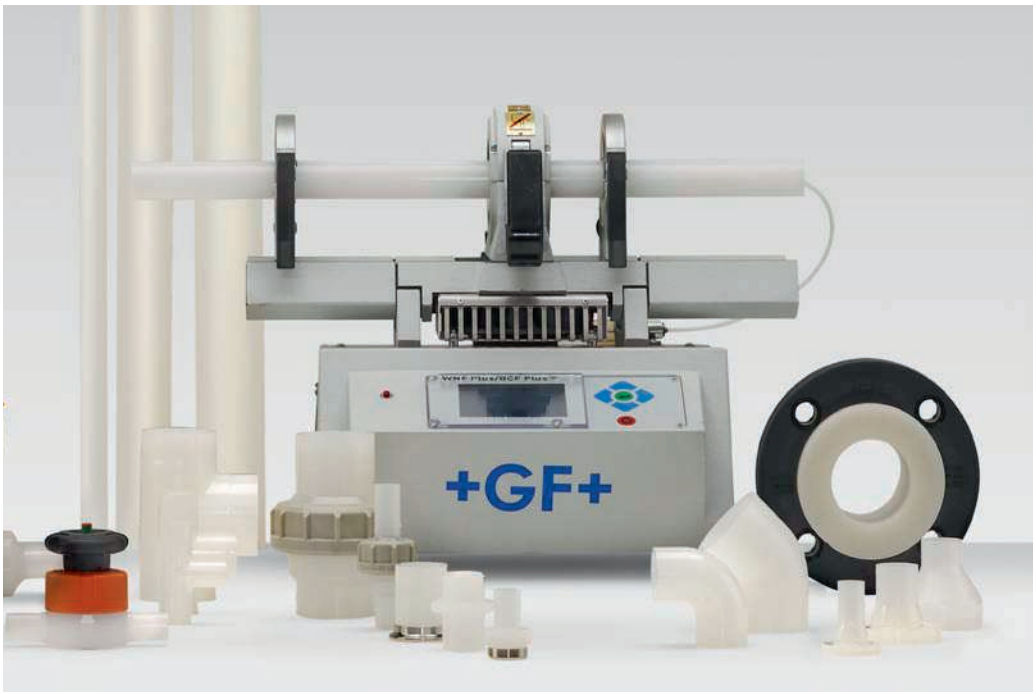
PROGEF® Natural



– Pipes
– Butt Fusion System

PROGEF® Natural (natural)

Pressure/temperature diagram for PP

PROGEF® Natural

The following pressure/temperature diagram for PROGEF® Natural pipes and fittings is valid for a lifetime of 25 years.

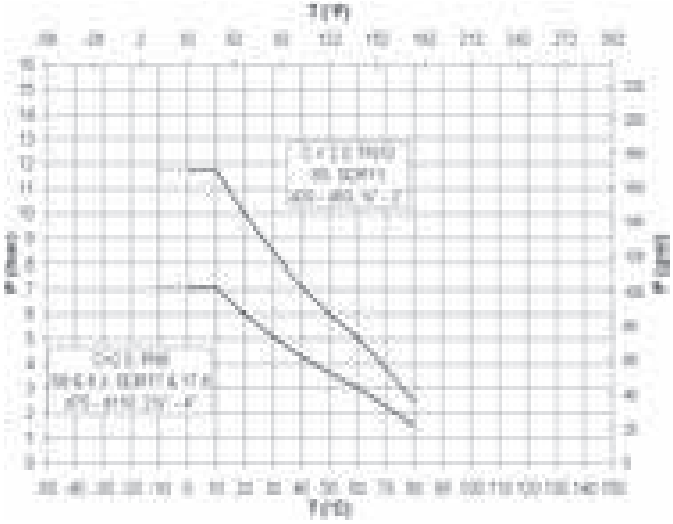
The design factor of 2.0 recommended by GF is incorporated.

It can be used for water or media resembling water, in other words, media which have no derating factor regarding the chemical resistance.

Remark: Please take into account the pressure/temperature diagrams for valves and special fittings. Becauseof the construction and/or sealing material used, differences are possible when compared with pipes and fittings. This information can be found in the planning fundamentals of the relevant types of valves, respectively special fittings.

Remark: Using PROGEF® Natural at higher temperatures can lead to a discoloration of the material.

In case of applications with temperatures in the range of the dotted lines please contact your GF representative.



P Permissible pressure in bar, psi
T Temperature in °C, °F

PROGEF Natural – System Specification

Material	Polypropylene Random Copolymer
Colour	Unpigmented, translucent
Density	~0.90 g/cm^3 (ISO 1183 / ASTM D 792)
Surface tension	30–35 mJ/m^2
Linear expansion coefficient	0.15 mm/m °K (DIN 53752)
E-modulus	900 N/mm^2 (ISO 527/ASTM D 790)
Thermal conductivity	0.23 W/mK (EN 12664)
Surface resistivity	› 10^{16} Ω (IEC 60093)
Dimension	d 20–d 110 in accordance with EN ISO 15494
Pressure Rating	Pipes/Fittings/Diaphragm valves: d 20 – d 63 SDR11, PN10, c = 2.0 d 75 – d 110 SDR17.6, PN6, c = 2.0
Temperature Rating	from 0 °C to 80 °C (< 60 °C for valves) (32 °F–176 °F)
Production	Fittings/valves: injection moulded Pipes: extruded
Surface Finish	Inner surface Ra ≤ 1 µm (39 µin)
Marking	Fittings, pipes and valves are embossed with a permanent identification during the production process to ensure full traceability: Lot No Material Dimension Pressure Rating
Testing and Inspection (EN ISO 15494)	Inclusions Visual inspection Surface finish Dimension tolerance Pressure testing Full product range passed the Initial Type Test (ITT)
Approvals/Conformance [1]	FDA CFR 21 177.1520 USP 25 class VI (physiological non-toxic)
Welding Technology	BCF Plus, bead and crevice free fusion IR Plus, infrared fusion (DVS 2207-6) Butt fusion (DVS 2207-11)
Documentation[2]	Certificate of Conformance with FDA, USP EN 10204 2.2 EN 10204 3.1 ASME BPE
Packing	Pipes: Capped & single bagged Fittings/valves: Multiple components single bagged in specified bag
Labeling	Brand Name Product Description Code Number Material Dimension CE-labeling [3] Approvals
Main Applications	Uses include cost effective, pure distribution of DI-water and critical biological fluids where chemical sanitisation is needed. **B**ead and **C**revice **F**ree jointing and minimal metallic leachout ensure the highest product quality. Highly resistant to impact, abrasion and many chemicals make it ideal for slurries transportation in the semiconductor industry.

