PP-R / PP-RCT

Pipes and Fittings for the environmentally Water Supply

M + M / P + W 8 15.1

PP-R

www.baenninger.de

Models and Measures
Planning and Working Instructions

B-R Bänninger

Checked Quality

Numerous national and international certificates and seals of appro-val have been awarded to us for the manufacture and distribution of our products. The application of our Quality Management System is chek-ked in regular audits, e. g. by Deutsche Gesellschaft zur Zertifizierung von Managementsystemen (DQS German Association for the Certification of Management Systems), member of the Inter-na-tional Certification Network (IQNet), amongst other things. We would be pleased to answer your questions regarding our specific national appro-vals in a personal meeting.

Das Kunststoff-Zentrum

SKZ

Certificate

The SKZ-Cert GmbH Zertifizierungen certifies to the company

B·R

Bänninger
Kunststoff-Produkte GmbH
Bänningerstraße 1
35447 Reiskirchen

Bänninger
Rohrleitungssysteme GmbH
Athenslebener Weg 21
39418 Staßfurt

The introduction and application of a quality management system according to
ISO 9001:2008

Scope:
Production and Distribution of Plastic Pipes, Fittings and Valves

The proof has been furnished by a quality audit.

This certificate is valid from: **06.11.2014** to: **05.11.2017**
Certificate No.: **2543/14.R**

Würzburg, 03.11.2014
Certification Body

DAkkS

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G 8241g PP-R
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G 8271B PP-RCT

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G 8287B PP-RCT

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G 8301 PP-R
G 8301B PP-RCT

S/P 14

G 8301B PP-RCT

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Fittings aus **PP-RCT** = Art.-Nr. + **B**	z. B.	**G 8002a B**
PP-RCT Fittings = Indicate number + **B**	e. g.	**G 8002a B**
Raccords **PP-RCT** = Réf. no. + **B**	p. ex.	**G 8002a B**
Accesorios en **PP-RCT** = Art. n° + **B**	p. ej.	**G 8002a B**
Фитинги из **PP-RCT** = Артикул № + **B**	напр.	**G 8002a B**

Modellübersicht • Summary of Models
Sommaire de modèles • Sumario de los modelos • Обэо моделей

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G 8090gB PP-RCT

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G 8091g PP-R
G 8091gB PP-RCT

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G 8092g PP-R
G 8092gB PP-RCT

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G 8244g PP-R
G 8244gB PP-RCT
G 8245g PP-R
G 8245gB PP-RCT

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G 8093g PP-R
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G 8095g PP-R
G 8095gB PP-RCT

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G 8130g PP-R
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G 8133g PP-R
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G 8243g PP-R
G 8243gB PP-RCT

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G 8330 PP-R
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G 8330A PP-R

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G 8333 PP-R
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G 8542gB PP-RCT

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G 8547g PP-R
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G 8130sB PP-RCT

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G 8243s PP-R
G 8243sB PP-RCT

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G 8270s PP-R
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G 8472g PP-R
G 8472gB PP-RCT

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G 8473g PP-R

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G 8490g PP-R

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G 8492g PP-R

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G 8494g PP-R

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G 8599d PP-R
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8599v

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8670

S/P 33

8670A

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83600

S/P 33

G 8600 PP-R
G 8600B PP-RCT
G 8600/1 PP-R
G 8600/1B PP-RCT

S/P 28

G 8650 PP-R
G 8650B PP-RCT

S/P 28

G 8655 PP-R
G 8655B PP-RCT
G 8655/1 PP-R
G 8655/1B PP-RCT

S/P 28/29

G 8700 PP-R
G 8700B PP-RCT
G 8700/1 PP-R
G 8700/1B PP-RCT

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G 8710 PP-R

S/P 29

G 8800 PP-R
G 8800B PP-RCT

S/P 30

G 8850 PP-R

S/P 30

G 8852

S/P 30

G 8060 PP-R
G 8060B PP-RCT

S/P 30

G 8860 PP-R

S/P 31

8910

S/P 31

G 8790 PP-R
G 8790B PP-RCT

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G 8791B PP-RCT

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G 8792B PP-RCT

S/P 17

620.75 VB/620.75 KL

S/P 17

620.75.00

S/P 34

671.410.01/674.410.01

S/P 17/34

9900

S/P 35

8500

S/P 35

8501

S/P 35

8502

S/P 35

8970

S/P 36

8975

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8980/8981

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8990

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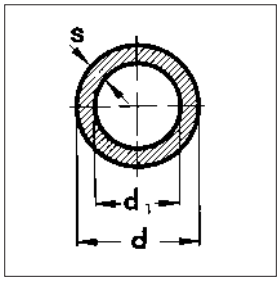
PP-RCT Druckrohr 20°C/1,6 MPa • 60°C/0,8 MPa
Anwendungsbereiche:Trinkwasser und Sanitärinstallation

Pressure pipe
Application: Potable Water and Industrial Installation

Tube pression
Tubería sanitaria • Напорная турба

G 8160B



d	DN	s	d_1	kg/m	Stp./m
20	15	2,3	15,4	0,139	100
25	20	2,8	19,4	0,203	100
32	25	2,9	26,2	0,284	60
40	32	3,7	32,6	0,420	40
50	40	4,6	40,8	0,640	20
63	50	5,8	51,4	1,395	20
75	–	6,8	61,4	1,440	8
90	65	8,2	73,6	2,030	8
110	80	10,0	90,0	3,080	8
125	100	11,4	102,2	3,910	4
160	125	14,6	130,8	6,330	4
200	160	18,2	163,6	9,950	4
250	200	22,7	204,6	15,289	4
315	250	28,6	257,8	24,600	4
355	300	32,2	290,6	31,160	4
400	–	36,3	327,4	39,560	4
450	350	40,9	368,2	50,100	4
500	400	45,4	409,2	61,700	4

Lieferform: 4 m Stangen — Rods in 4 meters

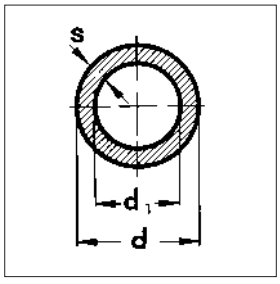
Verbindungsart Empfehlung ab ø 160 mm
Heizwendel-Muffenschweißen und Heizelement-Stumpfschweißen
From ø 160 mm on joining by socket welding and butt welding with

PP-RCT Druckrohr 20°C/2,0 MPa • 70°C/1,0 MPa
Anwendungsbereiche:Trinkwasser und Sanitärinstallation

Pressure pipe
Application: Potable Water and Industrial Installation

Tube pression
Tubería sanitaria • Напорная турба

G 8200B



d	DN	d_1	s	kg/m	Stp./m
20	15	14,4	2,8	0,141	100
25	20	18,0	3,5	0,238	100
32	25	23,2	4,4	0,369	60
40	32	29,0	5,5	0,587	40
50	40	36,2	6,9	0,900	20
63	50	45,8	8,6	1,377	20
75	–	54,4	10,3	1,961	8
90	65	65,4	12,3	2,938	8
110	80	79,8	15,1	4,355	8
125	90	90,8	17,1	5,555	4

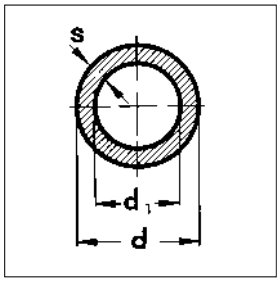
Lieferform: 4 m Stangen — Rods in 4 meters

PP-R Druckrohr 20°C/2,0 MPa • 70°C/1,0 MPa
Anwendungsbereiche:Trinkwasser und Sanitärinstallation

Pressure pipe
Application: Potable Water and Industrial Installation

Tube pression
Tubería sanitaria para agua fria y caliente
Напорная турба

G 8200

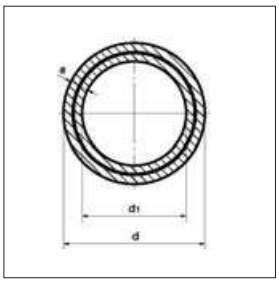


d	DN	d_1	s	kg/m	Stp./m
16	10	10,6	2,7	0,110	100
20	12	13,2	3,4	0,180	100
25	15	16,6	4,2	0,280	100
32	20	21,2	5,4	0,460	60
40	25	26,6	6,7	0,680	40
50	32	33,2	8,3	1,090	20
63	40	42,0	10,5	1,400	20
75	50	50,0	12,5	2,500	8
90	–	60,0	15,0	3,300	8
110	65	73,2	18,4	5,000	8
125	80	83,2	20,8	6,500	4

Lieferform: 4 m Stangen — Rods in 4 meters

PP-RCT Faser-Verbundrohr Watertec
Anwendungsbereiche: Trinkwasser und Sanitärinstallation mit 4 Streifen; Farbe: Verkehrsgrau RAL 7042
Fibre pipe
Application: Potable Water and Industrial Installation
Tube Fibre • Tubería Faser
Турба армированная волоком

G 8200FW



Patent angemeldet • Patent Pending

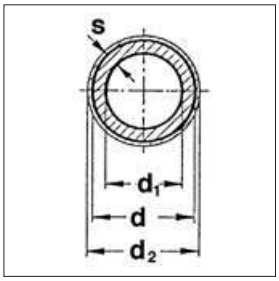
d	DN	d_1	s	kg/m	Stp./m
20°C / 2,0 MPa • 70°C/1,0 MPa					
20	15	14,4	2,8	0,151	100
25	20	18,0	3,5	0,232	100
32	25	24,8	3,6	0,340	60
40	32	31,0	4,5	0,513	40
50	40	38,8	5,6	0,746	20
63	50	48,8	7,1	1,244	20
75	–	58,2	8,4	1,700	8
90	65	69,8	10,1	2,450	8
110	80	85,4	12,3	3,647	8
125	100	97,0	14,0	4,480	4
20°C / 1,6 MPa • 70°C / 0,8 MPa					
160	125	130,8	14,6	6,755	4
200	160	163,6	18,2	10,640	4
250	200	204,6	22,7	16,160	4
315	250	257,8	28,6	25,387	4
355	300	290,6	32,2	36,520	4
400	–	327,4	36,3	40,601	4
450	350	368,2	40,9	57,310	4
500	400	409,2	45,4		4

Lieferform: 4 m Stangen — Rods in 4 meters

Verbindungsart Empfehlung ab ø 160 mm Heizwendel-Muffenschweißen
From ø 160 mm on socket welding with heating elements recommended

PP-RCT Stabi-Verbundrohr
20°C/2,0 MPa • 70°C/1,0 MPa
Anwendungsbereiche: Trinkwasser und Sanitärinstallation
Stabi-pipe
Application: Potable Water and Industrial Installation
Tube-Stabi • Tubería sanitaria con aluminio
Армированная турба Штаби

G 8215B



d	DN	d_1	d_2	s	kg/m	Stp./m
* 16	12	11,6	17,6	2,2	0,158	100
20	15	14,4	21,6	2,8	0,218	100
25	20	19,4	26,6	2,8	0,294	100
32	25	24,8	33,7	3,6	0,545	60
40	32	31,0	42,0	4,5	0,644	40
50	40	38,8	52,0	5,6	0,935	20
63	50	48,8	65,0	7,1	1,465	20
75	–	58,2	76,8	8,4	1,929	8
90	65	69,8	91,8	10,1	3,011	8
110	80	85,4	112,7	12,3	4,288	8
125	100	97,0	128,0	14,0	5,280	4

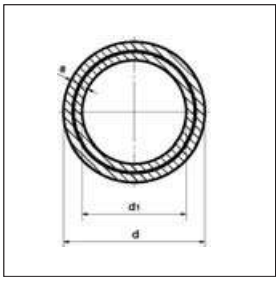
Lieferform: 4 m Stangen — Rods in 4 meters

* G 8215 Stabi-Verbundrohr PP-R/AL/PP-R

Stabi-Verbundrohre sind PP-RCT Rohre mit Alu-Ummantelung.
Stabi pipes are PP-RCT pipes coated with Aluminum

PP-RCT Faser-Verbundrohr Climatec
Anwendungsbereiche: Klimaanlagen, Industrieanlagen, Trinkwasser und Sanitärinstallation, mit 4 Sreifen;
Farbe: Kieselgrau RAL 7032, 1 Streifen in Rotbraun
Fibre pipe
Application: Air conditioning, Industrial plants, potable water and sanitary installation, with four stripes.
Colour: Grey RAL 7032, 1 stripe red-brown
Tube Fibre • Tubería inst. con aire acondicionado/industriales • Напорная турба

G 8160FC



Patent angemeldet • Patent Pending

d	DN	d_1	s	kg/m	Stp./m
20°C / 1,6 MPa • 70°C/0,8 MPa					
20	15	14,4	2,8	0,151	100
25	20	18,0	3,5	0,232	100
32	25	24,8	3,6	0,340	60
40	32	32,6	3,7	0,439	40
50	40	40,8	4,6	0,682	20
63	50	51,4	5,8	0,996	20
75	–	61,4	6,8	1,419	8
90	65	73,6	8,2	2,039	8
110	80	90,0	10,0	3,031	8
125	100	102,2	11,4	3,350	4
20°C / 1,0 MPa • 70°C / 0,5 MPa					
160	150	141,0	9,5	4,635	4
200	180	176,2	11,9	7,321	4
250	220	220,4	14,8	11,065	4
315	250	277,6	18,7	17,229	4
355	300	312,6	21,2	21,890	4
400	350	352,6	23,7	27,808	4
450	400	396,6	26,7	37,200	4
500	450	440,6	29,7	45,000	4

Lieferform: 4 m Stangen — Rods in 4 meters

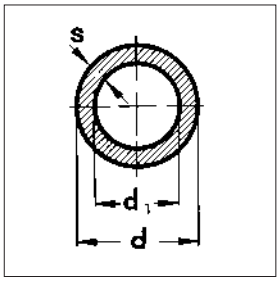
Verbindungsart Empfehlung ab ø 160 mm Heizwendel-Muffenschweißen
From ø 160 mm on socket welding with heating elements recommended

PP-R – Ringrohr 20°C/1,5 MPa • 60°C/0,8 MPa
Anwendungsbereiche:Trinkwasser und Sanitärinstallation • Fußbodenheizung

PP-R – Pipe in coils
Application: Potable water and sanitary installation • floor heating systems

Tube en cycle • Tubo en rollos • Турба в бухтах

G 8100R PP-R



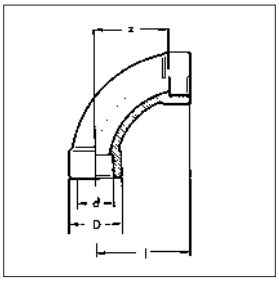
d	DN	d_1	s	kg/m	Stp./m
20	15	16	2,0	0,107	100
25	20	20,4	2,3	0,164	100

PP-R/PP-RCT – Bogen 90° mit beidseitiger Schweißmuffe

PP-R/PP-RCT – Bend 90° with welding socket at both ends

Courbe à 90° • Curva 90° • Колено 90°

G 8002a PP-R
G 8002aB PP-RCT



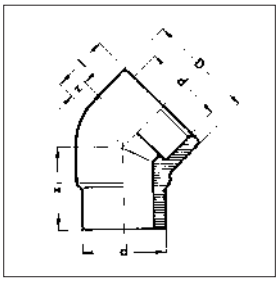
d	D	l	z	Stp.
16	23	36	33	10
20	28	56	42	5
25	34	69	53	5
32	42	86	68	2
40	52	106	86	2

PP-R/PP-RCT – Winkel 45° I - A mit Schweißmuffe und Schweißstutzen

PP-R/PP-RCT – Elbow 45° with welding socket and welding stub

Coude à 45° • Codo 45° macho/hembra soldable • Уголок 45°

G 8040 PP-R
G 8040B PP-RCT



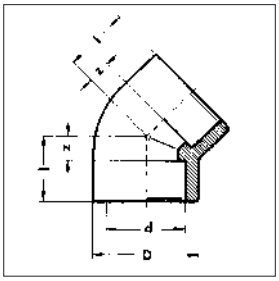
d	D	l	z	z_1	Stp.
20	29	20	5	28	5
25	34	22	6	34	5
32	43	26	8	39	5

PP-R/PP-RCT – Winkel 45° mit beidseitiger Schweißmuffe

PP-R/PP-RCT – Elbow 45° with welding socket at both ends

Coude à 45° • Codo 45° soldable • Уголок 45°

G 8041 PP-R
G 8041B PP-RCT



d	D	l	z	Stp.
16	23	19	6	10
20	29	21	6	10
25	34	24	8	10
32	43	28	10	10
40	52	32	11	5
50	65	37	13	5
63	82	44	16	2
75	99	50	20	2
90	120	58	25	1
110	148	69	32	1
125	165	77	37	1

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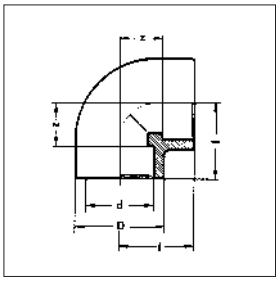
PP-R/PP-RCT – Winkel 90° mit beidseitiger Schweißmuffe

PP-R/PP-RCT – Elbow 90° with welding socket at both ends

Coude à 90° • Codo 90° F soldable • Уголок 90°

G 8090 PP-R
G 8090B PP-RCT



d	D	l	z	Stp.
16	26	24	11	10
20	29	28	13	10
25	34	32	16	10
32	43	38	20	10
40	52	44	23	10
50	65	52	28	10
63	84	62	34	2
75	101	71	41	2
90	120	83	50	1
110	148	99	62	1
125	165	124	84	1

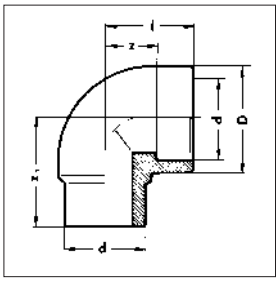
from d 160 on see page 15 / regardez page 15
ab d 160 mm siehe Seite 15

PP-R/PP-RCT – Winkel 90° I - A
mit Schweißmuffe und Schweißstutzen

PP-R/PP-RCT – Elbow 90° I - A
with welding socket and welding stub

Coude à 90°
Codo 90°macho/hembra soldable
Уголок 90° (внутр./наружн.)

G 8092 PP-R
G 8092B PP-RCT



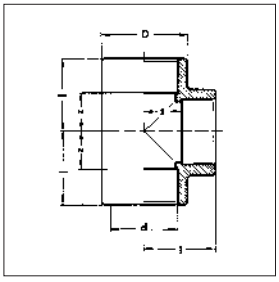
d	D	l	z	z_1	Stp.
16	24	22	9	25	10
20	29	27	12	36	10
25	34	30	14	41	10
32	43	36	18	48	10
40	52	42	21	55	10

PP-R/PP-RCT – T - Stück 90° mit allseitiger Schweißmuffe

PP-R/PP-RCT – Tee 90° with welding socket at all ends

Té à 90° • Te 90° soldable
Тройник 90°

G 8130 PP-R
G 8130B PP-RCT



d	D	l	z	Stp.
16	23	24	11	10
20	29	28	13	10
25	34	32	16	10
32	43	38	20	10
40	52	44	23	10
50	65	52	28	10
63	84	62	34	2
75	100	71	41	2
90	120	83	50	2
110	148	99	62	2
125	165	124	84	1

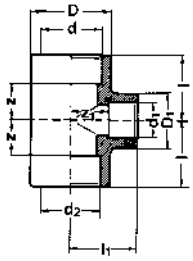
from d 160 on see page 15 / regardez page 15
ab d 160 mm siehe Seite 15

PP-R/PP-RCT – T - Stück 90° red. mit allseitiger Schweißmuffe

PP-R/PP-RCT – Tee 90° red. with welding socket at all ends

Té à 90°
Te 90° reducida soldable
Тройник 90° ред.

G 8130 red. PP-R
G 8130red.B PP-RCT



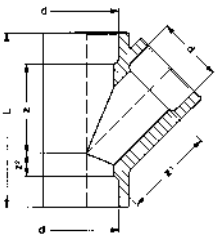
d - d_1 - d_2	D	D_1	l	l_1	z	z_1	Stp.
20 - 16 - 20	29	29	28	28	13	15	10
20 - 25 - 20	34	34	32	32	18	16	10
25 - 16 - 25	34	29	32	32	16	19	10
25 - 20 - 20	34	34	32	32	16	18	10
25 - 20 - 25	34	29	32	32	16	17	10
25 - 25 - 20	34	34	32	32	16	16	10
32 - 20 - 20	43	34	37	38	18	22	10
32 - 20 - 25	43	34	37	38	18	23	10
32 - 20 - 32	43	29	38	36	20	21	10
32 - 25 - 20	43	34	37	38	18	22	10
32 - 25 - 25	43	34	37	38	18	22	10
32 - 25 - 32	43	34	38	36	20	20	10
40 - 20 - 40	52	43	44	39	24	24	5
40 - 25 - 40	52	43	44	40	23	24	5
40 - 32 - 32	52	43	43	44	21	24	5
40 - 32 - 40	52	43	44	40	23	22	5
50 - 20 - 50	65	43	52	46	28	31	10
50 - 25 - 50	65	43	52	46	28	30	10
50 - 32 - 50	65	43	52	46	28	28	10
50 - 40 - 50	85	85	62	62	39	35	10
63 - 20 - 63	85	43	62	62	35	48	2
63 - 25 - 63	85	43	62	62	35	46	2
63 - 32 - 63	85	43	62	62	35	44	2
63 - 40 - 50	85	85	62	62	39	35	2
63 - 40 - 63	85	85	62	62	35	42	2
63 - 50 - 63	85	85	62	62	35	39	2
75 - 20 - 75	100	43	71	71	41	57	2
75 - 25 - 75	100	43	71	71	41	55	2
75 - 32 - 75	100	43	71	71	41	53	2
75 - 40 - 75	100	65	71	71	41	51	2
75 - 50 - 75	100	65	71	71	41	48	2
75 - 63 - 75	100	101	71	71	41	44	2
90 - 63 - 90	85	83	83	50	50	53	2
90 - 75 - 90	120	100	83	83	50	53	2
110 - 63 - 110	148	85	99	99	62	71	2
110 - 75 - 110	148	100	99	99	62	69	2
110 - 90 - 110	148	120	99	99	62	66	2
125 - 75 - 125	165	100	124	104	84	74	2
125 - 90 - 125	165	120	124	106	84	73	2
125 -110 - 125	165	148	124	110	84	87	2
160 - 90 -160	siehe Seite 15/see page 15/regardez						
160 -110 -160	siehe Seite 15/see page 15/regardez						

PP-R/PP-RCT – T-Stück 45° mit allseitiger Schweißmuffe SDR 11

PP-R/PP-RCT – Tee 45° with welding socket at all ends

Té à 45° • Te 45° soldable • Тройник 45°

G 8165 PP-R
G 8165B PP-RCT



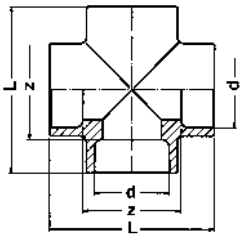
d	L	z	z^1	z^2
32	90	42	42	10
40	120	62	62	14
50	132	66	66	16
63	166	90	90	24

PP-R/PP-RCT – Kreuz mit allseitiger Schweißmuffe SDR 11

PP-R/PP-RCT – Cross with welding socket at all ends

Croix • Cruz soldable • Крестовина

G 8180 PP-R
G 8180B PP-RCT



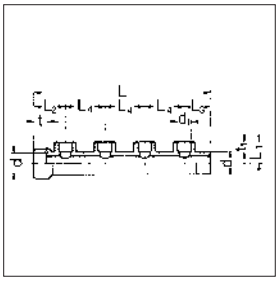
d	L	z
20	52	23
25	59	27
32	78	34
40	94	42
50	112	66
63	138	84

PP-R/PP-RCT – Verteiler-Rohr mit Schweißstutzen und Schweißmuffe

PP-R/PP-RCT – Manifold distributor pipe with welding socket and welding stub

Tube de distribution • Colector 4 salidas • Распределительная труба

G 8240 PP-R
G 8240B PP-RCT



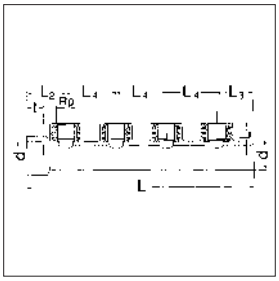
d - d_1x4	d	t	d_1	t_1	L	L_1	L_2	L_3	L_4
25-16x4	25	16	16	13	234	26	37	32	56
32-20x4	32	18	20	14,5	245	30	43	37	56
32-25x4	32	18	25	16	250	35	43	41	56
40-25x4	40	20,5	25	16	248	38	43	41	56
63-25x2	63	27,5	25	16	434	59	148	82	204
63-32x2	63	27,5	32	18	434	59	148	82	204

PP-R/PP-RCT – Verteiler-Rohr mit Schweißstutzen und zylindrischem Innengewinde

PP-R/PP-RCT – Manifold distributor pipe for socket welding: with welding stub and cylindrical female thread

Tube de distribution avec taraudage femelle • Colector 4 salidas y nosca hembra
Распределительная труба с внутренней резьбой

G 8240g PP-R
G 8240gB PP-RCT



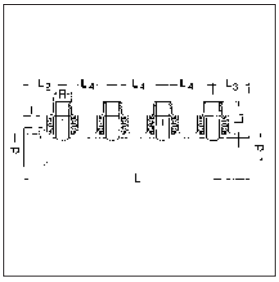
d-Rpx4	d	t	Rp	t_1	L	L_1	L_2	L_3	L_4
32-½x4	32	18	½	14	250	35	43	41	56
40-½x4	40	20,5	½	14	250	38	43	41	56
63-½x2	63	27,5	½	14	434	59	148	82	204
63-¾x2	63	27,5	¾	15	435	59	148	82	204

PP-R/PP-RCT – Verteiler-Rohr mit Schweißstutzen und kegligem Außengewinde

PP-R/PP-RCT – Manifold distributor pipe for socket welding: with welding stub and cylindrical male thread

Tube de distribution avec taraudage male • Colector 4 salidas y nosca macho
Распределительная труба с наружной резьбой

G 8241g PP-R
G 8241gB PP-RCT



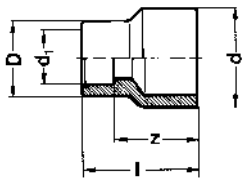
d-Rx4	d	t	R	t_1	L	L_1	L_2	L_3	L_4
32-½x4	32	18	½	15	250	50	43	41	56
40-½x4	40	20,5	½	15	250	53	43	41	56
63-½x2	63	27,5	½	15	434	73	148	82	204
63-¾x2	63	27,5	¾	15	434	75	148	82	204

PP-R/PP-RCT – Reduktion mit Schweißstutzen und Schweißmuffe

PP-R/PP-RCT – Reducer with welding socket and welding stub

Réduction • Reduccion soldable • Редуктор

G 8243 PP-R
G 8243B PP-RCT



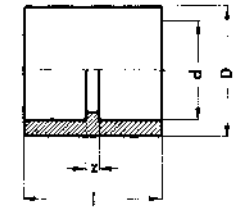
d - d_1	D	l	z	Stp.
20 - 16	23	33	20	10
25 - 16	23	32	19	10
25 - 20	29	36	22	10
32 - 20	29	37	23	10
32 - 25	34	39	23	10
40 - 20	34	43	28	10
40 - 25	34	43	27	10
40 - 32	43	45	27	10
50 - 20	43	51	36	10
50 - 25	43	51	35	10
50 - 32	43	51	33	10
50 - 40	52	53	33	10
63 - 20	34	56	42	5
63 - 25	34	56	40	5
63 - 32	43	58	40	5
63 - 40	52	60	40	5
63 - 50	65	63	40	5
75 - 50	65	67	44	2
75 - 63	80	71	44	2
90 - 50	65	74	51	2
90 - 63	80	78	51	2
90 - 75	99	81	51	2
110 - 63	85	87	60	2
110 - 75	100	90	60	2
110 - 90	120	93	61	2
125 - 110	siehe Seite 16 / see page 16 / regardez page 16			
400 - 355	siehe Seite 16 / see page 16 / regardez page 16			

PP-R/PP-RCT – Muffe

PP-R/PP-RCT – Socket

Manchon • Manguito soldable • Муфта

G 8270 PP-R
G 8270B PP-RCT



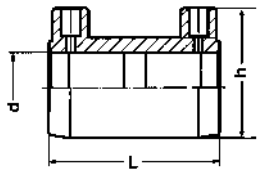
d	D	l	z	Stp.
16	23	31	5	10
20	29	34	5	10
25	34	37	5	10
32	43	41	5	10
40	52	46	5	10
50	65	52	5	10
63	84	60	5	2
75	99	65	5	2
90	120	76	10	2
110	148	80	6	2
125	165	90	10	2

PP-R – PP-RCT Heizwendel-Schweißmuffe PN 20

PP-R – PP-RCT Electrofusion socket

Manchon Electrosoudable
Manguitos para soldadura electrica
Сварочная муфта с нагревательной спиралью

