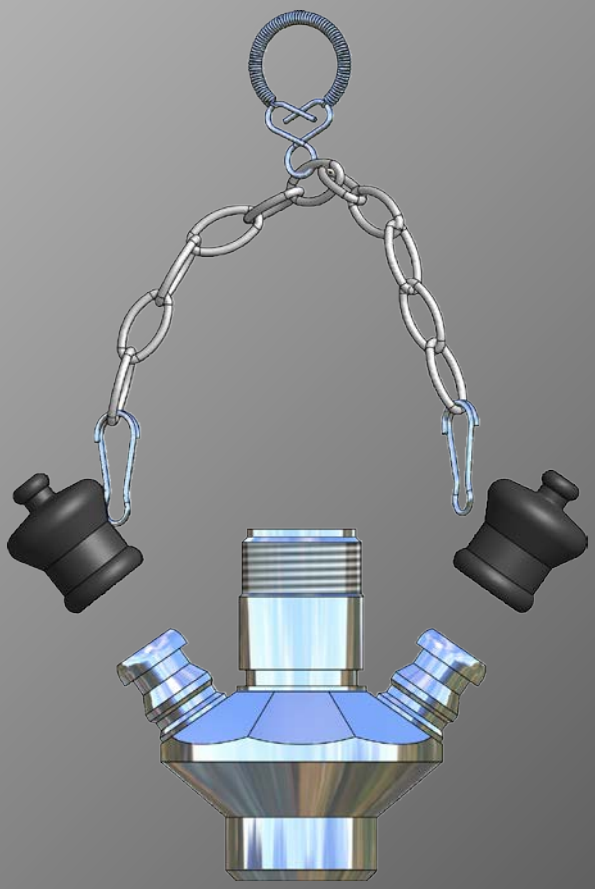
KEOFITT®

WORLD LEADERS IN STERILE SAMPLING™

W9™ SAMPLING VALVE

User Manual



SOME PEOPLE WOULDN'T GAMBLE WITH THEIR SAMPLE™

INTRODUCTION:

MANUFACTURER: Keofitt A/S
Industrivænget 6-8
5700 Svendborg
Denmark

TYPE: W9 SAMPLING VALVE
PATENTS: U.S. PAT. 5,246,204 • E.P. 0468957
YEAR OF INTRODUCTION: 1998
YEAR OF REVISED DESIGN: 2003

CONTENTS

PRESENTATION

The Keofitt W9™ sampling valve is a valve which can be readily sterilised and which meets both hygienic and process design requirements. This means that an effective cleaning and sterilisation of the sampling valve can be carried out between random samples independently of the course of the production process without compromising the same.
The W9 valve is 3-A and EHEDG Type EI authorised. 3-A Sanitary Standard is an American standard which is normative for a component's ease of cleaning and sterilisation. The standard ensures optimum conditions for food products which may come into contact with the component in question. The EHEDG Type EI certification is a European standard and it includes additional tests of bacterial increase on components that are in direct contact with the sample after the CIP process.
The valve is used in a wide range of processing industries, such as breweries, dairies, and the pharmaceutical and biotechnological industries.

VALVE FUNCTION

The valve is designed to regularly take representative random samples in the production process. The valve is therefore designed such that effective cleaning, sterilisation and sampling can be carried out regularly without interrupting the production process.
Sterilisation is carried out by supplying steam through the upper of the valve's two hose pieces. It is the perfect, hygienic design and surface finish of the inner part of the valve which enables absolute sterilisation in a closed state. According to an EHEDG-based test carried out by the Biotechnological Institute in Denmark, the valve is sterilised after just 1 minute's supply of steam at a pressure of 2 bar(g) (121 °C).
Following sterilisation, but prior to sampling, a sterile plug of rubber or stainless steel is fitted to the top hose piece. When the valve is opened the liquid will run out of the lower hose piece.
Note! The membrane functions both as a dynamic packing in the valve seat and as a hygienic, static packing against the valve body.

WARNING!

- During sterilisation with steam the valve will become hot, and care should thus be taken when handling the valve.
- The valve is designed for use in working conditions of up to 6 bar(g) pressure and temperatures of up to 121 °C. It is therefore important to be aware that the rubber plug (designed for max. 3 bar(g)) or the steel plug (designed for max. 10 bar(g)) can be forced out at high speed if not seated correctly.
- Always remember to use safety goggles when taking samples because of the risk to the eyes.

IMPORTANT!

- The valve cannot be used for vacuum since the membrane will be sucked hard into the seat.
- The membranes are available in three different qualities: silicone, EPDM and PTFE.
- The silicone membrane has the advantage that it in general can stand higher temperatures, but it cannot tolerate moisture condensation resulting from steam sterilisation.
- The EPDM membrane is better able to cope with condensation in the steam, and at the same time can be used with a majority of CIP fluids.
- The PTFE membrane resists most CIP fluids and very high steam temperatures.

EVERYDAY USE OF THE VALVE

Sterilisation

Sterilisation takes place with valve closed.

1. Remove the plugs.
2. Connect the steam hose to the valve's upper hose piece.
3. Open the steam supply and let it flow through the valve for sterilisation. 1 min. at 121°C (2 bar(g)).
4. Close the steam supply.

WARNING!