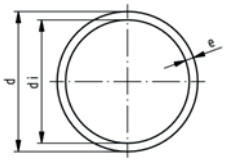
[1] For thermoplastic material only
[2] On request
[3] From 2008 on

PROGEF Natural Pipes, Fittings, Unions, Flanges and Flange Adaptors

Pipes

68 48 01

PROGEF Natural S5/SDR11 (PN10)



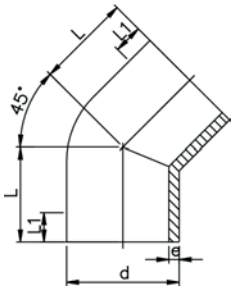
Model:

- Material: PP-R unpigmented
- Colour: natural
- Length: Lengths of 5 m
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Conventional butt-welding according to DVS 2207 part 11

d [mm]	Code	kg/m	e [mm]	di [mm]
20	**168 480 151**	0.107	1.9	16.2
25	**168 480 152**	0.164	2.3	20.4
32	**168 480 153**	0.261	2.9	26.2
40	**168 480 154**	0.412	3.7	32.6
50	**168 480 155**	0.638	4.6	40.8
63	**168 480 156**	1.010	5.8	51.4

Fittings for Butt Fusion

PROGEF Natural elbow 45° S5/SDR11

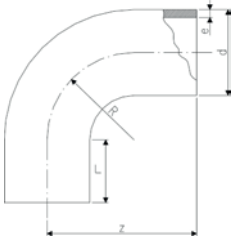


Model:

- Material: PP-R unpigmented
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Conventional butt-welding according to DVS 2207 part 11

d [mm]	FM	Code	kg	L [mm]	L1 [mm]	e [mm]
20	BCF, IR	**728 158 506**	0.007	32	24	1.9
25	BCF, IR	**728 158 507**	0.002	34	25	2.3
32	BCF, IR	**728 158 508**	0.019	36	25	2.9
40	BCF, IR	**728 158 509**	0.037	39	25	3.7
50	BCF, IR	**728 158 510**	0.054	42	26	4.6
63	BCF, IR	**728 158 511**	0.097	47	29	5.8

PROGEF Natural bend 90° S5/SDR11 - 0.75d

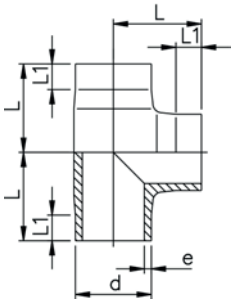


Model:

- Material: PP-R unpigmented
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Conventional butt-welding according to DVS 2207 part 11

d [mm]	FM	Code	kg	z [mm]	L [mm]	R [mm]	e [mm]
20	IR, BCF	**728 018 606**	0.007	38	23	15	1.9
25	IR, BCF	**728 018 607**	0.012	42	23	19	2.3
32	IR, BCF	**728 018 608**	0.026	46	22	24	2.9
40	IR, BCF	**728 018 609**	0.038	51	21	30	3.7
50	IR, BCF	**728 018 610**	0.065	58	21	37	4.6
63	IR, BCF	**728 018 611**	0.115	66	21	45	5.8

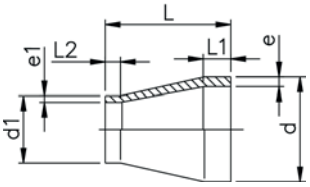
PROGEF Natural tee 90° equal S5/SDR11



Model:

- Material: PP-R unpigmented
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Conventional butt-welding according to DVS 2207 part 11

d [mm]	FM	Code	kg	L [mm]	L1 [mm]	e [mm]
20	BCF, IR	**728 208 506**	0.011	38	24	1.9
25	BCF, IR	**728 208 507**	0.019	42	26	2.3
32	BCF, IR	**728 208 508**	0.032	46	26	2.9
40	BCF, IR	**728 208 509**	0.059	51	23	3.7
50	BCF, IR	**728 208 510**	0.101	58	22	4.6
63	BCF, IR	**728 208 511**	0.182	66	20	5.8



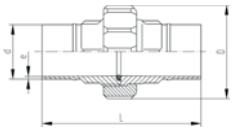
PROGEF Natural reducer S5/SDR11

Model:

- Material: PP-R unpigmented
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Conventional butt-welding according to DVS 2207 part 11

d [mm]	d1 [mm]	FM	Code	kg	L [mm]	L1 [mm]	L2 [mm]	e [mm]	e1 [mm]
25	20	BCF, IR	**728 908 537**	0.007	50	20	20	2.3	1.9
32	20	BCF, IR	**728 908 542**	0.010	50	20	20	3.0	1.9
32	25	BCF, IR	**728 908 541**	0.011	50	20	20	3.0	2.3
40	20	BCF, IR	**728 908 548**	0.015	58	20	23	3.7	1.9
40	25	BCF, IR	**728 908 547**	0.016	55	20	20	3.7	2.3
40	32	BCF, IR	**728 908 546**	0.019	55	20	20	3.7	2.9
50	25	BCF, IR	**728 908 554**	0.025	60	20	20	4.6	2.3
50	32	BCF, IR	**728 908 553**	0.027	60	20	20	4.6	2.9
50	40	BCF, IR	**728 908 552**	0.030	60	20	20	4.6	3.7
63	32	BCF, IR	**728 908 560**	0.043	65	20	20	5.8	2.9
63	40	BCF, IR	**728 908 559**	0.047	65	20	20	5.8	3.7
63	50	BCF, IR	**728 908 558**	0.052	65	20	20	5.8	4.6

EPDM 28 51 85
FPM 28 52 85

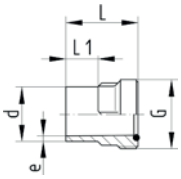


PROGEF Natural sanitary union S5/SDR11

Model:

- Material: PP-R unpigmented
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Conventional butt-welding according to DVS 2207 part 11
- Only EPDM codes meet FDA compliance.

d [mm]	FM	EPDM Code	FPM Code	kg	D [mm]	L [mm]	L1 [mm]	L2 [mm]	e [mm]
20	BCF, IR	**728 518 526**	**728 528 526**	0.048	48	107	53	25	1.9
25	BCF, IR	**728 518 527**	**728 528 527**	0.076	58	113	56	25	2.3
32	BCF, IR	**728 518 528**	**728 528 528**	0.106	65	119	59	25	2.9
40	BCF, IR	**728 518 529**	**728 528 529**	0.147	79	126	63	25	3.7
50	BCF, IR	**728 518 530**	**728 528 530**	0.194	91	131	65	25	4.6
63	BCF, IR	**728 518 531**	**728 528 531**	0.343	111	137	68	25	5.8



PROGEF Natural union bush S5/SDR11

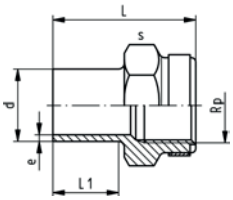
Model:

- Material: PP-R unpigmented
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Conventional butt-welding according to DVS 2207 part 11

d [mm]	PN	FM	Code	kg	G [inch]	L [mm]	L1 [mm]	e [mm]
20	10	BCF, IR	**728 648 526**	0.012	1	54	26	1.9
25	10	BCF, IR	**728 648 527**	0.020	1 1/4	57	26	2.3
32	10	BCF, IR	**728 648 528**	0.029	1 1/2	60	25	2.9
40	10	BCF, IR	**728 648 529**	0.047	2	63	25	3.7
50	10	BCF, IR	**728 648 530**	0.072	2 1/4	66	25	4.6
63	10	BCF, IR	**728 648 531**	0.104	2 3/4	69	25	5.8

Adaptor fittings for butt fusion

PROGEF Natural adaptor socket metric Rp

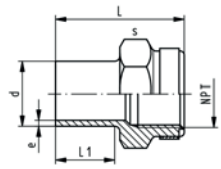


Model:

- Material: PP-R unpigmented
- With butt fusion spigot **SDR11** and BSP parallel female thread Rp, reinforced
- Connection to plastic or metal threads
- Reinforcing ring stainless (A2)
- Do not use thread sealing pastes that are harmful to PP

d [mm]	FM	Rp [inch]	PN	Code	kg	L [mm]	L1 [mm]	s [mm]	e [mm]
20	BCF, IR	½	10	**728 918 056**	0.014	49	28	32	1,9
25	BCF, IR	¾	10	**728 918 057**	0.022	51	28	36	2,3
32	BCF, IR	1	10	**728 918 058**	0.039	54	28	46	2,9
40	BCF, IR	1 ¼	10	**728 918 059**	0.057	56	28	55	3,7
50	BCF, IR	1 ½	10	**728 918 060**	0.085	60	28	64	4,6
63	BCF, IR	2	10	**728 918 061**	0.140	62	28	80	5,8

PROGEF Natural adaptor socket metric NPT

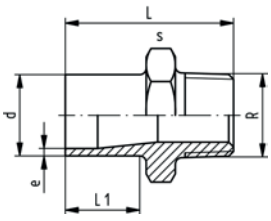


Model:

- Material: PP-R unpigmented
- With butt fusion spigot **SDR11**and NPT tapered female thread, reinforced
- Connection to plastic or metal threads
- Reinforcing ring stainless (A2)
- Do not use thread sealing pastes that are harmful to PP
- Install with low mechanical stress and avoid large cyclic temperature changes

d [mm]	FM	NPT [inch]	PN	Code	kg	L [mm]	L1 [mm]	s [mm]	e [mm]
20	BCF, IR	½	10	**728 914 056**	0.016	49	28	32	1.9
25	BCF, IR	¾	10	**728 914 057**	0.019	51	28	36	2.3
32	BCF, IR	1	10	**728 914 058**	0.039	54	28	46	2.9
40	BCF, IR	1 ¼	10	**728 914 059**	0.052	56	28	55	3.7
50	BCF, IR	1 ½	10	**728 914 060**	0.085	60	28	64	4.6
63	BCF, IR	2	10	**728 914 061**	0.140	62	28	80	5.8

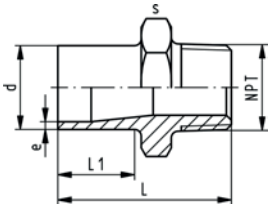
PROGEF Natural adaptor nipple metric R



Model:

- Material: PP-R unpigmented
- With butt fusion spigot SDR11 and tapered male thread
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PP
- Install with low mechanical stress and avoid large cyclic temperature changes

d [mm]	FM	R [inch]	PN	Code	kg	L [mm]	L1 [mm]	s [mm]	e [mm]
20	BCF, IR	½	10	**728 918 106**	0.013	51	28	32	1,9
25	BCF, IR	¾	10	**728 918 107**	0.017	52	28	36	2,3
32	BCF, IR	1	10	**728 918 108**	0.027	55	28	46	2,9
40	BCF, IR	1 ¼	10	**728 918 109**	0.037	58	28	55	3,7
50	BCF, IR	1 ½	10	**728 918 110**	0.052	60	28	65	4,6
63	BCF, IR	2	10	**728 918 111**	0.092	67	28	80	5,8

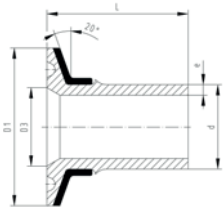


PROGEF Natural adaptor nipple metric NPT

Model:

- Material: PP-R unpigmented
- With butt fusion spigot **SDR11** and NPT tapered male thread
- Connection to plastic threads only
- Do not use thread sealing pastes that are harmful to PP
- Install with low mechanical stress and avoid large cyclic temperature changes

d [mm]	NPT [inch]	PN	FM	Code	kg	L [mm]	L1 [mm]	s [mm]	e [mm]
20	½	10	BCF, IR	**728 914 106**	0.013	51	28	32	1.9
25	¾	10	BCF, IR	**728 914 107**	0.017	52	28	36	2.3
32	1	10	BCF, IR	**728 914 108**	0.027	55	28	46	2.9
40	1 ¼	10	BCF, IR	**728 914 109**	0.039	58	28	55	3.7
50	1 ½	10	BCF, IR	**728 914 110**	0.054	60	28	65	4.6
63	2	10	BCF, IR	**728 914 111**	0.093	67	28	80	5.8

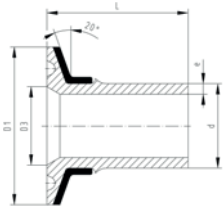


PROGEF Natural sanitary adaptor Connection to ISO 1127

Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Stainless steel reinforcement ring

d [mm]	FM	DN [mm]	PN	Code	kg	D1 [mm]	D3 [mm]	L [mm]	e [mm]
20	BCF, IR	15	10	**728 598 006**	0.031	50	18	49.0	1,9
25	BCF, IR	20	10	**728 598 008**	0.029	50	23	49.5	2,3
25	BCF, IR	25	10	**728 598 009**	0.029	50	29	49.5	2,3
32	BCF, IR	25	10	**728 598 010**	0.030	50	29	53.0	2,9
40	BCF, IR	32	10	**728 598 014**	0.054	64	38	54.0	3,7
50	BCF, IR	40	10	**728 598 016**	0.064	64	44	61.0	4,6
63	BCF, IR	50	10	**728 598 018**	0.097	77	56	67.0	5,8

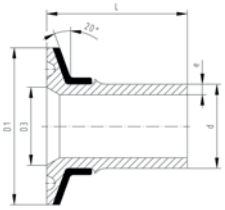


PROGEF Natural sanitary adaptor Connection to DIN 32676

Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Stainless steel reinforcement ring

d [mm]	FM	DN [mm]	PN	Code	kg	D1 [mm]	D3 [mm]	L [mm]	e [mm]
20	BCF, IR	15	10	**728 598 056**	0.013	34	16	49.0	1,9
20	BCF, IR	20	10	**728 598 057**	0.013	34	20	49.0	1,9
25	BCF, IR	25	10	**728 598 059**	0.032	50	26	49.5	2,3
32	BCF, IR	32	10	**728 598 062**	0.031	50	32	53.0	2,9
40	BCF, IR	40	10	**728 598 065**	0.036	50	38	54.0	3,7
50	BCF, IR	50	10	**728 598 067**	0.060	64	50	61.0	4,6

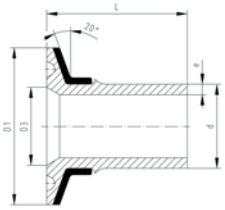


PROGEF Natural sanitary adaptor Connection to DIN 3017

Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Stainless steel reinforcement ring

d [mm]	FM	DN [mm]	PN	Code	kg	D1 [mm]	D3 [mm]	L [mm]	e [mm]
25	BCF, IR	25	10	**728 598 259**	0.031	50	22	49.5	2,3
32	BCF, IR	32	10	**728 598 262**	0.031	50	32	53.0	2,9
40	BCF, IR	40	10	**728 598 265**	0.033	50	35	54.0	3,7
50	BCF, IR	50	10	**728 598 267**	0.061	64	49	61.0	4,6
63	BCF, IR	65	10	**728 598 269**	0.093	78	60	67.0	5,8