G 8271 PP-R
G 8271B PP-RCT



d	h	L	Stp.
20	52	70	1
25	57	70	1
32	65	70	1
40	75	85	1
50	86	87	1
63	100	97	1
75	114	120	1
90	130	147	1
110	144	157	1
125	167	165	1

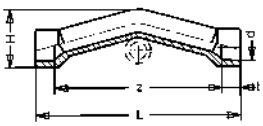
ab d 160 siehe Seite 16
from dia 160 on see page 16
à partir de d 160 regardez page 16

PP-R/PP-RCT – Überspringbogen für Kalt- und Warmwasserleitungen

PP-R/PP-RCT – Crossover for cold and hot water

Raccord à dos d'âne pour eau choide et froide • Salvatubos agua fria y caliente
Обводное колено опрысканнное с обеих сторон муфтой. Для водопровода холодный и горячей воды

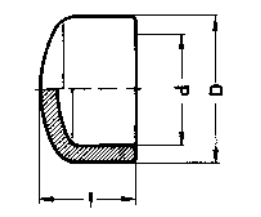
G 8287 PP-R
G 8287B PP-RCT



d	t	H	z	L
20	14,5	45	131	160
25	16	55	168	200
32	26	70	204	240

PP-R/PP-RCT – Kappe
PP-R/PP-RCT – Cap
Bouchon femelle
Tapa soldable
Заглушка

G 8301 PP-R
G 8301B PP-RCT

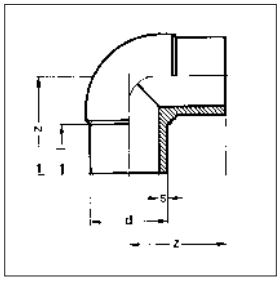


d	D	l	Stp.
16	23	24	10
20	29	25	10
25	34	28	10
32	43	32	10
40	52	36	10
50	65	41	10
63	79	48	5
75	99	54	2
90	120	66	2
110	148	79	2
125	165	87	2

ab d 160 siehe Seite 16
from dia 160 on see page 16
à partir de d 160 regardez page 16

PP-RCT – Winkel 90°, 20° C/1,6 MPa , 60° C 0,8 MPa
PP-RCT – Elbow 90°, 20° C/1,6 MPa , 60° C 0,8 MPa • Coude à 90° • Codo 90° • Уголок 90°

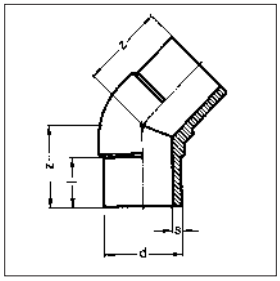
G 8090B PP-RCT



	SDR 11			
d	s	l	z	Stp.
160	14,6	117	210	1
200	18,2	128	250	1
250	22,7	180	307	1
315	28,6	192	393	1
355	32,2	170	411	1
400	36,3	187	470	1
450	40,9	204	527	1
500	45,4	222	562	1

PP-RCT – Winkel 45°, 20° C/1,6 MPa , 60° C 0,8 MPa
PP-RCT – Elbow 45°, 20° C/1,6 MPa , 60° C 0,8 MPa • Coude à 45° • Codo 45° • Уголок 45°

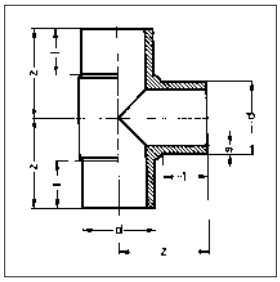
G 8041B PP-RCT



	SDR 11			
d	s	l	z	Stp.
160	14,6	113	169	1
200	18,2	127	201	1
250	22,7	155	217	1
315	28,6	161	280	1
355	32,2	170	320	1
400	36,3	187	350	1
450	40,9	204	383	1
500	45,4	220	410	1

PP-RCT – T - Stück 90°, 20° C/1,6 MPa , 60° C 0,8 MPa
PP-RCT – Tee 90°, 20° C/1,6 MPa , 60° C 0,8 MPa • Té à 90° • Te 90° • Тройник 90°

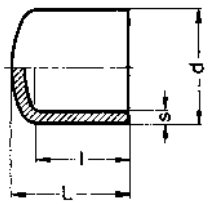
G 8130B PP-RCT



	SDR 11						
d - d_1 red.	s	s_1 red.	l	l_1 red.	z	z_1 red.	Stp.
160	14,6	–	124	–	225	–	1
160 - 90	14,6	8,2	111	84	212	190	1
160 -110	14,6	10,0	111	93	212	197	1
200	18,2	–	127	–	251	–	1
200 - 90	18,2	8,2	128	88	258	213	1
200 -110	18,2	10,0	128	98	258	224	1
200 -125	18,2	11,4	128	104	258	226	1
200 -160	18,2	14,6	128	112	258	242	1
250	22,7	–	148	–	314	–	1
315	28,6	–	165	–	357	–	1
355	32,2	–	170	–	392	–	1
400	36,3	–	187	–	435	–	1
450	40,9	–	204	–	480	–	1
500	45,4	–	220	–	523	–	1

PP-RCT – Kappe, 20° C/1,6 MPa, 60° C/0,8 MPa
PP-RCT – Cap, 20° C/1,6 MPa, 60° C/0,8 MPa • Bouchon femelle • Tapa soldable • Заглушка

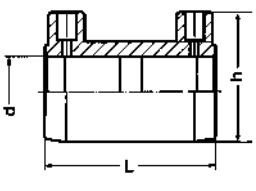
G 8301B PP-RCT



	SDR 11			
d	s	L	l	Stp.
160	14,6	140	100	1
200	18,2	190	145	1
250	22,7	218	163	1
315	28,6	250	192	1
355	32,2	275	215	1
400	36,3	283	228	1
450	40,9	306	195	1
500	45,4	335	212	1

PP-RCT – Heizwendel-Schweißmuffe aus SDR 11
PP-RCT – Electrofusion socket • Manchon Electrosoudable
Manguitos para soldadura electrica • Сварочная муфта с нагревательной спиралью

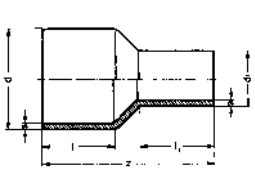
G 8271B PP-RCT



d	h	L	Stp.
160	205	176	1
200	245	187	1
250	315	243	1
315	375	280	1
355	435	315	1
400	482	355	1
450	534	350	1
500	593	360	1

PP-RCT – Reduktion, 20° C/1,6 MPa, 60° C/0,8 MPa
PP-RCT – Reducer, 20° C/1,6 MPa, 60° C/0,8 MPa • Réduction • Reduccion soldable • Редуктор

G 8243B PP-RCT



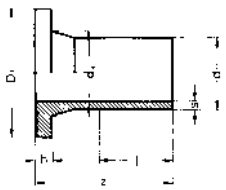
	SDR 11		SDR 9					
d - d_1	s	s_1	s	s_1	l	l_1	z	Stp.
125 - 110	–	–	14,0	12,3	100	85	225	1
160 - 110	14,6	10,0	–	–	110	93	255	1
160 - 125	14,6	11,4	–	–	113	95	260	1
200 - 160	18,2	14,6	–	–	142	117	303	1
250 - 160	22,7	14,6	–	–	138	111	339	1
250 - 200	22,7	18,2	–	–	140	130	340	1
315 - 250	28,6	22,7	–	–	160	145	400	1
355 - 250	32,2	22,7	–	–	177	150	425	1
355 - 315	32,2	28,6	–	–	177	173	425	1
400 - 315	36,3	28,6	–	–	190	165	460	1
400 - 355	36,3	32,2	–	–	190	185	463	1

Fittings für Heizwendel- oder Stumpfschweißung aus PP-RCT

Fittings for Butt-Welding with Heating Elements or by Electric Fusion PP-RCT • Raccords à souder bout à bout ou par électrosoudage
Manguitos para soldadura a espiral de calefacción o saldadura a tope
Фитинги ПП-Р для сварки посредством нагревательной спирали

PP-RCT – Vorschweißbund • PP–RCT – Flange adaptor • Collet à souder • Cuello de brida • Муфта с буртиком

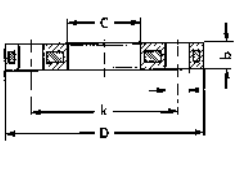
G 8791B PP-RCT



	SDR 11	SDR 9						
d	s	s	h	D_1	d_4	z	l	Stp.
160	14,6	–	25	212	175	175	110	1
200	18,2	–	32	268	232	205	127	1
250	22,7	–	35	320	285	235	146	1
315	28,6	–	36	372	337	262	185	1
355	32,2	–	40	430	373	280	182	1
400	36,3	–	45	482	427	315	192	1
450	40,9	–	60	585	514	340	220	1
500	45,4	–	60	585	530	344	234	1

Flansch PP, glasfaserverstärkt mit Stahleinlage • Backing flange PP, reinforced with fibre glass and steel inlay
Brides libres PP • Bridas con alma de acero • фланец ПП со стальной прокладкой

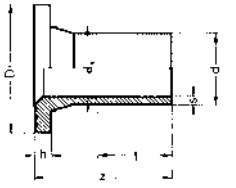
620.75.VB



d	D	k	b	c	l	AL
160	285	240	24	178	22	8
200	340	295	24	235	22	8
250	406	350	31	288	22	12
315	460	400	34	338	22	12
355	520	460	39	376	22	16
400	580	515	43	430	26	16
450	675	620	54	517	26	20
500	675	620	54	533	26	20

PP-RCT – Austrittshilfe für den Einsatz von Absperrklappen
PP-RCT – Exhaust help for throttle valve • Retrait pour robinet • Cuello de brida para montura mariposa
Вспомогательное приспособление выхода для вставки запорных клапанов

G 8792B PP-RCT

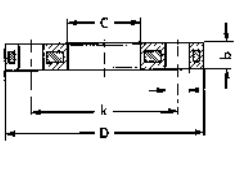


	SDR 6						
d	s	h	D_1	d_4	z	l	Stp.
110	18,3	32	158	125	170	100	1
*125	20,8	40	188	155	185	104	1

* für den Einbau von Klappen d = 140 mm
* for installation of flaps dia 140 mm
* pour installation des clapets d = 140 mm
* для вставки запорных клапановв d =140 mm

Flansch PP, glasfaserverstärkt mit Stahleinlage • Backing flange PP, reinforced with fibre glass and steel inlay
Brides libres PP • Bridas con alma de acero • фланец ПП со стальной прокладкой

620.75.KL

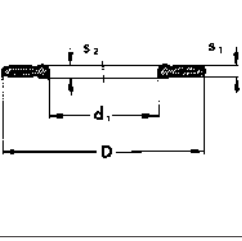


d	D	k	b	c	l	AL
110	220	180	18	128	18	8
*125(140)	250	210	24	158	18	8

* für den Einbau von Klappen d = 140 mm
* for installation of flaps dia 140 mm
* pour installation des clapets d = 140 mm
* для вставки запорных клапановв d =140 mm

Flachdichtring NBR mit Stahleinlage, Fabrikat Kroll + Ziller, für Vorschweißbunde
Flat gasket NBR with steel inlay, Manufacturer Kroll + Ziller, for flange adaptors
Joint plat • Junta plana • Плоское кольцевое уплотнение со стальной прокладкой для муфты с буртиком

671.410.01



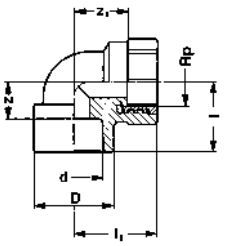
d	D	d_1	S_1	S_2
125	162	105	5	6
160	218	135	6	8
200	273	168	6	8
250	328	208	6	8
315	378	262	6	8
355 auf Anfrage / on request / sur demande				
400 auf Anfrage / on request / sur demande				
450 auf Anfrage / on request / sur demande				
500 auf Anfrage / on request / sur demande				

NBR = Perbunan N für Trinkwasser zugelassen nach DVGW - DIN 1988 mit KTW - Empfehlung und mikrobiologischer Zulassung entspr. DVGW Arbeitsblatt W 270.

NBR = Perbunan N approved for potable water according to DVGW - DIN 1988 with KTW recommendation and microbiological approval acc. to DVGW form W 270.
NBR = Perbunan N admis pour l'eau potable selon DVGW - DIN 1988 avec recommendation KTW et admission microbiologique selon DVGW page W 270.

PP-R-Rg/PP-RCT-Rg – Winkel 90° mit einseitigem zylindrischem Innengewinde
PP-R-Red Brass/PP-RCT-Red Brass – Elbow 90° with one sided cylindrical female thread
Coude à 90° Rg/PP-R/PP-RCT • Codo 90° soldable y rosca hembra
Уголок 90° с односторонней цилиндрической внутренней резьбой

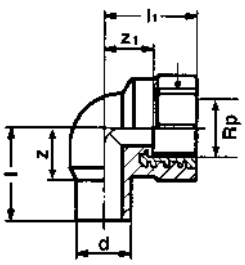
G 8090g PP-R
G 8090gB PP-RCT



d - Rp	D	l	l_1	z	z_1	SW	Stp.
16 - ½	23	25	32	12	18	36	10
20 - ½	29	28	34	14	20	36	10
20 - ¾	34	32	40	18	25	44	10
25 - ½	34	32	36	14	24	36	10
25 - ¾	34	32	40	16	25	44	10
32 - ¾	43	38	45	20	30	44	10
32 - 1	43	38	48	20	30	51	10

PP-R-Rg/PP-RCT-Rg – Winkel 90° mit einseitigem zylindrischem Innengewinde und Schweißstutzen
PP-R-Red Brass/PP-RCT-Red Brass – Elbow 90° with one sided cylindrical female thread and welding stub
Coude à 90° Rg/PP-R/PP-RCT • Codo 90° soldable y rosca hembra
Уголок 90° с односторонней цилиндр. внутренней резьбой и сварочным штуцером

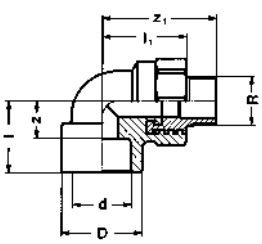
G 8091g PP-R
G 8091gB PP-RCT



d - Rp	l	l_1	z	z_1	SW	Stp.
20 - ½	34	34	19	18	36	10

PP-R-Rg/PP-RCT-Rg – Winkel 90° mit einseitigem kegligem Außengewinde
PP-R-Red Brass/PP-RCT-Red Brass – Elbow 90° / with one sided conical male thread
Coude à 90° Rg/PP-R/PP-RCT • Codo soldable y rosca macho
Уголок 90° с одностр. конической наружной резьбойй

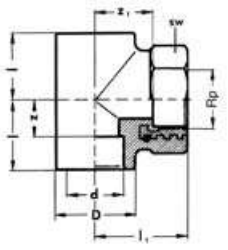
G 8092gPP-R
G 8092gB PP-RCT



d - R	D	l	l_1	z	z_1	SW	Stp.
16 - ½	23	25	32	12	47	36	10
20 - ½	29	28	34	14	49	36	10
20 - ¾	34	32	40	18	56	44	10
25 - ½	34	32	36	16	53	36	10
25 - ¾	34	32	40	16	56	44	10
32 - ¾	43	38	45	20	61	44	10
32 - 1	43	38	48	20	66	51	10

PP-R-Rg/PP-RCT-Rg – T - Stück 90° mit zylindrischem Innengewinde am Abgang
PP-R-Red Brass/PP-RCT-Red Brass – Tee 90° with cylindrical female thread at exit
Té à 90° Rg/PP-R/PP-RCT • Te soldable y rosca hembra
Тройник 90° цилиндрической внутренней резьбой на отводе

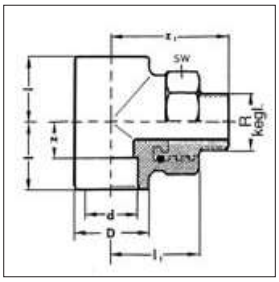
G 8130g PP-R
G 8130gB PP-RCT



d - Rp	D	l	l_1	z	z_1	SW	Stp.
16 - ½	23	25	32	12	18	36	10
20 - ½	29	28	34	14	20	36	10
20 - ¾	29	28	35	14	20	44	10
25 - ½	34	32	38	16	24	36	10
25 - ¾	34	32	40	16	25	44	10
32 - ¾	43	38	45	20	30	44	10
32 - 1	43	38	48	20	30	51	10

PP-R-Rg/PP-RCT-Rg – T-Stück 90° mit kegligem Außengewinde am Abgang
PP-R-Red Brass/PP-RCT-Red Brass – Tee 90° with conical male thread at exit
Té à 90° Rg/PP-R • Te soldable y rosca macho • Тройник 90°

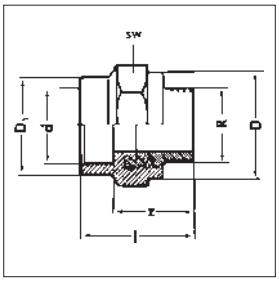
G 8133g PP-R
G 8133gB PP-RCT



d - R	D	l	l_1	z	z_1	SW	Stp.
16 - ½	23	25	32	12	47	36	10
20 - ½	29	28	34	14	49	36	10
20 - ¾	29	28	35	14	50	44	10
25 - ½	34	32	38	16	53	36	10
25 - ¾	34	32	40	16	55	44	10
32 - ¾	43	38	45	20	60	44	5
32 - 1	43	38	48	20	66	51	10

PP-R-Rg/PP-RCT-Rg
Übergangs-Gewinde-Nippel mit kegligem Außengewinde
PP-R-Red Brass/PP-RCT-Red Brass
Adaptor socket with conical male thread
Manchon d'adaptation Rg/PP-R/PP-RCT
Enlace soldable y rosca macho
Переходной резьбовой ниппель

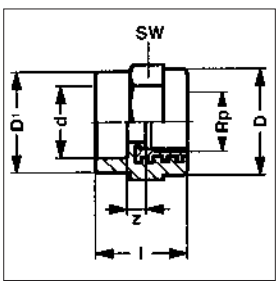
G 8243g PP-R
G 8243gB PP-RCT



d - R	D	D_1	l	z	SW	Stp.
16 - ½	35	24	53	40	36	10
20 - ½	35	29	55	40	36	10
20 - ¾	43	34	58	42	44	10
25 - ½	35	34	56	40	36	10
25 - ¾	43	34	58	42	44	10
32 - ¾	43	43	58	42	44	10
32 - 1	50	43	66	48	51	10
40 - 1	62	55	71	51	62	10
40 - 1¼	62	52	74	53	63	10
50 - 1¼	69	64	77	54	70	10
50 - 1½	69	64	77	54	70	10
63 - 2	84	79	92	65	85	5
75 - 2½	112	99	112	82	115	5
90 - 3	134	120	143	111	135	2
110 - 4	169	148	161	124	170	2
125 - 5	206	168	170	130	208	1

PP-R-Rg/PP-RCT-Rg
Übergangs-Gewindemuffe mit zylindrischem Innengewinde
PP-R-Red Brass/PP-RCT-Red Brass
Adaptor socket with cylindrical female thread
Manchon d'adaptation Rg/PP-R/PP-RCT
Enlace soldable y rosca hembra
Переходная резьбовая ниппель муфта

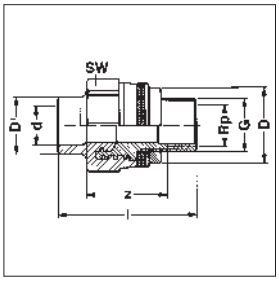
G 8270g PP-R
G 8270gB PP-RCT



d - Rp	D	D_1	l	z	SW	Stp.
16 - ½	35	24	38	11	36	10
20 - ½	35	29	40	11	36	10
20 - ¾	43	34	42	11	44	10
25 - ½	35	34	41	11	36	10
25 - ¾	43	34	42	11	44	10
32 - ¾	43	43	44	11	44	10
32 - 1	50	43	48	12	51	10
40 - 1	62	55	54	14	63	10
40 - 1 ¼	62	55	54	13	63	10
50 - 1 ¼	69	64	57	12	70	10
50 - 1 ½	69	64	57	14	70	10
63 - 2	84	79	68	19	85	5
75 - 2 ½	112	99	82	22	115	5
90 - 3	134	120	108	39	135	2
110 - 4	169	148	121	42	170	2
125 - 5	206	168	125	41	208	1

Übergangs-Gewinde-Nippel Rg/PP-R/PP-RCT für Hohlwandanschluss, mit Innengewinde
Bracket red brass/PP-R/PP-RCT for hollow wall installation with female thread
Applique Rg/PP-R/PP-RCT pour paroi creux • Enlace soldable y rosca hembra • Переходной резьбовой ниппель

G 8244g PP-R
G 8244gB PP-RCT
G 8245g PP-R
G 8245gB PP-RCT



G 8244g – length of thread 30 mm

d - Rp - G	D	D_1	l	z	SW	Stp.
16 - ½ - ¾	43	29	70	42	44	10
20 - ½ - ¾	43	29	70	40,5	44	10

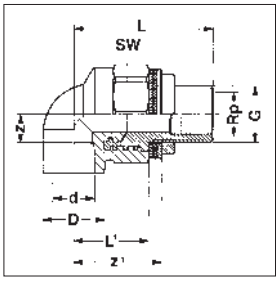
G 8245g – length of thread 19 mm

d - Rp - G	D	D_1	l	z	SW	Stp.
16 - ½ - ¾	43	29	59	31	44	10
20 - ½ - ¾	43	29	59	29,5	44	10

komplett mit Kontersatz • complete with counter set
complete avec set de contre • completo con juego de contratuercas

Winkel 90° Rg/PP-R/PP-RCT für Hohlwandanschluss, mit Innengewinde
Elbow 90° red brass/PP-R /PP-RCT for hollow wall installation with female thread
Coude à 90° Rg/PP-R/PP-RCT pour paroi creux • Codo 90° • Уголок 90°

G 8093g PP-R
G 8093gB PP-RCT
G 8095g PP-R
G 8095gB PP-RCT



G 8093g – length of thread 30 mm

d - Rp - G	D	L	L^1	z	z^1	SW	Stp.
16 - ½ - ¾	29	65	35	15	50	44	10
20 - ½ - ¾	29	65	35	13,5	50	44	10

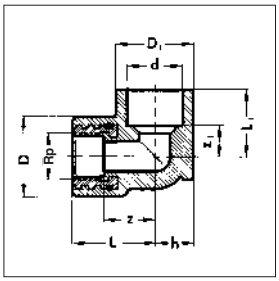
G 8095g – length of thread 19 mm e.g. for toilet tank in

d - Rp - G	D	L	L^1	z	z^1	SW	Stp.
16 - ½ - ¾	29	54	35	15	39	44	
20 - ½ - ¾	29	54	35	13,5	39	44	10

komplett mit Kontersatz • complete with counter set
complete avec set de contre • completo con juego de contratuercas

Wandscheibe Rg/PP-R/PP-RCT mit zylindrischem Gewinde
Bracket red brass/PP-R/PP-RCT for mounting wall with cylindrical female thread
Applique Rg/PP-R/PP-RCT pour montage sur crépi
Codo soldable y rosca hembra con sujeccion a la pared • Настенная шайба

G 8472g PP-R
G 8472gB PP-RCT

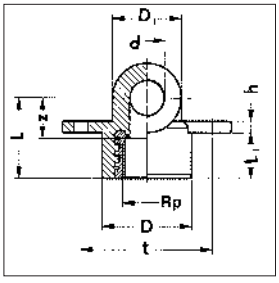


d - Rp	D	D_1	L	L_1	h	t*	z	z_1	Stp.
16 - ½	35	29	35	27	15	40	21	14	10
20 - ½	35	29	35	27	15	40	21	11	10
25 - ½	35	34	37	30	17	40	23	14	10
25 - ¾	43	43	43	35	22	50	28	19	10
32 - ¾	43	43	43	35	22	50	28	17	10

t* = Abstand der Befestigungslöcher
t* = Distance of mounting holes
t* = Distance de trous de montage

Wandscheibe für Hohlwandanschluss Rg/PP-RPP-RCT
Bracket red brass/PP-R/PP-RCT for hollow wall
Applique Rg/PP-R/PP-RCT pour paroi creux • Disco de pared para enlace de pared hueca
Настенная шайба для подсоединения к стене

G 8473g PP-R

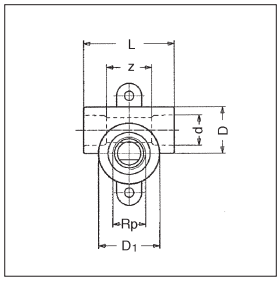


d - Rp	D	D_1	z	L	L_1	t*	h	Stp.
16 - ½	35	29	21	35	11	59	5	10
20 - ½	35	29	21	35	11	59	5	10
25 - ½	35	34	23	37	13	59	5	10

t* = Abstand der Befestigungslöcher
t* = Distance of mounting holes
t* = Distance de trous de montage

Durchgangs-Wandscheibe Rg/PP-R/PP-RCT
Bracket Red Brass/PP-R/PP-RCT for wall mounting • Applique Rg/PP-R/PP-RCT pour montage sur crépi
Codo soldable y rosca hembra con sujeccion a la pared
Двойная настенная шайба

G 8490g PP-R

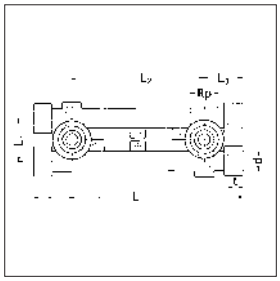


d - Rp	D	D_1	L	t*	z
20 - ½	30	39	58	62	29

t* = Abstand der Befestigungslöcher
t* = Distance of mounting holes
t* = Distance de trous de montage

PP-R/ PP-RCT – Montagegruppe • PP-R/PP-RCT – Subassembly
Sous-groupe • Unidad de montaje • Монтажная группа

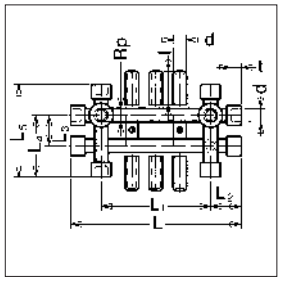
G 8492g PP-R



d - Rp	L	L_1	L_2	L_3	t	
20 - ½	211	43		136	37	14,5

PP-R/PP-RCT – Montagegruppe • PP-R/PP-RCT – Subassembly
Sous-groupe • Unidad de montaje • Монтажная группа

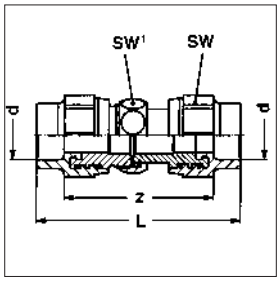
G 8494g PP-R



d - Rp	L	L_1	L_2	L_3	L_4	L_5	t	l
20 - ½	250	160	45	45	90	135	14,5	50

PP-R/PP-RCT – Verschraubung flach dichtend
PP-R/PP-RCT – Union flat sealing
Union
Union 2 Piezas
Винтовое соединение с плоским уплотнением

G 8330 PP-R
G 8330B PP-RCT



d	L	z	SW	SW^1
16	111	83	36	30
20	116	86	44	37
25	119	83	44	37
32	134	96	51	46
40	152	110	63	52
50	163	115	70	59
63	187	131	85	74
75	220	160	115	90
90	290	224	135	109

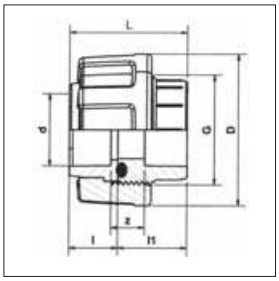
PP-R/PP-RCT – Anschlussverschraubung mit beidseitiger Schweißmuffe, Runddichtring EPDM, 20°C, 10 bar
Einzelteile: Einlegteil, Einschraubteil, Überwurfmutter glasfaserverstärkt, Runddichtring

PP-R/PP-RCT – Union with welding socket at both ends, round gasket EPDM, 20°C, 10 bar
Component parts: Insert, screw part, union nut reinforced with fibre glass, round gasket

Manchon union avec manchon des deux côtés, joint torique
Composites: Pièce folle, pièce fileté, écron

Enlace • Резьбовое соединеие для

G 8330A PP-R



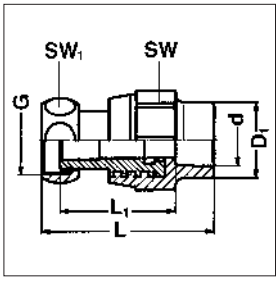
d	DN	G	L	l	l_1	z	D
20	15	1	44,0	17,5	26	15	46
25	20	1¼	47,5	19,0	28	15	56
32	25	1½	51,5	21,0	30	15	66
40	32	2	58,0	23,5	34	17	79
50	40	2¼	66,0	26,5	39	19	87
63	50	2¾	78,5	30,5	47	23	107

