PP-R Pipes and Fittings

Socket Welding System for Industrial Applications



PP-R

www.baenninger.de

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-national 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

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 Deutsche Akkreditierungsstelle D-ZM-17265-01-00

SKZ - CERT Gesellschaft mbH Zertifizierungen
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PP-R Industry-Program, RAL 7032 grey, Socket-Fusion-Fittings and Pipes



Elbow 90° Art. BG 8090

d	Verp.	€/St.
20 mm	10	
25 mm	10	
32 mm	10	
40 mm	5	
50 mm	10	
63 mm	10	
75 mm	2	
90 mm	2	
110 mm	2	



Pipe SDR 11 PN 10, 5m Art. BG 8100

d	Verp.	€/m
20x1,9 mm	125m	
25x2,3 mm	125m	
32x2,9 mm	75m	
40x3,7 mm	50m	
50x4,6 mm	25m	
63x5,8 mm	25m	
75x6,8 mm	10m	
90x8,2 mm	10m	
110x10,0 mm	10m	



Socket Art. BG 8270

d	Verp.	€/St.
20 mm	10	
25 mm	10	
32 mm	10	
40 mm	10	
50 mm	10	
63 mm	2	
75 mm	2	
90 mm	2	
110 mm	2	



Elbow 45° Art. BG 8041

d	Verp.	€/St.
20 mm	10	
25 mm	10	
32 mm	10	
40 mm	10	
50 mm	5	
63 mm	5	
75 mm	2	
90 mm	2	
110 mm	2	



Cap Art. BG 8301

d	Verp.	€/St.
20 mm	10	
25 mm	10	
32 mm	10	
40 mm	10	
50 mm	10	
63 mm	2	
75 mm	2	
90 mm	2	
110 mm	2	



Adaptor socket Art. BG 89107

d_a-R	Verp.	€/St.
25mm-1/2	1	
25mm-3/4	1	
32mm-3/4	1	
32mm-1	1	
40mm-1	1	
40mm-1 1/4	1	
50mm-1 1/4	1	
50mm-1 1/2	1	
63mm-1 1/2	1	
63mm-2	1	

8 bar bei 20°C



Tee 90° Art. BG 8130

d	Verp.	€/St.
20 mm	10	
25 mm	10	
32 mm	10	
40 mm	10	
50 mm	10	
63 mm	2	
75 mm	2	
90 mm	2	
110 mm	2	



Flange adaptor Art. BG 8790

d	a.V.	Verp.	€/St.
40 mm	X	2	
50 mm	X	2	
63 mm	X	2	
75 mm	X	2	
90 mm	X	2	
110 mm	X	2	



Backing flanges PP/St.. Art. 620.74.00

d	Verp.	€/St.
40 mm	1	
50 mm	1	
63 mm	1	
75 mm	1	
90 mm	1	
110 mm	1	



Tee red. Art. BG 8130 red.

d	Verp.	€/St.
25-20 mm	10	
32-20 mm	10	
32-25 mm	10	
40-20 mm	10	
40-25 mm	10	
40-32 mm	10	
50-25 mm	10	
50-32 mm	10	
50-40 mm	10	
63-25 mm	2	
63-32 mm	2	
63-40 mm	2	
63-50 mm	2	
75-32 mm	2	
75-40 mm	2	
75-50 mm	2	
75-63 mm	2	
90-63 mm	2	
90-75 mm	2	



Reducer Art. BG 8243

d_a-d_i	Verp.	€/St.
25-20 mm	10	
32-20 mm	10	
32-25 mm	10	
40-20 mm	10	
40-25 mm	10	
40-32 mm	10	
50-20 mm	10	
50-25 mm	10	
50-32 mm	10	
50-40 mm	10	
63-25 mm	5	
63-32 mm	5	
63-40 mm	5	
63-50 mm	5	
75-50 mm	2	
75-63 mm	2	
90-50 mm	2	
90-63 mm	2	
90-75 mm	2	
110-63 mm	2	
110-75 mm	2	
110-90 mm	2	



Flat gasket EPDM/St. Art. 670.41.01

d	Verp.	€/St.
40 mm	1	
50 mm	1	
63 mm	1	
75 mm	1	
90 mm	1	
110 mm	1	

Raw material:
PP-R (Polypropylen Random Copolymerisat) with high molecular weight.

