

Technical Information

VersaFlow Mag 4000 Electromagnetic Flow Sensor Specifications, 34-VF-03-01, March 2022



Standard Solution for the Process Industry

The VersaFlow electromagnetic flow sensor is a process industry standard suitable for the most demanding applications.

Highlights

- Proven in the Process industries
- Robust and reliable, all welded construction
- Works reliably under demanding conditions: High temperatures (up to 180°C / 356°F) pressures up to 2500 bar and low conductivity (non-water from 1 μ S/cm, water from 20 μ S/cm)
- Quick to install with standard ISO insertion lengths and easy to operate.
- Chemically resistant to a wide range of processes.
- Virtual reference option.
- Hazardous area versions available.
- Bi-directional flow metering
- Leak tight electrodes.

Industries

- Chemicals & Petrochemical
- Oil & Gas
- Pulp & Paper
- Water & Wastewater
- Minerals, Metals & Mining
- Automotive
- Pharmaceuticals
- Power Plants

Applications

- Clean liquids
- Slurries and pastes with high solids content
- Abrasive and aggressive products



Figure 1 – VersaFlow Magnetic Flow sensor

Electromagnetic Product range

VersaFlow Converters are compatible with all sensors



TWM9000 Integral Mounted



TWM9000 Remote Mounted



TWM1000



TWM9000 Wall Mounted

All meters consist of a sensor and a converter, which may be mounted integral to the sensor, or remotely, either with a field mount kit, wall mount housing or a 19" rack mount module. See specifications 34-VF-03-02 (TWM9000) or 34-VF-03-24 TWM1000 for converter details.

Technical Data

Table 1

Nominal diameter	MM41											MM42									
	ASME [inch]	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
DN [mm]		10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600

Nominal Flange Pressure

EN 1092-1 - PN40																						
EN 1092-1 - PN25																						
EN 1092-1 - PN16																						
EN 1092-1 - PN10																						
EN 1092-1 - PN6																						
ISO insertion length																						
ASME B16.5 - 150lbs RF																						
ASME B16.5 - 300lbs RF																						
ASME B16.5 - 600 lbs RF																						
ASME B16.5 - 900lbs RF																						
ASME B16.5 - 1500 lbs RF																						
JIS10K																						
JIS20K																						
DN10 – DN15 (3/8" – 1/2") connections, SS Duplex (1.4462)																						
N.B. for vacuum load see separate table.																						

Liner

PTFE																						
PFA																						
ETFE																						
Polyurethane (PU)																						
Hard rubber (Ex only)																						

Electrodes

Hastelloy C22																						
Hastelloy B2																						
Hastelloy C4																						
Platinum																						
Stainless steel 316 Ti (1.4571)																						
Titanium																						
Tantalum																						
Low noise HC22																						
Low noiseSS316Ti (1.4571)																						
N.B. Other materials on request																						

Table 2

Nominal diameter	MM41														MM42							
	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"		
ASME [inch]																						
DN [mm]	10	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600		

Grounding Rings

Stainless steel 316L Ti (1.4404)*	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Hastelloy C22**	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Titanium**	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Tantalum (ring #1 and #2 only)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
* DN 25 –600 : ring #1, 2 and 3 available.																					
** Ring #1, and #2 available.																					

Flanges

Carbon Steel St. 37-C22 (A105)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Stainless steel 1.4306(304)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Stainless steel 1.4404 (316 L)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Materials

Measuring tube -stainless steel	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Sensor Housing	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
- Stainless steel 316L Duplex (1.44-04)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
-Stainless steel 316L (1.4404)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
- Sheet steel	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
-Stainless steel 304 Duplex (1.4306)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Connection box (F-versions only)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
-die-cast aluminum, powder coated	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
-Stainless steel 304 (1.4301)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Other materials on request.																					

Protection Category

IP 66/67 eq. NEMA 4/4X / 6	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
IP 68 field eq. NEMA 6P	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
N.B. IP 68 is only available with a stainless-steel connection box																					

Approvals

Non - Ex	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
EEx zone 1/2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
FM - class I div. 2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
CSA- class I div. 2	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Please note the approvals are for flow sensors only.																					