PP-R/PP-RCT – Anschlussverschraubungmit Dichtung, für Armaturen und Wasserzähler

PP-R/PP-RCT – Union with gasket for armatures and water meters

Union pour robinetteries et compteurs d'eau
Enlace reductor desmontable rosca hembra
Резьбовое соединеие для подключения арматуры и водомеров с прокладкой

G 8332 PP-R
G 8332B PP-RCT



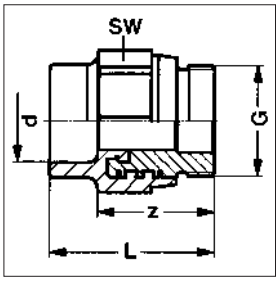
d	Nut thread	D_1	~ L	L_1	SW	SW_1
16	G ¾	29	64	44	36	30
20	G ¾	29	66	44	36	30
20	G 1	29	68	44	44	37
25	G ¾	34	67	44	36	30
25	G 1	34	72	47	44	37
32	G 1	43	80	53	44	37
32	G 1¼	43	80	53	51	46
40	G 1¼	55	86	56	63	46
40	G 1½	52	90	58	63	52
50	G 1¾	64	98	61	70	59
63	G 2⅜	79	114	71	85	74
75	G 2¾	99	131	86	113	90
90	G 3½	120	172	118	135	109

PP-R/PP-RCT – Einschraubteil für Verschraubung 8332

PP-R/PP-RCT – Screw part for union 8332

Pièce filetèe • Entronque roscado
Переходная деталь для 8332

G 8333 PP-R
G 8333B PP-RCT



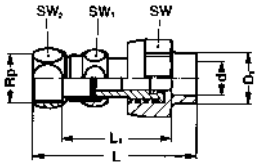
d - G	L	z	SW
16 - ¾	50	37	36
20 - ¾	50	34	36
20 - 1	53	38	44
25 - ¾	51	35	36
25 - 1	54	38	44
32 - 1¼	62	43	51
40 - 1½	72	51	63
50 - 1¾	77	53	70
63 - 2⅜	88	60	85
75 - 2¾	104	74	115
90 - 3½	137	104	135

Rohrverschraubung PP-R/PP-RCT/Ms/Rg, flach dichtend, Anschluss für Metallgewinde, Innengewinde

Union PP-R/PP-RCT/red brass, flat sealing connection for metal thread, female thread

Manchon union PP-R/PP-RCT/Rg
Machon de unión PP-R/PP-RCT/Latón/Bronce
Переходник с внутренней резьбой

G 8332g PP-R
G 8332gB PP-RCT



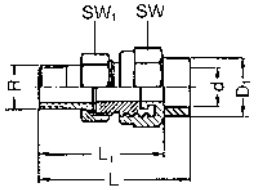
d - Rp	Nut thread	D_1	~ L	L_1	SW	SW_1	SW_2
16 - ½	G ¾	29	85	58	36	30	27
20 - ½	G ¾	29	85	56	36	30	27
20 - ¾	G 1	29	93	62	44	37	34
25 - ½	G ¾	34	87	57	36	30	27
25 - ¾	G 1	34	95	62	44	37	34
32 - ¾	G 1	43	97	62	44	37	34
32 - 1	G 1¼	43	103	67	51	46	44
40 - 1¼	G 1½	52	115	77	63	52	50
50 - 1½	G 1¾	64	126	85	70	59	55
63 - 2	G 2⅜	79	142	91	85	74	70
75 - 2½	G 2¾	99	169	112	113	90	90

Rohrverschraubung PP-R/PP-RCTMs/Rg, flach dichtend, Anschluss für Metallgewinde, Außengewinde

Union PP-R/PP-RCT/brass/red brass, flat sealing connection for metal thread, male thread

Manchon union PP-R/PP-RCT/Rg
Racor de enlace desmontable macho
Переходник с наружной резьбой

G 8333g PP-R
G 8333gB PP-RCT

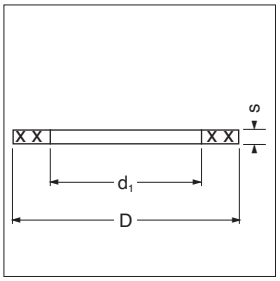


d - R	Nut thread	D_1	~ L	L_1	SW	SW_1
16 - ½	G ¾	29	79	66	36	30
20 - ½	G ¾	29	79	65	36	30
20 - ¾	G 1	29	86	72	44	37
25 - ½	G ¾	34	81	65	36	30
25 - ¾	G 1	34	88	72	44	37
32 - ¾	G 1	43	81	63	44	37
32 - 1	G 1¼	43	98	80	51	46
40 - 1¼	G 1½	52	113	92	63	52
50 - 1½	G 1¾	64	119	96	70	59
63 - 2	G 2⅜	79	137	109	85	74
75 - 2½	G 2¾	99	175	145	113	90

Flachdichtring
Flat gasket
Joint plat
Junta plana
Плоское кольцевое уплотнение

für Rohrverschraubungen PP-R / PP-RCT
for unions PP-R/PP-RCT • pour unions PP-R / PP-RCT
Art.-Nr. G 8330, G 8332, G 8332g, G 8333g, G 8600 + G 8650

8490f



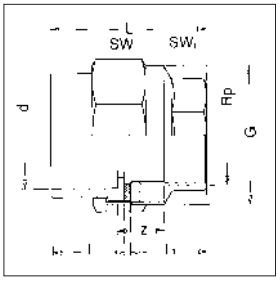
d	R/Rp	Mutter-gewinde	D	d_1	s
16/20/25	½	G ¾	24	17	3
20/25/32	¾	G 1	30	21	3
32	1	G 1¼	38	27	3
40	1¼	G 1½	44	32	3
50	1½	G 1¾	50	40	3
63	2	G 2⅜	66	52	3
75	2½	G 2¾	78	63	3
90	3	G 3½	97	75	3

Rohrverschraubung PP-R/PP-RCT/V2A, nur komplett lieferbar mit Schweißmuffe und zyl. Innengewinde, Flachdichtung EPDM; Anschluss für Metallgewinde

Union PP-R/PP-RCT/stainless steel, available only as complete set, with welding socket and cylindrical female thread, flat gasket EPDM, connection for metal thread

Manchon union PP-R/PP-RCT/V2A • Unión roscada de tubos PP-R/PP-RCT/V2A Ü Переходник PP-R/PP-RCT/V2A

G 8542g PP-R
G 8542gB PP-RCT



20° C/1,0 MPa

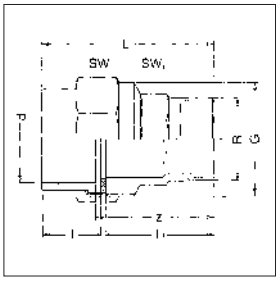
d - Rp	DN	G	L	l	l_1	z	SW	SW_1
20 - ½	15	1	49	21	25	21	38	27
25 - ¾	20	1¼	52	21	28	20	47	32
32 - 1	25	1½	57	23	31	21	52	38
40 - 1¼	32	2	62	26	33	21	66	47
50 - 1½	40	2¼	68	29	36	24	72	53
63 - 2	50	2¾	78	33	42	26	87	65

Rohrverschraubung PP-R/PP-RCT/V2A, nur komplett lieferbar mit Schweißmuffe und kegligem Außengewinde, Flachdichtung EPDM; Anschluss für Metallgewinde

Union PP-R/PP-RCT/stainless steel, available only as complete set, with welding socket and conical male thread, flat gasket EPDM, connection for metal thread

Manchon union PP-R/PP-RCT/V2A • Unión roscada de tubos PP-R/PP-RCT/V2A Ü Переходник PP-R/PP-RCT/V2A

G 8547g PP-R
G 8547gB PP-RCT



20° C/1,0 MPa

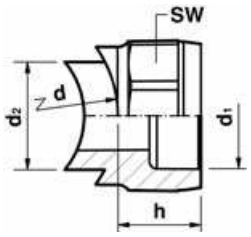
d - R	DN	G	L	l	l_1	z	SW	SW_1
20 - ½	15	1	68	21	43	52	38	27
25 - ¾	20	1¼	73	21	49	58	47	27
32 - 1	25	1½	79	23	53	61	52	34
40 - 1¼	32	2	87	26	58	82	66	43
50 - 1½	40	2¼	94	29	62	89	72	50
63 - 2	50	2¾	107	33	71	102	87	61

PP-R/PP-RCT – Einschweißsattel

PP-R/PP-RCT Welding saddle

Selle de soudage
Adaptador a soldar
Вварное седло

G 8130sB PP-RCT



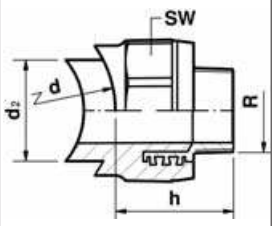
Dim. d x d_1	d_2	h	SW
40- 63 x 20	25	29	38
40- 63 x 25	25	29	38
75-125 x 20	25	29	38
75-125 x 25	25	29	38
75-125 x 32	32	35	51
75-125 x 40	40	38	63
110-125 x 50	50	39	70
125 x 63	63	45	85
160-250 x 20	25	29	38
160-250 x 25	25	29	38
160-250 x 32	32	35	51
160-250 x 40	40	38	63
160-250 x 50	50	39	70
160-250 x 63	63	45	85
315-630 x 20	25	29	38
315-630 x 25	25	29	38
315-630 x 32	32	35	51
315-630 x 40	40	38	63
315-630 x 50	50	39	70
315-630 x 63	63	45	85

Einschweißsattel PP-R/PP-RCT/Rg mit Außengewinde

Welding saddle PP-R/PP-RCT/Red Brass with male thread

Selle de soudage avec taraudage male PP-R/PP-RCT/Rg
Adaptador a soldar con rosca macho
Вварное седло с наружной резьбой

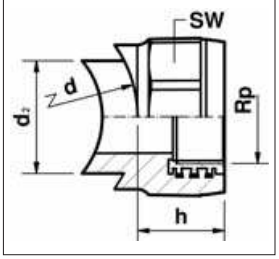
G 8243sB PP-RCT



Dim. d x R	d_2	h	SW
40- 63 x ½	25	43	38
75-125 x ½	25	43	38
75-125 x ¾	32	50	51
75-125 x 1	32	52	51
75-125 x 1	40	56	63
75-125 x 1 ¼	40	58	63
90-125 x 1 ¼	50	59	70
110-125 x 1 ½	50	59	70
125 x 2	63	70	85
160-250 x ½	25	43	38
160-250 x ¾	32	50	51
160-250 x 1	32	52	51
160-250 x 1	40	56	63
160-250 x 1 ¼	40	58	63
160-250 x 1 ¼	50	59	70
160-250 x 1 ½	50	59	70
160-250 x 2	63	70	85
315-630 x ½	25	43	38
315-630 x ¾	32	50	51
315-630 x 1	32	52	51
315-630 x 1	40	56	63
315-630 x 1 ¼	40	58	63
315-630 x 1 ¼	50	59	70
315-630 x 1 ½	50	59	70
315-630 x 2	63	70	85

Einschweißsattel PP-R/PP-RCT/Rg mit Innengewinde
Welding saddle PP-R/PP-RCT/red brass with female thread
Selle de soudage avec taraudage intérieure
Adaptador a soldar con rosca hembra
Вварное седло с внутренней резьбой

G 8270sB PP-RCT

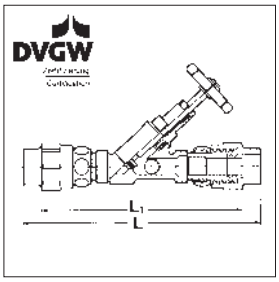


Dim. d x Rp	d_2	h	SW
40- 63 x ½	25	43	38
75-125 x ½	25	43	38
75-125 x ¾	32	50	51
75-125 x 1	32	52	51
75-125 x 1	40	38	63
75-125 x 1 ¼	40	38	63
90-125 x 1 ¼	50	39	70
110-125 x 1 ½	50	39	70
125 x 2	63	45	85
160-250 x ½	25	29	38
160-250 x ¾	32	35	51
160-250 x 1	32	52	51
160-250 x 1	40	38	63
160-250 x 1 ¼	40	38	63
160-250 x 1 ¼	50	39	70
160-250 x 1 ½	50	39	70
160-250 x 2	63	45	85
315-630 x ½	25	29	38
315-630 x ¾	32	35	51
315-630 x 1	32	52	51
315-630 x 1	40	38	63
315-630 x 1 ¼	40	38	63
315-630 x 1 ¼	50	39	70
315-630 x 1 ½	50	39	70
315-630 x 2	63	45	85

Schrägsitzventil Ms mit Entleerung; Anschluss PP-R/PP-RCT Schweißmuffe

Angle seat brass valve with draining connection PP-R/PP-RCT welding socket
Robinet à soupape diagonale en laiton avec vidage; branchement PP-R/PP-RCT manchon à souder
Válvula con asiento de latón en ángulo y conexión para
Косопосадочный вентилв Мс со сливом воды

G 8600 PP-R
G 8600B PP-RCT

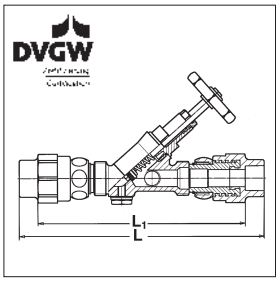


d	L	L_1
50	298	251
63	347	292

Schrägsitzventil Ms mit Rückflussverhinderer und Prüfstopfen; Anschluss PP-R/PP-RCT Schweißmuffe

Angle seat brass valve with return flow preventor and test plug; connection PP-R/PP-RCT welding socket
Robinet à soupape diagonale en laiton avec empêchement d'ecoulement de retour et bouchon d'essai; branchement PP-R/PP-RCT manchon à souder
Válvula con asiento de latón en ángulo con antiretorno y tapón de prueba
Косопосадочный вентилв Мс со стопором обратного потока и котнрольным патрубком

G 8600/1 PP-R
G 8600/1B PP-RCT

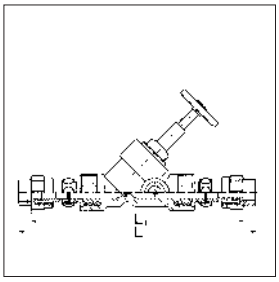


d	L	L_1
50	298	251
63	347	292

Schrägsitzventil PP-R/PP-RCT mit Metallsitz, Entleerungsventil und Prüfstopfen; mit Anschlussverschraubung

Angle seat valve PP-R/PP-RCT with metal seat, with draining connection and union
Robinet à soupape PP-R/PP-RCT siège en métal avec vidage avec branchement union
Válvula de asiento inclinado PP-R/PP-RCT metal con desagúe y tapón de prueba; con unión
Косопосадочный вентилв с металлической основой, со сливным котнрольным патрубком и подсоединительной деталью

G 8650 PP-R
G 8650B PP-RCT

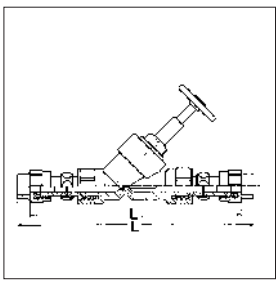


d	L	L_1
20	258	229
25	261	229
32	294	258
40	336	295

Schrägsitzventil PP-R/PP-RCT mit Metallsitz ohne Entleerungsventil; mit Anschlussverschraubung

Angle seat valve PP-R/PP-RCT with metal seat, without draining connection with union
Robinet à soupape PP-R/PP-RCT siège en métal sans vidage avec union
Válvula de paso total PP-R/PP-RCT metal con unión
Косопосадочный вентилв ППР с металлической основой без сливного патрубка, с подсоединительной деталью

G 8655 PP-R
G 8655B PP-RCT

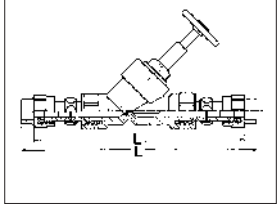


d	L	L_1
20	258	229
25	261	229
32	294	258
40	336	295

Schrägsitzventil PP-R/PP-RCT mit Metallsitz und Rückflussverhinderer; mit Anschlussverschraubung

Angle seat valve PP-R/PP-RCT with metal seat and with return flow preventor and union
Robinet à soupape PP-R/PP-RCT avec empéchement d'ecoulement de retour et union
Válvula de asiento inclinado PP-R/PP-RCT/metal y dispositivo antiretorno; con union
Косопосадочный вентилв с металлической основой, со сливным котнрольным патрубком и подсоединительной деталью

G 8655/1 PP-R
G 8655/1B PP-RCT

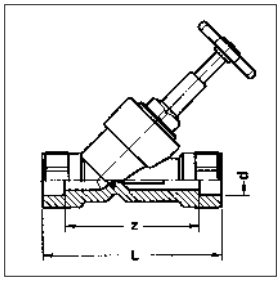


d	L	L_1
20	258	229
25	261	229
32	294	258
40	336	295

Schrägsitzventil PP-R/PP-RCT ohne Entleerung

Angle seat valve PP-R/PP-RCT without draining connection
Robinet à soupape
Válvula paso total y asiento inclinado
Косопосадочный вентилв беэ слива воды

G 8700 PP-R
G 8700B PP-RCT

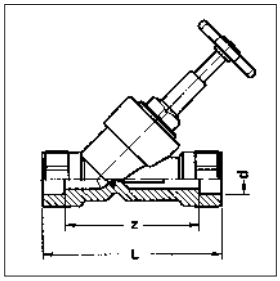


	mit Metallsitz	
d	L	z
20	115	86
25	115	83
32	120	84
40	145	104

Schrägsitzventil PP-R/PP-RCT mit Rückflussverhinderer ohne Entleerung

Angle seat valve PP-R/PP-RCT with return flow preventor without draining connection
Robinet à soupape
Válvula paso total y asiento inclinado y dispositivo antiretorno
Косопосадочный вентилв со стопором обратного потока без слива воды

G 8700/1 PP-R
G 8700/1B PP-RCT

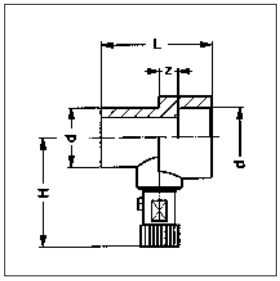


	mit Metallsitz	
d	L	z
20	115	86
25	115	83
32	120	84
40	145	104

Entleerungsstutzen mit Schweißmuffe und Schweißstutzen

Drain valve for socket-welding, female and male
Soupape pour dépober
Válvula de drenaje
Сливной патрубок сварочной муфтой и сварным штуцером

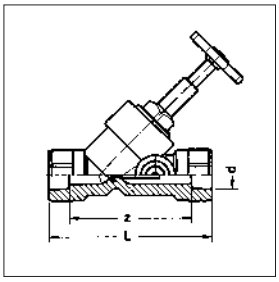
G 8710 PP-R



d	L	z	H
20	52	8	51
25	54	8	53
32	59	9	56
40	62	7	62

Schrägsitzventil PP-R/PP-RCT mit integriertem Entleerungsventil und Prüfstopfen
Angle seat valve PP-R/PP-RCT with draining connection and test plug
Robinet à soupape diagonale en laiton avec vidage
Válvula de asiento inclinado con desagüe y tapón de prueba
Косопосадочный вентилв с интегрир. сливным и котнр. патрубком

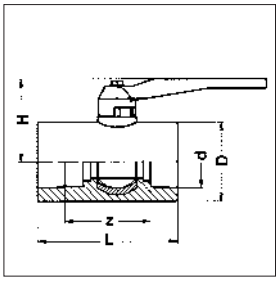
G 8800 PP-R
G 8800B PP-RCT



mit Metallsitz		
d	L	z
20	115	86
25	115	83
32	120	84
40	145	104

Kugelhahn PP-R/PP-RCT
Ball valve PP-R/PP-RCT
Robinet à bille
Válvula de esfera
Шаровой кран

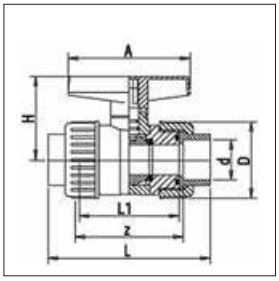
G 8850 PP-R



d	D	L	z	H
20	30	74	45	54
25	37	78	46	72
32	48	91	55	56
40	60	105	64	62
50	75	122	75	67
63	94	145	90	85
75	108	166	106	98

Kugelhahn aus PP SDR 11, mit Dichtung aus EPDM, Kugelabdichtung aus PTFE; 20°C, 10 bar
Ball valve PP SDR 11, with sealing EPDM, ball sealing in PTFE; 20°C, 10 bar
Robinet à bille
Válvula de esfera
Шаровой кран

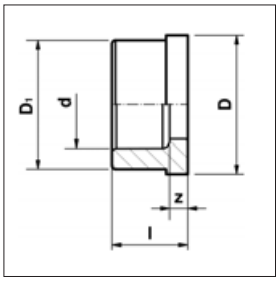
G 8852



d	DN	L	L1	z	D	H	A
20	15	98	63	70	46	51	68
25	20	113	75	82	56	61	78
32	25	121	79	87	66	70	88
40	32	138	91	98	79	81	98
50	40	148	95	101	87	90	108
63	50	175	115	121	107	110	118
75	65	275	205	213	128	137	186

Einlegteil aus PP-R/PP-RCT mit Schweißmuffe für Verschraubungen G 8330A, G 8542g, G 8547g und Kugelhahn G 8852
Insert of PP-R/PP-RCT with welding socket for unions G 8330A, G 8542g, G 8547g and ball valve G 8852
Pièce folle en PP-R/PP-RCT avec manchon soudable pour manchon union G 8330A, G 8542g, G 8547g et robinet G 8852
Pieza loca de PP-R/PP-RCT con unión soldable para Uniones G 8330A, G 8542g, G 8547g Válvula de esfera con unión doble G 8852
Вкладыш из ПП-Р / ПП-РСТ смуфтой для соединение G 8330A, G 8542g, G 8547g и кранов

G 8060 PP-R
G 8060B PP-RCT

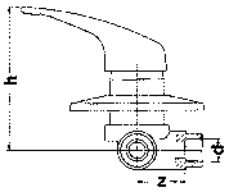


d	DN	D_1		D	l	z
20	15	27,5	30	21	6	
25	20	36	38,5	21	6	
32	25	41,5	44,7	23	6	
40	32	53	56,5	28	7	
50	40	59	62,6	32	8	
63	50	74	78,5	42	13	
75	–	90	97,2	35	5	

Einhebel-Mischbatterie PP-R/PP-RCT

Single mixing device PP-R/PP-RCT
Mélangeur single PP-R/PP-RCT
Grifería PP-R/PP-RCT
Рычажной смеситель

G 8860 PP-R

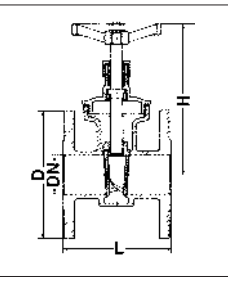


d	z	h
20	27	130

Flanschen-Schieber DIN 3352, aus Rotguss DIN 1705, Nenndruck 16 bar

Gate Valve DIN 3352, red brass DIN 1705, 16 bar
Ouverture bride, DIN 3352, cuivre DIN 1705, 16 bar
Puerta valvulas DIN 3352, cobre DIN 1705, 16 bar
Стальная задвижка

G 8910

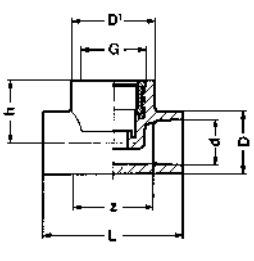


d	DN	D	L	H
90	80	200	150	245
110	100	220	160	340
125	125	250	200	400
160	150	285	210	430
Größere Dimensionen auf Anfrage.				
Bigger sizes available on request.				

PP-R/PP-RCT – Ventil-Unterteil, für Oberteil 3/4" (UP oder AP) max. 12 mm Gewindelänge

PP-R/PP-RCT – Bottom part of valve for upper part 3/4" (in wall or on wall), max. 12 mm Threading length
Pièce inférieure de robinet à reçevoir pièce supérieure 3/4", max. 12 mm longueur de taraudage
Cuerpo de válvula (solo parte inferior)
Вентиль-нижняя часть, для верiней части 3/4", максималь. длина нарезки 12мм

G 8599a PP-R
G 8599aB PP-RCT



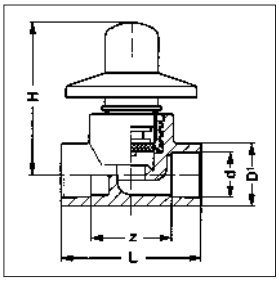
d - G	D	D¹	z	L	h	Stp.
20 - ¾	34	45	46	75	33	5
25 - ¾	34	45	43	75	33	5
32 - ¾	43	45	39	75	33	5

PP-R/PP-RCT – UP-Ventil mit Flügelrad und geschlossener Kappe

PP-R/PP-RCT – Concealed valve with winged wheel and closed flap

Soupape • Válvula para empotrar • Уп-вентиль с лопастным колесом и заглушкой

G 8599b PP-R
G 8599bB PP-RCT



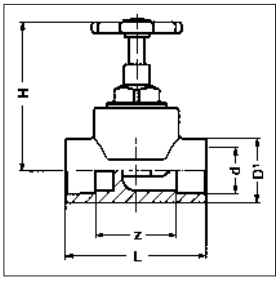
d - G	D	D1	z	L	H
20 - ¾	34	45	46	75	63
25 - ¾	34	45	46	75	63
32 - ¾	43	45	39	75	63

PP-R/PP-RCT – Geradsitzventil

PP-R/PP-RCT Straight seat valve

Soupape droite • Válvula de compuerta • прямопосадочный вентиль

G 8599c PP-R
G 8599cB PP-RCT



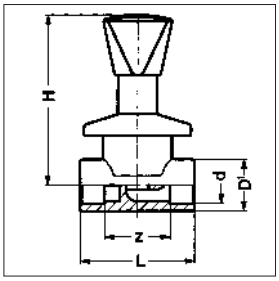
d - G	D	D1	z	L	H
20 - ¾	34	45	46	75	69
25 - ¾	34	45	43	75	69
32 - ¾	43	45	39	75	69

PP-R/PP-RCT – UP-Ventil mit verchromtem Oberteil

PP-R/PP-RCT – Concealed valve with chromed upper part

Soupape pour installation sous crépi avec pièce superieur chromé • Válvula de corte mando cromado
Уп-вентиль с хромированной верхней частью

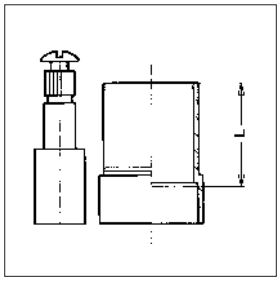
G 8599d PP-R
G 8599dB PP-RCT



d - G	D	D1	z	L	H
20 - ¾	34	45	46	75	112
25 - ¾	34	45	43	75	112
32 - ¾	43	45	39	75	112

Verlängerung für UP-Ventil
Prolongation for concealed valve • Rallonge pour soupape UP • Prolongación para válvula de empotrar
Удлинение для УП-Вентиля

8599v



L
30

8670

Druckminderer PN 16
mit Aussengewinde 3/4
für Anschlussverschraubung G 8332
Druck einstellbar von 1,5 bis 5,5 bar

Pressure Reducer PN 16
with male thread 3/4
suitable for union G 8332
Pressure adjustable from 1,5 to 5,5 bar

Réducteur de pression PN 16
avec taraudage mal 3/4
pour union G 8332
pressure réglable de 1,5 jusqu'au 5,5 bar

Редуктор давления PN 16
с наружной резьбой 3/4
для резьбового соединения G 8332

8670A

Manometer für Druckminderer 8670
Messbereich 0 bis 10 bar (0 bis 145 PSI)
Anschlussgewinde G 1/4

Pressure Gauge
for pressure reducer 8670
Measuring range 0 to 10 bar (0 to 145 PSI),
connecting thread G 1/4

Manomètre pour réducteur de pression 8670, gamme de mesure 0 jusqu'au 10 bar (0 à 145 PSI)
connexion taraudage G1/4

Манометр
для редуктора давления 8670
диапазон измерений 0 до 10 бар (0 до 145 PSI),
соединительная резьба G 1/4

83600

Rückschlagventil PN 16
mit Innengewinde 3/4
für Rohrverschraubung G 8333g

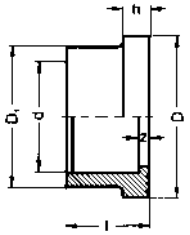
Check valve PN 16
with female thread 3/4
for union G 8333g

Soupape de retenue à bille PN 16
taraudage femelle 3/4
pour manchon union G 8333g

Запорный вентиль PN 16
с внутренней резьбой 3/4
для переiодника G 8333g

PP-R/PP-RCT – Bundbuchse, für Flachdichtring Dichtfläche gerillt
PP-R/PP-RCT – Flange adaptor for flat gasket, seal face grooved
Collet • Cuellos de bridas • Втулка

G 8790 PP-R
G 8790B PP-RCT

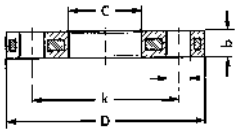


d	D	D_1	l	z	h	Stp.
40	61	50	29	9	8	2
50	74	61	27	4	8	2
63	102	76	40	13	17	2
75	122	90	38	8	19	2
90	137	108	45	12	21	2
110	158	131	50	13	21	2
125	162	146	53	13	25	2

ab d 160 siehe Seite 17
from d 160 on see page 17
à partir de d 160 regardez page 17

Flansch aus PP, glasfaserverstärkt mit Stahleinlage für Bundbuchsen, Anschlussmaße nach PN 10/PN16
Backing flanges PP/St for flange adaptor, with steel inlay, tie dimension acc. to PN 10 • Brides libres PP/St pour collets à souder
Bridas con alma de acero • фланец из полипропилена со стальной прокладкой для втулки

620.75.00

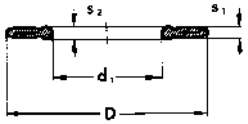


d	D	k	b	c	l	AL	Stp.
40	140	100	16	51	18	4	1
50	150	110	18	62	18	4	1
63	165	125	18	78	18	4	1
75	185	145	18	92	18	4	1
90	200	160	18	110	18	8	1
110	220	180	18	133	18	8	1
125	220	180	18	149	18	8	1

ab d 160 siehe Seite 17
from d 160 on see page 17
à partir de d 160 regardez page 17

Flachdichtring NBR mit Stahleinlage Fabrikat Kroll + Ziller, für Bundbuchsen
Flat gasket NBR, Manufacturer Kroll + Ziller, for flange adaptor • Joint plat • Junta plana
Плоское кольцевое уплотнение НБР со стальной прокладкой для втулки

674.410.01



d	D	d_1	s_1	s_2	Stp.
40	82	40	3	4	1
50	91	51	3,5	4,5	1
63	107	63	4	5	1
75	127	75	4	5	1
90	142	90	4	5	1
110	162	110	5	6	1
125	162	105	5	6	1

ab d 160 siehe Seite 17 • from d 160 on see page 17
à partir de d 160 regardez page 17

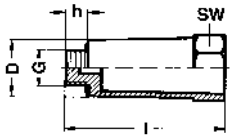
NBR = Perbunan N für Trinkwasser zugelassen nach DVGW- DIN 1988 mit KTW - Empfehlung und mikrobiologischer logischer Zulassung entspr. DVGW Arbeitsblatt W 270.

