QUILINOX®
ALL ABOUT FLUIDS

Screen Gaskets

Property of Ultrapharma BV

Screen gaskets Brochure

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1. The use of Screens

A particle can have many different shapes. Think about hair, it has a diameter of Ø0,1 mm but the length can be centimeters long. If the hair arrives perpendicular to the screen, it might pass a 100 mesh screen. With a conventional filter, the second or third layer will prevent the hair to pass. Retention of standard screens is calculated according to international standards utilizing perfectly round glass spheres. Our screens are only one layer and therefore they cannot be considered the same as conventional filters. Each screen gasket has a high-performance gasket made out of one of the validated compounds that we use for our standard Sanitary Gaskets range.

Screens are designated in mesh sizes such as mesh 20, 40, 100, and so on (Photo 1). 20 Mesh means 20 wires per inch, in both directions, the opening is therefore square. The higher the mesh number the smaller the hole size. The smallest size has a 10µm retention: 200 x 1150 wires. Moreover, it is important to take into account the physical shape of the particles anticipated in your system. It is surely not an exact science.

2. Applications

Pump protection

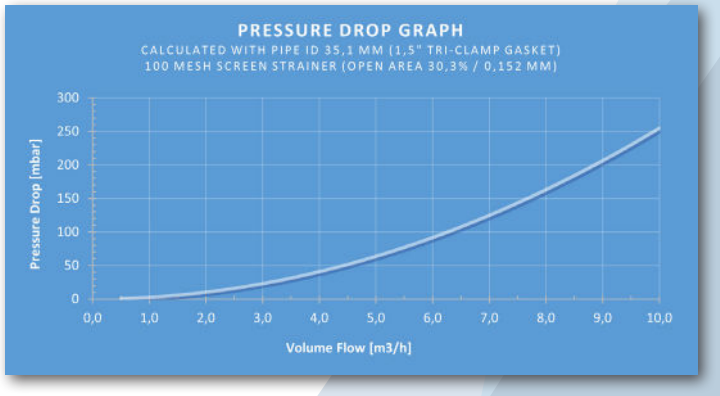
In practice, a typical application for a screen is pump protection. Think about what can be pumped through a new build piping system in a startup. Some pumps might not survive this first run.

Filling needles

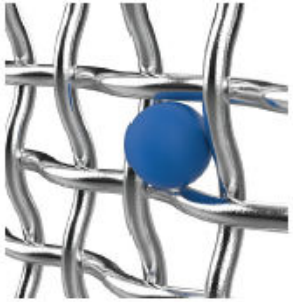
Another application is a fine filter in front of filling needles in the final stage of a filling line. The fine filter is applied to prevent an isolated loose particle from ending up in a vial or a bag.

WFI systems

Screens can also be used at the point of use in WFI systems. It is fascinating to know that the pressure drop over a 1,5'' screen with 100 mesh is only 90 mbar at 6m³/h. Frequent cleaning of the screen is required. Eventually, the captured particles will create a higher pressure drop.



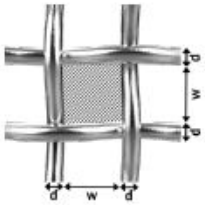
3. Mesh explained



Retention

The nominal retention of a square mesh screen is based on the size of a perfectly spherical ball which then is just retained. In real life, the objects we would like to retain are not perfectly square and the absolute retention might be slightly different. A particle can have many different shapes. For example a hair has a diameter Ø 0,1 mm but the length can be centimeters long. If the hair arrives perpendicular to the screen it might pass a 100 mesh screen. With the single layer screen which we are discussing now it is not an exact science. It is important to take into account the physical shape of the particles anticipated in your system when choosing your mesh sizes.

Warp, Weft, Aperture & Wire diameter



The length wires are called warp wires, the wires which are weaved into it in width are called weft wires. Do note that with a square weave as shown in the picture, these two are interchangeable.

The space in between two warp or weft wires is called the aperture (w), whereas the wire diameter (d) is the thickness of the wire.