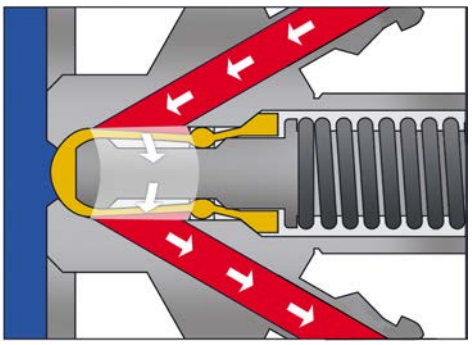
- During sterilisation with steam the valve will become hot, and care should thus be taken when handling the valve.
- The valve is designed for use in working conditions of up to 6 bar(g) and temperatures of up to 121°C. It is therefore important to be aware that the rubber plug (designed for max. 3 bar(g)) or the steel plug (designed for max. 10 bar(g)) can be forced out at high speed if not seated correctly. Therefore always remember to use safety goggles when taking samples because of the risk to the eyes.
- For valve heads allowed for Group IIGD, Category 2 (zone 1) both handle and top of valve heads N and Q must be cleaned before use.
- Use saturated steam without condensation at max. 2 bar(g). At higher pressures the membrane can be damaged/split. In most cases the coaxial design ensures absolute cleanliness without the use of CIP or similar. If CIP is used, please refer to enclosed data sheet. If in doubt, contact Keofitt.

IMPORTANT!

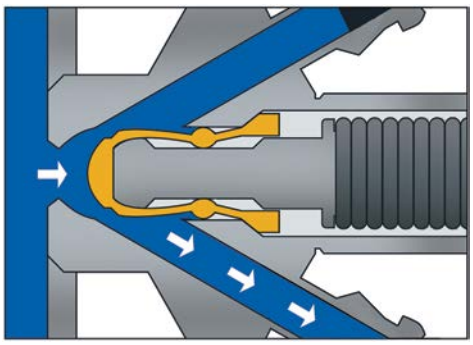
- To reach 121°C a pressure of 2 bar(g) is needed. This can only be reached by use of a pressure release valve, or other counter pressure device mounted on the outlet connection.
- Let steam hose be in place to prevent air contamination during sampling. If removal of steam hose is required, fit a sterile rubber or stainless steel plug onto the upper hose piece.

Sampling

1. Open the valve and take the sample.
2. Shut the valve after the sample has been taken.
3. Clean the valve with steam and/or hot water, cf. 'sterilisation', points 1-4.



Sterilisation



Sampling

TECHNICAL DATA

Material

Valve body:	AISI 316L (1.4404)
Valve head:	AISI 316L (1.4404)
Membrane:	Silicone (grey) EPDM (black) PTFE (white)

Certificate

Valve body:	3.1
Membrane silicone	acc. to FDA & BGA
Membrane EPDM	acc. to FDA & BGA
Membrane PTFE	acc. to FDA & BGA

* A 6-digit code is marked on the valve body. This code refers to a 3.1 certificate which accompanies every consignment of valve bodies.

Pressure - max.

Working pressure:	6 bar(g) / 87 psi(g)
Rubber plug	3 bar(g) / 44 psi(g)
Steel plug	10 bar(g) / 145 psi(g)

Temperature - max.

Sterilisation temp.:	121°C / 249,80°F **

** It is important that the steam is saturated, but dry, as condensation can damage the membrane. (Dry steam at max. 2 bar(g)).

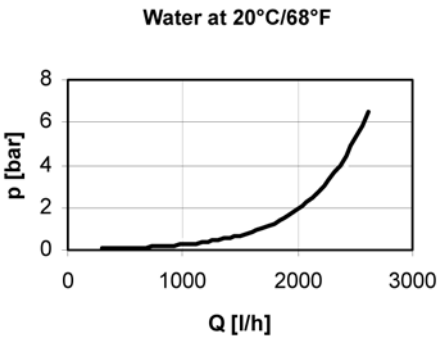
Surface finish

Internal:	Ra ≤0,5 µm/20 µinch
External:	Electropolished

Every valve is Ra measured.
A serial number identifies each valve body. A surface finish certificate copy is available on www.keofit.dk

Viscosity:

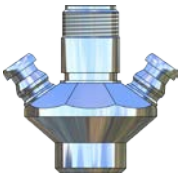
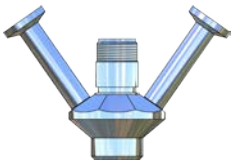
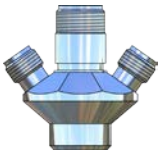
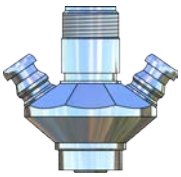
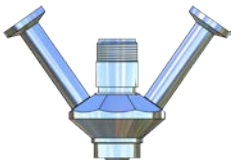
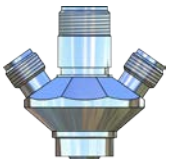
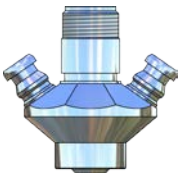
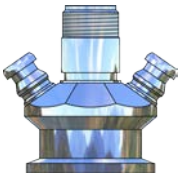
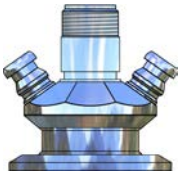
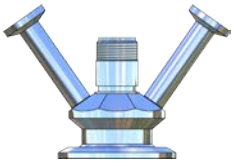
Viscosity range:	0-1000cP, with particles up to 3mm in diameter.