NBR = Perbunan N approved for potable water acc. DVGW - DIN 1988 with KTW-Recommendation and microbiological approval acc. to DGW W270.

NBR = Perbunan N admìs pour l'eau potable selon DVGW - DIN 1988 avec recommendation KTW et admission microbiologique selon DVGW page W 270.

Abpresszapfen mit Dichtung, PVC
Wall inlet plug with gasket PVC • Bouchon étanche à murer avec plat • Tapón para empotrar con junta
Обжимной шип с уплотнением

9900



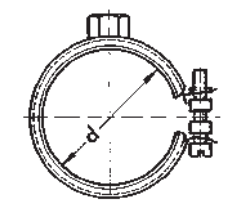
G	D	l	h	SW	Stp.
½	33	87	10	36	10
¾	40	91	14	41	10

9910 Ersatzdichtring
9910 Replacement round gasket • 9910 Joint emplacement

G	O-Ring	Stp.
½	19,4 x 3	10
¾	25 x 3	10

Rohrschelle
Pipe bracket
Collier pour tube
Abrazaderas metalicas
Їомут для Подвески труб

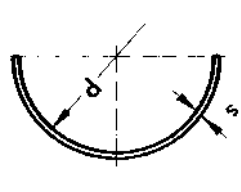
8500



d	Größe/Size	Stp.
16	15 - 18	10
20	20 - 23	10
25	25 - 28	10
32	31 - 35	10
40	40 - 43	10
50	47 - 53	10
63	64 - 67	10
75	75	10
90	90	10
110	110	10
125	125	10
160	160	10
200	200	10
250	250	10
315	315	10

Halbschale, verzinkt, optische Mängel sind durch unsachgemäße Lagerung nicht zu vermeiden
Support semi-tube, galvanized, visual defects cannot be avoided by incorrect storage
Support semi-tube, galvanisé, défauts visuels sont inévitables par stockage incorrect
Soporte galvanizado para tubos, es inevitable defectos ópticos por almacenamiento no apropiado
Полувкладыш, оцинкованный, при неправильном іранении не избежать появление визуальны недостатков

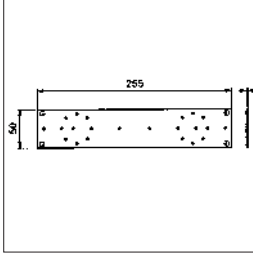
8501



d	s	kg/m	Länge
16 - 25	0,6	0,200	3m
32	0,6	0,255	3m
40	0,6	0,315	3m
50	0,6	0,380	3m
63	0,6	0,500	3m
75	0,6	0,600	3m
90	0,6	0,684	3m
110	0,6	0,783	3m

Montageplatte • Mounting plate • Plaque à montage • Placa de montaje
Монтажная плита для размеров 76, 100, 153, 200 мм

8502



Für Stichmaße:	mm
For depth gauge:	mm
Distance:	mm
	76
	100
	153
	200

Daily practice proved tube cutters and pipe scissors to be the optimum tools for cutting plastic pipes. Both devices make clear rectangular cuts indispensable for professional weld joints. PP-R pipes can easily be cut with these tools.

Pipe cutter, type scissors

8970

d 16 - 40 mm

Pipes of up to 40 mm in diameter can be cut with the plastic-tube scissors. For pipe from 50 mm in diameter on, the pipe cutter has to be used.

Tube-cutter

8975

d 50 - 110 mm

The scraper is used to remove the outer surface oxide layer on the PP-R pipe.
Before welding the pipe with the electrofusion socket (part no. 8271) this layer on the outer surface has to be scraped off within the welding section.

Scraper

8974

The Stabi-Pipes are finished with an aluminium coating on their outer surface.
This aluminium coating has to be scraped off within the welding section before welding the pipe. Each peeling tool is designed for two individual pipe diameters. The peeling tools for diameters from 50 mm on have turning handles.

Peeling tool for tube Stabi-Pipe

8977

d =
16 + 20
20 + 25
32 + 40
50 + 63,
75, 90,
110 mm
125 mm

Spare blade for peeling tool for Stabi-Pipe

8978

Peeling tool

13015

8982

d =16, 20, 25, 32, 40, 50, 63, 75, 90, 110, 125

Welding tool

8983

d = 7, 11 mm

Repairing set

8593

d = 7, 11 mm

Repairing plug for welding of bore wholes (up to 10 mm) part. no. 8983

8984e

d = 40, 50, 63, 75, 90, 110, 125, 160, 200, 250, 315, 355, 400 mm

Welding tool for the welding of saddles

d	d_2
40- 63	x 25
75-125	x 25
75-125	x 32
75-125	x 40
75-125	x 50
75-125	x 63
160-250	x 25
160-250	x 32
160-250	x 40
160-250	x 50
160-250	x 63
315-630	x 25
315-630	x 32
315-630	x 40
315-630	x 50
315-630	x 63

8986a

Chamfering device for removing the aluminium from stabi pipes as preparation for welding saddles

8986b

d = 25, 32, 40, 50, 63 mm

Borer for the installation of welding saddles

8972

Temperature measuring instrument with surface sensor

13010

Clamping tool d 160 – 315 mm

The shown heating element was developed for manual welding. Stationary mounting can be done by a simple fixing device. The heating element diameter up to 63 mm allows welding without problems even under difficult construction site conditions and in slots. At 220 volt the thermostatically controlled heating element has power of 600 watt for coated heating sockets and mandrils from 16 mm to 63 mm in diameter. This device completed by a post and tools is delivered in a metal case.

Heating element for welding by hand

Part. no. 8980, d = 16 – 63 mm

Part. no. 8981, d = 20 – 32 mm

8980/8981

Heating element for welding by hand 125 mm without welding tools

8991

d = bis 125 mm

The socket-welding machine with heating element is suitable for pipes and fittings to 125 mm in diameter. The clamping fixtures are designed to provide both sufficient clamping function and centric positioning. A definite on-axis alignment of the clamped joint parts is guaranteed.
The heating element is thermostatically controlled and has a signal lamp. Its power is 1000 w. at 220 v. The heating sockets and mandrils of 50, 63, 75, 90, 110 and 125 mm are teflonized and easy to mount on the heating element.

Socket-welding machine with heating elements

8988

d = 50 - 125 mm

Butt Welding Machine with Heating Element.
Type SP250 - Part Number 8289/250

The butt welding machine SP250 is suitable
for welding PP-R/PP-RCT pipes and fittings from 90 mm to 250 mm. The welding machine includes the basic machine, the heating element, a hydraulic aggregate as well as an electrical planing tool.

The heating element is coated with Teflon, thermostatically controlled and has an output of 1.500 watt at 220 volt.

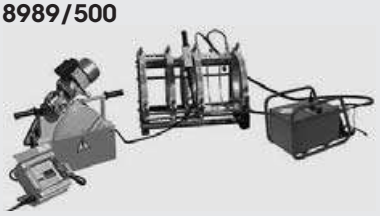
Welding machine for butt welding

Part. no. 8989/250 d = 90 – 250 mm

Part. no. 8989/315 d = 90 – 315 mm

Part. no. 8989/500 d = 200 – 500 mm

8989/250
8989/315
8989/500



Butt Welding Machine with Heating Element.
Type SP315 - Part Number 8989/315

The butt welding machine SP315 is suitable for welding PP-R/PP-RCT pipes and fittings from 90 mm to 315 mm. The welding machine includes the basic machine, the heating element, a hydraulic aggregate as well as an electrical planing tool.

The heating element is coated with Teflon, thermostatically controlled and has an output of 2.500 watt at 220 volt.

Butt Welding Machine with Heating Element.
Type SP500 - Part Number 8989/500

The butt welding machine SP315 is suitable for welding PP-R/PP-RCT pipes and fittings from 200 mm to 500 mm. The welding machine includes the basic machine, the heating element, a hydraulic aggregate as well as an electrical planing tool.

The heating element is coated with Teflon, thermostatically controlled and has an output of 4.050 watt at 220 volt.

Electrofusion machine for electrofusion sockets

8990

Pipes and Fittings of PP-R/PP-RCT for hot and cold water as well as for heating installations

DIN EN ISO 15874	Plastic piping systems for hot and cold water installations Polypropylene (PP)
DIN 8077	Polypropylene (PP) pipes Dimensions
DIN 8078	Polypropylene (PP) pipes General quality requirements
DVGW W 534, W 542 W 544	Pipe joints Compound pipes for drinking water installations Plastic pipes for drinking water installations
DVS 2207 Part 11	Welding of thermoplastic Heated tool welding of pipes, piping parts and panels made of PP
DVS 2208 Part 1	Welding of thermoplastics Machines and devices for heated tool welding of pipes, piping parts and panels
KTW Recommendation	Physiological harmlessness According to the recommendations of the German health authority
VOB Partl C DIN 18381	German construction contract procedures (VOB) – part C: General technical specifications in construction contracts (ATV)- Installation of gas, water and drainage pipework inside buildings
DIN EN 10226 Part 1	Wittworth pipe threads for pipes and fittings Parallel female thread and tapered male thread
DIN 16928	Pipe joints and piping parts installation General regulations

DVGW Zertifizierung *Certification*

GEPRÜFT SKZ WÜRZBURG ÜBERWACHT

Starting at the day of installation of the PP-R / PP-RCT piping system PN 20 we grant a warranty of 10 years. This product liability includes personal and physical damages, installation costs and costs for disassembly up to 30 Mio EURO per damage event. This will be confirmed by issuing the warranty certificate related to the project.

Warranty Certificate No.

Bänninger Kunststoff-Produkte GmbH • Bänningerstr. 1 • D-35447 Reiskirchen/Germany • Phone + 49 640889-0 • Fax + 49 6408 6756

For your security we have covered a product liability insurance with a reputated German insurance company. Compliance with the existing DIN standards, our planning and working instructions as well as professional installation by an approved skilled company are compulsory for any indemnification.

In case of any damage – provided that the damage has verifiably been caused by manufacturing resp. material faults – you will be indemnified up to the below mentioned amounts:

1. **Product liability:** € **30.000.000,--**
   for personal damages and physical damages at buildings and machinery
2. **Costs for installation and disassembly:** € **1.000.000,--** without any consequential charges
3. **Damages caused to the environment:** € **10.000.000,--** caused by products influencing soil, air or water

The warranty starts on the day of installation and will end 10 years after the production date of the installed Bänninger products.

This certificate is valid after the performing company has confirmed the professional installation with their signature and stamp and Bänninger has countersigned it.

Please fill in the warranty certificate after installation has been completed and send it to **Bänninger Kunststoff-Produkte GmbH, Bänningerstrasse 1, 35447 Reiskirchen, Germany.** Bänninger will countersign the certificate and return it to you.

Received at Bänninger

Policy-N°: 13294786-01018113
13294786-01031133

Handled by: Date:

Back to: ☐ Sender ☐ Constructor ☐ Installation Company

Reiskirchen,

Mandatory signature

(No legal right can be derived from this warranty certificate.)

This is to confirm that the used Bänninger products have been installed professionally according to the DIN standards and the planning and working instructions.

Full address

Name of constructor resp. project

Installed material: **PP-R/PP-RCT** ☐ approx. ..... meters of pipe

Installed material: **PE** ☐

Installed material: **PVC-U** ☐

Assigned purpose:
(e.g. residential house, hotel etc.)

Installation has been carried out and completed by us on:

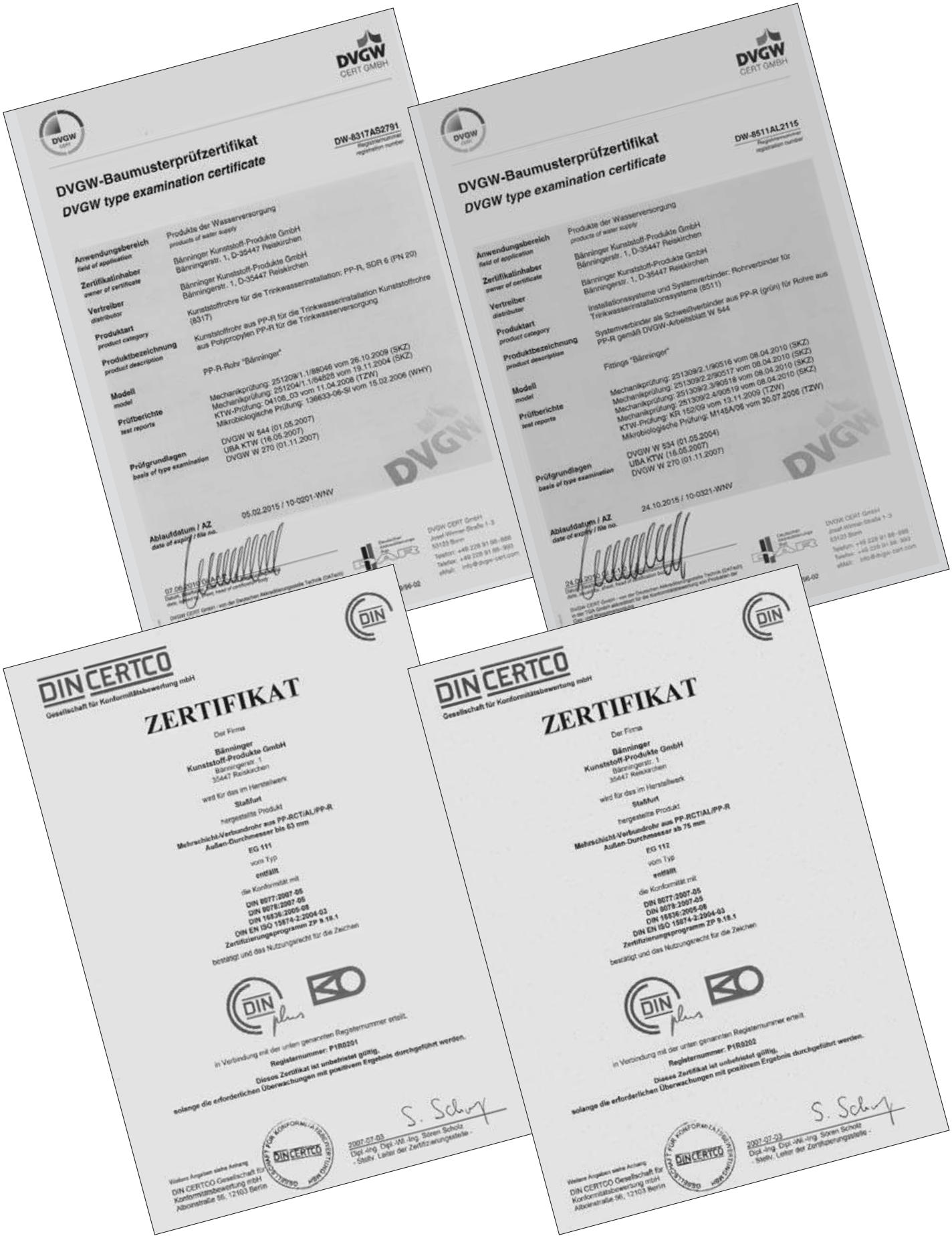
Delivery / commissioning date:

Full address:

Stamp installation company

Mandatory signature

04/12



DVGW CERT GMBH

DVGW-Baumusterprüfzertifikat
DVGW type examination certificate

DW-8317AS2791

Anwendungsbereich: Produkte der Wasserversorgung
Zertifikatinhaber: Bänninger Kunststoff-Produkte GmbH, Bänningerstr. 1, D-35447 Reiskirchen
Vertreiber: Bänninger Kunststoff-Produkte GmbH, Bänningerstr. 1, D-35447 Reiskirchen
Produktart: Kunststoffrohre für die Trinkwasserinstallation; PP-R; SDR 6 (PN 20) (8317)
Produktbezeichnung: Kunststoffrohr aus PP-R für die Trinkwasserinstallation Kunststoffrohre aus Polypropylen PP-R für die Trinkwasserversorgung
Modell: PP-R-Rohr "Bänninger"
Prüfberichte: Mechanikprüfung: 251209/1.1/88046 vom 26.10.2009 (SKZ)
Mechanikprüfung: 251204/1.1/84828 vom 19.11.2004 (SKZ)
KTW-Prüfung: 04108_03 vom 11.04.2008 (TZW)
Mikrobiologische Prüfung: 136633-06-SI vom 15.02.2006 (WHY)
Prüfgrundlagen: DVGW W 544 (01.05.2007)
UBA KTW (16.05.2007)
DVGW W 270 (01.11.2007)

Ablaufdatum / AZ: 05.02.2015 / 10-0201-WNV

DVGW CERT GMBH
Josef-Wirmer-Straße 1-3
53123 Bonn
Telefon: +49 228 91 88- 888
Telefax: +49 228 91 88- 993
eMail: info@dvgw-cert.com

DVGW CERT GMBH

DVGW-Baumusterprüfzertifikat
DVGW type examination certificate

DW-8511AL2115

Anwendungsbereich: Produkte der Wasserversorgung
Zertifikatinhaber: Bänninger Kunststoff-Produkte GmbH, Bänningerstr. 1, D-35447 Reiskirchen
Vertreiber: Bänninger Kunststoff-Produkte GmbH, Bänningerstr. 1, D-35447 Reiskirchen
Produktart: Installationssysteme und Systemverbinder: Rohrverbinder für Trinkwasserinstallationssysteme (8511)
Produktbezeichnung: Systemverbinder als Schweißverbinder aus PP-R (grün) für Rohre aus PP-R gemäß DVGW-Arbeitsblatt W 544
Modell: Fittings "Bänninger"
Prüfberichte: Mechanikprüfung: 251309/2.1/90516 vom 08.04.2010 (SKZ)
Mechanikprüfung: 251309/2.2/90517 vom 08.04.2010 (SKZ)
Mechanikprüfung: 251309/2.3/90518 vom 08.04.2010 (SKZ)
Mechanikprüfung: 251309/2.4/90519 vom 13.11.2009 (TZW)
KTW-Prüfung: KR 152/09 vom 13.11.2009 (TZW)
Mikrobiologische Prüfung: M145A/06 vom 30.07.2006 (TZW)
Prüfgrundlagen: DVGW W 534 (01.05.2004)
UBA KTW (16.05.2007)
DVGW W 270 (01.11.2007)

Ablaufdatum / AZ: 24.10.2015 / 10-0321-WNV

DVGW CERT GMBH
Josef-Wirmer-Straße 1-3
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Telefax: +49 228 91 88- 993
eMail: info@dvgw-cert.com

DIN CERTCO
Gesellschaft für Konformitätsbewertung mbH

ZERTIFIKAT

Der Firma
Bänninger Kunststoff-Produkte GmbH
Bänningerstr. 1
35447 Reiskirchen
wird für das im Herstellwerk
Staffurt
hergestellte Produkt
Mehrschicht-Verbundrohr aus PP-RCT/AL/PP-R
Außen-Durchmesser bis 63 mm
EG 111
vom Typ
entsäuert
die Konformität mit
DIN 8077:2007-05
DIN 8078:2007-05
DIN 16836:2005-08
DIN EN ISO 15874-2:2004-03
Zertifizierungsprogramm ZP 9.18.1
bestätigt und das Nutzungsrecht für die Zeichen

in Verbindung mit der unten genannten Registernummer erteilt.
Registernummer: P1R0201
Dieses Zertifikat ist unbefristet gültig,
solange die erforderlichen Überwachungen mit positivem Ergebnis durchgeführt werden.

Weitere Angaben siehe Anhang
DIN CERTCO Gesellschaft für Konformitätsbewertung mbH
Alboinstraße 56, 12103 Berlin

2007-07-03
Dipl.-Ing. Dipl.-Wi.-Ing. Sören Scholz
- Stellv. Leiter der Zertifizierungsstelle -

DIN CERTCO
Gesellschaft für Konformitätsbewertung mbH

ZERTIFIKAT

Der Firma
Bänninger Kunststoff-Produkte GmbH
Bänningerstr. 1
35447 Reiskirchen
wird für das im Herstellwerk
Staffurt
hergestellte Produkt
Mehrschicht-Verbundrohr aus PP-RCT/AL/PP-R
Außen-Durchmesser ab 75 mm
EG 112
vom Typ
entsäuert
die Konformität mit
DIN 8077:2007-05
DIN 8078:2007-05
DIN 16836:2005-08
DIN EN ISO 15874-2:2004-03
Zertifizierungsprogramm ZP 9.18.1
bestätigt und das Nutzungsrecht für die Zeichen

in Verbindung mit der unten genannten Registernummer erteilt.
Registernummer: P1R0202
Dieses Zertifikat ist unbefristet gültig,
solange die erforderlichen Überwachungen mit positivem Ergebnis durchgeführt werden.

Weitere Angaben siehe Anhang
DIN CERTCO Gesellschaft für Konformitätsbewertung mbH
Alboinstraße 56, 12103 Berlin

2007-07-03
Dipl.-Ing. Dipl.-Wi.-Ing. Sören Scholz
- Stellv. Leiter der Zertifizierungsstelle -


ÉPÍTÉSÜGYI MINŐSÉGELLENŐRZŐ INTÉZET

ÉPÍTŐIPARI ALKALMASSÁGI BIZONYÍTVÁNY

BÁNNINGER

ÉPÍTŐIPARI FELHASZNÁLÁSÁRA


APROBATA TECHNICZNA


МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

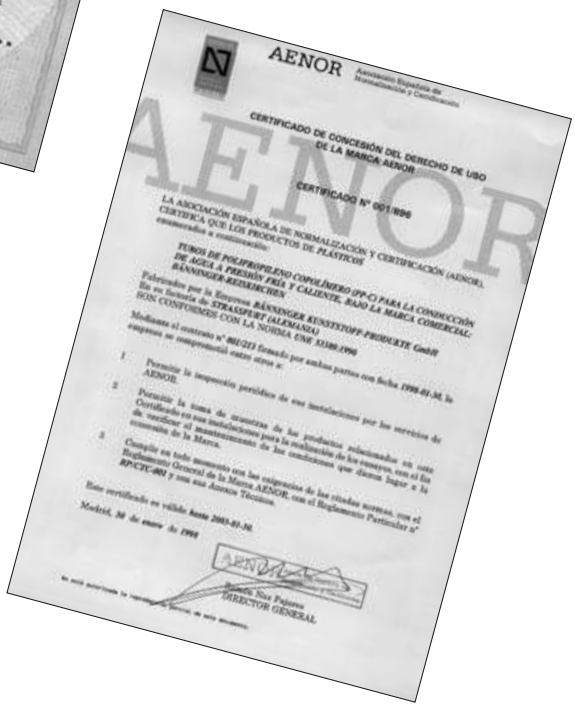
ДЕПАРТАМЕНТ ГОСУДАРСТВЕННОГО САНИТАРНО-ЭПИДЕМИОЛОГИЧЕСКОГО НАДЗОРА

СЕРТИФИКАТ

126134

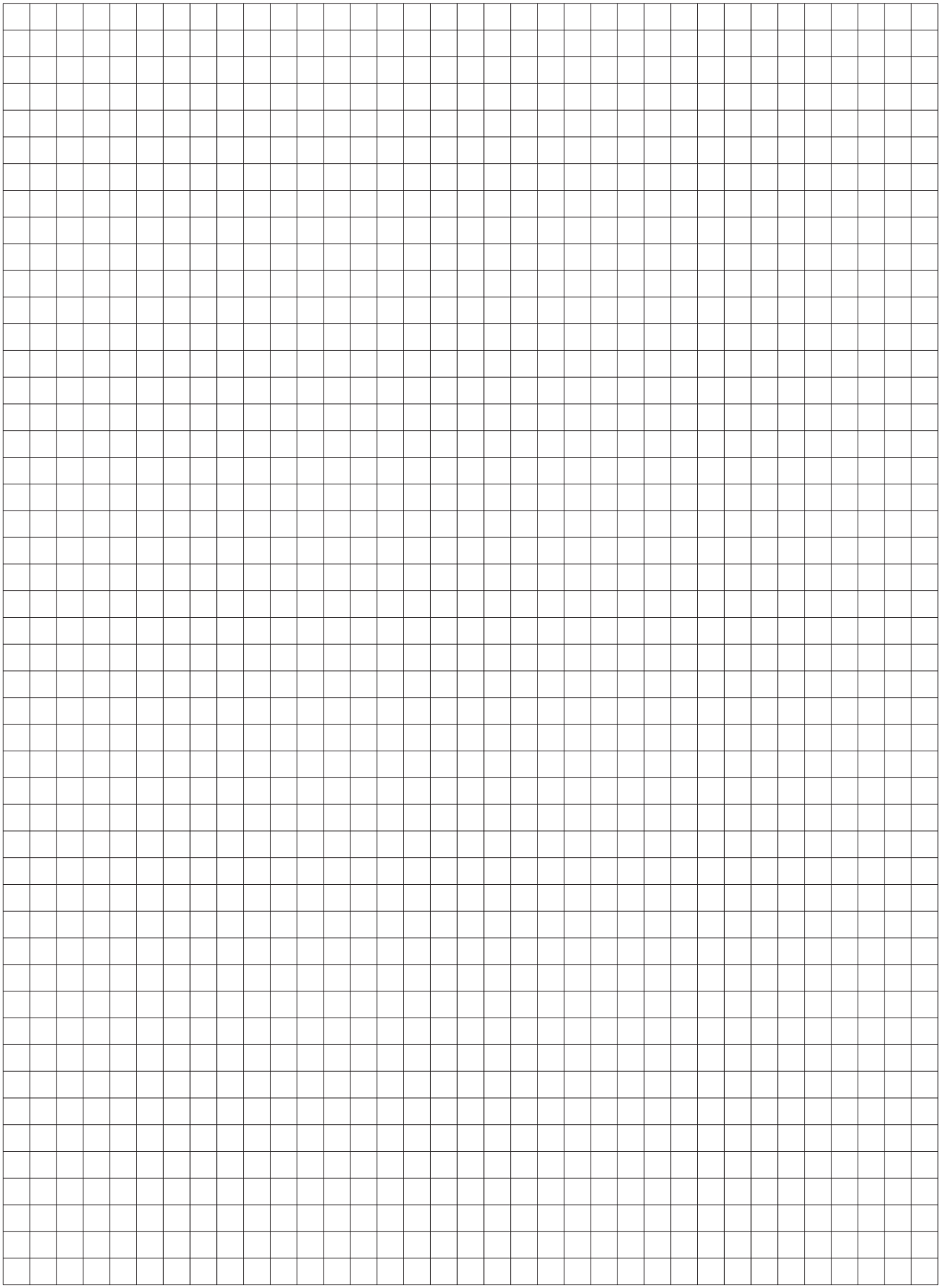

BESTÄTIGUNG DER REGISTRIERUNG

gemäß § 3 (2) Normengesetz 1971


AENOR

CERTIFICADO DE CONCESIÓN DEL DERECHO DE USO DE LA MARCA AENOR

CERTIFICADO Nº 001/896



Index

Material:
PP-R (Polypropylene Random-Copolymerisate) of high molecular weight and stabilized to high temperature. The material corresponds to KTW-recommendation of the German Board of Health.