■ standard ■ optional □ on request

Technical Data**Table 3**

Measuring System		
Measuring principle	Faraday's Law	
Application range	Electrically conductive fluids	
Conductivity		
Non-water	>10 μ S	min. 1 μ S/cm (TWM 9000), min. 5 μ S/cm (TWM 1000)
Water	min. 20 μ S/cm	
Measured value		
Primary value	Flow velocity	
Secondary value	Volume flow	
Design		
Features	Fully welded maintenance free sensor	
	Standard as well as customized designs e.g higher pressure ratings	
	Industry standard insertion lengths	
Construction	The measurement system consists of a flow sensor and a signal converter. Signal converter is available as compact or separate version.	
Compact version	With signal converter TWM1000 & TWM9000	
Housing Remote version	Wall mount (W) with TWM1000	
	Field (F), wall (W) or rack (R) mount with TWM9000	
Performance specifications		
Measuring accuracy		
Sensor diameter	Signal converter type	Accuracy
DN10...600 / 3/8...24"	TWM9000	\pm 0.2% of mv + 1 mm/s
DN10...600 / 3/8...24"	TWM1000	\pm 0.3% of mv + 1 mm/s
Repeatability	\pm 0.1% of measured value, minimum 1 mm/s	
Stability	\pm 0.1% of measured value	
Calibration	Standard: 2-point calibration by direct volume comparison	
Measuring range	-12...+12 m/s / -40...+40 ft/s	
Pressure loss	Negligible	
Permissible gas and solid content		
Gas content(volume)	TWM9000: \leq 5%	
Solid content(volume)	TWM1000: \leq 10%	
Solid content(volume)	TWM9000: \leq 70%	
Versions		
Configuration	Compact	Separate
VersaFlow MAG 4000	TWM 9000C TWM 1000C	TWM9000F, R, W TWM1000W

Measuring Accuracy

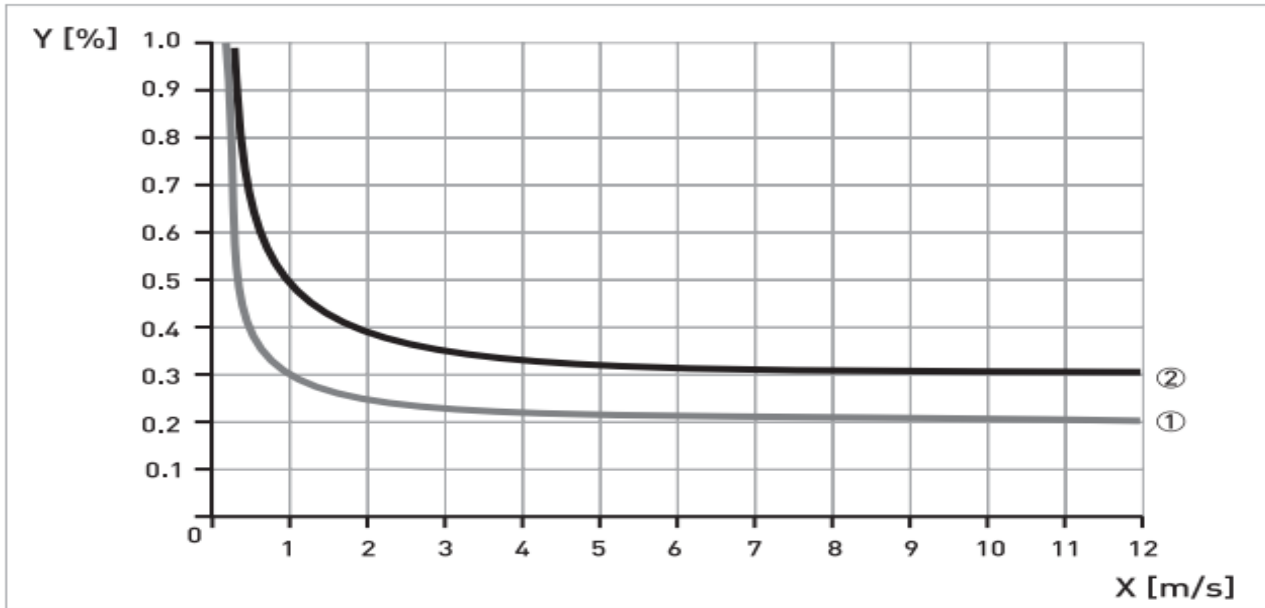


Figure 2 – Flow velocity vs. accuracy

X [m/s] : flow velocity
 Y [%] : deviation from the actual measured value (mv)