Mesh Open Area (A_0)

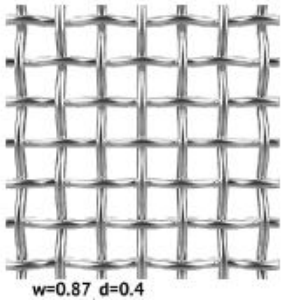
The mesh open area describes the total of all apertures as percentage of the mesh surface.

$$\text{Mesh Open Area } (A_0) = \left(\frac{w^2}{(w+d)^2}\right) \times 100\%$$

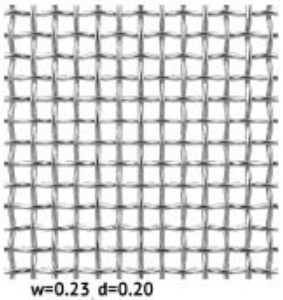
Mesh calculation

The mesh count describes the number of apertures per imperial inch is calculated as follows:

$$\text{Mesh} = \frac{25.4 \text{ mm}}{w\,(\text{mm}) + d\,(\text{mm})}$$



w=0.87 d=0.4
20 Mesh



w=0.23 d=0.20
60 Mesh

4. Screen reference chart

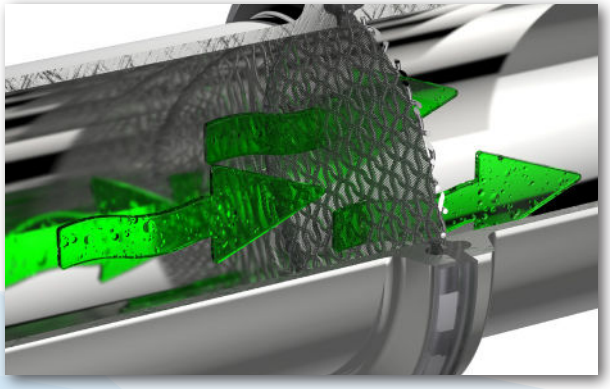
Approx. Retention in Microns	Opening in mm	Mesh (wire/inch) Plain WeaveØ	Open Area %	Filter Cloth Twilled Weave	Double Mesh Sintered + 24 Mesh @ PTFE seal
11000µ	11,00	2x2	66	Laser cut holes in 316L plates 1,00 mm thick.	
5156µ	5,16	4x4	65,9		
3340µ	3,34	6x6	62,4		
2464µ	2,46	8x8	60,2		
1905µ	1,91	10x10	56,3		
1617µ	1,62	12x12	52,4		
1414µ	1,41	14x14	51,8		
1218µ	1,22	16x16	50,7		
1061µ	1,06	18x18	48,2		
870µ	0,87	20x20	46,2		
703µ	0,70	24x24	44,1		
527µ	0,53	30x30	37,2		
415µ	0,42	40x40	43		
308µ	0,31	50x50	30,3		
233µ	0,23	60x60	30,3		
180µ	0,18	80x80	31,4		
140µ	0,14	100x100	30,3		x
118µ	0,12	120x120	30,9		
103µ	0,10	150x150	37,2		x
80µ	0,08	200x200	33,6		x
61µ	0,06	250x250	36		x
50µ	0,05	300x300	34		x
43µ	0,04	325x325	30	-	x
30µ	0,03		-	165x800	x
21µ	0,02		-	165x1400	x
14µ	0,01		-	200x1400	x
10µ	0,01		-	325x2300	x