Jointing:
Welding joints
Socket-welding by heating-elements according to DVS (German Welding Inst.) specifications: leaflet 2207, part 11, section 3.2.
Tools and devices for socket-welding by heating-elements according to DVS leaflet 2208, part 1, section 5, schedule 2, type A.

Threaded joints:
The threaded joint of adaptor pipe-fittings correspond to the requirements of DIN EN 10226 Part 1 resp. ISO 7, i. e. cylindrical female thread, conical male thread.
Male threads for connecting backnuts correspond to the requirements of DIN-ISO 228, part 1.

Dimensions:
Pipes: According to DIN 8077 (Pipes of polypropylene PP).
Fittings: According to DIN EN ISO 15874, (Pipe connections and fittings for polypropylene PP) injection moulded fittings, z-dimensions tolerance ± 3 mm, we reserve the right to modify dimensions without previous notice.

Quality:
Pipes: according to DIN 8078 for PP-R (polypropylene PP pipes).
General quality standards, test.
Fittings: according to DIN EN ISO 15874
(Pipe connections and fittings for polypropylene PP pressure pipeline.)
General quality standards, test.

Operating pressure:
For cold water at 20° C: up to 20 bar[1.)]
for hot water at 70° C: up to 10 bar[1.)]
for heating at 70° C: up to 3 bar.
The regulations and guide-lines-dealing with the different fields of application are to be observed.

Chemical Resistance:
Detailed information on the chemical resistance of polypropylene pipes and pipelines is available in annex 1 to DIN 8078. Please note the explanations on page 1 of annex.

Orders:
When ordering, kindly always state the dimensions and the order number in addition to the designation of the piece required.
Example: Elbow 90°, d 32, No. 8090

Marking:
The fittings are marked as follows:
Example: B·R, d, PP-R, P

Signs and Symbols:
d =nominal size = pipe diameter
R =male thread-conical
Rp =female thread-cylindric
Rc =female thread-conical
G =male thread-cylindric
Stp=standard packing
® =registered trade mark
AL =number of screw holes

Utilization
The system of tubing of PP-R, as described in this catalogue, has primarly been developped for application in the sanitary field for cold and hot water.

This system can be applied as well in the industrial section.

Tubes and fittings are dimensioned in a way to assure, according to actual results of long-term tests a utilisation of at least 50 years, based on max. 10 bar and a constant temperature of 70 degrees Celsius.

For hot water piping, made according to DIN 1988, the tube row 6 (PN 20) according to DIN 8077 is valid, for dimensions according to table 1.

Tubes are available in lenghts of 4 m.

Plastic pipes and fittings of PP-R generally have all advantages which have been registered in all sections of industry and of installation technics. Most of all the excellent resistance of corrosion gives proof of an extensively long utilization of installation tubing in the building technic, without risk of damages known from metallic materials.
Therefore PP-R as installation-material represents an excellent choice for piping of cold and hot water.

Properties	Measuring technique	Unit	PP - R Value	PP - RCT Value
Melting index MFR 190/5 MFR 230/2,16	ISO / R 1133	 g/10 min. g/10 min.	 0,5 0,24 – 0,36	 0,5 0,24 – 0,36
Density	ISO / R 1183	g/cm³	0,895	0,905
Melting range	polarizing microscope	0°C 0°F	140 – 150 289 – 302	140 – 150 284 – 302
Yield stress Tensile strength Tensile expansion	ISO / R 527 feed speed Test bar	N/mm² N/mm² %	21 40 600	25 45 300
Bending stress at 3,5% Marginal fibre expansion	ISO 178 test specimen 5.1	N/mm²	20	23
Modulus of elasticity	ISO 178	N/mm²	800	900
Mechanical properties following impact bending test at 0° C	DIN 8078		no fracture	no fracture
Expansion coefficient	VDE 0304 Part 1 § 4	K^{-1}	1,5 x 10^{-4}	1,5 x 10^{-4}
Thermal conductivity at 20° C/58° F	DIN 52612	W/m K	0,24	0,24
Specific heat at 20° C68° F	adiabatic calorimeter	kJ/kg K	2,0	2,0
Pipe friction factor	––		0,007	0,007

	Conc. %	TEMPERATURE 20°C	60°C	100°C
Acetone	TR	+	+	
Alum	GL	+	+	
Alum of all kinds, hydr.	all	+	+	
Formic acid		+	•	
	85	+	•	–
	10	+	+	•
Ammonia, gaseous	TR	+	+	
Ammonia, hydr.	conc.	+	+	
Ammoniumacetate	GL	+	+	
Ammonium carbonate	GL	+	+	
Ammonium cloride	GL	+	+	
Ammonium nitrate	GL	+	+	+
Ammonium phosphate	GL	+	+	+
Ammonium sulphate	GL	+	+	+
Amylalcohol, pure	TR	+	+	+
Aniline	TR	•	•	
Apple juice	H	+	+	+
Batterie acid		+	+	
Barium salts	GL	+	+	+
Benzaldehyde	GL	+	+	
Benzine	H	•	–	–
Benzoic acid	GL	+	+	
Benzene	TR	•	–	–
Succinic acid, hydr.	GL	+	+	
Beer	H	+	+	+
Bleaching solution	20	•	•	–
Borax	L	+	+	
Boric acid	GL	+	+	+
Bromine, liquid	TR	–	–	–
Bromine, vapours	all	•	–	–
Bromine water	GL	•	–	–
Butane gas	TR	+	+	
Butyl acetate				
Calcium cloride	GL	+	+	+
Calcium nitrate	GL	+	+	
Corn oil	TR	+	•	
Chlor, liquid	TR	–	–	–
Chlorine, gaseous wet	1	–	–	–
Chlorobenzene	TR	•		
Chloride of lime	all	+	+	
Chloroform	TR	•	–	–
Chlorosulphonic acid	TR	–	–	–
Chlorine water	GL	•	–	–
Hydrogen chloride, gaseous	TR	+	+	
Chromic sulphuric acid		–	–	–
Cyclohexane	TR	+		
Cyclohexanol	TR	+	•	
Cyclohexanone	TR	•	–	–
Dekahydronaphtaline	TR	•	–	–
Dibutyl phthalate	TR	•	–	–
Diesel oil	H	+	•	
Diethylether	TR	+	•	
1,4-Dioxane	TR	•	•	
Peanut oil	TR	+	+	
Vinegar	H	+	+	+
Acetic acid (glacial acetic acid)	TR	+	•	–
Acetic acid, hydr.	50	+	+	•
Acetic acid anhydride	TR	+		

	Conc. %	TEMPERATURE 20°C	60°C	100°C
Ethyl acetate	TR	+	•	–
Butyl acetate	TR	•	–	–
Ether				
Ethyl benzene	TR	•	–	–
Ethyl chloride	TR	–	–	–
Pine needle oil	H	+	•	
Hydrofluoric acid solution	40	+	+	
Formaldehyde, hydr.	40	+	+	
Antifreezing solution (motor vehicles)	H	+	+	+
Fruit juices	H	+	+	+
Glycerine	TR	+	+	+
Urea, hydr.	GL	+	+	
Fuel oil	H	+	•	
Heptane	TR	+	•	–
Hexane	TR	+	•	
Iso-octane	TR	+	•	–
Jodine salution	H	+	•	
Caustic potash solution (potassium hydroxide)	50	+	+	+
Potassium carbonate (Potash)	GL	+	+	
Potassium chlorate	GL	+	+	
Potassium chloride	GL	+	+	
Bichromate of potash	GL	+	+	
Potassium iodide	GL	+	+	
Potassium nitrate, hydr.	GL	+	+	
Potassium permanganate	GL	+	–	
Potassium persulphate	GL	+	+	
Coconut oil	TR	+		
Cresol	90	+	+	
LANOLIN®	H	+	•	
Linseed oil	H	+	+	+
Lactic acid	90	+	+	
Magnesium salts	GL	+	+	
Menthol	TR	+	•	
Methanol	TR	+	+	
Methylene chloride	TR	•	–	–
Methyl ethyl ketone	TR	+	•	
Milk	H	+	+	+
Motor oil (motor vehicles)	TR	+	•	
Nickle salts, hydr.	GL	+	+	
Sodium carbonate	50	+	+	•
Sodium chlorate	GL	+	+	
Sodium chloride	VL	+	+	+
Sodium chlorite, hydr.	2 – 20	+	•	–
Sodium hydrochlorite, hyd.	10	+		
Sodium nitrate	GL	+	+	
Sodium nitrite	G	+	+	
Sodium phosphate	GL	+	+	+
Sodium sulphate	GL	+	+	
Sodium sulphide	GL	+	+	
Sodium sulphite	40	+	+	+
Sodium thiosulphate	GL	+	+	
Caustic soda solution	up to 60	+	+	+

Chemical resistance

	Conc. %	TEMPERATURE 20°C	60°C	100°C
Oleum	TR	–	–	–
Olive oil	TR	+	+	•
Oleic acid	GL	+	•	–
Oxalic	GL	+	+	•
Ozone	0,5 ppm	+	•	
Paraffin	H	+	+	
Paraffin oil	TR	+	•	–
Perchlorethylene				
Petroleum ether	TR	+	•	
Petroleum	TR	+	•	
Peppermint oil	TR	+		
Phenol (hydr. phase)	5	+	+	
Phosphoric acid	85	+	+	+
Photographic developer	H	+	+	
Propane, gaseous	TR	+	•	
Pyridine	TR	•	•	
Mercury	TR	+	+	
Mercury salts	GL	+	+	
Castor oil	TR	+	+	
Nitric acid, hydr.	10	+	•	–
Hydrochloric acid, hydr.	up to 20	+	+	
	20 – 36	+	•	
Sulphur dioxide	TR	+	+	
Carbonum disulphide	TR	–	–	–
Sulphuric acid, hydr.	80-TR	•	–	
	10 – 80	+	+	
	10	+	+	+
Hydrogen sulphide	TR	+	+	
Sea water	H	+	+	+
Silver salts	GL	+	+	
Silicone oil	TR	+	+	+
Sodium carbonate (soda)	50	+	+	•
Soybean oil	TR	+	•	
Starch solution, hydr.	all	+	+	
Turpentine oil	TR	–	–	–
Turpentine substitute	TR	+	•	–
Tetrachloroethane	TR	•	–	–
Tetrachloroethylene (Perchlorethylen)	TR	•	•	
Carbon Tetrachloride	TR	–	–	–
Tetrahydrofurane	TR	•	–	–
Tetrahydronaphtalene (Tetralin)	TR	–	–	–
Toluene	TR	•	–	–
Transformer oil	TR	•	–	
Trichloroethylene	TR	–	–	–
Petroleum jelly	TR	+	•	
Detergent	VL	+	+	
Water	H	+	+	+
Hydrogen peroxide, hydr.	30	+	•	
Tricresyl phosphate	TR	+	•	
Trioctyl phosphate	TR	+		
Wine	H	+	+	
Tartaric acid, hydr.	10	+	+	

	Conc. %	TEMPERATURE 20°C	60°C	100°C
Xylene	TR	•	–	–
Zinc salts, hydr.	GL	+	+	
Stannous chloride	GL	+	+	
Citric acid, hydr.	VL	+	+	+
Sugar sirup	H	+	+	

Signs and symbols:

VL = moderate loosening, mass-part ≤ 10%

L = moderate loosening, mass-part > 10%

GL = Saturated (with 20°C), hydrous solution

TR = medium rate flow is minimum-technical pure

H = usual in trade composition

\+ = resistant

• = limited resistant

– = inconstant

Application areas for fittings and pipes made of PP-R and PP-RCT according to DIN 8077

Cold water pipelines:
Continuous operation temperature up to 20°C
Continuous operation pressure up to 20 bar

Warm water pipelines:
Continuous operation temperature up to 70°C
Continuous operation pressure up to 10 bar

Heating pipelines:
Continuous operation temperature up to 70°C
Continuous operation pressure up to 3 bar
(Installation pressure according to DIN EN 12828)

		Operating years					
		1	5	10	25	50	100
	Temperature °C	Max. Operating pressure (bar) according to DIN 8077					
Field of application: Drinking water and sanitary installation							
G 8160 B **PP-RCT Pressure Pipe** 20° C/1,6 MPa, 60° C/0,8 MPa	20	16,6	16,0	15,8	15,5	15,3	15,1
	40	12,3	11,9	11,7	11,5	11,3	11,1
	60	8,9	8,6	8,4	8,2	8,1	–
	70	7,5	7,2	7,0	6,9	6,8	–
	80	6,2	6,0	5,9	5,7	–	–
	95	4,7	4,4	4,3	–	–	–
G 8200 B **PP-RCT Pressure Pipe** 20° C/2,0 MPa, 70° C/1,0 MPa	20	26,3	25,4	25,1	24,6	24,3	24,0
	40	19,6	18,9	18,6	18,2	17,9	17,6
	60	14,2	13,6	13,4	13,1	12,8	–
	70	11,9	11,4	11,2	10,9	10,7	–
	80	9,9	9,5	9,3	9,1	–	–
	95	7,4	7,1	6,9	–	–	–
G 8200 **PP-R Pressure Pipe** 20° C/2,0 MPa, 70° C/1,0 MPa	20	29,9	28,1	27,4	26,4	25,7	25,0
	40	21,6	20,2	19,6	18,8	18,3	17,8
	60	15,4	14,3	13,9	13,3	12,9	–
	70	12,9	12,0	11,6	10,0	8,5	–
	80	10,8	9,6	8,1	6,5	–	–
	95	7,6	5,2	4,3	–	–	–
G 8215 B **PP-RCT Stabi composite pipe** 20° C/2,0 MPa, 70° C/1,0 MPa	20	25,0	24,2	23,9	23,5	23,1	22,8
	40	18,6	18,0	17,7	17,3	17,1	16,8
	60	13,5	13,0	12,7	12,4	12,2	–
	70	11,3	10,9	10,7	10,4	10,2	–
	80	9,5	9,0	8,9	8,6	–	–
	95	7,1	6,7	6,6	–	–	–

Application areas for fittings and pipes made of PP-R and PP-RCT according to DIN 8077

Cold water pipelines:
Continuous operation temperature up to 20°C
Continuous operation pressure up to 20 bar

Warm water pipelines:
Continuous operation temperature up to 70°C
Continuous operation pressure up to 10 bar

Heating pipelines:
Continuous operation temperature up to 70°C
Continuous operation pressure up to 3 bar
(Installation pressure according to DIN EN 12828)

Field of application: Drinking water and sanitary installation

	Operating years					
	1	5	10	25	50	100
Temperature °C	Max. Operating pressure (bar) according to DIN 8077					
G 8200 FW **PP-RCT Fiber composite pipe Watertec** 20° C/2,0 MPa, 70° C/1,0 MPa						
20	25,0	24,2	23,9	23,5	23,1	22,8
40	18,6	18,0	17,7	17,3	17,1	16,8
60	13,5	13,0	12,7	12,4	12,2	–
70	11,3	10,9	10,7	10,4	10,2	–
80	9,5	9,0	8,9	8,6	–	–
95	7,1	6,7	6,6	–	–	–
G 8200 FW **PP-RCT Fiber composite pipe Watertec** 20° C/1,6 MPa, 70° C/0,8 MPa						
20	19,9	19,3	19,0	18,6	18,4	18,1
40	14,8	14,3	14,1	13,8	13,6	13,3
60	10,7	10,3	10,1	9,9	9,7	–
70	9,0	8,6	8,5	8,3	8,1	–
80	7,5	7,2	7,0	6,9	–	–
95	5,6	5,3	5,2	–	–	–

Field of application: Air conditioning, Industrial plants, Drinking water and sanitary installation

G 8160 FC **PP-RCT Fiber composite pipe Climatec** 20° C/1,6 MPa, 70° C/0,8 MPa						
20	19,9	19,3	19,0	18,6	18,4	18,1
40	14,8	14,3	14,1	13,8	13,6	13,3
60	10,7	10,3	10,1	9,9	9,7	–
70	9,0	8,6	8,5	8,3	8,1	–
80	7,5	7,2	7,0	6,9	–	–
95	5,6	5,3	5,2	–	–	–
G 8160 FC **PP-RCT Fiber composite pipe Climatec** 20° C/1,0 MPa, 70° C/0,5 MPa						
20	12,5	12,1	12,0	11,7	11,6	11,4
40	9,3	9,0	8,8	8,7	8,5	8,4
60	6,7	6,5	6,4	6,2	6,1	–
70	5,7	5,4	5,3	5,2	5,1	–
80	4,7	4,5	4,4	4,3	–	–
95	3,5	3,3	3,3	–	–	–

Classification of operating conditions according to DIN EN ISO 15874-1

The selection of a particular application class according to the following table should be agreed among the contracting parties.
For each application class allowable operating pressure p_D of 4 bar[2)], 6 bar, 8 bar or 10 bar applies, depending on the application.

Application class	Calculation-temperature T_D °C	Service life[b] at T_D Years	T_{max} °C	Service life at T_{max} Year(s)	T_{mal} °C	Service life at T_{mal} h	Typical application area	PP-R pipe system SDR 6	PP-RCT pipe system SDR 7,4
1[a]	60	49	80	1	95	100	Warm water supply (60°C)	10 bar	10 bar
2[a]	70	49	80	1	95	100	Warm water supply (70°C)	8 bar	10 bar
4[b]	20 2,5 Followed by 40 20 Followed by 60 25 Followed by (see next column)		70	2,5 Followed by (see next column)	100	100	Floor heating and Low temperatur radiator connections	10 bar	10 bar
5[b]	20 14 Followed by 60 25 Followed by 80 10 Followed by (see next column)		90	1 Followed by (see next column)	100	100	High temperature radiator connections	6 bar	8 bar

[a] Pertinent to the national regulations either application class 1 or application class 2 may be selected.
[b] If there is more than one operational temperature for one application area, the corresponding sevice life time should be summed (for example the temperature collective for class 5 for a period of 50 years consists of:

- 20°C over 14 years followed by
- 60°C over 25 years followed by
- 80°C over 10 years followed by
- 90°C over 1 year followed by
- 100°C over 100 h)

Explanation:
The column **T_{mal}** gives the highest allowed temperature (for example at disruption of the controlling), max 100° C
The column **Service life at T_{mal}** shows that this breakdown temperature allows a max period of 100 h (over 50 years) whereas single breakdown segments should not exceed 3 hours.

REMARK:
This norm does not apply when higher values are assigned to T_D, T_{max} and T_{mal} than those quoted on the table.

2) 1 bar = 10^5 N/m² = 0,1 MPa

Allowed operating pressures
for warm and hot water pipelines made of PP-R and PP-RCT

			PP-R	PP-RCT		
Time-Temperature collective	Tempe-rature	Operating period (Years)	Allowed operating pressures • Nominal pressure			
			SDR 6[1] (bar)	SDR 7,4 (bar)	SDR 9 (bar)	SDR11 (bar)
Continuous temperature 70°C including **30 days per year with** ➔	75°C	5	14,12	13,30	10,50	8,40
		10	13,66	13,00	10,30	8,20
		25	11,69	12,70	10,10	8,00
		45	10,13	12,50	9,90	7,90
	80°C	5	13,80	12,20	9,70	7,70
		10	13,36	12,00	9,50	7,50
		25	11,04	11,70	9,30	7,30
		42,5	9,70	11,50	9,10	7,20
	85°C	5	13,28	11,10	8,80	7,00
		10	12,53	10,90	8,70	6,90
		25	10,03	10,60	8,40	6,70
		37,5	9,09	10,50	8,30	6,60
	90°C	5	12,57	10,10	8,00	6,40
		10	10,94	9,90	7,90	6,20
		25	8,76	9,60	7,60	6,10
		35	8,07	9,50	7,60	6,00
Continuous temperature 70°C including **60 days per year with** ➔	75°C	5	14,06	13,10	10,40	8,20
		10	13,32	12,80	10,20	8,10
		25	11,30	12,50	9,90	7,90
		45	9,83	12,30	9,80	7,80
	80°C	5	13,09	12,00	9,50	7,50
		10	12,44	11,70	9,30	7,40
		25	10,52	11,50	9,10	7,20
		40	9,31	11,30	9,00	7,10
	85°C	5	11,96	10,90	8,70	6,90
		10	11,33	10,40	8,30	6,60
		25	9,04	10,40	8,30	6,60
		35	8,32	10,30	8,20	6,50
	90°C	5	10,79	9,90	7,90	6,20
		10	9,66	9,70	7,70	6,10
		25	7,71	9,40	7,50	5,90
		30	7,39	9,40	7,40	5,90
Continuous temperature 70°C including **90 days per year with** ➔	75°C	5	13,85	13,00	10,30	8,20
		10	13,40	12,70	10,10	8,00
		25	11,13	12,40	9,80	7,80
		45	9,65	12,20	9,70	7.70
	80°C	5	13,19	11,80	9,40	7,50
		10	12,32	11,60	9,20	7,30
		25	8,86	11,30	9,00	7,10
		37,5	8,94	11,20	8,90	7,00
	85°C	5	12,36	10,80	8,60	6,80
		10	10,52	10,60	8,40	6,60
		25	8,42	10,30	8,20	6,50
		32,5	7,90	10,20	8,10	6,40
	90°C	5	10,40	9,80	7,80	6,20
		10	8,79	9,60	7,60	6,00
		25	7,03	9,30	7,40	5,90

[1] SDR = Standard Dimension Ratio = diameter / wall thickness

Allowed operating pressures
for warm and hot water pipelines made of PP-R and PP-RCT

			PP-R	PP-RCT		
Time-Temperature collective	Tempe-rature	Operating period (Years)	Allowed operating pressures • Nominal pressure			
			SDR 6[1)] (bar)	SDR 7,4 (bar)	SDR 9 (bar)	SDR11 (bar)
Continuous temperature 70°C including **120 days per year with** ➔	75°C	5		12,90	10,20	8,10
		10		12,60	10,00	7,90
		25		12,30	9,70	7,70
		45		12,10	9,60	7,60
	80°C	5		11,70	9,30	7,40
		10		11,50	9,10	7,20
		25		11,20	8,90	7,10
		35		11,10	8,80	7,00
	85°C	5		10,70	8,50	6,70
		10		10,50	8,30	6,60
		25		10,20	8,10	6,40
		30		10,10	8,00	6,40
	90°C	5		9,70	7,70	6,10
		10		9,50	7,50	6,00
		25		9,20	7,30	5,80
Continuous temperature 70°C including **150 days per year with** ➔	75°C	5		12,80	10,10	8,00
		10		12,50	10,00	7,90
		25		12,20	9,70	7,70
		40		12,10	9,60	7,60
	80°C	5		11,70	9,30	7,30
		10		11,40	9,10	7,20
		25		11,20	8,90	7,00
		35		11,10	8,80	7,00
	85°C	5		10,60	8,40	6,70
		10		10,40	8,20	6,50
		25		10,10	8,00	6,40
	90°C	5		9,60	7,60	6,00
		10		9,40	7,50	5,90
		20		9,30	7,30	5,80

Allowed operating pressures
for warm and hot water pipelines made of PP-R and PP-RCT

			PP-R	PP-RCT		
Time-Temperature collective	Tempe-rature	Operating period (Years)	Allowed operating pressures • Nominal pressure			
			SDR 6[1] (bar)	SDR 7,4 (bar)	SDR 9 (bar)	SDR11 (bar)
Continuous temperature 70°C including **180 days per year with** ➔	75°C	5		12,70	10,10	8,00
		10		12,50	9,90	7,90
		25		12,20	9,70	7,70
		45		12,00	9,50	7,60
	80°C	5		11,60	9,20	7,30
		10		11,40	9,00	7,20
		25		11,10	8,80	7,00
		30		11,00	8,80	6,90
	85°C	5		10,50	8,40	6,60
		10		10,30	8,20	6,50
		25		10,10	8,00	6,30
	90°C	5		9,60	7,60	6,00
		10		9,40	7,40	5,90
		18		9,20	7,30	5,80
Continuous temperature 70°C including **210 days per year with** ➔	75°C	5		12,70	10,10	8,00
		10		12,40	9,90	7,80
		25		12,10	9,60	7,60
		40		12,00	9,50	7,50
	80°C	5		11,60	9,20	7,30
		10		11,30	9,00	7,10
		25		11,10	8,80	7,00
		30		11,00	8,70	6,90
	85°C	5		10,50	8,30	6,60
		10		10,30	8,20	6,50
		25		10,00	8,00	6,30
	90°C	5		9,50	7,60	6,00
		10		9,30	7,40	5,90
		15		9,20	7,30	5,80

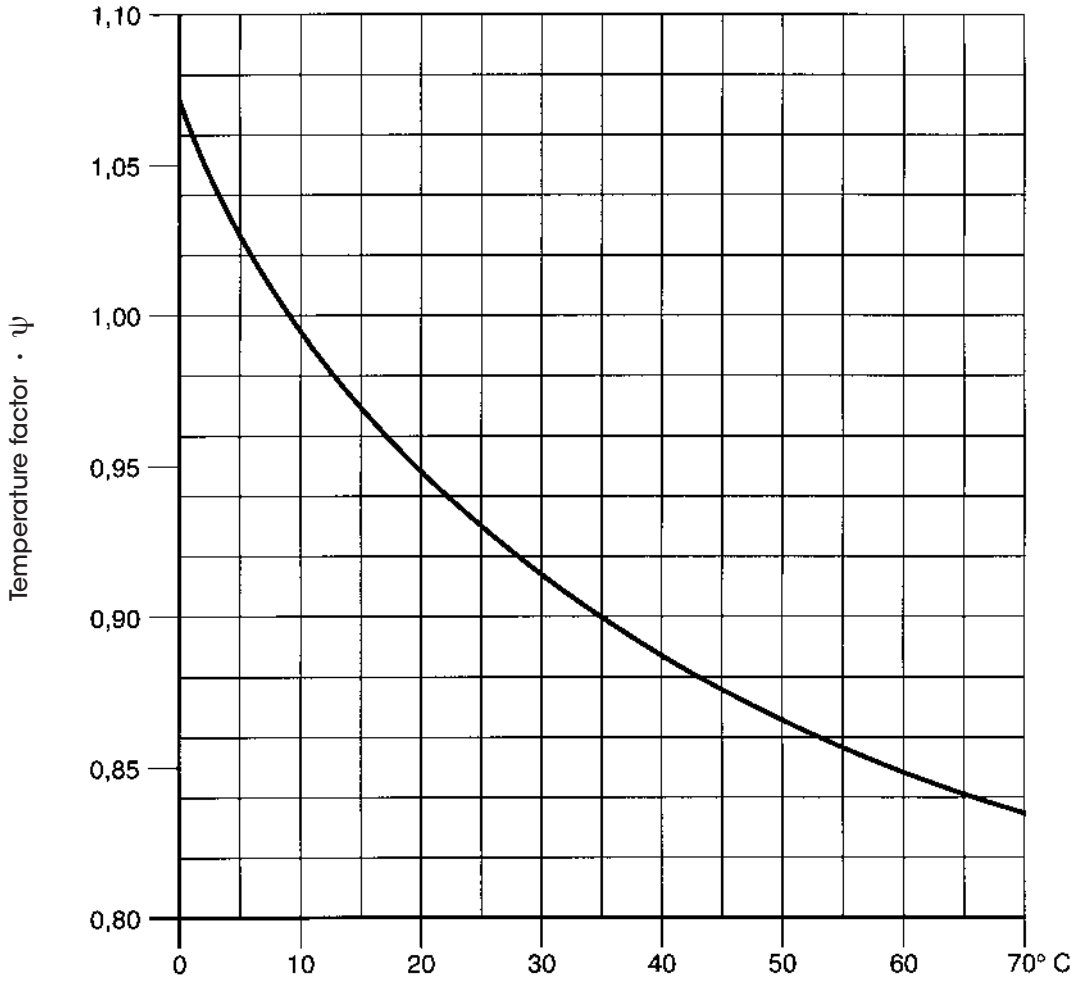


Fig. 2: Temperature of the flow medium

For the individual fitting resistance values given in the chart below (fig. 3) can be applied by approximation.
The individual joint resistance values can be determined altogether.
As a standard value add an extra of 3% to 5% to the overall pressure drop.