Accuracy

Flow Sensor diameter	Signal Converter type	Accuracy	Curve
DN10...600 (3/8...24")	TWM 9000	± 0 .2% of mv + 1 mm/s	(1)

Measuring error

The measuring error is obtained from the combined effects of accuracy and zero stability.

Reference conditions

- Product: Water
- Temperature: +5...35°C / +41...95°F
- Operating pressure: 0.1...5 barg / 1.5...72.5 psig
- Inlet section: > 5 DN
- Outlet section: > 2 DN

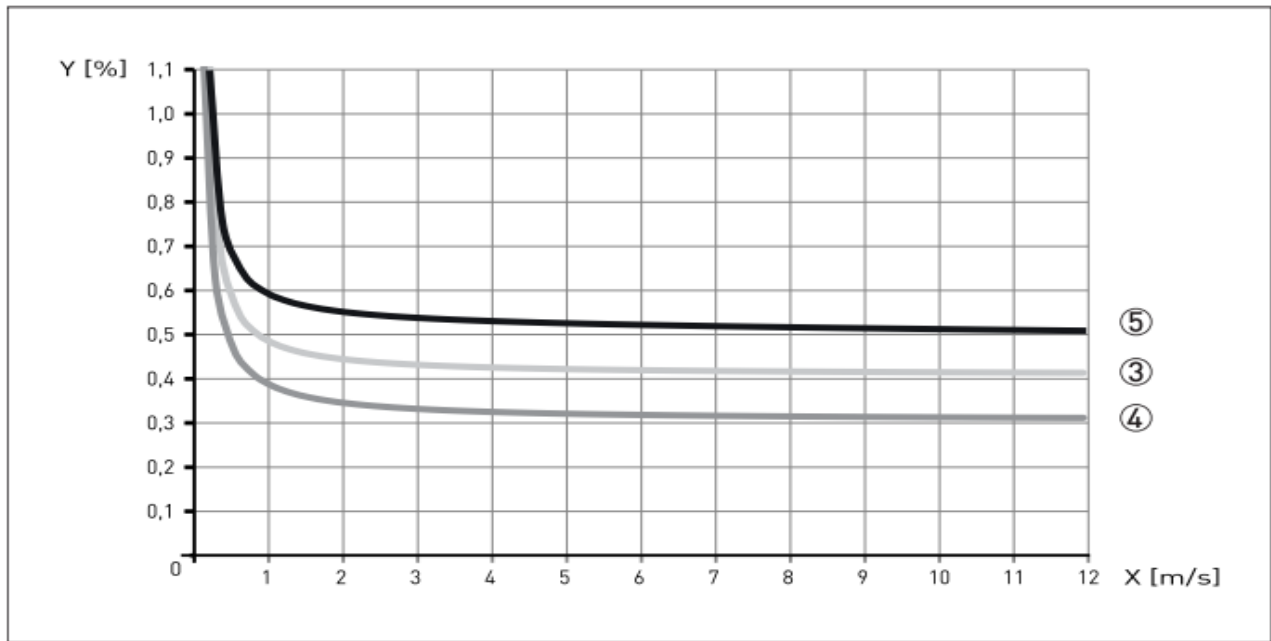


Figure 3 – Flow velocity vs. accuracy

X [m/s] : flow velocity

Y [%] : deviation from the actual measured value (mv)

Accuracy

Flow Sensor diameter	Signal Converter type	Accuracy	Curve
DN10...600 (3/8...24")	TWM 1000	± 0.3% of mv + 1 mm/s	(4)

Measuring error

The measuring error is obtained from the combined effects of accuracy and zero stability.