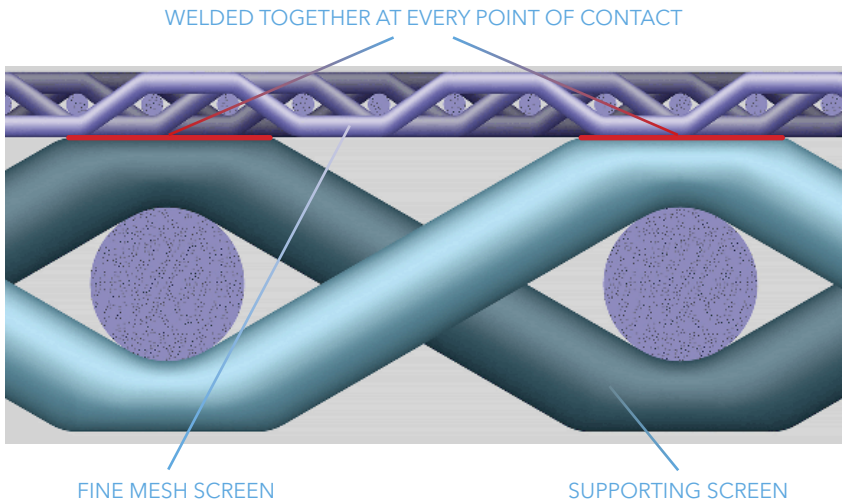
5. Double mesh screens

Fine mesh screens are fragile and could break away when solid material builds up. It is possible to use two screens on top of each other. One for support and one for the final filtration. When using double mesh screens, it is important to place them in the correct orientation towards the flow direction. Reversed process conditions could lead to failure of the fine mesh by breaking off.

A better solution is the use of 'Sintered mesh screens'. The screen is build up with a supporting screen and a fine mesh screen on top. These are 'welded' together and cannot be separated. This double mesh product provides better pressure resistance and is suitable for backwashing cycles.

We recommend using double mesh sintered screens from 100 mesh and down (see the last column of the screen reference chart on the previous page). Double mesh sintered screens are very good in combination with our Removable Steam-Flon® gaskets.





All of our standard screens come in the material 316 stainless steel and our sintered screens come in 316L stainless steel.

316L stainless steel is almost identical to 316. The only difference between 316 and 316L is the carbon content. 316L has a maximum carbon content of 0.03%, while 316 has a maximum carbon content of 0.08%. This makes 316L a slightly better choice for welding, the reason why we prefer this material for our sintered screens.

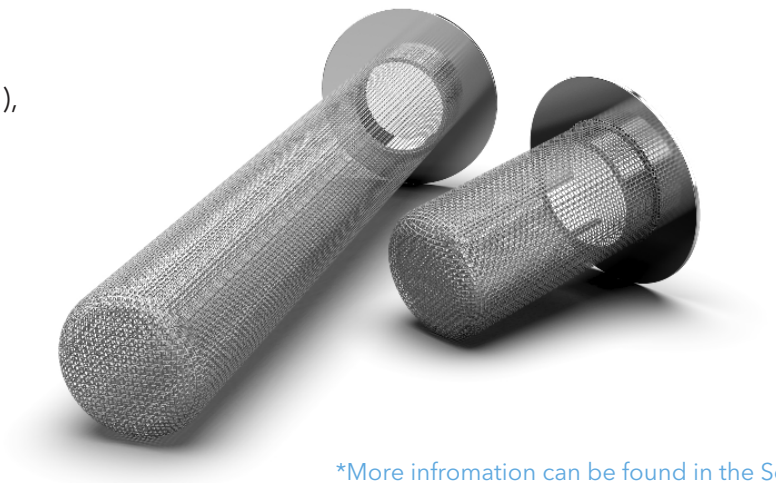
6. Sock screens

Sock screens are designed to take up a large amount of soil. Flat screens will finally block when too much soil is accumulated. There is also a potential chance that the flat screen can break. Sock screens can take 8 to 10 times more soil and are therefore used in processes where high particle collection is expected. Our sock screens are available in 25, 50 and 150 mm lengths and can be made in a wide range of mesh sizes.

Standard mesh sizes for sock screens are 10, 20, 40, and 100 mesh. Other mesh sizes are on request. Sock screens are mounted with 'Elastomeric Slit Gaskets'. These can be removed when they wear out.

Materials:

EPDM (CDM-1004)
FKM (CDM-1010)
Platinum Silicone (CDM-1012)
Removable Steam-Flon® (CDM-1019), when PTFE is required.



*More infromation can be found in the Sock Screen Brochure

7. Perforated screens

Perforated screens are basically stainless plates with specific hole sizes. The hole size variation is limited to a couple of perforation sizes. The holes are relatively large and the plates are used to capture large debris. This is possible because they are very strong (±1,00 mm thick). The perforated screens are supplied with so-called slit gaskets. A reason for this is that when the gasket is damaged, it can be replaced. Our perforated screens are available in EPDM (CDM-1004), FKM (CDM-1010), and Platinum Silicone (CDM-1012). They can also be utilized in combination with our unique Removable Steam-Flon® gaskets (CDM-1019).