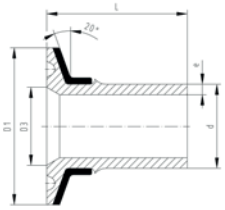


PROGEF Natural sanitary adaptor Connection to ISO 2852

Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Stainless steel reinforcement ring

d [mm]	FM	DN [mm]	PN	Code	kg	D1 [mm]	D3 [mm]	L [mm]	e [mm]
25	BCF, IR	25	10	**728 598 309**	0.027	51	22	50	2,3
32	BCF, IR	32	10	**728 598 312**	0.031	51	32	53	2,9
40	BCF, IR	40	10	**728 598 315**	0.033	51	35	54	3,7
50	BCF, IR	50	10	**728 598 317**	0.061	64	49	61	4,6
63	BCF, IR	65	10	**728 598 319**	0.093	78	60	67	5,8



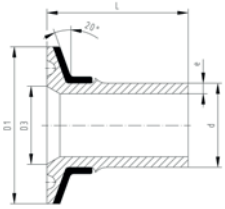
PROGEF Natural sanitary adaptor Connection to ASME BPE

Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Stainless steel reinforcement ring

* Without stainless steel reinforcement ring

d [mm]	FM	Inch	PN	Code	kg	D1 [mm]	D3 [mm]	L [mm]	e [mm]
* 20	BCF, IR	3/4	10	**728 598 357**	0.005	25	16	49	1.9
25	BCF, IR	1	10	**728 598 359**	0.029	51	22	50	2.3
32	BCF, IR	1 1/4	10	**728 598 362**	0.030	51	35	53	2.9
40	BCF, IR	1 1/2	10	**728 598 365**	0.037	51	35	54	3.7
50	BCF, IR	2	10	**728 598 367**	0.063	64	48	61	4.6
63	BCF, IR	2 1/2	10	**728 598 369**	0.096	78	60	67	5.8

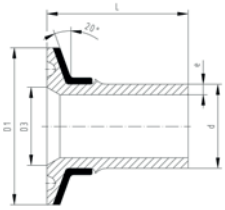


PROGEF Natural sanitary adaptor Connection to JIS G3447

Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Stainless steel reinforcement ring

d [mm]	FM	DN	PN	Code	kg	D1 [mm]	D3 [mm]	L [mm]	e [mm]
20	BCF, IR	15 A	10	**728 598 406**	0.014	34	18	49.0	1,9
25	BCF, IR	1 S	10	**728 598 408**	0.032	50	23	49.5	2,3
32	BCF, IR	1 1/4 S	10	**728 598 410**	0.033	50	30	53.0	2,9
40	BCF, IR	1 1/2 S	10	**728 598 414**	0.033	50	35	54.0	3,7
50	BCF, IR	2 S	10	**728 598 416**	0.061	64	48	61.0	4,6
63	BCF, IR	2 1/2 S	10	**728 598 418**	0.093	78	60	67.0	5,8



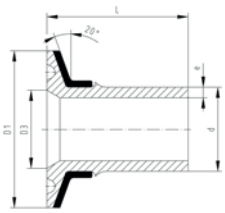
PROGEF Natural sanitary adaptor Connection to 3A standard

Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Stainless steel reinforcement ring

* Without stainless steel reinforcement ring

d [mm]	FM	Inch	PN	Code	kg	D1 [mm]	D3 [mm]	L [mm]	e [mm]
* 20	BCF, IR	3/4	10	**728 598 207**	0.006	25	16	49.0	1,9
25	BCF, IR	1	10	**728 598 209**	0.031	50	22	49.5	2,3
32	BCF, IR	1 1/2	10	**728 598 213**	0.032	50	35	53.0	2,9
40	BCF, IR	1 1/2	10	**728 598 215**	0.033	50	35	54.0	3,7
50	BCF, IR	2	10	**728 598 217**	0.062	64	48	61.0	4,6
63	BCF, IR	2 1/2	10	**728 598 219**	0.093	78	60	67.0	5,8



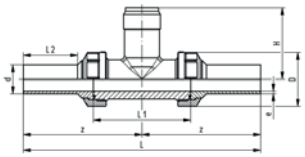
PROGEF Natural sanitary adaptor Connection to membrane manometer

Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Stainless steel reinforcement ring

d [mm]	FM	DN [mm]	PN	Code	kg	e [mm]	D1 [mm]	D3 [mm]	L [mm]
20	BCF, IR	15	10	**728 598 516**	0.029	1,9	50	34	49
25	BCF, IR	20	10	**728 598 518**	0.027	2,3	50	34	50
32	BCF, IR	25	10	**728 598 520**	0.032	2,9	50	34	53

28 31 81



PROGEF Natural installation fitting type 318 For butt fusion systems metric

Model:

- Material: PP-H
- Threaded outlet 1 ¼" NPSM
- Union end with butt fusion spigot PP-R

Range of use:

- compatible signet flow sensors: type 2551, 2537, 515, 8510, 2536, 8512
- compatible signet pH/ORP sensors: type 2724, 2725, 2726

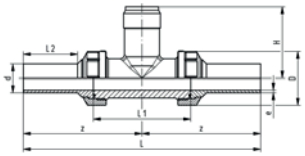
Attention:

- sensor length depends on installation fitting

d [mm]	DN [mm]	PN	FM	EPDM Code	FPM Code	kg
20	15	10	BCF, IR	**728 318 106**	**728 318 136**	0.250
25	20	10	BCF, IR	**728 318 107**	**728 318 137**	0.190
32	25	10	BCF, IR	**728 318 108**	**728 318 138**	0.250
40	32	10	BCF, IR	**728 318 109**	**728 318 139**	0.356
50	40	10	BCF, IR	**728 318 110**	**728 318 140**	0.510
63	50	10	BCF, IR	**728 318 111**	**728 318 141**	0.800

d [mm]	D [mm]	z [mm]	L [mm]	L1 [mm]	L2 [mm]	H [mm]	e [mm]	Sensor Type
20	45	99	198	90	38	76	1.9	flow X0, pH XX
25	55	107	214	100	42	78	2.3	flow X0, pH XX
32	62	115	230	110	41	81	2.9	flow X0, pH XX
40	75	118	236	110	42	85	3.7	flow X0, pH XX
50	84	126	252	120	44	89	4.6	flow X0, pH XX
63	101	134	268	130	45	95	5.8	flow X0, pH XX

27 31 80



PROGEF Natural installation fitting type 318 For butt fusion systems metric

Model:

- Body and union nut PVDF
- Threaded outlet 1 ¼" NPSM
- Union end with butt fusion spigot PP-R

Range of use:

- compatible signet flow sensors: type 2551, 2537, 515, 8510, 2536, 8512
- compatible signet pH/ORP sensors: type 2724, 2725, 2726

Attention:

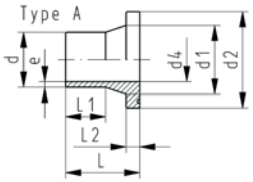
- sensor length depends on installation fitting

d [mm]	DN [mm]	PN	FM	EPDM Code	FPM Code	kg
20	15	10	BCF, IR	**728 318 006**	**728 318 036**	0.250
25	20	10	BCF, IR	**728 318 007**	**728 318 037**	0.355
32	25	10	BCF, IR	**728 318 008**	**728 318 038**	0.427
40	32	10	BCF, IR	**728 318 009**	**728 318 039**	0.700
50	40	10	BCF, IR	**728 318 010**	**728 318 040**	0.850
63	50	10	BCF, IR	**728 318 011**	**728 318 041**	1.182

d [mm]	D [mm]	z [mm]	L [mm]	L1 [mm]	L2 [mm]	H [mm]	e [mm]	Sensor Type
20	45	99	198	90	38	76	1.9	flow X0, pH XX
25	55	107	214	100	42	78	2.3	flow X0, pH XX
32	62	115	230	110	41	81	2.9	flow X0, pH XX
40	75	118	236	110	42	85	3.7	flow X0, pH XX
50	84	126	252	120	44	89	4.6	flow X0, pH XX
63	101	134	268	130	45	95	5.8	flow X0, pH XX

Flange Adaptors, Flanges and Gaskets for Butt Fusion

PROGEF Natural flange adaptor S5/SDR11
Combined jointing face: flat and serrated

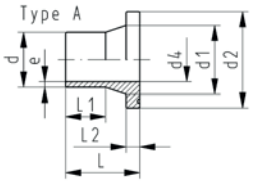


Model:

- Material: PP-R unpigmented
- Conventional butt-welding according to DVS 2207 part 11
- Bead and Crevice Free weldable with the new BCF® Plus fusion machine
- Infrared-(IR Plus®) compatible. Choose fusion parameters: PP-n (PP-R)
- Gasket: Profile flange gasket EPDM No. 48 44 07, FPM No. 49 44 07

d [mm]	DN [mm]	FM	Code	kg	d1 [mm]	d2 [mm]	d4 [mm]	L [mm]	L1 [mm]	L2 [mm]	e [mm]
20	15	WNF/IR	**728 798 706**	0.015	27	45	16	50	29	7	1.9
25	20	WNF/IR	**728 798 707**	0.028	33	58	20	52	27	9	2.3
32	25	WNF/IR	**728 798 708**	0.042	40	68	26	54	28	10	3.0
40	32	WNF/IR	**728 798 709**	0.064	50	78	32	56	25	11	3.7
50	40	WNF/IR	**728 798 710**	0.092	61	88	40	62	32	12	4.6
63	50	WNF/IR	**728 798 711**	0.142	75	102	51	68	38	14	5.8

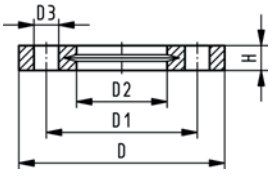
Flange Adapter - ANSI Serrated, PN 10, Natural PP



d [mm]	FM	Code	kg	e [mm]	d1 [mm]	d2 [mm]	d4 [mm]	L [mm]	L1 [mm]	L2 [mm]
20	WNF/IR	**728 798 706**	0.015	1.9	27	45	16	50	29	7
25	BCF, IR	**728 798 657**	0.028	2.3	33	54	20	52	27	9
32	BCF, IR	**728 798 658**	0.042	3.0	40	63	26	54	28	10
40	BCF, IR	**728 798 659**	0.064	3.7	50	73	32	56	25	11
50	BCF, IR	**728 798 660**	0.091	4.6	61	82	40	62	32	12
63	WNF/IR	**728 798 711**	0.142	5.8	75	102	51	68	38	14
75	IR	**728 798 787**	0.202	4.5	89	122	66	70	16	
90	IR	**728 798 788**	0.271	5.4	105	138	79	79	17	
110	IR	**728 798 789**	0.354	6.6	125	158	96	82	18	

27 70 04
27 70 05

Backing flange PP-V
For butt fusion systems metric



Model:

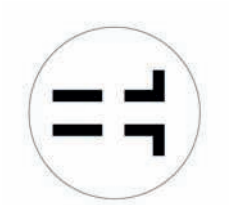
- Modern full-plastic flange PP-GF (30 % glass-fibre reinforced)
- With V-groove which applies force evenly on collar
- With integrated bolt retainers as an assembly aid
- UV-resistant. Applicable for outside applications
- Connecting dimension: ISO 7005, EN 1092, BS 4504, DIN 2501
- **Bolt circle PN 10**

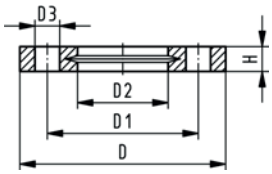
* Combined version, metric-ANSI
AL: number of holes
[1]) Suitable for socket- and butt fusion systems (no pictograph on flange)

d [mm]	DN [mm]	PN	Code	kg	D [mm]	D1 [mm]	D2 [mm]	D3 [mm]	H [mm]	AL	SC
[1]) 20	15	16	**727 700 406**	0.093	95	65.0	28	14	16	4	M12
[1]) 25	20	16	**727 700 407**	0.120	105	75.0	34	14	17	4	M12
[1]) 32	25	16	**727 700 408**	0.151	115	85.0	42	14	18	4	M12
[1]) 40	32	16	**727 700 409**	0.244	140	100.0	51	18	20	4	M16
[1]) 50	40	16	**727 700 410**	0.297	150	110.0	62	18	22	4	M16
[1]) 63	50	16	**727 700 411**	0.362	165	125.0	78	18	24	4	M16

27 70 14
27 70 15

Backing flange PP-V
For butt fusion systems Inch ANSI





Model:

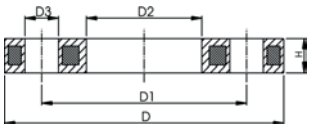
- Modern full-plastic flange PP-GF (30 % glass-fibre reinforced)
- With V-groove which applies force evenly on collar
- With integrated bolt-fixing as an assembly aid
- UV-resistant. Applicable for outside applications
- Connecting dimension: ANSI/ASME B 16.5 class 150, ASTM D 4024, BS 1560, BS EN 1759
- **Bolt circle class 150**

[1]) Suitable for socket- and butt fusion systems (no pictograph on flange)
AL: number of holes
* Combined version, metric-ANSI

Inch	DN [mm]	d [mm]	PN	Code	kg	D [mm]	D1 [mm]	D2 [mm]	D3 [mm]	H [mm]	AL	SC
[1] ½	15	20	16	**727 701 406**	0.091	95	60.0	28	16	16	4	M12
[1] ¾	20	25	16	**727 701 407**	0.120	105	70.0	34	16	17	4	M12
[1] 1	25	32	16	**727 701 408**	0.147	115	79.0	42	16	18	4	M12
[1] 1 ¼	32	40	16	**727 701 409**	0.246	140	89.0	51	16	20	4	M16
[1] 1 ½	40	50	16	**727 701 410**	0.299	150	98.0	62	16	22	4	M16
[1] 2	50	63	16	**727 701 411**	0.361	165	121.0	78	19	24	4	M16
[1] 2 ½	65	75	16	**727 701 412**	0.492	185	140.0	92	19	26	4	M16
3	80	90	16	**727 701 513**	0.607	200	152.0	108	19	27	4	M16
4	100	110	16	**727 701 514**	0.736	229	190.0	128	19	28	8	M16
10	250	250	16	**727 701 521**	2.241	406	362.0	288	26	38	12	M20
10	250	280	16	**727 701 522**	2.173	406	362.0	294	26	38	12	M20
12	300	315	16	**727 701 523**	3.627	483	432.0	338	26	42	12	M20