Reference conditions

Product: Water

Temperature: +5...35°C / +41...95°F

Operating pressure: 0.1...5 barg / 1.5...72.5 psig

Inlet section: > 5 DN

Outlet section: > 2 DN

Temperature Range**Table 4**

Temperature range	Process [°C]		Ambient [°C]		Process [°F]		Ambient [°F]	
	min.	max.	min.	max.	min.	max.	min.	max.
PTFE								
Remote Converter (TWM 1000 or TWM 9000)	-40	180	-40	65	-40	356	-40	149
Compact with TWM 1000 or TWM 9000	-40	140	-40	65	-40	284	-40	149
PFA								
Remote Converter (TWM 1000 or TWM 9000)	-40	180	-40	65	-40	356	-40	149
Compact with TWM 1000 or TWM 9000	-40	140	-40	65	-40	284	-40	149
ETFE								
Remote Converter (TWM 1000 or TWM 9000)	-40	120	-40	65	-40	248	-40	149
Compact with TWM 1000 or TWM 9000	-40	120	-40	65	-40	248	-40	149
Hard rubber								
Remote Converter (TWM 1000 or TWM 9000)	-5	80	-25	65	23	176	-13	149
Compact with TWM 1000 or TWM 9000	-5	80	-40	65	23	176	-40	149
*N.B. Hard rubber liner is available for Ex-versions only								
Polyurethane (PU)								
Remote Converter (TWM 1000 or TWM 9000)	-5	65	-25	65	23	149	-13	149
Compact with TWM 1000 or TWM 9000	-5	65	-40	65	23	149	-40	149

Dimensions and Weights**Table 5**

Nominal size		Dimensions [mm]						Approx. weight
DN	PN	L		H	W	Total (T)		[kg]
[mm]	[bar]	DIN	ISO			box	TWM9000	
DN25...150								
25	40	150	200	140	115	218	297	4
32	40	150	200	157	140	235	314	5
40	40	150	200	166	150	244	323	5
50	40	200	200	186	165	264	343	9
65	16	200	200	200	185	278	357	9
80	40	200	200	209	200	287	366	12
100	16	250	250	237	220	315	394	15
125	16	250	250	266	250	344	423	19
150	16	300	300	300	285	378	457	27
DN200...600								
200	10	350	350	361	340	439	518	34
250	10	400	450	408	395	486	565	48
300	10	500	500	458	445	536	615	58
350	10	500	550	510	505	588	667	78
400	10	600	600	568	565	646	725	101
450	10	600	-	618	615	696	775	111
500	10	600	-	671	670	749	828	130
600	10	600	-	781	780	859	938	165

Table 6

Nominal size		Dimensions 150lbs [inch]					Approx. weight
ASME	PN	Flow Sensor Only			Total (T)		[lb]
[inch]	[psi]	L	H	W	box	TWM9000	
DN 1" ...6"							
1"	284	5,91	5,39	4,25	8,46	11,57	7
1¼"	284	5,91	5,98	4,62	8,83	11,94	7
1½"	284	5,91	6,1	5	9,17	12,28	11
2"	284	7,87	7,05	5,98	10,12	13,23	18
2½"	284	7,87	7,72	7,00	11,05	14,15	24
3"	284	7,87	8,03	7,5	11,1	14,21	26
4"	284	9,84	9,49	9	12,56	15,67	-40
5"	284	9,84	10,55	10	13,26	16,73	49
6"	284	11,81	11,69	11	14,76	17,87	64
DN8" ...24"							
8"	284	13,78	14,25	13,5	17,32	20,43	95
10"	284	15,75	16,3	16	19,37	22,48	143
12"	284	19,69	18,78	19	21,85	24,96	207
14"	284	27,56	20,67	21	23,74	26,85	284
16"	284	31,5	22,95	23,5	26,02	29,13	364
18"	284	31,5	24,75	25	27,8	30,91	410
20"	284	31,5	26,97	27,5	30,04	33,15	492
24"	284	31,5	31,38	32	34,45	37,56	675
Pressures are applicable at 20° C (68°F)							
For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47 (>24")							