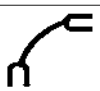
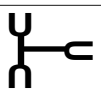
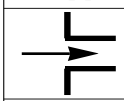
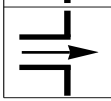
Outside pipe diameter d mm	16 20 25	32 40	50 63	63
Fitting Type	Drag coefficient			
	1,5	1,0	0,6	0,5
	2,0	1,7	1,1	0,8
	0,3			
	1,5			
 Stream in	0,5			
 Stream out	1,0			

Fig. 3: Pressure drop in fittings

Reference values for the minimum flow pressures and calculated flows for generally used drinking water service points

Minimum flow pressure $P_{min\ Fl}$ bar	Type of drinking water service points		Calculated flow for outlet of: Mixed water – Volume flow cold l/s	Mixed water – Volume flow hot l/s	Either cold or hot water – Volume flow l/s
	outlet valve				
0.5	without air whirler	DN 15	–	–	0.30
0.5		DN 20	–	–	0.50
0.5		DN 25	–	–	1.00
1.0	with air whirler	DN 10	–	–	0.15
1.0		DN 15	–	–	0.15
1.0	shower heads for clinsing showers	DN 15	0.10	0.10	0.20
1.2	Pressure rinser in acc.to DIN 3265 part 1	DN 15	–	–	0.70
1.2	Pressure rinser in acc.to DIN 3265 part 1	DN 20	–	–	1.00
0.4	Pressure rinser in acc.to DIN 3265 part 1	DN 25	–	–	1.00
1.0	Pressure rinser for urinals	DN 15	–	–	0.30
0.5	corner valve for urinals	DN 15	–	–	0.30
1.0	household dishwasher	DN 15	–	–	0.15
1.0	household washing machine	DN 15	–	–	0.25
	mixer for				
1.0	showers	DN 15	0.15	0.15	–
1.0	bath tubs	DN 15	0.15	0.15	–
1.0	kitchen sinks	DN 15	0.07	0.07	–
1.0	wash-stands	DN 15	0.07	0.07	–
1.0	bidet	DN 15	0.07	0.07	–
1.0	mixer	DN 20	0.30	0.30	–
0.5	flushing box acc.to DIN 19542	DN 15	–	–	0.13
	heater for drinking water for supply of service point (incl. fitting for mixed outlet)				
1.0	electric water boiler	DN 15	–	–	0.10*
	electric hot water tank and boiler				0.10
1.1**	with nominal contents 5 – 15 l	DN 15	–	–	0.20
1.2**	with nominal contents 30 – 150 l	DN 15	–	–	
	electric flow water heater with hydraulic test, without flow limitation				
1.5	nominal capacity	12 kW	–	–	0.06
1.9		18 kW	–	–	0.08
2.1		21 kW	–	–	0.09
2.4		24 kW	–	–	0.10
1.0	gas flow water heater	12 kW	–	–	0.10

* with fully opened throttle valve – ** values under unfavourable conditions (shower)

Note: Service points which are not included in the table and devices of similar kind with larger flow of fittings than indicated are to be taken into account according to the recommendations of the producer as far as determination of pipe diameter is concerned

Linear deformation of PP-R pipes under heat influence

Thermoplastic plastics PP-R pipes are exposed to thermal expansion. The linear extension of such pipes is higher than with steel pipes. This fact must be all means be taken into consideration in the laying process. Already in the pipe arrangement planning stage each possibility should therefore be utilized fully to compensate all extension processes within a pipe section.

The linear thermal expansion coefficient for PP-R and PP-RCT pipes is:

$$\varepsilon t = 1.5 \cdot 10^{-4} \quad (K^{-1})$$

Polypropylene pipes mechanically stabilized by an aluminium coating on the pipe periphery (Stabi-Rohr/Stabi-Pipe) have a reduced thermal expansion coefficient. The aluminium coating prevents linear extension at about4/5.

The linear thermal expansion coefficient for PP-R Stabi-Pipes can by approximation assumed as:

$$\varepsilon t = 0.3 \cdot 10^{-4} \quad (K^{-1})$$

The linear thermal expansion coefficient for PP-RCT Fibre-Pipes is:

$$\varepsilon t = 0.35 \cdot 10^{-4} \quad (K^{-1})$$

Δl = Linear extension in (mm)

εt = Thermal expansion coefficient in $\left(\frac{mm}{m\ °C}\right)$

L = Pipe length (m)

Δt = Temperature difference (°K)

The linear deformation of a pipe is thus calculated according to the following formula:

$$\Delta l = \varepsilon t \cdot L \cdot \Delta t \quad (mm)$$

The calculation of the linear deformation is based on the laying temperature. The following example gives you an idea of how to calculate.

Example for a pipe length of 8m:

1. Lowest pipe wall temperature + 9° C (cold-water pipe)

Difference 7° K

2. Laying temperature + 16° C

Difference 54° K

3. Highest pipe wall temperature + 70° C (hot-water pipe)

To 1. Shortening of the pipe: 8 m • 7° • 0,03 = 1,68 mm

To 3. Extension of the pipe: 8 m • 54° • 0,03 = 12,96 mm

Diagram and chart to establish the temperature-dependent linear expansion of PP-R and PP-RCT - Pipes.

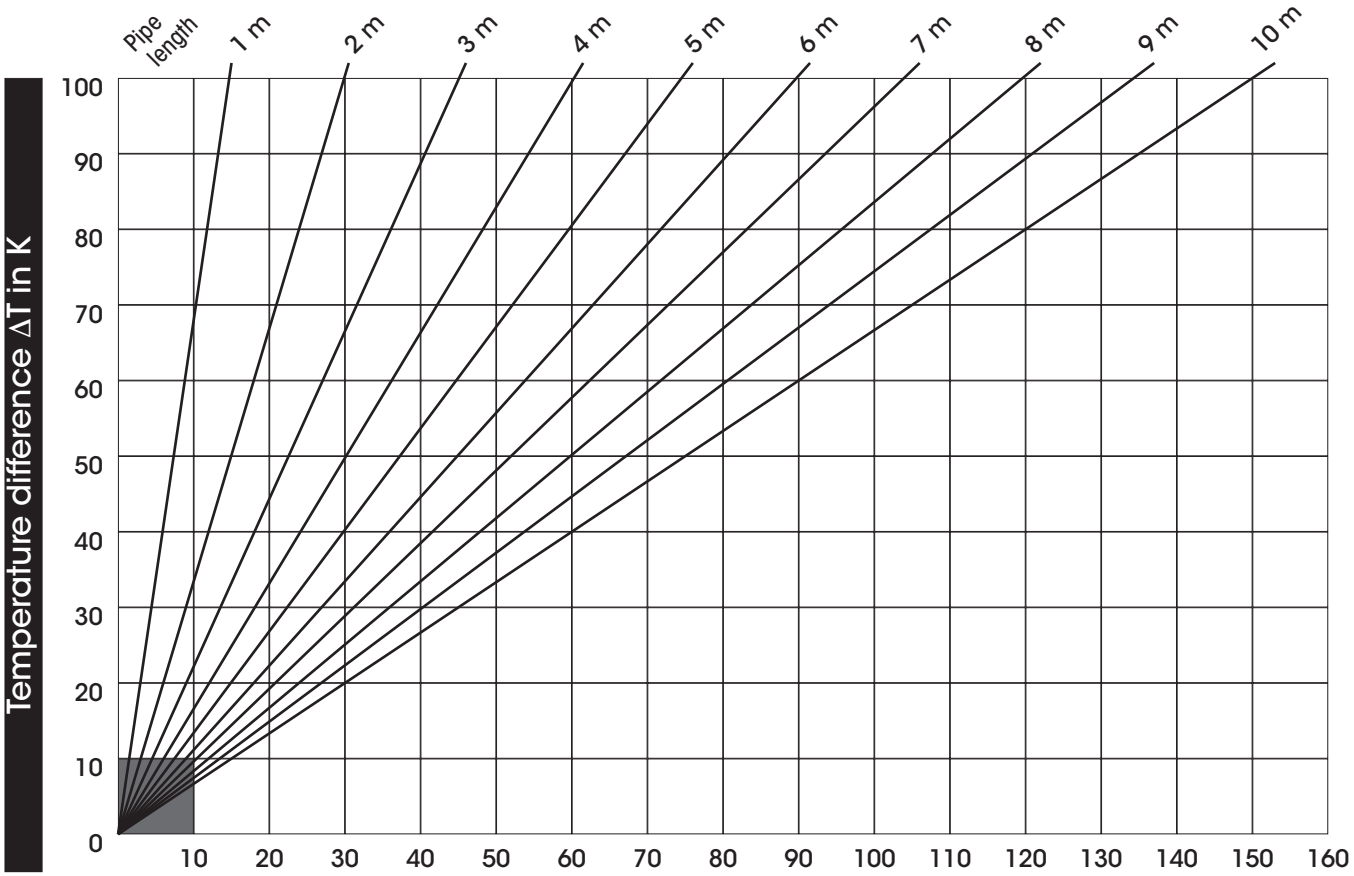


Fig. 4

	Temperature difference ΔT in K									
Pipe length	10	20	30	40	50	60	70	80	90	100
0,1 m	0,15	0,30	0,45	0,60	0,75	0,90	1,05	1,20	1,35	1,50
0,2 m	0,30	0,60	0,90	1,20	1,50	1,80	2,10	2,40	2,70	3,00
0,3 m	0,45	0,90	1,35	1,80	2,25	2,70	3,15	3,60	4,05	4,50
0,4 m	0,60	1,20	1,80	2,40	3,00	3,60	4,20	4,80	5,40	6,00
0,5 m	0,75	1,50	2,25	3,00	3,75	4,50	5,25	6,00	6,75	7,50
0,6 m	0,90	1,80	2,70	3,60	4,50	5,40	6,30	7,20	8,10	9,00
0,7 m	1,05	2,10	3,15	4,20	5,25	6,30	7,35	8,40	9,45	10,50
0,8 m	1,20	2,40	3,60	4,80	6,00	7,20	8,40	9,60	10,80	12,00
0,9 m	1,35	2,70	4,05	5,40	6,75	8,10	9,45	10,80	12,15	13,50
1,0 m	1,50	3,00	4,50	6,00	7,50	9,00	10,50	12,00	13,50	15,00
2,0 m	3,00	6,00	9,00	12,00	15,00	18,00	21,00	24,00	27,00	30,00
3,0 m	4,50	9,00	13,50	18,00	22,50	27,00	31,50	36,00	40,50	45,00
4,0 m	6,00	12,00	18,00	24,00	30,00	36,00	42,00	48,00	54,00	60,00
5,0 m	7,50	15,00	22,50	30,00	37,50	45,00	52,50	60,00	67,50	75,00
6,0 m	9,00	18,00	27,00	36,00	45,00	54,00	63,00	72,00	81,00	90,00
7,0 m	10,50	21,00	31,50	42,00	52,50	63,00	73,50	84,00	94,50	105,00
8,0 m	12,00	24,00	36,00	48,00	60,00	72,00	84,00	96,00	108,00	120,00
9,0 m	13,50	27,00	40,50	54,00	67,50	81,00	94,50	108,00	121,50	135,00
10,0 m	15,00	30,00	45,00	60,00	75,00	90,00	105,00	120,00	135,00	150,00

Fig. 4a Linear expansion ΔL in mm

Diagram and chart to establish the temperature-dependent linear expansion of "Stabi-Tubes" (aluminium-coated PP-R tubes).

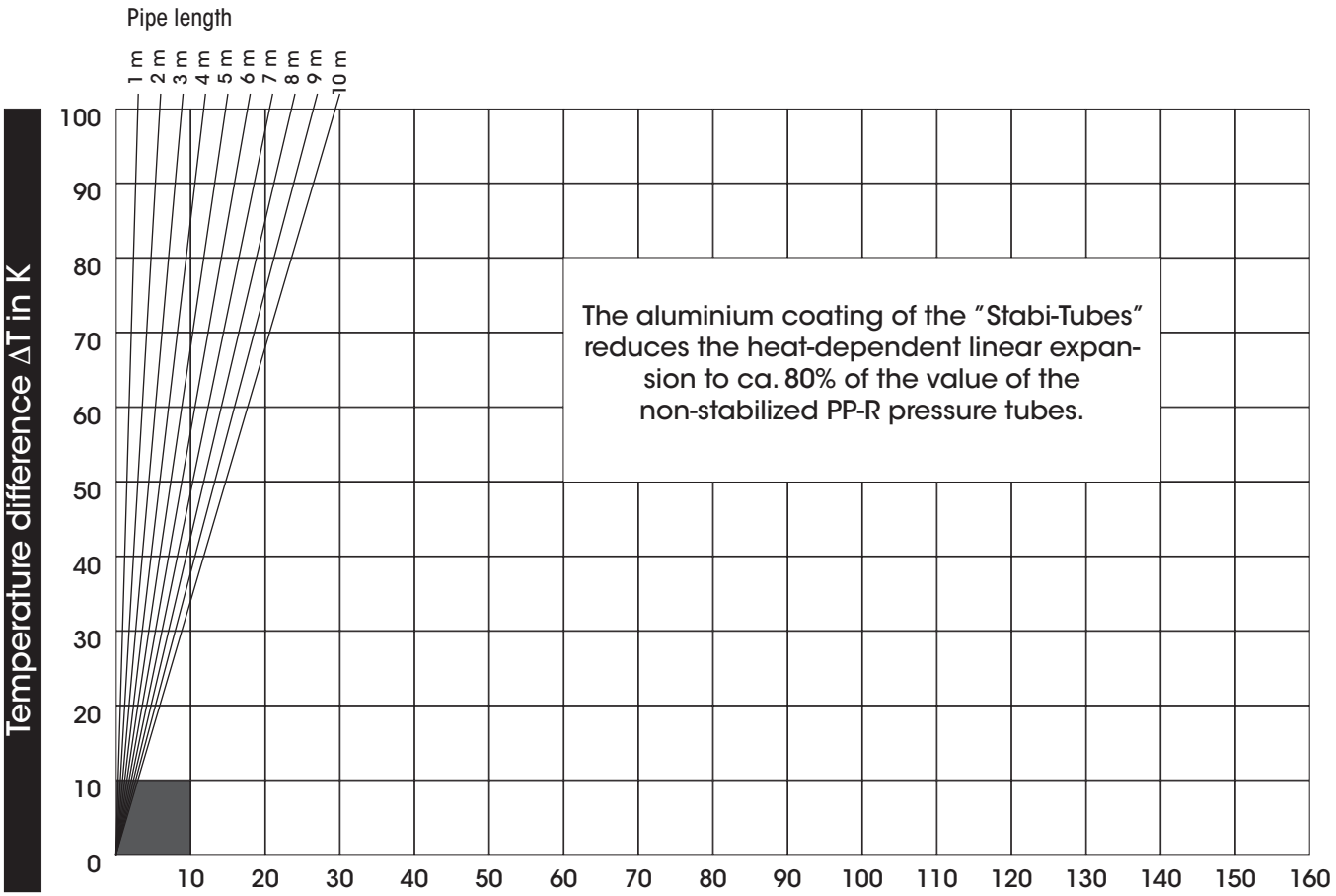


Fig. 5

	Temperature difference ΔT in K									
Pipe length	10	20	30	40	50	60	70	80	90	100
0,1 m	0,03	0,06	0,09	0,12	0,15	0,18	0,21	0,24	0,27	0,30
0,2 m	0,06	0,12	0,18	0,24	0,30	0,36	0,42	0,48	0,54	0,60
0,3 m	0,09	0,18	0,27	0,36	0,45	0,54	0,63	0,72	0,81	0,90
0,4 m	0,12	0,24	0,36	0,48	0,60	0,72	0,84	0,96	1,08	1,20
0,5 m	0,15	0,30	0,45	0,60	0,75	0,90	1,05	1,20	1,35	1,50
0,6 m	0,18	0,36	0,54	0,72	0,90	1,08	1,28	1,44	1,62	1,80
0,7 m	0,21	0,42	0,63	0,84	1,05	1,26	1,47	1,68	1,89	2,10
0,8 m	0,24	0,48	0,72	0,96	1,20	1,44	1,68	1,92	2,16	2,40
0,9 m	0,27	0,54	0,81	1,08	1,35	1,62	1,89	2,16	2,43	2,70
1,0 m	0,30	0,60	0,90	1,20	1,50	1,80	2,10	2,40	2,70	3,00
2,0 m	0,60	1,20	1,80	2,40	3,00	3,60	4,20	4,80	5,40	6,00
3,0 m	0,90	1,80	2,70	3,60	4,50	5,40	6,30	7,20	8,10	9,00
4,0 m	1,20	2,40	3,60	4,80	6,00	7,20	8,40	9,60	10,80	12,00
5,0 m	1,50	3,00	4,50	6,00	7,50	9,00	10,50	12,00	13,50	15,00
6,0 m	1,80	3,60	5,40	7,20	9,00	10,80	12,80	14,40	16,20	18,00
7,0 m	2,10	4,20	6,43	8,40	10,50	12,60	14,70	16,80	18,90	21,00
8,0 m	2,40	4,80	7,20	9,60	12,00	14,40	16,80	19,20	21,60	24,00
9,0 m	2,70	5,40	8,10	10,80	13,50	16,20	18,90	21,60	24,30	27,00
10,0 m	3,00	6,00	9,00	12,00	15,00	18,00	21,00	24,00	27,00	30,00

Fig. 5a — Linear expansion ΔL in mm

Diagram and chart to establish the temperature dependent linear expension of PP-RCT fibre pipes (PP-R with inlayed PP fiber glass layer).

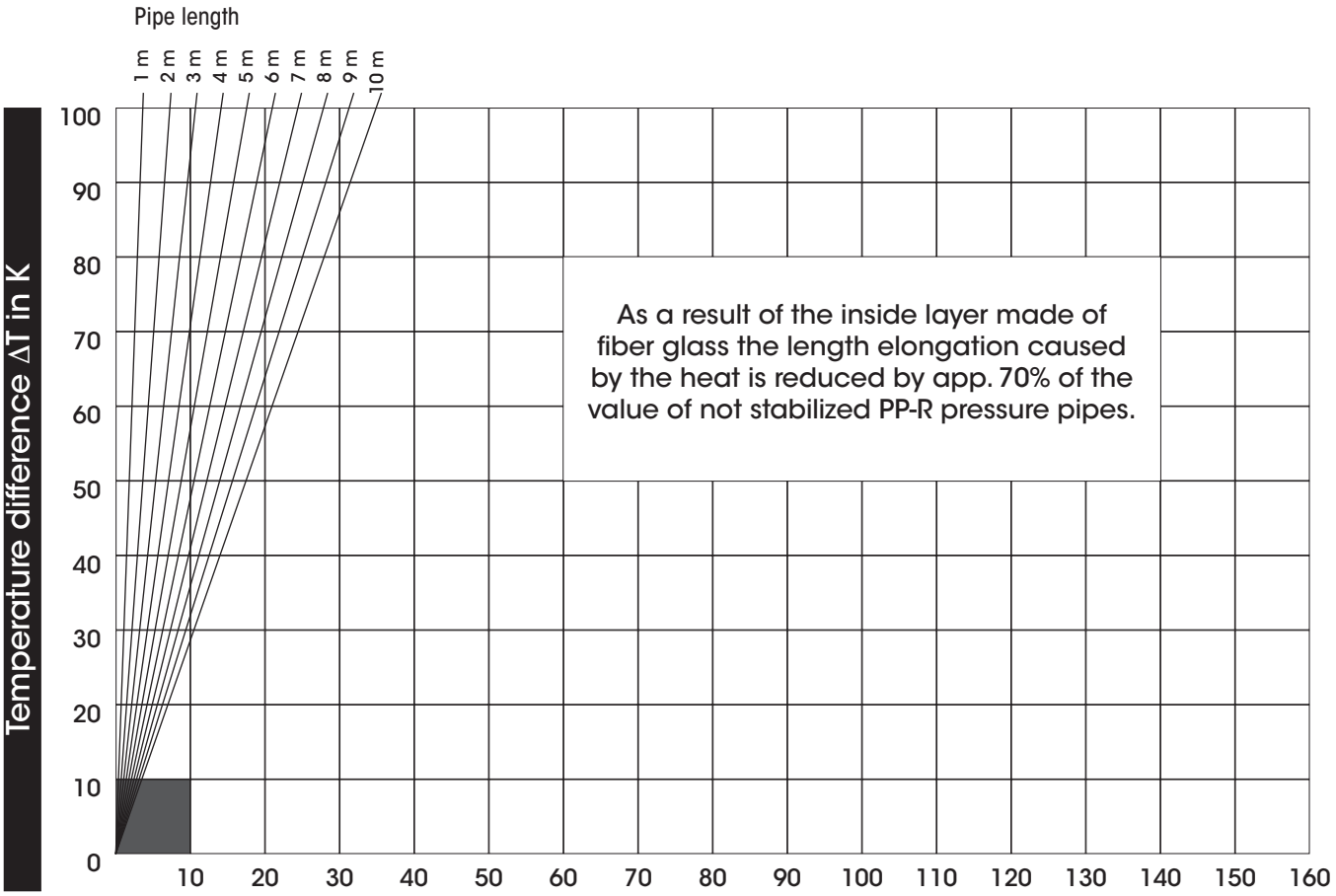


Fig. 5b

	Temperature difference ΔT in K									
Pipe length	10	20	30	40	50	60	70	80	90	100
0,1 m	0,04	0,07	0,11	0,14	0,18	0,21	0,25	0,28	0,32	0,35
0,2 m	0,07	0,14	0,21	0,28	0,35	0,42	0,49	0,56	0,63	0,70
0,3 m	0,11	0,21	0,32	0,42	0,53	0,63	0,74	0,84	0,95	1,05
0,4 m	0,14	0,28	0,42	0,56	0,70	0,84	0,98	1,12	1,26	1,40
0,5 m	0,18	0,35	0,53	0,70	0,88	1,05	1,23	1,40	1,58	1,75
0,6 m	0,21	0,42	0,63	0,84	1,05	1,26	1,47	1,68	1,89	2,10
0,7 m	0,25	0,49	0,74	0,98	1,23	1,47	1,72	1,96	2,21	2,45
0,8 m	0,28	0,56	0,84	1,12	1,40	1,68	1,96	2,24	2,52	2,80
0,9 m	0,32	0,63	0,95	1,26	1,58	1,89	2,21	2,52	2,84	3,15
1,0 m	0,35	0,70	1,05	1,40	1,75	2,10	2,45	2,80	3,15	3,50
2,0 m	0,70	1,40	2,10	2,80	3,50	4,20	4,90	5,60	6,30	7,00
3,0 m	1,05	2,10	3,15	4,20	5,25	6,30	7,35	8,40	9,45	10,50
4,0 m	1,40	2,80	4,20	5,60	7,00	8,40	9,80	11,20	12,60	14,00
5,0 m	1,75	3,50	5,25	7,00	8,75	10,50	12,25	14,00	15,75	17,50
6,0 m	2,10	4,20	6,30	8,40	10,50	12,60	14,70	16,80	18,90	21,00
7,0 m	2,45	4,90	7,35	9,80	12,25	14,70	17,15	19,60	22,05	24,50
8,0 m	2,80	5,60	8,40	11,20	14,00	16,80	19,60	22,40	25,20	28,00
9,0 m	3,15	6,30	9,45	12,60	15,75	18,90	22,05	25,20	28,35	31,50
10,0 m	3,50	7,00	10,50	14,00	17,50	21,00	24,50	28,00	31,50	35,00

Fig. 5c Linear expansion ΔL in mm

Mostly the linear extension of a PP-R / PP-RCT pipe line can be compensated by changing the direction. Attention has to be paid to the fact that the pipeline can easily move in axial direction. In case linear extension com- pensation of a changed direction is not possible installation of an expansi- on bend is necessary. An axial com- pensation is mostly not suitable and uneconomical.

For spring deflexion of a pipeline the size of the bending limb has to be con- sidered which is calculated with the adjoining formula.

Figures 6 and 7 show the mode of action of a change of length and its compensation. The correct choice of the fixed points with regard to the necessary bending limbs Ls has to be considered.

$$L_s = C \cdot \sqrt{d \cdot \Delta L} \ (mm)$$

L_S = Length of bending limb (mm)

d = Outside pipe diameter (mm)

DL = Linear deformation (mm)

C = Material-depending constant for PP-R = 15

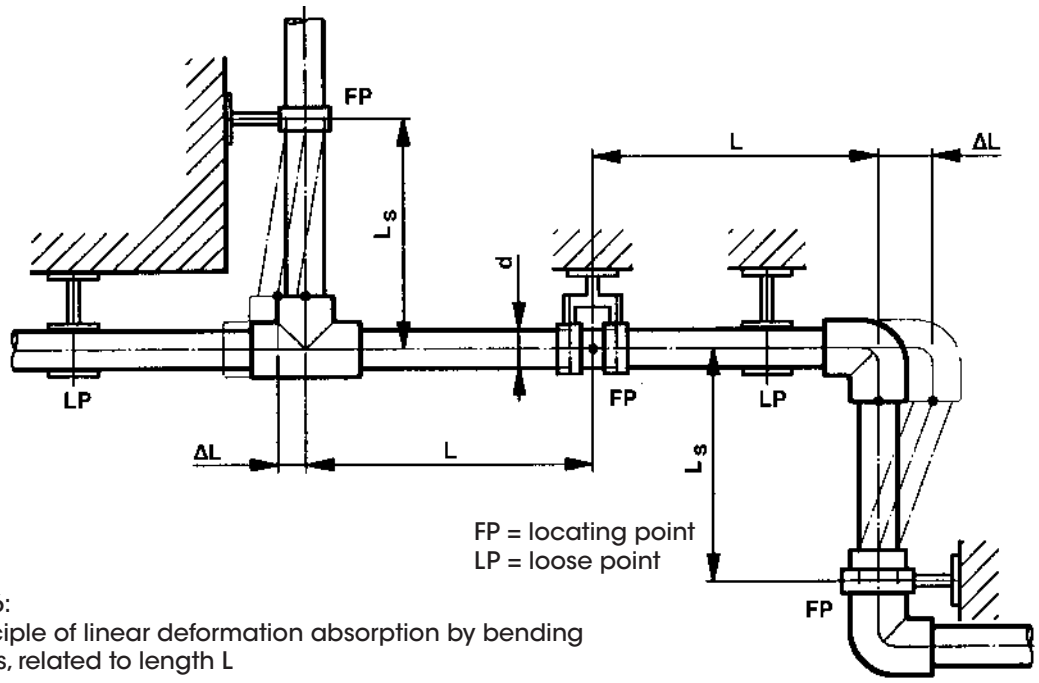


Fig. 6:
Principle of linear deformation absorption by bending limbs, related to length L

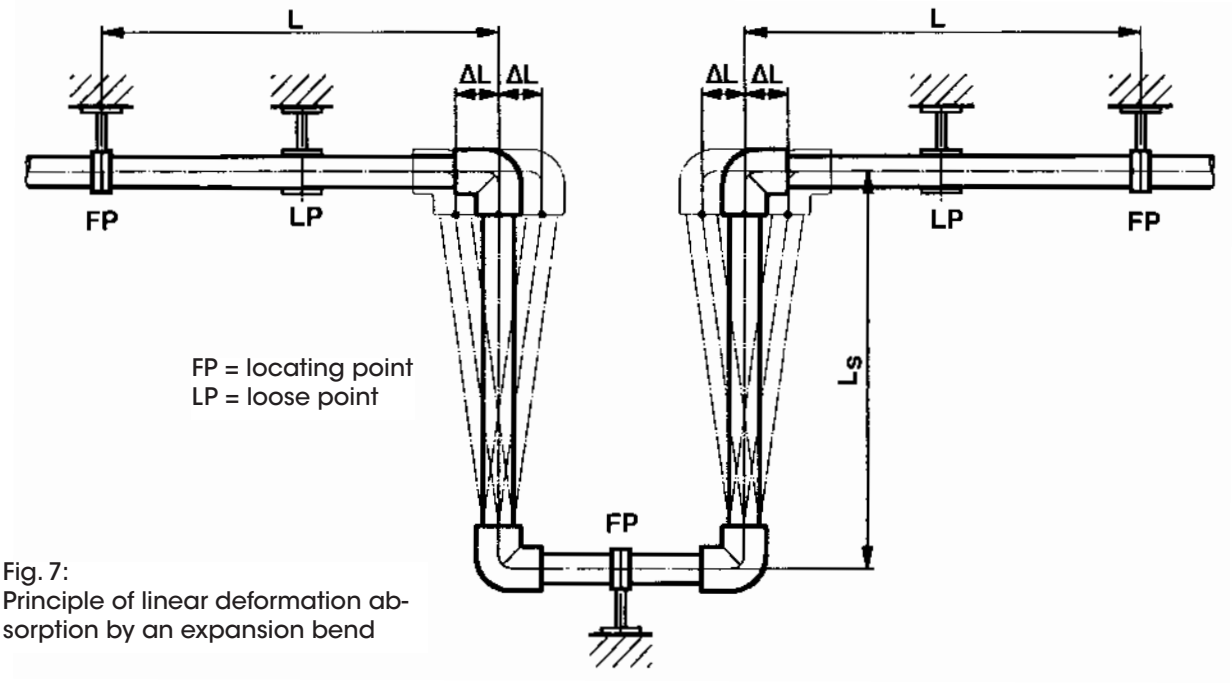
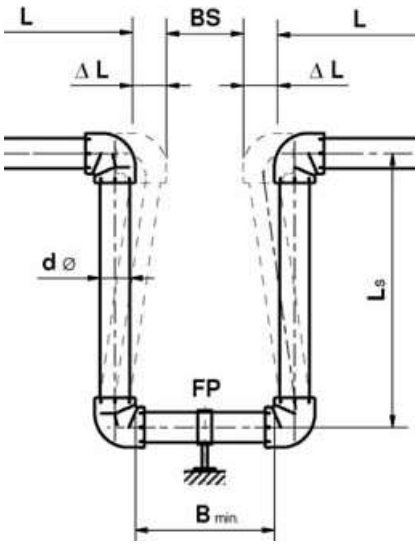


Fig. 7:
Principle of linear deformation absorption by an expansion bend

Expansion bends can easily be made right at the site.
Beside the required pipe length 4 elbows (8090) or 4 pipe bends (8002a) are needed.
To construct an expansion bend, the bending limb L_s is calculated in dependence on the linear deformation ΔL. As standard value, the L_s value given in the Fig. 8 diagram can be used.
Spacing Bmin should be at least 210 mm..