27 70 02
27 70 03

Backing flange PP-Steel
For butt fusion systems metric



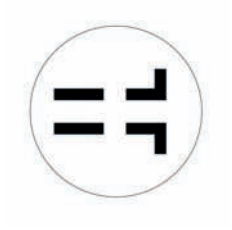
Model:

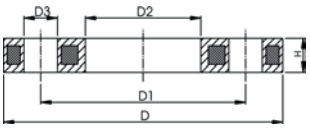
- Material: PP (30 % glass-fibre reinforced) with steel ring
- UV-resistant. Applicable for outside applications
- Connecting dimension: ISO 7005, EN 1092, BS 4504, DIN 2501
- **Bolt circle PN 10**

AL: number of holes

d [mm]	DN [mm]	PN	Code	kg	D [mm]	D1 [mm]	D2 [mm]	D3 [mm]	H [mm]	AL	SC
20	15	16	**727 700 206**	0.216	95	65	28	14	12	4	M12
25	20	16	**727 700 207**	0.279	105	75	34	14	12	4	M12
32	25	16	**727 700 208**	0.429	115	85	42	14	16	4	M12
40	32	16	**727 700 209**	0.621	140	100	51	18	16	4	M16
50	40	16	**727 700 210**	0.722	150	110	62	18	20	4	M16
63	50	16	**727 700 211**	1.084	165	125	78	18	20	4	M16

27 70 12





Backing flange PP-Steel
For butt fusion systems Inch ANSI

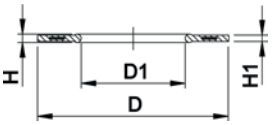
Model:

- Material: PP (30 % glass-fibre reinforced) with steel ring
- UV-resistant. Applicable for outside applications
- Connecting dimension: ANSI/ASME B 16.5 class 150, ASTM D 4024, BS 1560, BS EN 1759
- **Bolt circle class 150**

AL: number of holes

d [inch]	DN [mm]	d [mm]	PN	Code	kg	D1 [mm]	D2 [mm]	D3 [mm]	D [mm]	H [mm]	AL	SC
½	15	20	16	**727 701 206**	0.213	60	28	16	95	12	4	M12
¾	20	25	16	**727 701 207**	0.260	70	34	16	105	12	4	M12
1	25	32	16	**727 701 208**	0.416	79	42	16	115	16	4	M12
1 ¼	32	40	16	**727 701 209**	0.730	89	51	16	140	16	4	M16
1 ½	40	50	16	**727 701 210**	0.809	98	62	16	150	18	4	M16
2	50	63	16	**727 701 211**	0.866	121	78	19	165	18	4	M16
2 ½	65	75	16	**727 701 212**	1.117	140	92	19	185	18	4	M16
3	80	90	16	**727 701 313**	1.499	152	108	19	200	20	4	M16
4	100	110	16	**727 701 314**	1.739	190	128	19	229	20	8	M16
8	200	200	16	**727 701 319**	5.440	298	235	22	340	27	8	M20
8	200	225	16	**727 701 320**	5.621	298	238	22	340	27	8	M20

EPDM 48 44 07
FPM 49 44 07



Profile flange gasket metric

Model:

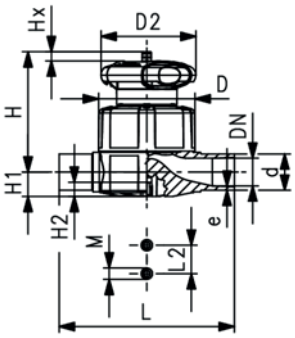
- For all metric GF Flange Adaptors
- Profile Gasket with steel insert (type G-ST-P/K)
- Hardness: 70° Shore **EPDM**, 75° Shore **FPM**
- **EPDM:** approved acc. to DVGW W 270, KTW recommendation
- Centering on the inner diameter of the screw crown
- material steel insert: carbon steel

di FA are the suitable inner diameters of flange adaptors

d [mm]	DN [mm]	PN	EPDM Code	FPM Code	kg	D [mm]	D1 [mm]	H [mm]	H1 [mm]	di FA [mm]
20	15	16	**748 440 706**	**749 440 706**	0.013	51	20	4	3	10 - 20
25	20	16	**748 440 707**	**749 440 707**	0.014	61	22	4	3	12 - 22
32	25	16	**748 440 708**	**749 440 708**	0.019	71	28	4	3	18 - 28
40	32	16	**748 440 709**	**749 440 709**	0.026	82	40	4	3	30 - 40
50	40	16	**748 440 710**	**749 440 710**	0.039	92	46	4	3	36 - 46
63	50	16	**748 440 711**	**749 440 711**	0.050	107	58	5	4	48 - 58

PROGEF Natural Hand-Operated and Actuated Valves

Diaphragm Valves



PROGEF Natural
Diaphragm valve type 515
With butt fusion spigots SDR11 metric

Model:

- Material: PP-R unpigmented
- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Handwheel with built-in locking mechanism
- Overall length EN 558

Option:

- Individual configuration of the valve (see diagram)
- Self adjusting multifunctional module with integrated limit switches

d [mm]	DN [mm]	PN	kv-value (Δp=1 bar) [l/min]	EPDM Code	PTFE/EPDM Code	kg
20	15	10	125	**168 515 112**	**168 515 132**	0.308
25	20	10	271	**168 515 113**	**168 515 133**	0.393
32	25	10	481	**168 515 114**	**168 515 134**	0.969
40	32	10	759	**168 515 115**	**168 515 135**	1.125
50	40	10	1263	**168 515 116**	**168 515 136**	2.083
63	50	10	1728	**168 515 117**	**168 515 137**	2.630

d [mm]	D [mm]	D2 [mm]	L [mm]	L2 [mm]	H [mm]	H1 [mm]	H2 [mm]	M	Lift = Hx [mm]
20	65	65	124	25	73	14	12	M6	7
25	80	65	144	25	81	18	12	M6	10
32	88	87	155	25	107	22	12	M6	13
40	101	87	176	45	115	26	15	M8	15
50	117	135	193	45	148	32	15	M8	19
63	144	135	223	45	166	39	15	M8	25

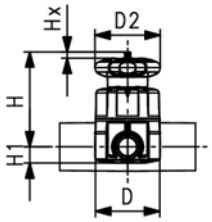
PROGEF Natural
Diaphragm valve type 519
With butt fusion spigots SDR11 metric

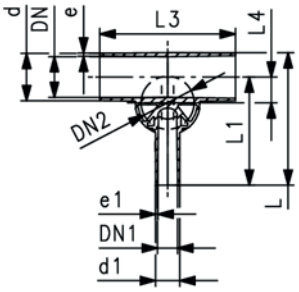
Model:

- Material: PP-R unpigmented
- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Handwheel with built-in locking mechanism
- Smallest possible dead space

Option:

- Individual configuration of the valve (see diagram)
- Self adjusting multifunctional module with integrated limit switches