Table 7

Nominal size		Dimensions 150lbs [mm]					Approx. weight
ASME	PN	Flow Sensor Only			Total (T)		[kg]
[inch]	[psi]	L	H	W	box	TWM9000	
DN1" ...6"							
1"	284	150	137	108	215	294	0.5
1¼"	284	150	152	117	224	303	0.5
1½"	284	150	155	127	233	312	0.8
2"	284	200	179	152	257	336	1.3
2½"	284	200	196	178	281	359	1.7
3"	284	200	204	190,5	282	361	1.8
4"	284	250	241	228,6	319	398	2.8
5"	284	250	268	254	346	425	3.4
6"	284	300	297	279,4	375	454	4.5
DN8" ...24"							
8"	284	350	362	342,9	440	519	6.6
10"	284	400	414	406,4	492	571	4.6
12"	284	500	477	482,6	555	634	6.6
14"	284	700	525	533,4	603	682	9
16"	284	800	583	596,9	661	740	11.6
18"	284	800	628	635	706	785	13
20"	284	800	685	698,5	763	842	15.7
24"	284	800	797	812,8	875	954	21.5
Pressures are applicable at 20°C (68 °F)							
For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47(>24")							

Table 8

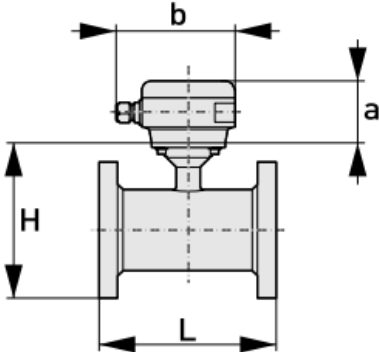
Nominal size		Dimensions 300lbs [inch]					Approx. weight
ASME	PN	Flow Sensor Only			Total (T)		[lb]
[inch]	[psi]	L	H	W	box	TWM9000	
DN1" ...6"							
1"	741	5,91	5,71	4,87	8,78	11,89	11
1½"	741	7,87	6,65	6,13	9,72	12,83	13
2"	741	9,84	7,32	6,5	10,39	13,5	22
3"	741	9,84	8,43	8,25	11,5	14,61	31
4"	741	11,81	10	10	13,07	16,18	44
6"	741	12,6	12,44	12,5	15,51	18,62	73
DN8" ...24"							
8"	741	15,75	15,04	15	18,11	21,22	157
10"	741	19,69	17,05	17,5	20,12	23,23	247
12"	741	23,62	20	20,5	23,07	26,18	375
14"	741	27,56	21,65	23	24,72	27,83	474
16"	741	31,5	23,98	25,5	27,05	30,16	639
20"	741	31,5	28,46	30,5	31,54	34,65	937
24"	741	31,5	33,39	36	36,46	39,57	1345
Pressures are applicable at 20°C (68 °F)							
For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47(>24")							

Table 9

Nominal size		Dimensions 300lbs [mm]					Approx. weight
ASME	PN	Flow Sensor Only			Total (T)		[kg]
[inch]	[psi]	L	H	W	box	TWM9000	
DN0,1"…6"							
1"	741	150	145	123,8	223	300	0.8
1½"	741	200	169	155,6	247	326	0.9
2"	741	250	186	165,1	264	343	1.5
3"	741	250	214	209,6	292	371	2.2
4"	741	300	254	254	332	411	3.1
6"	741	320	316	317,5	394	473	5.1
DN0,8"…24"							
8"	741	400	382	381	460	539	11
10"	741	500	433	444,5	511	590	17
12"	741	600	508	520,7	586	665	26
14"	741	700	550	584,2	628	707	33
16"	741	800	609	647,7	687	766	45
20"	741	800	723	774,7	801	880	66
24"	741	800	848	914,4	926	1005	95
Pressures are applicable at 20°C (68 °F)							
For higher temperatures, the pressure and temperature ratings are as per ASME B16.5 (up to 24") or ASME B16.47(>24")							