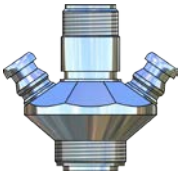
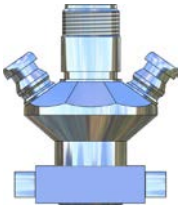
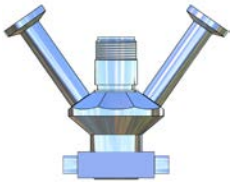
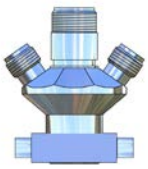


$$Kv = Q\sqrt{\frac{p}{1000 * \Delta p}}$$

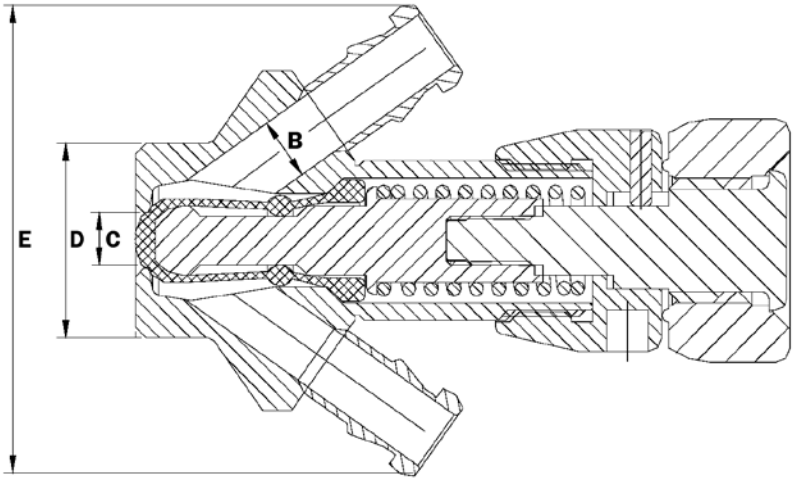
Kv: Valve capacity [m3/h]
Cv: Valve capacity [USgal/min]
Q: • Flow through valve seat [m3/h]
p: • Viscosity of fluid [kg/m3]
p: • Presure drop across valve [bar]

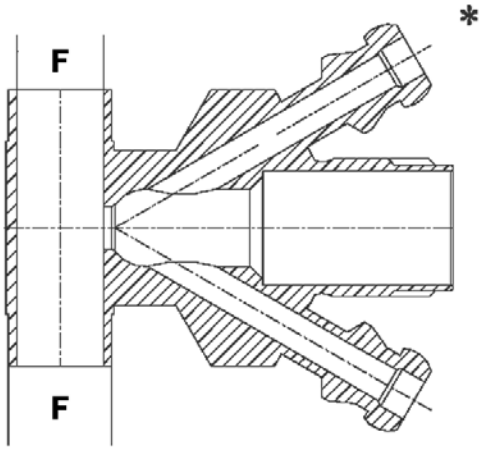
VALVE BODIES W9

	Hose piece				Mini tri-clamp				M16x1,5			
Tank welding (type T) - process connection	 850001				 850006				 850015			
	B	**C**	**D**	**E**	**B**	**C**	**D**	**E**	**B**	**C**	**D**	**E**
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	28 mm	68,22 mm	9 mm	8 mm	28 mm	122,1 mm	9 mm	8 mm	28 mm	69,1 mm
Pipe welding (type P) - process connection	 850011				 850010				 850016			
	B	**C**	**D**	**E**	**B**	**C**	**D**	**E**	**B**	**C**	**D**	**E**
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	25 mm	68 mm	9 mm	8 mm	25 mm	122 mm	9 mm	8 mm	25 mm	69 mm
Pipe welding (type P) - NW25 - process connection	 850014											
	B	**C**	**D**	**E**								
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	28 mm	68 mm								
Clamp - connection 1” - process connection	 850021				 850022				 850024			
	B	**C**	**D**	**E**	**B**	**C**	**D**	**E**	**B**	**C**	**D**	**E**
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	50,4 mm	68 mm	9 mm	8 mm	50,4 mm	122 mm	9 mm	8 mm	50,4 mm	69 mm
Clamp - connection 2” - process connection	 850003				 850005							
	B	**C**	**D**	**E**	**B**	**C**	**D**	**E**				
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	64 mm	68 mm	9 mm	8 mm	64 mm	122 mm				

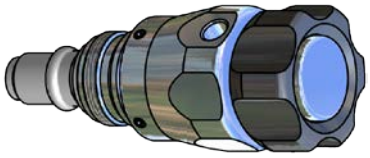
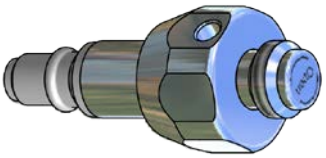
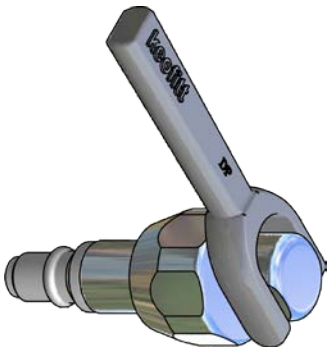
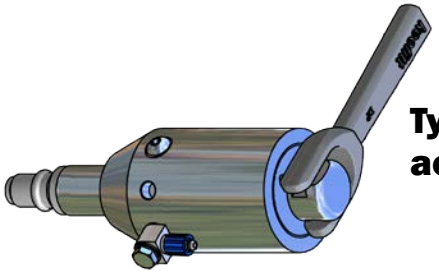
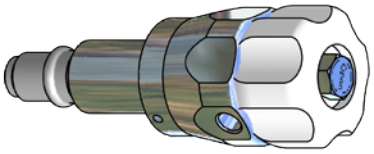
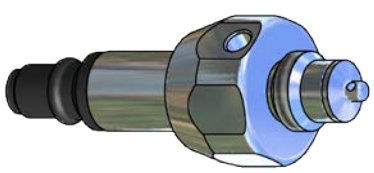
	Hose piece				Mini tri-clamp				M16x1,5			
Varivent® Ø50 - process connection OD Ø56 mm	 850008											
	B	**C**	**D**	**E**								
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	56 mm	68 mm								
Varivent® Ø68 - process connection OD Ø68 mm	 850009											
	B	**C**	**D**	**E**								
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	68 mm	68 mm								
Thread - Socket - process connection OD M28x1,5	 850031											
	B	**C**	**D**	**E**								
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	28x1,5 mm	68 mm								
In-line - Vertical/Horizontal - OD12x1 - 1”	 On request				 On request				 On request			
	B	**C**	**F***	**E**	**B**	**C**	**F***	**E**	**B**	**C**	**F***	**E**
Key measurements *(Please refer to bottom page 11!)*	9 mm	8 mm	variable	68 mm	9 mm	8 mm	variable	122 mm	9 mm	8 mm	variable	69 mm