Fig. 7a:
Expansion bend, made of PP-R pipe and 90° elbow

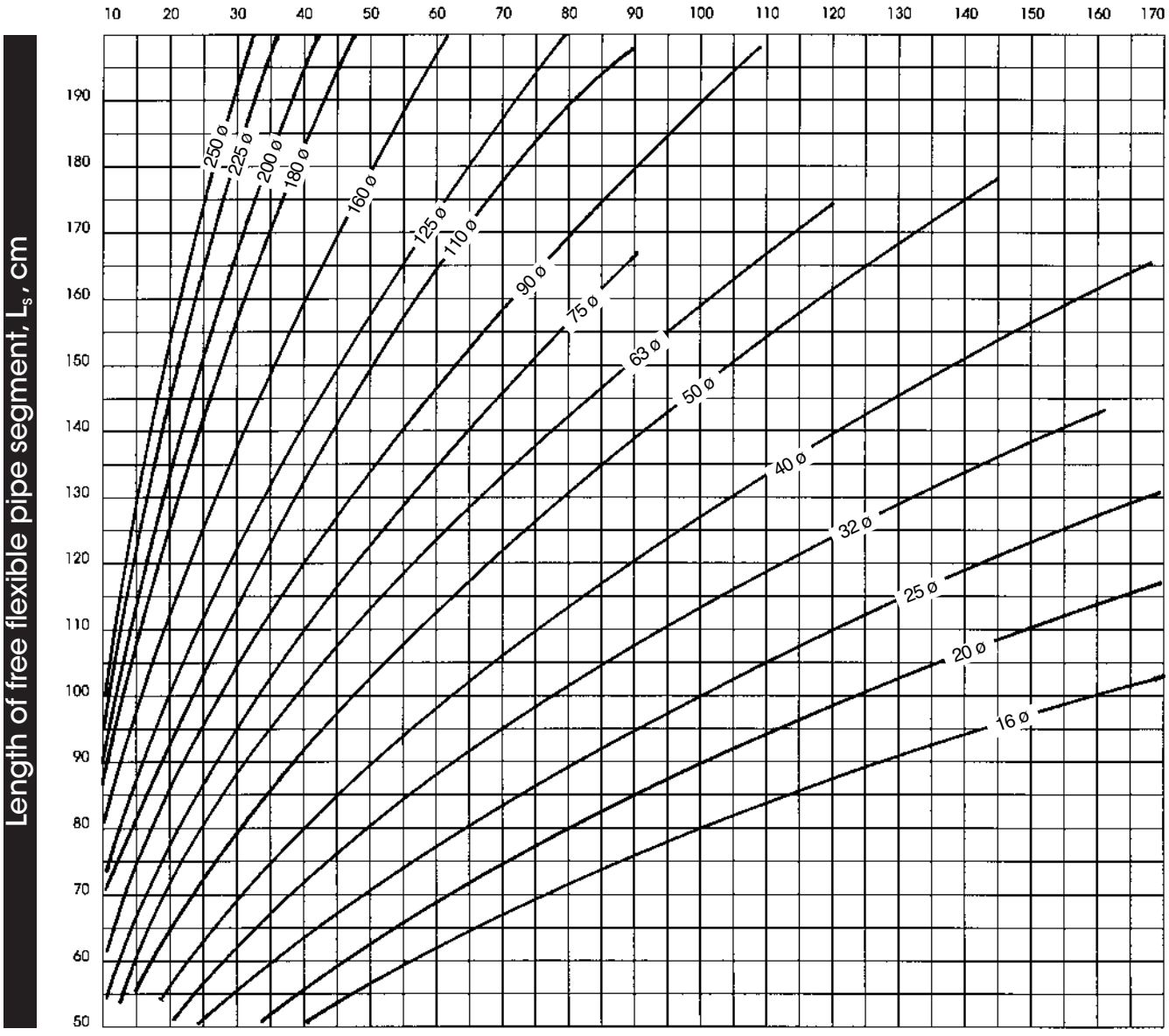


d = Outer diameter op pipe
L = Length of pipe
ΔL = Linear elongation of pipe (longitudinal)
L_S = Length of bending shank
B_{min} = Width of bending shank
BS = Safety distance (min.150 mm)

Calculation of expansion bend:

$$B_{min} = 2 \times \Delta L + BS$$

Fig. 8



Example for in-wall piping

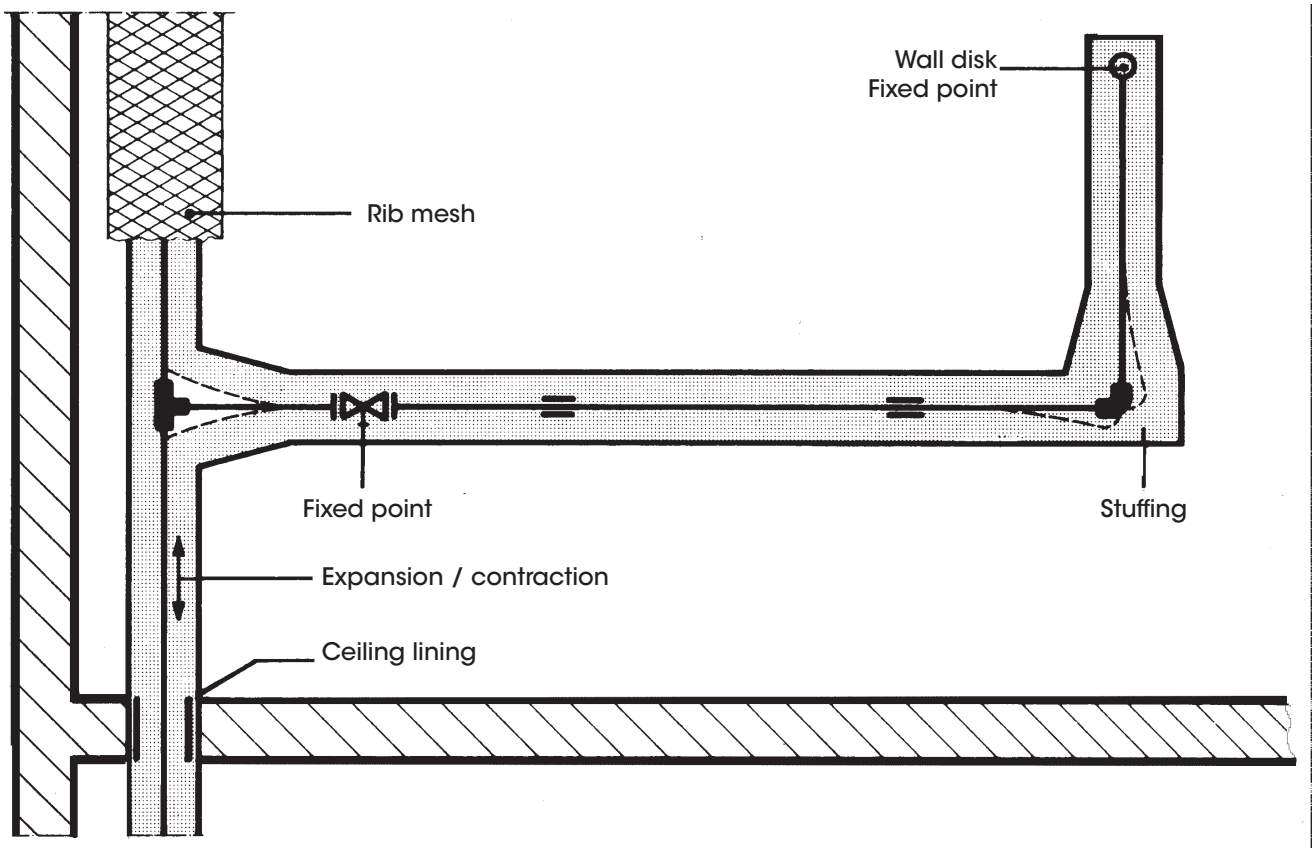


Fig. 9

Installation in Sanitary Installation Shaft:
Risers in pipe shafts have to be installed in such a way that the diverting pipeline can adjust the longitudinal expansion of the risers.

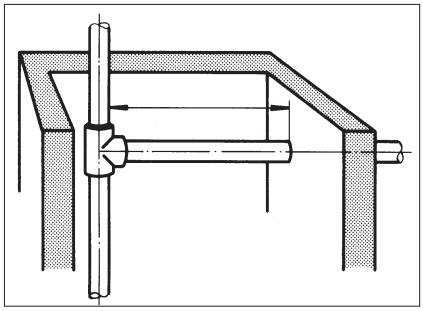


Fig. 1
Best positioning in the pipe shaft.

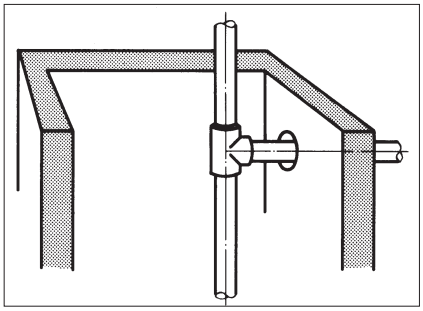


Fig. 2
Sufficient dimensioning of the casing pipe for the diverting pipeline.

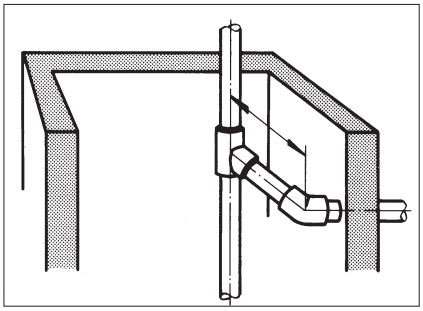


Fig. 3
Installation of a spring leg.

The kind and number of pipe fixings depends among other things on the pipe size and linear expansion. Loca- ting points shall divide the pipes into individual pipe sections allowing expansion or contraction. The guidan- ce of such sections is made with loose clips. The clip distances or spans de- pend on operation conditions, pipe material, and weight of the filled pipe. In practical use the spans given in figu- res 10, 10a, 11, 11a and 11b proved to be appropriate.

d	Spans L at cm bei T°C						
mm	20°C	30°C	40°C	50°C	60°C	70°C	80°C
16	62	59	55	53	50	48	46
20	73	68	64	61	58	56	54
25	84	79	74	71	67	65	62
32	98	92	87	83	79	76	73
40	111	106	100	96	91	88	84
50	124	118	113	109	105	101	97
63	139	133	127	123	118	115	111
75	152	145	138	134	129	126	121
90	166	159	152	147	141	138	133
110	184	176	168	162	156	152	147
125	208	198	189	183	176	172	166

Fig. 10: Spans for **PP-R and PP-RCT pipes,** nos. G 8200B, G 8200

d	Spans L at cm bei T°C				
Ø	20°C	30°C	40°C	50°C	60°C
20	64	60	57	54	51
25	73	69	65	62	59
32	86	81	76	73	69
40	100	94	88	84	80
50	113	108	101	97	92
63	127	121	115	111	107
75	138	132	125	121	117
90	151	144	137	133	128
110	167	159	152	147	142
125	188	180	171	166	160
140	208	199	190	184	177
160	223	213	203	197	189
200	249	238	227	220	212
250	279	266	254	246	237
280	295	282	269	260	251
315	313	299	285	276	266
355	332	317	302	293	282
400	353	337	321	311	300
450	374	357	341	330	318
500	394	377	359	348	335

Fig.10a: Spans for **PP-RCT**, no. G 8160B

d	Spans L at cm bei T°C						
Ø	20°C	30°C	40°C	50°C	60°C	70°C	80°C
16	60	56	53	51	48	47	44
20	70	66	62	59	56	54	52
25	77	72	68	65	62	60	57
32	90	85	80	76	73	70	67
40	104	98	92	88	84	81	77
50	117	111	106	102	97	94	89
63	131	125	119	116	111	109	104
75	143	137	130	126	121	118	114
90	157	150	143	138	133	130	125
110	173	165	158	153	147	143	138
125	195	187	178	172	166	162	156

Fig. 11: Spans for **PP-RCT Stabi-Pipes,** no. G 8215B

d	Spans L at cm bei T°C						
Ø	20°C	30°C	40°C	50°C	60°C	70°C	80°C
20	70	66	62	59	56	54	52
25	81	76	71	68	65	63	60
32	90	85	80	76	73	70	67
40	104	98	92	88	84	81	77
50	117	111	106	102	97	94	89
63	131	125	119	116	111	109	104
75	143	137	130	126	121	118	114
90	157	150	143	138	133	130	125
110	173	165	158	153	147	143	138
125	195	187	178	172	166	162	156
160	223	213	203	197	189	185	178
200	249	238	227	220	213	206	199
250	279	266	254	246	237	231	223
315	313	299	285	276	266	259	250
355	332	317	302	293	282	275	265
400	353	337	321	311	300	292	282
450	374	357	341	330	318	310	299
500	394	377	359	348	335	327	315

Fig. 11a: Spans for **PP-RCT Fibre pipes Watertec,** no. G 8200FW

d	Spans L at cm bei T°C						
Ø	20°C	30°C	40°C	50°C	60°C	70°C	80°C
20	70	66	62	59	56	54	52
25	81	76	71	68	65	63	60
32	90	85	80	76	73	70	67
40	100	94	88	84	80	77	74
50	113	108	101	97	92	89	85
63	127	121	115	111	107	104	99
75	138	132	125	121	117	114	110
90	151	144	137	133	128	125	121
110	167	159	152	147	142	138	133
125	188	180	171	166	160	156	150
160	205	196	187	181	172	166	159
200	229	219	209	202	195	190	182
250	256	245	233	226	217	212	205
315	288	275	262	254	244	238	230
355	306	292	278	270	260	253	244
400	324	310	295	286	275	268	259
450	344	329	313	303	292	285	275
500	363	346	330	320	308	300	290

Fig. 11b: Spans for **PP-RCT Fibre pipes Climatec,** no. G 8160FC

Piping system pipes often require pipes to be bypassed. Cross over connec- tions (Fig. 12) are highly suitable. Similar to manufacturing expansion bends of Bänninger parts cross over bends can easily be made with 2 elbo- ws 45° (8040) male and female and 1 bend (8002a).

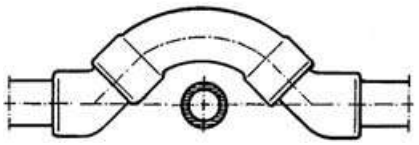


Fig.. 12: Cross over connection

For connecting sanitary armatures, shut-off devices or for plastic-metal transition pieces our programme offers the required transition fittings.
The threads are according to DIN EN 10226 Part 1 and ISO 7: cylindrical female thread and conical male thread. All screw connections, threaded pipe sockets or nipples are designed for easy installation with standard wrenches.

Do not use pipe wrenches for threaded plastic parts to imperatively avoid any damage. Also a possible deformation of the parts by using a pipe wrench must be excluded.

The installation of pipes for cold and hot water supply must be done in accordance with the norms of DIN1988.

For ceiling installation the use of galvanized or coated metal shells (Fig. 13) is recommended if necessary. In such case the fixing distances are to be extended accordingly.

Fig. 13: Pipe in shell

Equipotential Bonding
Acrylic bath and shower tubs, also with metal water supply and discharge equipment, do not require any earthing when BÄNNINGER PP-R pipework is used since neither PP-R nor the tubs are conductive. When using metal tubs, an equipotential bonding must be created. For further information see DIN VDE 0100, part 701.

Welding Procedure

The **Bänninger** PP-R/PP-RCT pipework is coupled by socket fusion welding. The pipes and fittings are connected longitudinally overlapping. The heating of pipe ends and sockets is done by a heating element with fitted bushes. After the necessary welding temperature is reached the joining process is done. The pipe and socket diameter as well as the respective heated bush diameters are matched to build up the necessary pressure during the joining process.

The heating element is electrically heated. It has to comply with DVS Directive 2208 part 1 in construction and accuracy.

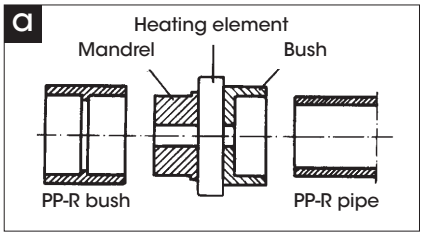
Note on the welding process:
The heating elements (mandrel and bush) must correspond to DVS 2208 part 1, par. 5, table 2, type A (excluding mechanical processing of pipe).

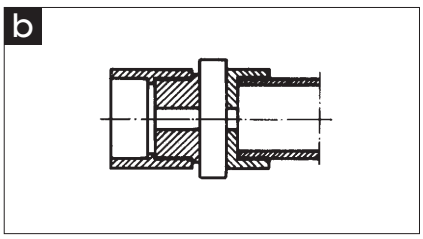
Figures a, b and c schematically show the 3 welding process stages:

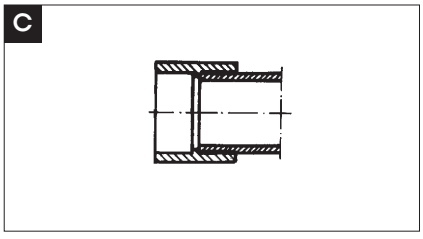
a = Welding preparation

b = Warming up

c = Welded joint







Preparations

Cut pipes square into sections. Thoroughly clean both joint faces, the pipe end and socket with spirit and absorbent paper. Mark socket depth on the pipe.
Bring the heating element to 260° C. Check the set temperature before the welding process.
Temperature tolerance ± 10° C.
The heating element should have an integrated thermometer, otherwise the temperature of the heating element must be controlled by an appropriate measuring device.

Do not start heating the joint parts before the heating temperature has reached 260° C. The mandrel and bush must be clean and have to be cleaned before each following welding process.

1	2	3	4
Pipe outside diameter mm	Heating phase s	Switch s	Cooling min
16 20 25	5 5 7	4	2
32 40 50	8 12 18	6	4
63 75	24 30	8	6
90 110 125	40 50 60	10	8

Fig. 14
Standard values for socket fusion welding at a room temperature of 20° C. At a room temperature below +5° C the heating phases should be increased by up to 100%.

Welding

Push the pipe and fitting quickly and axially up to the stop of the mandrel and the marked insertion depth respectively and hold them fast without torsion. The heating of the joint faces is done according to the table in fig. 14.
After the end of the heating period pull the pipe and fitting abruptly off the heating element and join them immediately axially aligned and without torsion.
In considering the correct insertion depth (fig. 15). The pipe must be pushed in up to marked insertion depth respectively up to the socket bottom. We recommend to fix the two joint parts again for a certain time (approximately the heating period).

The welded joint must not be stressed mechanically before end of the cooling time.

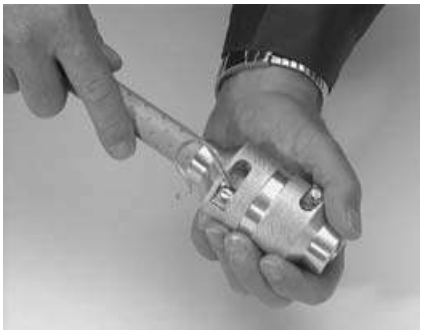
Pipe Ø d (mm)	Bush depth=Insertion depth (mm)
16	13,0
20	14,5
25	16,0
32	18,0
40	20,5
50	23,5
63	27,5
75	30,0
90	33,0
110	37,0
125	40,0

Fig. 15:
Bush depths for PP-R and PP-RCT fittings

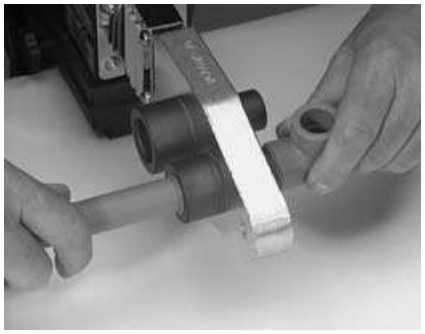
Proceeding Socket Welding

1. Pipes are measured and cut to the required length. Cutting should be rectancular to the pipe axis (90°).

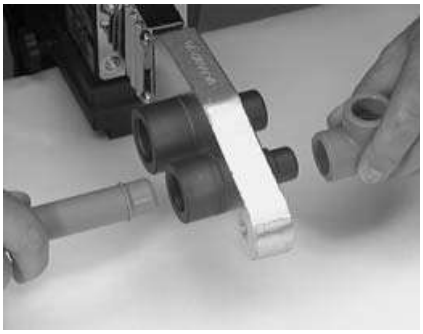
2. Clean the joint area with cleaner. Mark the insert depth of the fitting on the pipe.



3. When using **Bänninger Stabi-Pipes,** the aluminum coating has to be peeled off before welding them. The length of the peeled zone is determined by the peeling device.



4. Pipe and fitting have to be heated simultaneously. Push in parts to be joined axially.

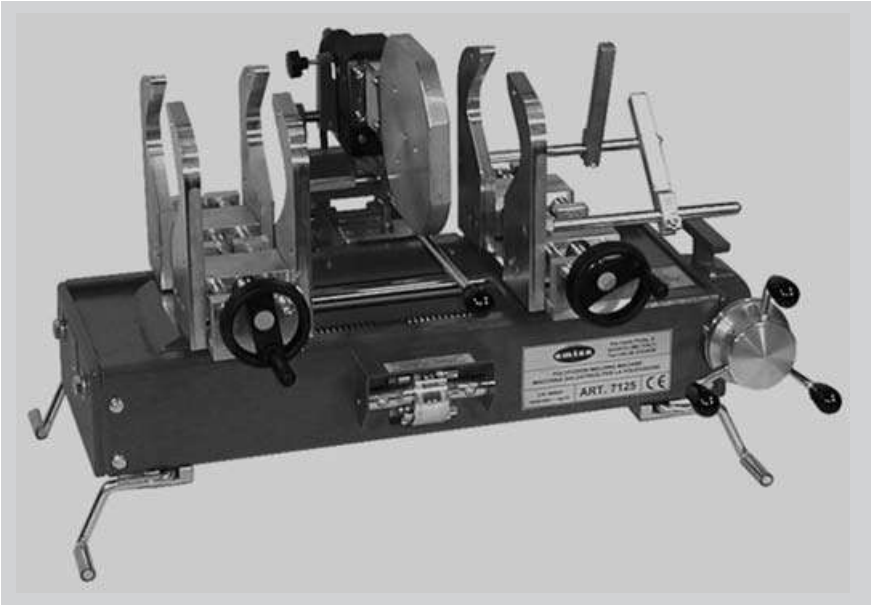


5. At the end of heating period fitting and pipe end from the heating elements have to be pulled off fifully and simultaneously.

6. Adapt and join pipe and fitting within the max. allowed period without turning the parts against each other.

Immediately after the cooling time the fused joints can fully work under pressure. The fusion of the joint parts results in a unique longitudinally force-locked joint.

The welding machine No. 8988 is suitable for socket welding of pipes and / or fittings made of PP-R/PP-RCT d = 125 mm



The socket welding machine No. 8988 consists of:

- Basic unit with movable slides
- Heating element
- Prism clamping jaws
- Socket and mandrels from d = 50 mm to d = 125 mm according to DVS 2208
- Tripod for pipe support
- Metal transport case

Setting of welding machine:
Put the heat reflector into the holder. Mount the appropriate welding tools (socket and mandrel), install the clamping jaws.
Switch-on the device and the energy control lamp turns on. The temperature control lamp extinguishes after reaching the operating temperature (260°).

Fig. 1
Set the heat reflector in the holder

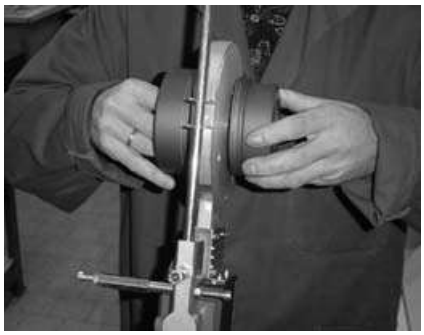


Fig. 2
Place the socket and the mandrel on the heat reflector

Fig. 3
Mount the prism clamping jaws

This is how the push-in depth will be precisely determined:
Select the relevant fitting/pipe diameter on the measuring drum which is situated in the middle of the machine base. Adjust the position of the slides; arrows in the middle of the machine base must stand one over the other, also on the hand wheel. Place the fitting into the clamping jaw and seize it with the hand wheel. Lock and seize the stop. Place the pipe axially forwards the fitting into the chunk jaw and position in such a way that it is situated frontally at the fitting. Seize the pipe with the hand wheel.

Fig. 4
Select the pipe / fitting diameter

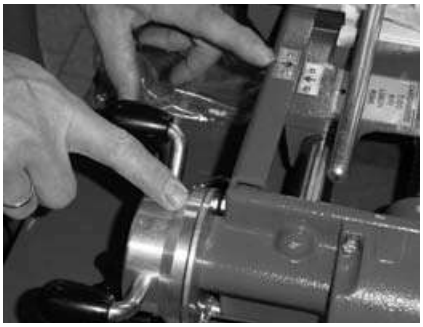


Fig. 5
Adjust the position of the slides

Fig. 6
Place and adjust the fitting in the clamping jaw

Fig. 7
Adjust the stop to hold the fittings

Fig. 8
Lay the pipe axially into the fitting and place in such a way that it is situated frontally to the fitting

Welding
(According to the DVS regulations 2207, part 11)

Before starting the welding process it has to be checked if the welding temperature has been reached. The first welding can be made 5 minutes after the welding temperature is reached. Split apart the machine slides and close down the heating element. Slowly move the machine slides by turning the hand wheel. Align the heating element so that the pipe and the fitting properly fit into the welding tools. Move the slides with constant forward motion up to the point until the stop is reached. The heating timer of the joint surfaces starts only after the stop is reachead. After end of the heating time the slides are separated. The heating element shall be brought into idle position as quickly as possible. Move the machine slides with the hand wheel at constant forward motion up to stroke end so that the precise joining depth between the pipe and the fitting is reached. The welding may only be removed from the clamping jaws after the cooling time. Unscrew the clamping jaw with the hand wheel and take off the welded part.

Fig. 9
Move the machine slides with the hand wheel, warmup the pipe and the fitting in the welding tools

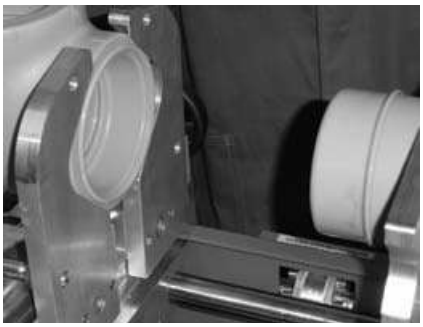
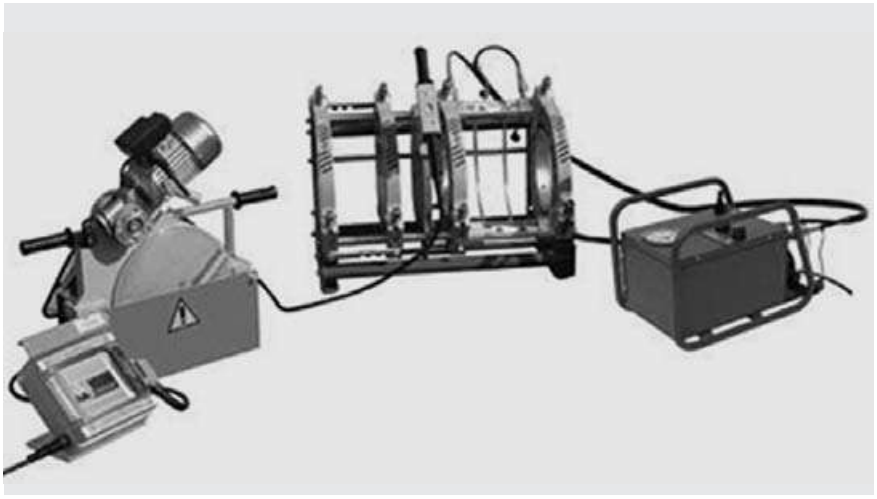


Fig. 10
After the warming time join pipe and fitting

Fig. 11
Move the machine slides up to stroke end

Fig. 12
Remove the welding joint after the end of the cooling time from the clamping jaws

The welding machine part no. 8989 is suitable for butt welding of pipes and/or fittings made of PP-R / PP-RCT from dia = 90 mm up to dia = 500 mm



The butt welding machine with heating element part no. 8989 includes:

- Basic machine with movable slide
- Heating element
- Hydraulic aggregate
- Electrical planing tool
- Flexible hydraulic hoses
- Metal box for electrical heating elements and planing tool.