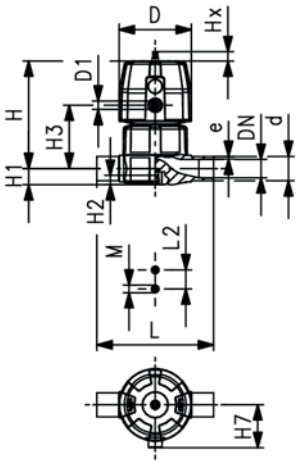




d [mm]	d1 [mm]	Valve Size d [mm]	DN [mm]	DN1 [mm]	DN2 [mm]	PN	kv-value (Δp=1 bar) [l/min]	EPDM Code	PTFE/EPDM Code	kg
20	20	20	15	15	15	10	57	**168 519 101**	**168 519 301**	0.321
25	20	25	20	15	20	10	89	**168 519 103**	**168 519 303**	0.397
25	25	25	20	20	20	10	118	**168 519 104**	**168 519 304**	0.399
32	20	25	25	15	20	10	80	**168 519 107**	**168 519 307**	0.424
32	25	25	25	20	20	10	105	**168 519 108**	**168 519 308**	0.426
32	32	32	25	25	25	10	231	**168 519 109**	**168 519 309**	0.980
40	20	32	32	15	25	10	85	**168 519 112**	**168 519 312**	1.008
50	20	25	40	15	20	10	86	**168 519 118**	**168 519 318**	0.485
50	25	32	40	20	25	10	160	**168 519 119**	**168 519 319**	1.054
50	32	32	40	25	25	10	206	**168 519 120**	**168 519 320**	1.056
63	20	25	50	15	20	10	84	**168 519 125**	**168 519 325**	0.524
63	25	32	50	20	25	10	150	**168 519 126**	**168 519 326**	1.097
63	32	32	50	25	25	10	184	**168 519 127**	**168 519 327**	1.100

d [mm]	D [mm]	D2 [mm]	L [mm]	L1 [mm]	L3 [mm]	L4 [mm]	H [mm]	Lift = Hx [mm]	e [mm]	e1 [mm]
20	65	65	117	96	162	12	75	7	1.9	1.9
25	80	65	133	108	162	16	80	10	2.3	1.9
25	80	65	133	108	162	16	80	10	2.3	2.3
32	80	65	142	120	162	19	84	10	2.9	1.9
32	80	65	142	120	162	19	84	10	2.9	2.3
32	88	87	145	120	160	19	107	13	2.9	2.9
40	88	87	149	128	180	23	115	13	3.7	1.9
50	80	65	160	134	180	27	97	10	4.6	1.9
50	88	87	160	134	180	28	120	13	4.6	2.3
50	88	87	160	134	180	28	120	13	4.6	2.9
63	80	65	177	144	180	33	104	10	5.8	1.9
63	88	87	177	144	180	35	127	13	5.8	2.3
63	88	87	177	144	180	35	127	13	5.8	2.9

Diaphragm valves pneumatic



PROGEF Natural
Diaphragm valve DIASTAR Six
FC (Fail safe to close)
With butt fusion spigots SDR11 metric

Model:

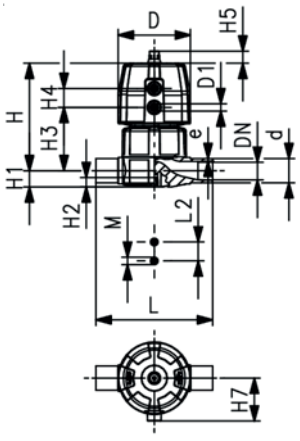
- Material: PP-R unpigmented
- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Rotating air connection at 90° intervals

Option:

- Individual configuration of the valve (see diagram)

d [mm]	DN [mm]	PN	kv-value (Δp=1 bar) [l/min]	EPDM Code	kg
20	15	6	125	**168 615 112**	0.466
25	20	6	271	**168 615 113**	0.900
32	25	6	481	**168 615 114**	1.063
40	32	6	759	**168 615 115**	1.744
50	40	6	960	**168 615 116**	2.203
63	50	6	1181	**168 615 117**	2.979

d [mm]	D [mm]	D1_G [inch]	L [mm]	L2 [mm]	H [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H7 [mm]	M	Lift = Hx [mm]	e [mm]
20	68	⅛	124	25	101	14	12	60	43	M6	7	1.9
25	96	⅛	144	25	132	18	12	73	57	M6	10	2.3
32	96	⅛	154	25	143	22	12	84	57	M6	13	2.9
40	120	⅛	174	45	173	26	15	99	69	M8	14	3.7
50	120	⅛	194	45	193	32	15	119	69	M8	16	4.6
63	120	⅛	224	45	205	39	15	132	69	M8	16	5.8



PROGEF Natural
Diaphragm valve DIASTAR Ten
FC (Fail safe to close)
With butt fusion spigots SDR11 metric

Model:

- Material: PP-R unpigmented
- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Rotating air connection at 90° intervals

Option:

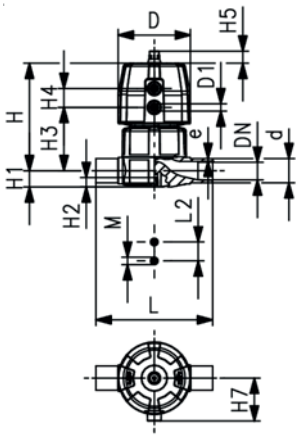
- Individual configuration of the valve (see diagram)
- Comprehensive range of accessories available

* PN: PTFE

Working Pressure: **one side**

d [mm]	DN [mm]	PN* [bar]	kv-value (Δp=1 bar) [l/min]	EPDM Code	PTFE Code	kg
20	15	10/6*	125	**168 625 112**	**168 625 132**	0.502
25	20	10/6*	271	**168 625 113**	**168 625 133**	0.987
32	25	10/6*	481	**168 625 114**	**168 625 134**	1.155
40	32	10/6*	759	**168 625 115**	**168 625 135**	1.914
50	40	10/6*	1263	**168 625 116**	**168 625 136**	3.371
63	50	10/5*	1728	**168 625 117**	**168 625 137**	3.928

table continued next page



d [mm]	D [mm]	D1_G [inch]	L [mm]	L2 [mm]	H [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	H5 [mm]	H7 [mm]	M	Lift = Hx [mm]	e [mm]
20	68	⅛	124	25	101	14	12	60	24	16	43	M6	7	1.9
25	96	⅛	144	25	132	18	12	73	25	16	57	M6	10	2.3
32	96	⅛	154	25	143	22	12	84	25	16	57	M6	13	2.9
40	120	¼	174	45	173	26	15	99	26	26	69	M8	15	3.7
50	150	¼	194	45	214	32	15	119	36	26	88	M8	19	4.6
63	150	¼	224	45	226	39	15	132	36	26	88	M8	23	5.8

PROGEF Natural
Diaphragm valve DIASTAR Ten
FO (Fail safe to open)
With butt fusion spigots SDR11 metric

Model:

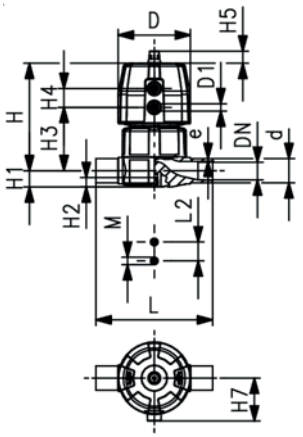
- Material: PP-R unpigmented
- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Rotating air connection at 90° intervals