Dimension ''A'' varies according to the type of valve head mounted on the valve body. ''A'' is the same dimension for all valves except type N.
Patent: É.P.0468957 and U.S.Pat.5,246,204

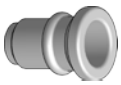
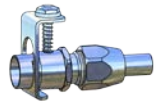
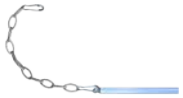
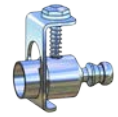
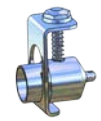




VALVE HEADS FOR W9

	Available with:					
	Silicone 600051	**Silicone** 600251	**EPDM** 600052	**EPDM** 600252	**PTFE** 850055	Valve head item no.
 **Type H, manually operated**	✓					600041
			✓			600041E
					✓	855541
 **Type K, manually operated key version**	✓					600042
			✓			600042E
					✓	855542
 **Type Q, manually operated with lever**	✓					600043
			✓			600043E
					✓	855543
 **Type N, pneumatically activated**	✓					600044
			✓			600044E
					✓	855544
 **Type B, pressure resistant up to 12 bar(g)**	✓					600047
			✓			600047E
					✓	855547
 **Type H, with Micro Port**		✓				600048
				✓		600048E
					÷	
 **Type H, with Micro Port and key**		✓				600049
				✓		600049E
					÷	

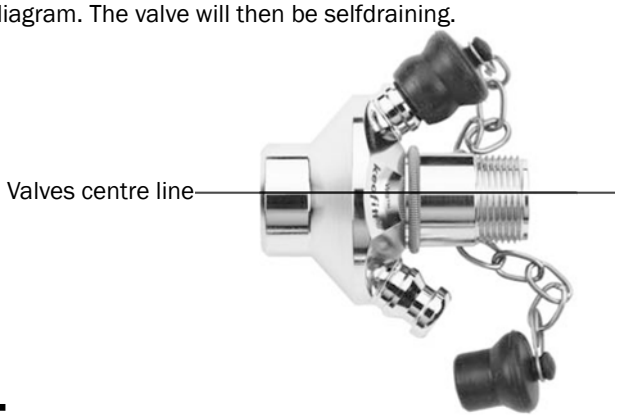
PARTS AND ACCESSORIES FOR W9

	Item	Material	Ident no.	Remark
	Membrane EPDM black	EPDM	600052	
	Membrane silicone grey	Silicone	600051	
	Membrane EPDM black	EPDM	600252	with Micro Port
	Membrane silicone grey	Silicone	600251	with Micro Port
	Membrane teflon	Teflon	850055	
	Key ring open right		600076	
	Double st.st. chain		600064	
	Rubber cap with knob		600062	
	Adjustable pressure relief valve (0-3 Bar(g))		850059	
	Quick coupling steel pipe		800070	
	Tommy bar		900018	
	Quick coupling for PTFE		800071	
	Quick coupling with 3/8” Hose Barb		800082	
	Sampling coil with st.st. cap		800058	
	Quick coupling with M4 hose piece		800086	
	Cap M16x1,5		800061	
	Bushing st.st.		600149	
	Hypodermic needle (long)		900022	

MOUNTING INSTRUCTIONS

Location:

The valve should always be located with its centre line in a horizontal position, and with the two hose pieces in a vertical position as shown in the diagram. The valve will then be selfdraining.



Before welding:

Remember to disassemble the valve body and head. The valve body and head must be separated during welding. Rubber plugs, chain and membrane must be removed from the valve body, as otherwise heat from the welding process will damage them.

WELDING INSTRUCTIONS

Valves for welding are available in two types: T (tank) and P (pipe).

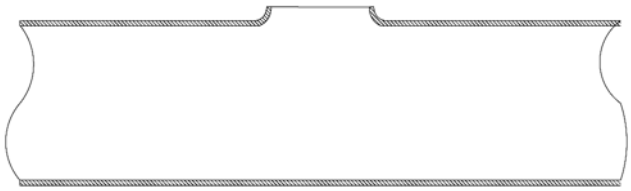
1. For type T (tank) it is necessary to drill a hole ø28 mm into the tank wall, and then fit the valve into this hole flush with the inside of the tank. Welding should be carried out as a penetration welding.
   Material thickness less than 4 mm: Weld from inside. Material thickness greater than 4 mm: Weld from both outside and inside.
   Since type T has a solid end piece, the valve will not be damaged by penetration welding. However, the use of purge gas in the form of either Argon or Formier gas is recommended in order to give the best result.

2. For type P (pipe) penetration welding must be carried out from outside. The valve is machined with a recess-like shoulder on the outside of the end piece which gives approximately the same material thickness (1.5mm material thickness) as in the pipe wall.
   This machined shoulder can be modified according to the customer's wishes.

IMPORTANT!

- When grinding/polishing the internal weld, the valve seat must not be touched.

The welding result will be best if the following method is used:
A collar is made on the pipe section so that the valve has a flat contact face. This flaring must look like a T-piece, as shown in the example below.