Parameters for PP-butt welding with heating element at 20° C outside temperature
according to DVS data sheet 2207, part 11

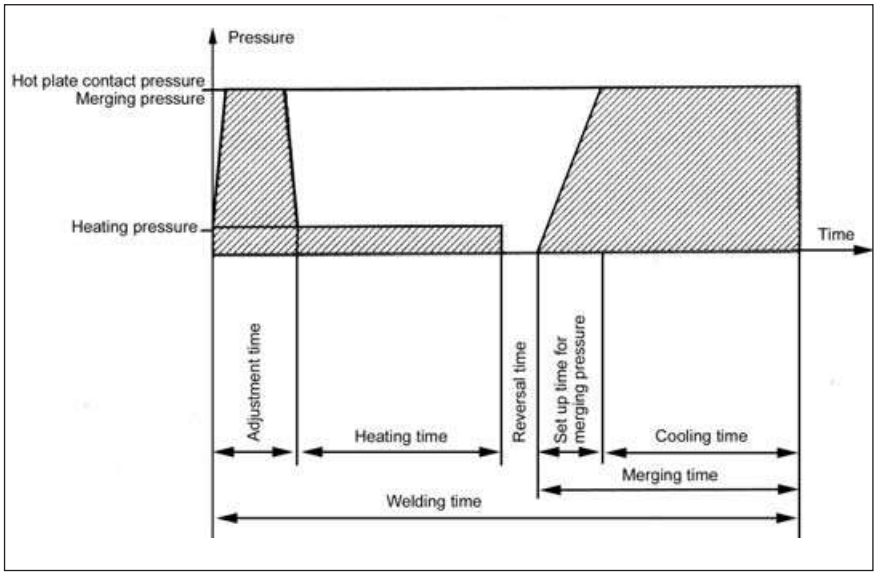


Fig. 1

Preparation before welding
Before start the temperature of the heating element should be controlled. In order to have optimal welding connections, the heating element should be cleaned with a non-fuzzing paper before each welding.
The wall thickness of the fittings that shall be welded should be conform in the welding area.
Pipes and fittings have to be aligned axial.
The areas that shall be welded should be planed with a tool, which has to be clean and free of grease. So they should be plane parallel in the plane condition.
The roundness of the pipe has to be ensure either by the clamping device of the welding machine or extra clamps.

Permissable misalignment of wall 0,1 x wall thickness (s)

During butt welding with heating elements the areas to be joined are heated up to the welding temperature by means of the heating element and compressed after the heating element has been removed. Heating temperature 210° C ± 10° C The step-by-step welding procedure is shown in Fig. 1.

Welding Procedure:
During butt welding with heating elements the areas to be joined are adjusted with pressure at the heating element (adjusting with merging pressure) until the specified bead height is reached. Following heating up to welding temperature with reduced pressure (0,10 ± 0,01 N/mm2) and joining with merging pressure after removal of the heating element (Adaption).

Fig. 2 shows the principle of the welding procdure.

After merging a double bead (K) has to exist over the complete perimeter. The bead formation is an orientation for the uniformity of the weldings among each other.

Fig. 3 shows the bead formation during butt welding with heating elements.

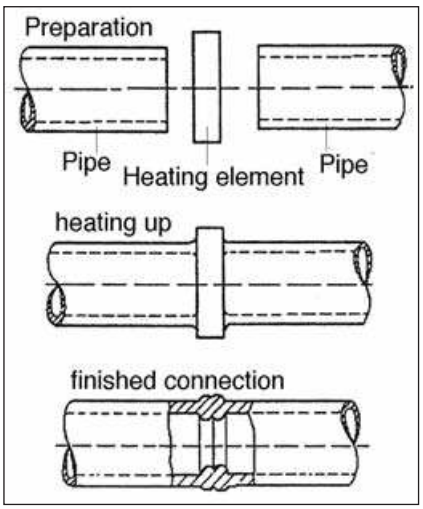


Fig. 2

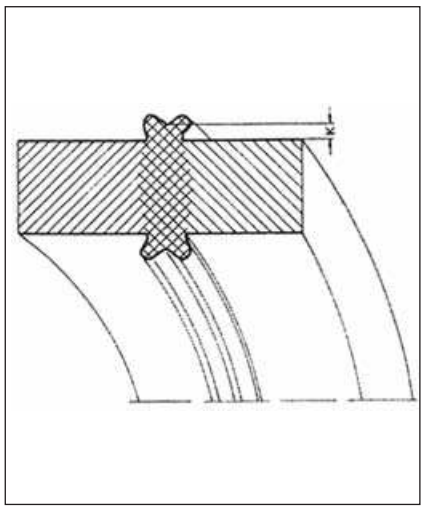


Fig. 3

Application area:
Additional extension of existing pipe systems.
Direct connection of consumer pipe to a supply pipe line.
Alternative for Tees.

Welding preparation:
Heat up the heating element to 260° C.
Control the set temperature prior to the welding process. Temperature difference ± 10° C.
The welding elements must be clean and should be cleaned prior to every welding process.

Fig. 1
Bore the pipe wall with the boring machine (Part no. 8986b)

Fig. 2
For stabi composite pipes (Part no. 8215B) remove the residual aluminium with the chamfering tool (Part no. 8986a)

Fig. 3
Push into the heat nozzle of the welding saddle tool (Part no. 8984e) the bore hole as well as the connecting piece of the welding saddle into the heating socket. The heating time for all dimensions amounts to 30 seconds.

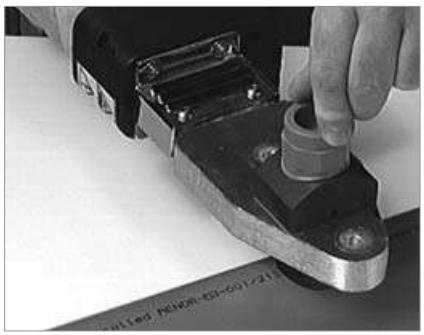


Fig. 4
Push the stub of the welding saddle quickly intothe heated bore hole. Fix the fitting for about 15 seconds on the pipe.

After a cooling time of 10 minutes the fused joint can fully work under pressure.

The appropriate branch pipe will be assembled by means of socket fusion welding or by using female or male adaptors with the welding saddle.

Processing Instructions for Repair Plug

Application area:
Repair of bored pipes.

Preparations:
Empty and uncover the damaged pipe. Select the heating unit, clean it before every welding process. Heat up the heating unit to 260° C (±10° C). Check the temperature before the welding process.

Selection of welding elements:

Repair -Set: d = 7 mm
For welding of holes up to 6 mm

Repair-Set: d = 11 mm
For welding of holes up to 10 mm

Fig. 1
Mark the degree of the push-in depth (wall thickness) on the repair plug.
Distance tool to be fixed according to the wall thickness of the pipe and tighten the screw.

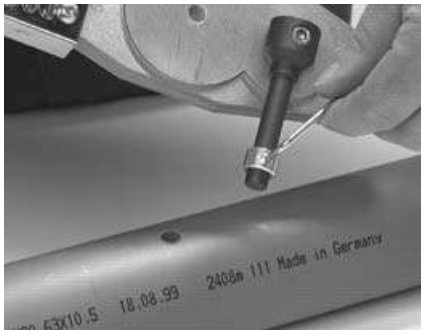


Fig. 2
Heat up the borehole and the welding plugs with the repair-set for 15 seconds.

Fig. 3
Remove the welding device and set in the repair plug precisely without twisting it.
After cooling time of 5 minutes remove the protruding end of the repair plug, and the repaired part can again work under pressure.

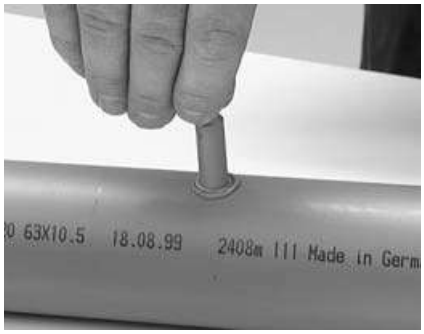


Fig. 1
Cut the pipe rectangularly with plastic scissors or with a pipe cutter.

Fig. 2
Remove the outside oxide layer using a scraper.

Fig. 3
On **Bänninger Stabi-Pipes,** the aluminum coating must be peeled off before jointing.

Fig. 4
Clean the joint surfaces with a purifying agent (e. g. spirit).

Fig. 5
Mark out the socket depth.

Fig. 6
Push in the socket up to the marked position on the pipe.

Fig. 7
Plug the cable plugs into the contact bushings.
Enter the voltage and the welding time in the welding device. The welding data can be seen on the barcode label of the socket. Start the welding device with the switch.

Preparing the welding surfaces.
Cut the PP-R/PP-RCT pipe ends rectangularly to the pipe axis with a pair of plastic pipe scissors. Remove the outer surface oxide layer in chips with a scraper and clean it with non-fuzzing, absorbent paper and purifying agent (e. g. spirit).

On **Bänninger Stabi-Tubes** the aluminum coating has to be peeled off before connecting them. For this purpose the **Bänninger** peeling tools (no. 8977) for electrofusion welding sockets must be used. They achieve a greater peeling length than that required for normal sokket welding. The pipe ends are pushed into the peeling tool to remove the aluminum coating up to the stop of the peeling tool.

Mounting of the electrofusion welding sockets.
Mark the socket depth on the pipe. After having finished all preparations take the electrofusion welding the socket out of packing and **be careful not to touch the inner surfaces of the socket.** Now shift the socket slowly on the tube up to the marked point.

Fixation of pipes/fittings.
To protect the welding point against tensile and bending stress during the welding process the pipes and fittings to be welded have to be fixed in a clamping device after they have been adjusted in the electrofusion socket. Attention has to be paid to the fact that the position of pipe and fitting is exactly axially parallel.

Connecting the socket cord.
Position the electrofusion welding sockets in a way offering easiest connection of the cord plugs to the contact bushes. Having chekked the required generator voltage to be available switch on the device and put the cord plugs on to the contact bushes. Set the diameter of the pipe to be connected and start the welding process with the switch. The electrofusion machine automatically calculates and controls the required welding time and shows the welding indicators after successful welding. The welding indicator does not evidence the welding quality. Its value may differ depending on the slot width between the electrofusion welding socket and the pipe.

Cooling Time
Never disregard the required cooling times. The full loading capacity of the welded section for example for test pressure or working pressure requires a minimum cooling time of 2 hours.

Pressure Test

Pressure test with water according to DIN 1988.

For completely installed but not yet concealed pipes DIN 1988 (Technische Regeln für Trinkwasser-Installation/Technical Regulations for Drinking Water Installations) requires a hydraulic pressure test. Under pressure testing the properties of the PP-R/PP-RCT pipe material cause an expansion of the pipe affecting the test result. The difference between pipe and test medium temperatures can additionally influence the test result. Due to the thermal expansion coefficient a change in temperature of 10 K results in a change in pressure of 0,5 to 1 bar. The pressure testing of parts of plastic pipe systems should therefore be done at an as much as possible constant test medium temperature.

Filling of the Pipe System
Fill the pipes with filtered water until they are free of air. Use pressure gauges allowing to clearly read pressure changes of 0.1 bar. Install the pressure gauge at the lowest point of the pipe system.

The pressure test must be done as a preliminary test and a principal test, whereas a preliminary test only may be considered sufficient for smaller installations such as supply and distributing pipes in moist rooms.

Preliminary Test
For the preliminary test a test pressure corresponding to the allowed working pressure plus 5 bar is applied which has to be renewed 2 times at 10-minute intervals within 30 minutes. After another 30 minutes the test pressure shall not have dropped by more than 0.6 bar (0.1 bar per 5 minutes) and no leakage must have occured.

Principal Test
Directly after the preliminary test the principal test has to be carried out. The test period is 2 hours. The test pressure determined after the preliminary test shall not have dropped by more than 0.2 bar after 2 hours.

No leakage shall be found at any section of the tested installation.

To avoid stagnation of residual water and damages caused by frost a pressure test as dry leak test with compressed air (or inert gas) can be carried out (pages 78 + 79).

TEST SHEET (draft)

(According to the standards given in DIN 1988)

Object description:

Executing company:

Client:

Object:

Raw material: **PP-R / PP-RCT** ☐ _____ ☐

Pipe length:				
	Ø 16 m	Ø 20 m	Ø 25 m	Ø 32 m
	Ø 40 m	Ø 50 m	Ø 63 m	Ø 75 m
	Ø 90 m	Ø 110 m	Ø 125 m	Ø 140 m
	Ø 160 m	Ø 225 m	Ø 250 m	Ø 280 m
	Ø 315 m			

Joining: Welding pcs. Gluing pcs.

Number of tapping points: pcs. Highest tapping point above pressure gauge: pcs. Total pipe length: m

Preliminary test:

Test pressure bar

1st regulation after 10 minutes bar

2nd regulation after 10 minutes bar

Pressure after 30 minutes bar

Pressure decrease bar

Result of preliminary:

Principal test:

Test pressure bar

Pressure decrease after 2 hours bar
(0,2 bar max.)

Result of the principal test:

Pressure test acknowledged:

Beginning of the test h End of test h Test period h

Place Date Time

Signatures:

Customer Contractor

Leak test with compressed air or inert gas

General
Because of compressibility of gases during proceeding pressure tests with air the provisions for prevention of accidents "Working on gas facilities" as well as the regulation "Technical rules for gas installations DVGW-TRGI (German Technical and Scientific Association for Gas and Water – Technical rules for gas installations)" should be taken into account because of physical and technical security reasons. In coordination with the responsible professional organization and following this regulation the testing pressure was set at max. 3 bar as during load and leak tests for gas pipelines.

General provisions
New pipeline facilities may only be put into operation if the compulsory pressure test is successfully passed. No leakages are allowed. The pressure test should be carried out before the lines are buried. The tests on the new line facility can be implemented either on the whole facility or in line sections. The division into smaller test sections (small pressure / liter product) provides higher level of reliability and is more precise while testing. On the pressure gauge leaks can be identified faster compared to bigger and widely branched voluminous sections. Hence leak locations can be determined faster. Apparatuses, drinking water warmers, armatures or pressure tanks must be disconnected from the pipelines prior to the air pressure test in case they have larger capacity and can affect reliability and test accuracy. All pipeline openings must be directly closed with metallic plugs, metallic blanking plates or blank flanges that withstand the testing pressure. Closed shut-off valves do not count as leak-proof closures. Exhaust valves for deflation of the testing pressure should be installed in sufficient quantity and on appropriate locations where the air can be deflated in a safe manner.

If leaks are observed during the visual or noise inspections or if a pressure drop is identified above the allowed values all connections should be checked with regard to leak tightness with test equipment that creates bubbles. After removal of possible leaks the pressure test should be repeated. During the testing period no single leak may be detected on any location of the inspected facility.

In exceptional cases a minor pressure drop may be identified on the pressure gauge although during the visual inspection or during the inspection with testing equipment that creates bubbles no leaks cold be observed.

Nevertheless the facility can be water proof.

In case of any doubts a water proof test can bring a certainty regarding the leak tightness.

The safety of people and goods during the test should be taken into account as a basic principle.

Because of technical security reasons e. g. slipping away of a defective pipe connection, higher pressures than 3 bar are not permitted.

A gradual pressure increase and a regular visual inspection of the pipe connections are appropriate as additional safety measures.

Leak tightness test
The leak tightness test is implemented with a pressure test of **110 mbar** prior to the load test.
The applied pressure gauge must have an appropriate precision of 1 mbar (10 mmWS) display range for the pressure that will be measured. For this purpose the U-pipe pressure gauges known from the TRGI test or the standpipes can be used. The components on the pipeline facility must be suitable for the test pressures or have to be dismounted before the test.

After application of the test pressure the testing period for **up to 100 liter line volume must be at least 30 minutes.** For every additional 100 liters the testing period must be increased by 10 minutes. The leak tightness test starts once the test pressure is achieved and taking into consideration the respective waiting period for adjusting the medium to the ambient temperature.

Load test
The load test is implemented with a maximum test pressure of **3 bar** and a pressure gauge with a display range of 0,1 bar. The load test is combined with a visual inspection of all pipe connections during which it is checked whether welding, solder pressure and clamp connections as well as adhesive and screwed joints are performed in a proper manner in order to be leak-proof.

The load test with diameter increased pressure should be:
– at nominal up to DN 50 maximum 3 bar and

– at nominal diameter over DN 50 – DN 100 maximum 1 bar.

After application of the test pressure the testing period is 10 minutes.

Selection of the test medium
For leak tightness and load test the following media can be used:

– oil-free compressed air,
– inert gas
  e. g. Nitrate and carbon dioxide
– inert gas
  with 5% hydrogen in the nitrogen
  (applied at the procedure for locating the leakage)

By means of technical security equipment like pressure reducing regulator on compressors it has to be ensured that the specified test pressure for the pipe facility is not exceeded.

Pressure test protocol for drinking water installation with compressed air or inert gas as a control medium (model)

Construction project: _____

_____

_____

Client represented by: _____

Contractor / responsible expert represented by: _____

Material of the pipeline system: _____

Connection type: _____

Pressure on the facility: bar Ambien temperature:: °C Temperature of the control medium: °C

Control medium ☐ Oil-Free compressed air ☐ Nitroge ☐ Carbon dioxide ☐ _____

The water supply facility was controlled as ☐ a complete facility ☐ sectionwise

All lines are closed with metallic plugs, caps, blanking plates or blank flange.
Aparatuses, pressure tanks or drinking water warmers are disconnected from the lines.
A visual inspection of all pipe connections was done with regard to the professional construction.

☐ **Leak tightness test** Test pressure 110 mbar
Testing period up to 100 l line volume for at least 30 minutes.
For each additional 100 liters the testing period should be increased by 10 minutes.

Line volume _____ Liter Testing period _____ Minutes

Temperature balance and steady-state condition are awaited, after this the testing period starts.

☐ During the testing period no pressure decrease was observed.

☐ **Loading test with higher pressure**

Testing pressure ≤ 50 DN max. 3 bar > 50 DN max 1 bar

Testing time 10 Minutes

First a temperature balance and a steady-state condition is awaited, after this the testing period starts.

☐ During the testing period no pressure decrease was observed.

☐ The pipelines are leak-proof.

Location _____ Date _____

Client / Representative _____ Contractor / Representative _____

Authoritative for the insulation of pipework the German Heating Installation Regulation of the Energy Saving Act/Heizungsanlagen-Verordnung zum Energieeinsparungsgesetz (HeizAnLV)

Heat insulation according to DIN 1988

Drinking water systems for cold water must be protected against heating and, if necessary, condensation water. For the minimum insulation layer standard values see table (fig. 16).

Installation mode	Insulation layer thickness λ= 0,040 W/(m·K)
Pipes freely installed, in non-heated room (e. g. cellar)	4 mm
Pipes freely installed, in heated room	9 mm
Pipes in channel, no hot-water pipes	4 mm
Pipes in channel, beside hot-water pipes	13 mm
Pipes in wall conduit, risers	4 mm
Pipes in wall recesses, beside hot water pipes	13 mm
Pipes on concrete surface	4 mm
For other heat conductivity values, convert insulation layer thickness accordingly by using a diameter of d = 20 mm.	

Fig. 16

Heat insulation according to the Heating installation regulation.

Heat distribution installations must be insulated against heat loss. See figures 17 + 18

Line	Nominal width (NW) of the pipes/Fittings in mm	Minimum insulation layer Thickness, related to a thermal conductivity of 0,035 W $m^{-1}K^{-1}$
1	up to NW 20	20 mm
2	from NW 22 to NW 35	30 mm
3	from NW 40 to NW 100	as NW
4	over NW 100	100 mm
5	Pipes and fittings under lines 1 to 4 inceiling and wall cut-throughs, pipe-crossing sections, with central distributing pipes, radiator connection pipes of maxi mally 8 m length	1/2 of the requirements given in lines 1 to 4

Fig. 17

	d x s	DN	Insulation layer thickness λ= 0,035 W/(m·K)
Pipes PN 20	16 x 2,7	10,6	20 mm
	20 x 3,4	13,2	
	25 x 4,2	16,6	
	32 x 5,4	21,2	30 mm
	40 x 6,7	26,6	
	50 x 8,4	33,2	
	63 x 10,5	42,0	42 mm
	75 x 12,5	50,0	50 mm
	90 x 15,0	60,0	60 mm

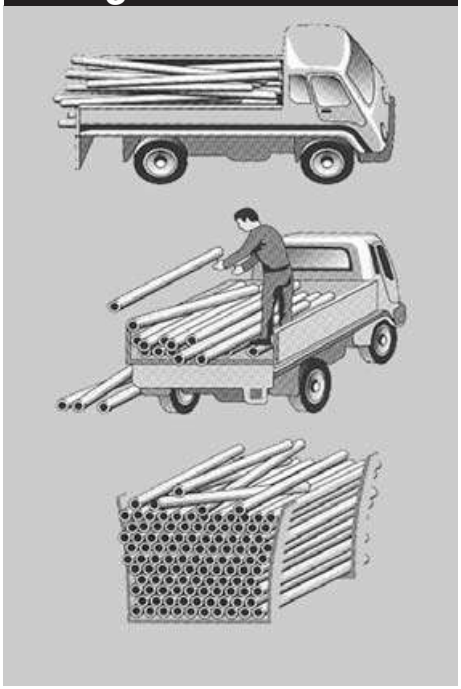
Fig. 18

Polypropylene pipes according to DIN 8077 are highly selfinsulating in respect to their heat transfer. Thus PN 20 PP-R/PP-RCT pipes in continuous operation at a passing medium temperature of 80° C show an about 27° C lower temperature at their outside diameter. This proves their heat insulation to be much more effective than that of metal pipes.

Fire Protection

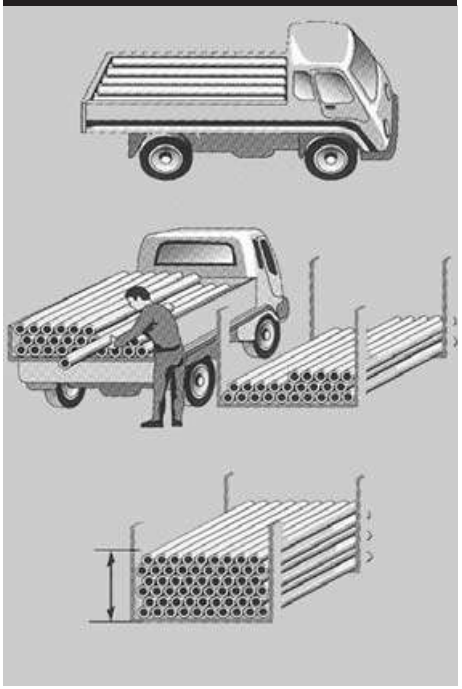
PP-R/PP-RCT is classified under building material class 2 - normal flammability. The respective national building laws (building regulations on all administrative levels and their implementing regulations) must be adhered to. The application of approved fire protection measures prevent the passing of smoke and fire for the pipes through walls and ceilings.

Wrong



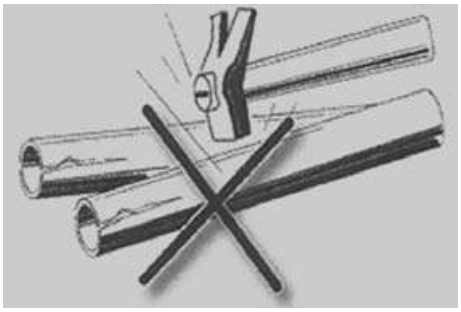
Prevent impacts
(especially against pipe ends)

Correct

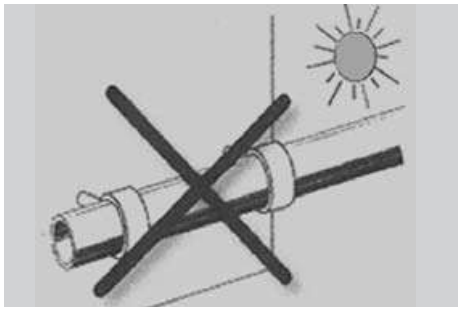


Prevent excessive loads

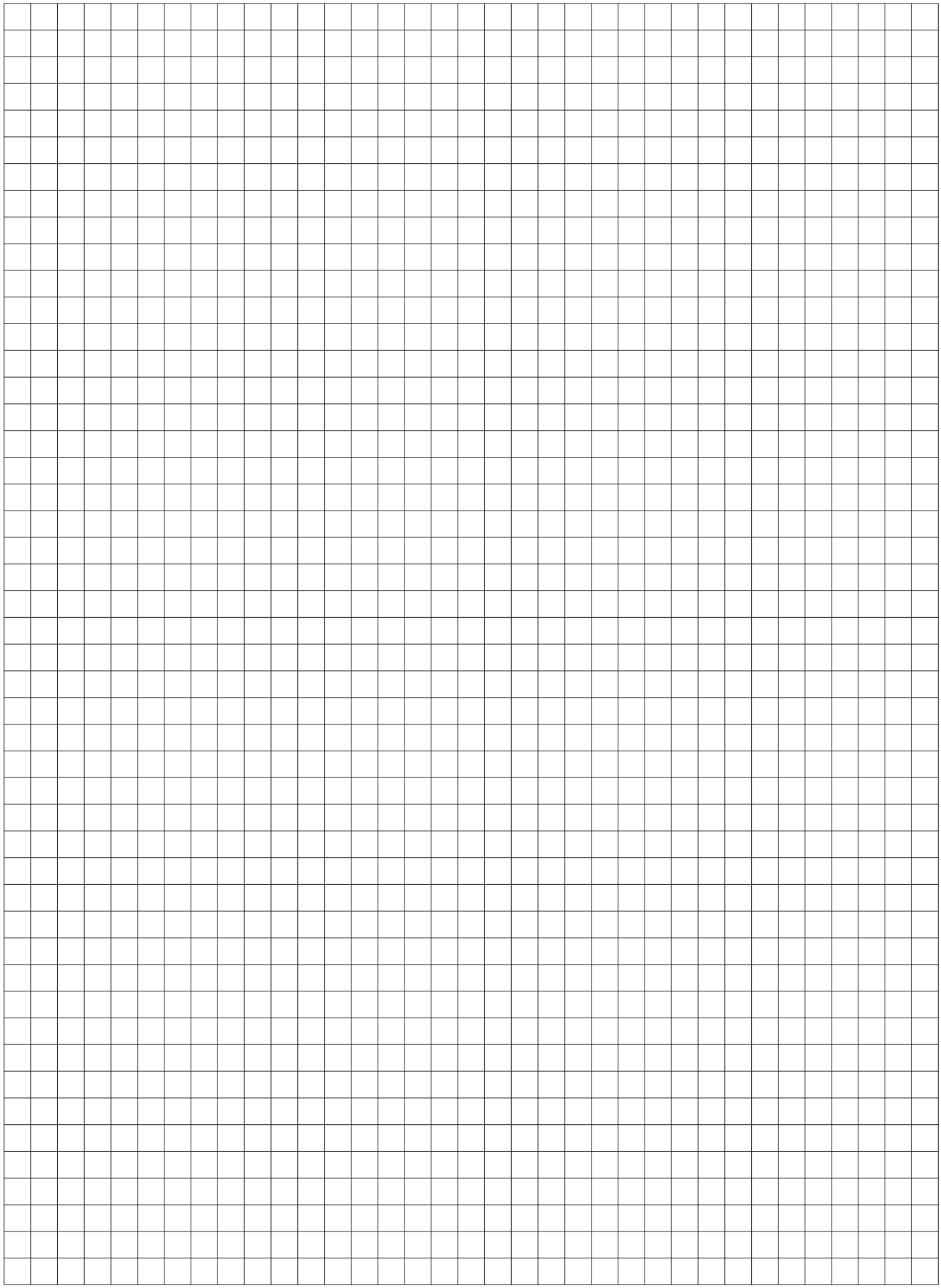
Prevent wrong lying



At temperatures lower than 0° prevent impacts (especially against pipe ends), excessive loads, crushing or bending. Please handle pipes with care at low temperatures.



UV radiation has influence on polymeric plastic products. Protect pipes against weathering and UV radiation to prevent damages. For this reason pipes and fittings are supplied in suitable plastic bags or cardboard boxes.



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