Our perforated screens can also be used as a backer in combination with a fine mesh filter. The perforated plate will protect the fine mesh from breaking out when collecting particles.It is important to position the combined filter in the correct flow direction (as discussed earlier with the double mesh screens).

The perforated disc and screen can be used in combination with our Elastomeric slits gaskets and the Removable Steam-Flon® gaskets.

Available standards: DIN32676 Series A, DIN32676 Series B (ISO1127), DIN32676 Series C (ASME BPE), and SMS3017.

8. Screen reference chart

Hole Diameter (mm)	Centre line Diameter (mm)	Thickness (mm)	TC flange Diameter (mm)
0,80	2,00	1,00	25, 34, 50, 64, 77, 91, 106, 119
1,00	2,20	1,00	25, 34, 50, 64, 77, 91, 106, 119
1,50	2,50	1,00	25, 34, 50, 64, 77, 91, 106, 119
2,50	5,00	1,00	50, 64, 77, 91, 106, 119
3,00	5,00	1,00	50, 64, 77, 91, 106, 119

9. DIN11864 Screens

We have introduced a complete range of DIN11864 screens. The DIN11864 is becoming more popular in both the pharmaceutical and the food industries. The Tri-Clamp fitting has been around so long that all special components have become easily available. The DIN11864 is a relatively new fitting and therefore these special components are not readily available. They are available now at Ultrapharma because we made an effort to invest in these new components.

10. DIN11864 Screens - Available Sizes

DIN		ISO		ASME BPE
DN10	DN40	DN10	DN40	1″
DN15	DN50	DN15	DN50	1½″
DN20	DN65	DN20	DN65	2″
DN25	DN80	DN25	DN80	2½″
DN32	DN100			4″

Screen Options
Our wide retention range varies from; 5555 micron up to 10 micron.

Elastomer Compounds
EPDM (CMD-1004) FKM (CMD-1010) Platinum Silicone (CMD-1012)

*details mentioned on this page apply only for the DIN11864.

11. New: Screen with tab

How useful would it be if you can see which screen gasket is mounted by looking only on the outside of your piping system? You do not have to disassemble anything and you do not have to memorize it. Our screens gaskets are meant to capture isolated particles created by moving parts in our piping system. On top of that, our engineering has developed screen gaskets with tabs. A tab is a helpful feature to visualize the presence of our screen gaskets 'in line' and is easy to recognize from the outside.

As you can see in the photos, the mesh size and heat number screen material can be laser engraved on the tab. Our screens are available in various mesh sizes and compounds.

12. Materials

EPDM (CMD-1004)

Meets
FDA CFR 177.2600 USP 42 Cytotoxicity testing <87> USP 30 Class VI-121°C <88> USP 35 Physicochemical Testing <381> EC1935/2004 for Water & Acid only Conform ADIF (Animal Derived Ingredient Free) BSE/TSE

Platinum Silicone (CMD-1012)

Meets
FDA CFR 177.2600 USP 35 Cytotoxicity Testing <87> USP 35 Class VI-121°C <88> European Pharmacopoeia 2013, 3.1.9 Conform ADIF (Animal Derived Ingredient Free) BSE/TSE

FKM (CMD-1010)

Meets
FDA CFR 177.2600 USP 42 Cytotoxicity Testing <87> USP 30 Class VI-121°C <88> EC1935/2004 on all simulants <10mg/dm2 Conform ADIF (Animal Derived Ingredient Free) BSE/TSE

Steam-Flon® (CMD-1019)

Meets
FDA CFR 177.1550 USP 44 Cytotoxicity Testing <87> USP 35 Class VI-121°C <88> USP 35 Physicochemical Testing <661> EC10/2011 Migration test Conform ADIF (Animal Derived Ingredient Free) BSE/TSE

Virgin PTFE (CMD-1028)

Meets
FDA CFR 177.1550 USP 40 Cytotoxicity <87> USP 40 Class VI-121°C <88> USP 40 Physicochemical testing <661> Conform ADIF (Animal Derived Ingredient Free) BSE/TSE

Notes

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