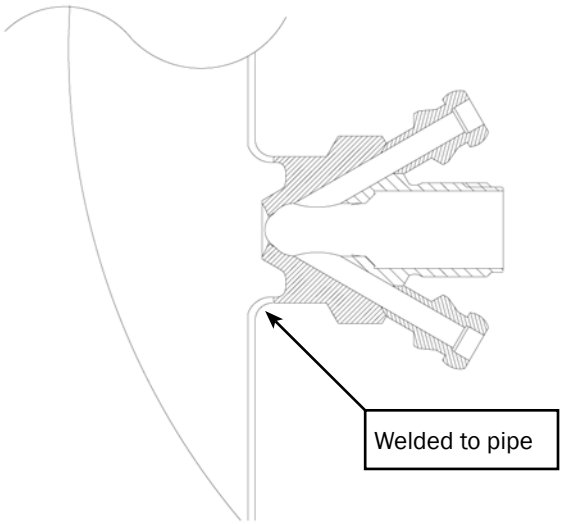
- The pipe section and the valve's hose pieces are sealed with sponge rubber or similar.
- Purge gas such as Argon or Formier gas is fed through the valve body into the pipe section and the system is now filled with 6 times the estimated volume of the pipe section. All 02 is thus expelled from the system and welding can commence.
- Welding can take place with the purge gas continually flowing in the system.
- The gas remains in the system until the item is lukewarm, after which the set-up can be dismantled.

Guideline welding values:
W9 valve welded onto a 2 mm 3" dairy pipe: 50-60 Amp.

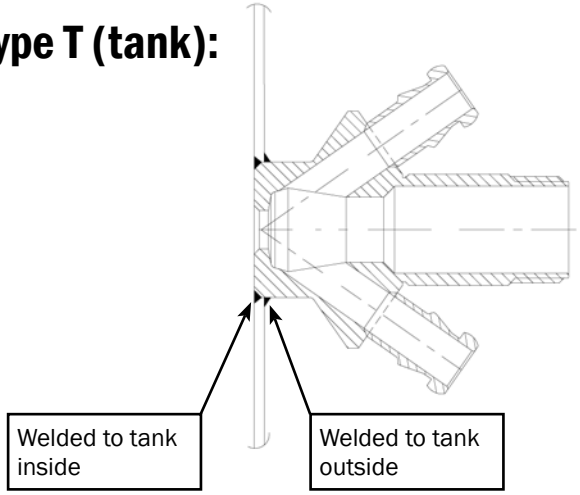
It should be noted that Keofitt can supply all P type valves welded onto a pipe section according to customer specifications. Flaring is thus avoided and only a girth weld is required.

BLOCK DIAGRAM FOR WELDING TO PIPE AND TANK

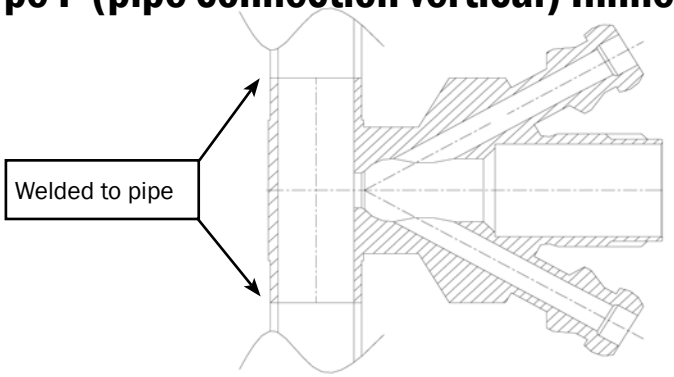
Keofitt valve type P (pipe):



Keofitt valve type T (tank):

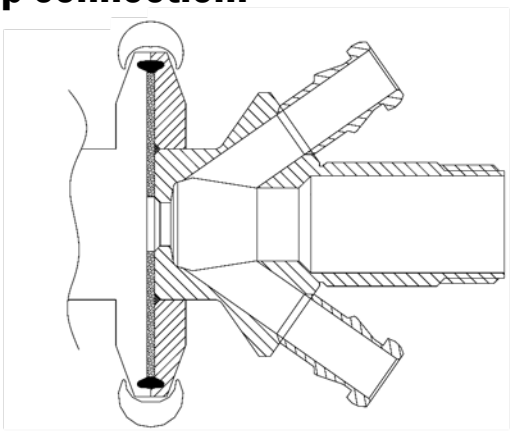


Keofitt valve type P (pipe connection vertical) Inline:

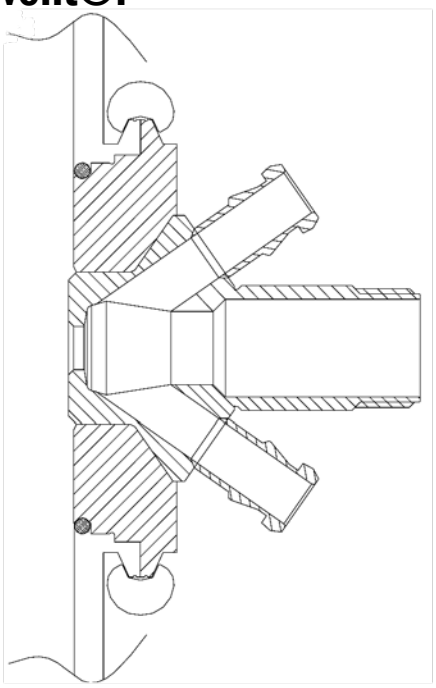


BLOCK DIAGRAM FOR INSTALLATION WITH CLAMP,VARIVENT® AND THREAD

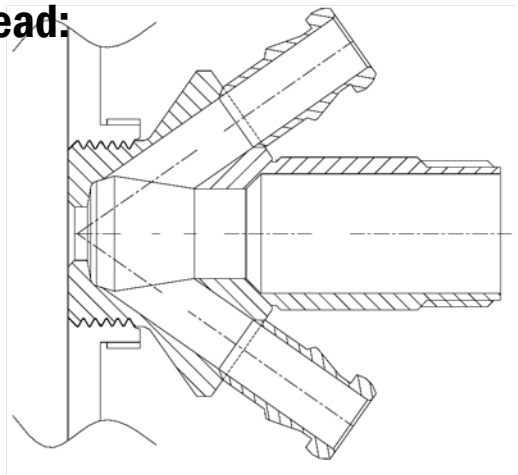
Keofitt valve type Clamp connection:



Keofitt valve type Varivent®:



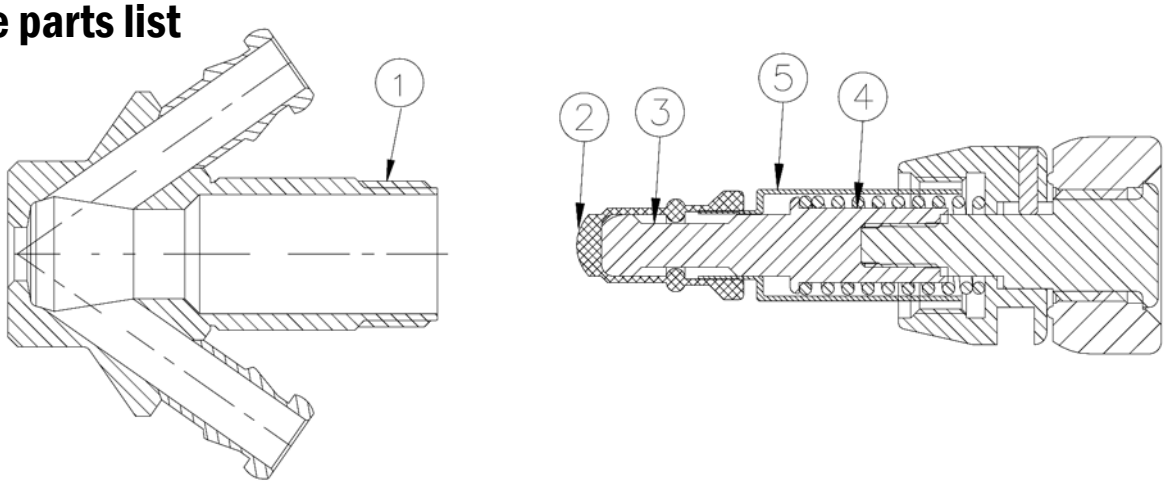
Keofitt valve type Thread:



MAINTENANCE

The rubber membrane should be replaced every two months. PTFE membranes should be replaced every 12 months. In the event of intensive sterilisation and cleaning it may be necessary to replace it more frequently. For valve heads with Micro Port, approx. 5-10 samples may be drawn off per membrane at 5-2 bar(g) respectively. The rubber plug must be replaced at least once every six months. In each individual case a standard operating procedure including maintance intervals should be endorsed based on experience. For disassembly of valve body and valve head, see instructions.

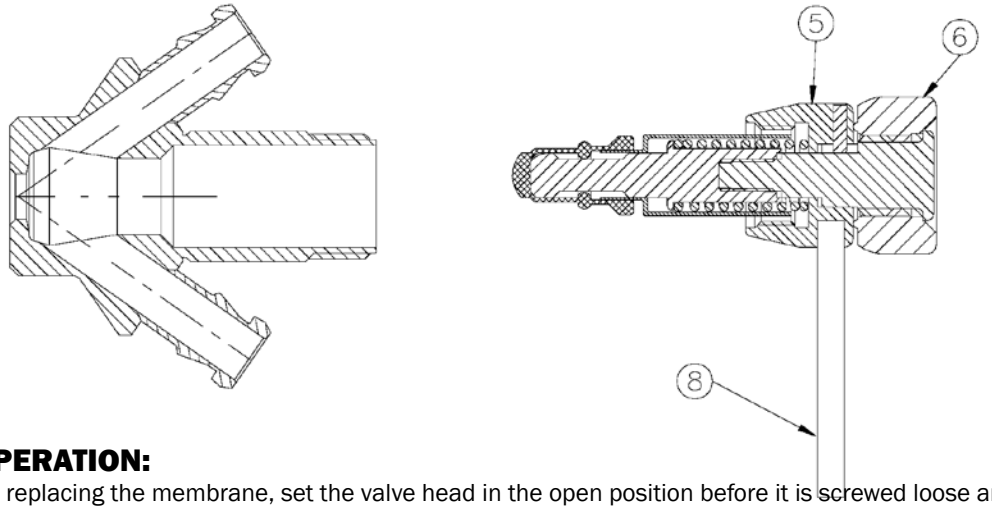
Spare parts list



Pos. Item

1. Valve body
2. Membrane Silicone (grey)
   Membrane EPDM (black)
   Membrane PTFE (White)
3. Lower stem
4. Spring
5. Steel bushing

Disassembly and assembly of valve body and head



ORDER OF OPERATION:

Remember! When replacing the membrane, set the valve head in the open position before it is screwed loose and pulled out of the valve body. Omitting to do so may result in twisting and cutting of the membrane.

1. Set the valve head at the open position. For types h and k this is done by turning pos. 6 clockwise.
2. Remove the valve head pos. 5. A Tommy bar pos. 8 should be used for disassembly and assembly. This is carried out by turning pos. 5 anti-clockwise until loose and then pulling the valve head off.
3. Refit the valve head (in the open position) once the necessary parts have been replaced. Care should be taken not to damage the threads.

INSTRUCTIONS ON REPLACING PTFE MEMBRANE

1. Open valve.
2. Remove the valve head from the valve body.
3. Push the membrane upwards until the tool for membrane fits under it.
4. Insert tool for membrane, between the membrane and the bushing.
5. Close valve head.
6. Now the membrane is loosened from the valve head and can be replaced.