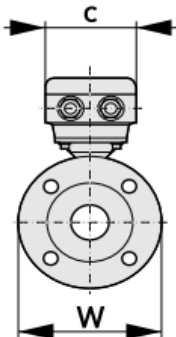
Dimensions and Weights

Frontview VersaFlow (w/TWM9000F)



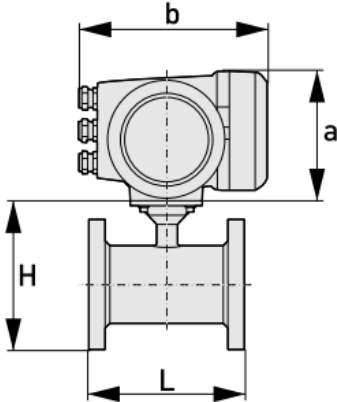
a = 88 mm / 3.5"
b = 139 mm / 5.5"

Sideview VersaFlow (w/TWM9000F)



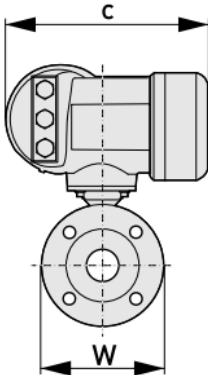
c = 106 mm / 4.2"

Frontview VersaFlow (w/TWM9000C)



a = 155 mm / 6.1"
b = 230 mm / 9.1"

Sideview VersaFlow (w/TWM9000C)



c = 260 mm / 10.2"

Figure 4 – Dimensions and weights

Note: For Sensor with TWM1000 Converter refer to Specification 36-VF-03-24.

Vacuum Load**Table 10**

Liner	Diameter [mm]	Max. pressure [bar]	Vacuum load in mbar abs. at a process temperature [°C] of ...								
			40	60	70	80	90	100	120	140	180
PFA	DN 25 - 150	50	0	0	0	0	0	0	0	0	0
Hard rubber	DN 200 - 300	150	250	400	400	400	-	-	-	-	-
	DN 350 - 600	150	500	600	600	600	-	-	-	-	-
ETFE	DN 200 - 600	150	100	100	100	100	100	100	100	-	-
PTFE	DN 200 - 300	50	500	750	1000	1000	1000	1000	1000	1000	1000
	DN 350 - 600	50	800	1000	1000	1000	1000	1000	1000	1000	1000
Poly urethane (PU)	DN 200 - 600	1500	500	600	-	-	-	-	-	-	-

Table 11

Liner	Diameter [inch]	Max. pressure [psi]	Vacuum load in psia at a process temperature [°F] of ...								
			104	140	158	176	194	212	248	284	356
PFA	1"-6"	725	0	0	0	0	0	0	0	0	0
Hard rubber	8" - 12"	2176	3,6	5,8	5,8	5,8	-	-	-	-	-
	14" - 24"	2176	7,3	8,7	8,7	8,7	-	-	-	-	-
ETFE	8" - 24"	2176	1,5	1,5	1,5	1,5	1,5	1,5	1,5	-	-
PTFE	8" - 12"	725	7,3	10,9	14,5	14,5	14,5	14,5	14,5	14,5	14,5
	14' - 24'	725	11,6	14,5	14,5	14,5	14,5	14,5	14,5	14,5	14,5
Poly urethane (PU)	8' - 24"	21756	7,3	8,7	-	-	-	-	-	-	-

Sales and Service

For application assistance, current specifications, ordering, pricing, and name of the nearest Authorized Distributor, contact one of the offices below.

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Web

Knowledge Base search
engine <http://bit.ly/2N5Vldi>

AMERICAS

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Email: (Sales)

FP-Sales-Apps@Honeywell.com

or

(TAC)

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Web

Knowledge Base search
engine <http://bit.ly/2N5Vldi>

Specifications are subject to change without notice.

For more information

To learn more about VersaFlow,
visit <https://process.honeywell.com>
Or contact your Honeywell Account Manager

Process Solutions

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Honeywell

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