Option:

- Individual configuration of the valve (see diagram)
- Comprehensive range of accessories available

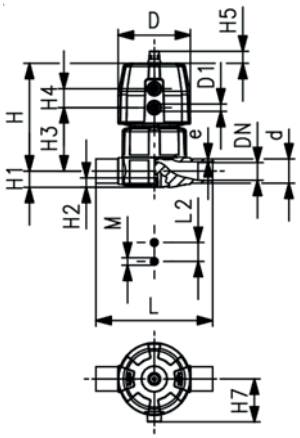
* PN: PTFE

Working Pressure: **one side**



d [mm]	DN [mm]	PN* [bar]	kv-value (Δp=1 bar) [l/min]	EPDM Code	kg
20	15	10/6*	125	**168 645 112**	0.442
25	20	10/6*	271	**168 645 113**	0.801
32	25	10/6*	481	**168 645 114**	0.954
40	32	10/6*	759	**168 645 115**	1.534
50	40	10/6*	1263	**168 645 116**	3.251
63	50	10/5*	1728	**168 645 117**	3.810

d [mm]	D [mm]	D1_G [inch]	L [mm]	L2 [mm]	H [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	H5 [mm]	H7 [mm]	M	Lift = Hx [mm]	e [mm]
20	68	⅛	124	25	101	14	12	60	24	16	43	M6	7	1.9
25	96	⅛	144	25	132	18	12	73	25	16	57	M6	10	2.3
32	96	⅛	154	25	143	22	12	84	25	16	57	M6	13	2.9
40	120	⅛	174	45	173	26	15	99	26	26	69	M8	15	3.7
50	150	¼	194	45	214	32	15	119	36	26	88	M8	19	4.6
63	150	¼	224	45	226	39	15	132	36	26	88	M8	23	5.8



PROGEF Natural
Diaphragm valve DIASTAR Ten
DA (Double acting)
With butt fusion spigots SDR11 metric

Model:

- Material: PP-R unpigmented
- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Rotating air connection at 90° intervals

Option:

- Individual configuration of the valve (see diagram)
- Comprehensive range of accessories available

* PN: PTFE

Working Pressure: **one side**

d [mm]	**DN** [mm]	**PN*** [bar]	**kv-value (Δp=1 bar)** [l/min]	**EPDM Code**	**kg**
20	15	10/6*	125	**168 655 112**	0.426
25	20	10/6*	271	**168 655 113**	0.765
32	25	10/6*	481	**168 655 114**	0.924
40	32	10/6*	759	**168 655 115**	1.474
50	40	10/6*	1263	**168 655 116**	2.501
63	50	10/5*	1728	**168 655 117**	3.060

d [mm]	**D** [mm]	**D1_G** [inch]	**L** [mm]	**L2** [mm]	**H** [mm]	**H1** [mm]	**H2** [mm]	**H3** [mm]	**H4** [mm]	**H5** [mm]	**H7** [mm]	**M**	**Lift = Hx** [mm]	**e** [mm]
20	68	⅛	124	25	101	14	12	60	24	16	43	M6	7	1.9
25	96	⅛	144	25	132	18	12	73	25	16	57	M6	10	2.3
32	96	⅛	154	25	143	22	12	84	25	16	57	M6	13	2.9
40	120	⅛	174	45	173	26	15	99	26	26	69	M8	15	3.7
50	150	¼	194	45	214	32	15	119	36	26	88	M8	19	4.6
63	150	¼	224	45	226	39	15	132	36	26	88	M8	23	5.8

PROGEF Natural
Diaphragm valve DIASTAR Ten
FC (Fail safe to close)
With butt fusion spigots SDR11 metric

Model:

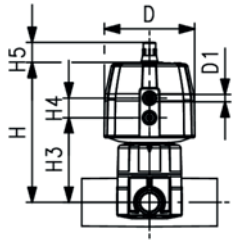
- Material: PP-R unpigmented
- Double flow rate compared to predecessor
- One housing nut replaces four screws
- Rotating air connection at 90° intervals
- Smallest possible dead space

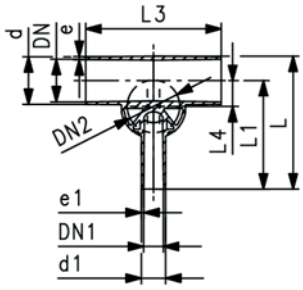
Option:

- Individual configuration of the valve (see diagram)
- Comprehensive range of accessories available

* PN: PTFE

Working Pressure: **one side**





d [mm]	d1 [mm]	Valve Size d [mm]	DN [mm]	DN1 [mm]	DN2 [mm]	PN* [bar]	kv-value (Δp=1 bar) [l/min]	EPDM Code	PTFE/EPDM Code
20	20	20	15	15	15	10/6*	57	**168 629 101**	**168 629 301**
25	20	25	20	15	20	10/6*	89	**168 629 103**	**168 629 303**
25	25	25	20	20	20	10/6*	118	**168 629 104**	**168 629 304**
32	20	25	25	15	20	10/6*	80	**168 629 107**	**168 629 307**
32	25	25	25	20	20	10/6*	105	**168 629 108**	**168 629 308**
32	32	32	25	25	25	10/6*	231	**168 629 109**	**168 629 309**
40	20	32	32	15	25	10/6*	85	**168 629 112**	**168 629 312**
50	20	25	40	15	20	10/6*	86	**168 629 118**	**168 629 318**
50	25	32	40	20	25	10/6*	160	**168 629 119**	**168 629 319**
50	32	32	40	25	25	10/6*	206	**168 629 120**	**168 629 320**
63	20	25	50	15	20	10/6*	84	**168 629 125**	**168 629 325**
63	25	32	50	20	25	10/6*	150	**168 629 126**	**168 629 326**
63	32	32	50	25	25	10/6*	184	**168 629 127**	**168 629 327**

d [mm]	D [mm]	D1 [inch]	L [mm]	L1 [mm]	L3 [mm]	L4 [mm]	H [mm]	H3 [mm]	H4 [mm]	H5 [mm]	Lift = Hx [mm]	e [mm]	e1 [mm]
20	68	⅛	117	96	162	12	104	71	25	16	7	1.9	1.9
25	96	⅛	133	108	162	16	131	72	25	16	10	2.3	1.9
25	96	⅛	133	108	162	16	131	72	25	16	10	2.3	2.3
32	96	⅛	142	120	162	19	135	76	25	16	10	2.9	1.9
32	96	⅛	142	120	162	19	135	76	25	16	10	2.9	2.3
32	96	⅛	145	120	160	19	143	93	25	16	13	2.9	2.9
40	96	⅛	149	128	180	23	151	101	25	16	13	3.7	1.9
50	96	⅛	160	134	180	27	148	90	25	16	10	4.6	1.9
50	96	⅛	160	134	180	28	156	106	25	16	13	4.6	2.3
50	96	⅛	160	134	180	28	156	106	25	16	13	4.6	2.9
63	96	⅛	177	144	180	33	155	96	25	16	10	5.8	1.9
63	96	⅛	177	144	180	35	163	113	25	16	13	5.8	2.3
63	96	⅛	177	144	180	35	163	113	25	16	13	5.8	2.9