we ran into a requirement for anti-vibration clamps. It does happen that vibrations in pipework loosen the wing nuts from the clamp. This can lead to very dangerous situations. The rubber inside the V-groove of our Elasto-Clamp® will absorb vibrations and therefore eliminate a potential disaster.

We developed a new wing nut with a small rubber ring inside to further increase the functionality of this new anti-vibration clamp. Same product but with a secondary function.

The Anti-Vibration wingnut can also be installed on the Elasto-Clamp® to enhance the absorption of vibrations, preventing the wingnut to come loose.

This wing nut can also be used on all hinge clamps with 5/16" UNC thread 1/2" through 4" size. Securing a vibration proof connection.

5. Things you should know

The Elasto-Clamp® is available in the following sizes:

- 25 mm flanges (1/2" -3/4") Part N. 13EC-050/075
- 50.5 mm flanges (1" - 1.5") Part N. 13EC-100/150
- 64 mm flanges (2") Part N. 13EC-200 (under investigation)

Anti Vibration wing nut Part N. UPW004R-VIBRAThe Elasto-Clamp® is most effective on elastomeric gaskets Type-I and Type-II.

The Elasto-Clamp® is not recommended in combination with PTFE-type gaskets, individual tests must proof suitability first.

The Elasto-Clamp® is made in 304SS (1.404) stainless steel with 316SS wing nut.

The Elasto-Clamp® is optionally available with anti-vibration wing nut.

Advantages of the Elasto-Clamp®:

- Longer service life of elastomeric gaskets.
- Less failures due to lower mechanical stress.
- Better flow capacity of your system, due to the lack of restrictions of intrusion of gasket material inside the pipe.
- Lower maintenance costs, and easier to disassemble.
- Over-compression, due to misalignment of fittings, is now under control.
- Anti Vibration feature build in.

 Ultrapharma^{bv}

De Droogmakerij 12
1851 LX Heiloo
The Netherlands
+31 856 200 900
info@ultrapharma.com