To attach new membrane to valve head.

7. Set the valve head to closed position.
8. Place the new membrane on valve head.
9. Mount the membrane bushing with the new Teflon membrane by pressing the membrane with your hand until it clicks.
10. Set the valve head in open position.
11. Insert the valve head into the valve body.
12. Close valve head.

IMPORTANT

- Once the membrane has been removed from the valve head the click system in the membrane might be damaged. Therefore the membrane might be unsafe for further use and it is recommended not to use the membrane again.
- Do not use hammer or other tool that might scratch the surface of the membrane.

Tool nr.	*Type of valve*
300255	*I40, I52 and W15*
400255	*M4*
600255	*W9*
870255	*W25*

UPGRADE FROM SILICONE TO PTFE MEMBRANE

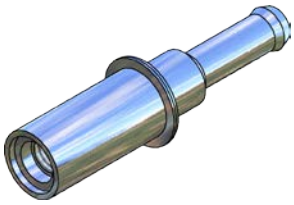
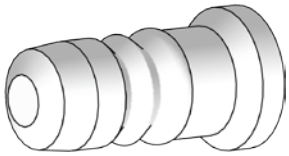
For manually operated valve heads type H, K and Q

1. Close valve.
2. Pull off the silicone / EPDM membrane.
3. Take the bushing off. (page 17, pos. 5)
4. Put the valve head in vice.
5. Turn the hex-nut counter clockwice until the membrane seat and spring are loose. Put the new lower stem for PTFE membrane in the vice.
6. Fit the new spring on the new lower stem.
7. Insert the rest of the valve head in the pin and press firmly.
8. Turn the hex-nut clockwise until the lower stem is firmly in place. Care should be taken not to damage the threads.
9. Put the bushing over the spring, then place PTFE membrane on the lower stem and press firmly until it clicks in place.
10. Put the valve head in open position.
11. Put valve head in valve body and tighten.

IMPORTANT!

- This is a delicate procedure to be performed by skilled personell only.
- Use vice with aluminium grips, to avoid scratching and damaging the valve head.
- Use the spring supplied with the PTFE kit. PTFE membranes require a different type of spring than EPDM and silicone membranes.
- Do not use hammer or other tool that might scratch the surface of the membrane.

UPGRADE KIT 854155 CONSISTING OF:

	Ident no.	Part name	Material
	600340	Lower stem for PTFE	AISI 316L
	850055	Membrane for W9	PTFE
	600411	Spring H-Q-K 12 bar(g)	St.St.

UPGRADE FROM SILICONE TO PTFE MEMBRANE

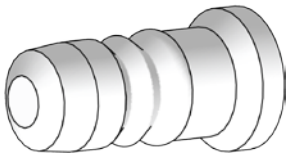
FOR PNEUMATICALLY ACTIVATED VALVE HEADS TYPE N:

1. Put the actuator in open position. Dismount the actuator by turning it anti-clockwise and pull it out. Dismount the silicone membrane and the membrane bushing holding it. Dismount Lever/Q-handle.
2. Use a special tool in the two holes on the end cap and turn it anti-clockwise. Be aware of the pressure released from the spring.
3. Pull out all parts. Inspect interior of actuator forloose parts or particles.
4. Install new valve stem for Teflon. Before mounting, make sure to grease the seal on the entire surface (only use mineral grease).
5. While mounting the valve stem turn it while pushing it down to avoid damaging the seal.
6. Remount the magnet, the magnet bushing and the spring.
7. Remount the end-cap by pushing it down turning it clockwise. Tighten it by use of the special tool. Care should be taken not to damage the threads.
8. Mount the air-connection.
9. Mount the bushing with the new teflon membrane installed by pressing the membrane with your hand until it clicks in place.
10. Remount the lever/Q-handle on the actuator and put it in open position. Remount the actuator on the valve body pushing while turning clockwise. Dismount lever/Q-handle. Tighten actuator by use of the tommy-ttt.
11. Re-connect the air hose to air fitting on actuator.

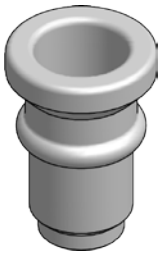
IMPORTANT!

- Do not use a hammer or any other hard material to mount the membrane. This can damage the membrane seal.

UPGRADE KIT 854455 CONSISTING OF:

	Ident no.	Part name	Material
	600345	Stem for W9	AISI 316L
	850055	Membrane for W9	PTFE
	850820	O-ring ø32	EPDM

SILICONE MEMBRANE - ITEM NO. 600051

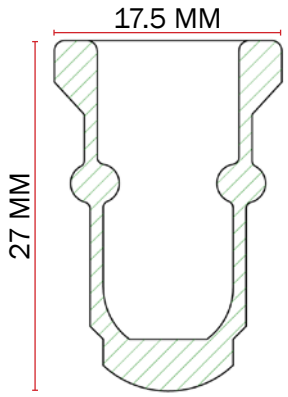


TECHNICAL SPECIFICATION

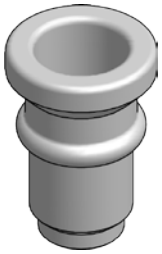
• Type:	Silicone
• Colour:	Grey
• Resistance to chemicals acids/bases)	Suitable
• Food safe	Yes (FDA*)
• Temp. max.	130-250°C / 266-482°F
• Steam pressure max.	2 bar/29 psi
• Process pressure	1-6 bar/14-87 psi

Keofitt recommends to change the silicone membrane 4-6 times a year or as needed. The recommendation is based on 1-5 samples a day, but should reflect individual tear and wear from individual cleaning and sterilisation procedures.

*FDA approved compound according to Code of Federal Regulations Title 21 - § 177.1550



SILICONE MEMBRANE FOR MICRO PORT - ITEM NO. 600251

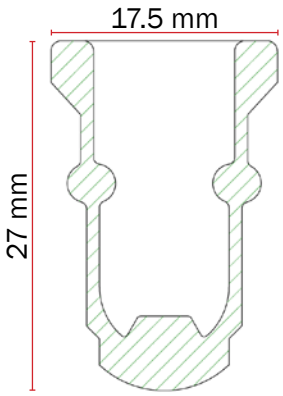


TECHNICAL SPECIFICATION

• Type:	Silicone
• Colour:	Grey
• Resistance to chemicals acids/bases)	Suitable
• Food safe	Yes (FDA*)
• Temp. max.	130-250°C / 266-482°F
• Steam pressure max.	2 bar/29 psi
• Process pressure	1-6 bar/14-87 psi

Keofitt recommends to change the silicone membrane 4-6 times a year or as needed. The recommendation is based on 1-5 samples a day, but should reflect individual tear and wear from individual cleaning and sterilisation procedures.

*FDA approved compound according to Code of Federal Regulations Title 21 - § 177.1550



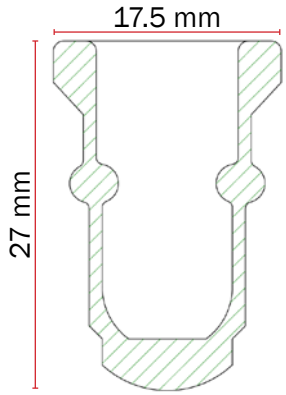
EPDM MEMBRANE - ITEM NO. 600052

TECHNICAL SPECIFICATION

• Type:	EPDM
• Colour:	Black
• Resistance to chemicals acids/bases)	Very good
• Food safe	Yes (FDA*)
• Temp. range	1-130°C / 34-266°F
• Steam pressure max.	2 bar/29 psi
• Process pressure	1-6 bar/14-87 psi

Keofitt recommends to change the EPDM membrane 4-6 times a year or as needed. The recommendation is based on 1-5 samples a day, but should reflect individual tear and wear from individual cleaning and sterilisation procedures.

*FDA approved compound according to Code of Federal Regulations Title 21 - § 177.1550



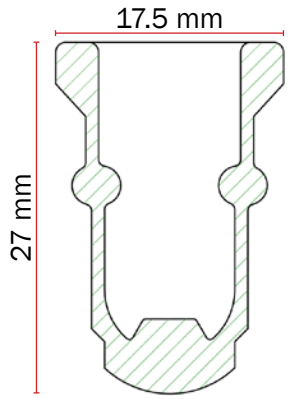
EPDM MEMBRANE FOR MICRO PORT- ITEM NO. 600252

TECHNICAL SPECIFICATION

• Type:	EPDM
• Colour:	Black
• Resistance to chemicals acids/bases)	Very good
• Food safe	Yes (FDA*)
• Temp. max.	130-150°C / 266-302°F
• Steam pressure max.	2 bar/29 psi
• Process pressure	1-6 bar/14-87 psi

Keofitt recommends to change the EPDM membrane 4-6 times a year or as needed. The recommendation is based on 1-5 samples a daybut should reflect individual tear and wear from individual cleaning and sterilisation procedures.

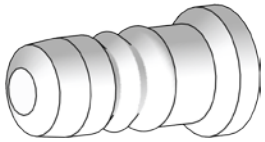
*FDA approved compound according to Code of Federal Regulations Title 21 - § 177.1550

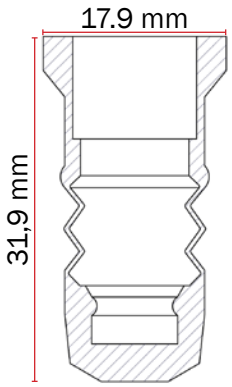


PTFE MEMBRANE - ITEM NO. 850055

TECHNICAL SPECIFICATION

• Type:	PTFE
• Colour:	White
• Resistance to chemicals acids/bases)	Excellent**
• Food safe	Yes (FDA*)
• Temp. range	1-150°C / 34-302°F
• Steam pressure max.	2 bar/29 psi
• Process pressure	1-6 bar/14-87 psi





Keofitt recommends to change the PTFE membrane once a year or as needed.
The recommendation is based on 1-5 samples a day, but should reflect individual tear and wear from individual cleaning and sterilisation procedures.

*FDA approved compound according to Code of Federal Regulations Title 21 - § 177.1550
** Is not attacked by common chemicals, with the exception of strongly oxidising acids.

INSTRUCTIONS ON REPLACING PTFE MEMBRANE

1. Open valve.
2. Remove the valve head from the valve body.
3. Push the membrane upwards until the tool for membrane fits under it.
4. Insert tool for membrane, between the membrane and the bushing.
5. Close valve head.
6. Now the membrane is loosened from the valve head and can be replaced.

To attach new membrane to valve head.

7. Set the valve head to closed position.
8. Place the new membrane on valve head.
9. Mount the membrane bushing with the new Teflon membrane by pressing the membrane with your hand until it clicks.
10. Set the valve head in open position.
11. Insert the valve head into the valve body.
12. Close valve head.

IMPORTANT

- Once the membrane has been removed from the valve head the click system in the membrane might be damaged. Therefore the membrane might be unsafe for further use and it is recommended not to use the membrane again.
- Do not use hammer or other tool that might scratch the surface of the membrane.

Tool for membrane item no. 600255

Keofitt reserves the right to change technical data without notice!
For complete set of updated data sheets and manuals for Keofitt products please refer to our web page www.keofitt.dk

KEOFITT®
WORLD LEADERS IN STERILE SAMPLING™