Connection:
Welding connection:
Electrofusion welding according to DSV data sheet 2207, part 11, point 3.2 (welding instructions).
Equipment for electrofusion welding according to DVS data sheets 2208, part 1, point 5, table 7 (sizes of heating elements for process A without mechanical treatment of the pipes).
DVS standard 2208-1, point 5.2 (technological options):
Any mechanical surface treatment in the weld seem are of the pipe is not made if the technological option of socked welding is being applied (process A).

Thread connections:
The connection thread of transition fittings is in accordance with the standard DIN EN 10266 part 1 for Withworth pipe threads.
Types of threads: **R = conical male thread**
Rp = cylindrical female thread
Rc = conical male thread
G = cylindrical male thread

Measures:
Pipes according to DIN 8077 (Polypropylen PP pipes)
Fittings according to DIN 15874
Tolerances of z-size +/- 3 mm, subject to dimensional change.

Chemical resistance:
Detailed data concerning the chemical resistance of Polypropylene pipes and fittings is included in standard DIN 8078, annex 1. The explanations on page 1 of the annex have to be considered.

Pipes are available in straight rods of 5 m length.
Plastic pipes and fittings made of Polypropylen Random Copolymerisat offer all advantages which have been prooved in all matters concerning the industrial application.

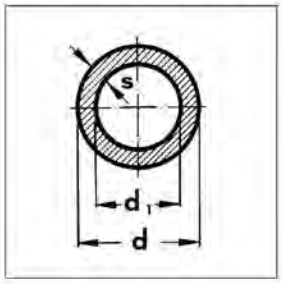
DIN EN ISO 15874	Plastic piping systems for hot and cold water installations Polypropylene (PP)
DIN 8077	Polypropylene (PP) pipes Dimensions
DIN 8078	Polypropylene (PP) pipes General quality requirements
DVS 2207 Part 11	Welding of thermoplastic Heated tool welding of pipes, piping parts and panels made of PP
DVS 2208 Part 1	Welding of thermoplastics Machines and devices for heated tool welding of pipes, piping parts and panels
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

PP-R Druckrohr 20°C / 1,0 MPa

Pressure pipe

Tube pression

Tubería sanitaria • Напорная турба

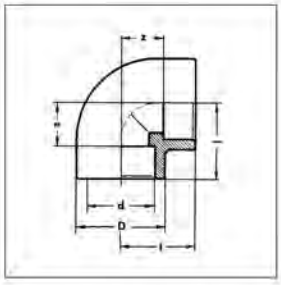


d	DN	s	d_1	kg/m
20	15	2,3	15,4	0,139
25	20	2,8	19,4	0,203
32	25	2,9	26,2	0,284
40	32	3,7	32,6	0,420
50	40	4,6	40,8	0,640
63	50	5,8	51,4	1,395
75	–	6,8	61,4	1,440
90	65	8,2	73,6	2,030
110	80	10,0	90,0	3,080

PP-R – Winkel 90° mit beidseitiger Schweißmuffe

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

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

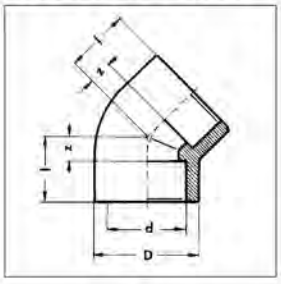


d	D	l	z
20	29	28	13
25	34	32	16
32	43	38	20
40	52	44	23
50	65	52	28
63	84	62	34
75	101	71	41
90	120	83	50
110	148	99	62

PP-R – Winkel 45° mit beidseitiger Schweißmuffe

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

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

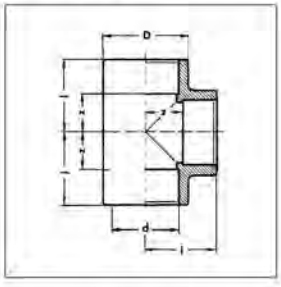


d	D	l	z
20	29	21	6
25	34	24	8
32	43	28	10
40	52	32	11
50	65	37	13
63	82	44	16
75	99	50	20
90	120	58	25
110	148	69	32

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

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

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

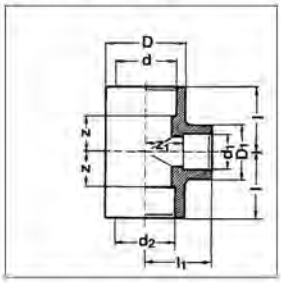


d	D	l	z
20	29	28	13
25	34	32	16
32	43	38	20
40	52	44	23
50	65	52	28
63	84	62	34
75	100	71	41
90	120	83	50
110	148	99	62

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

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

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

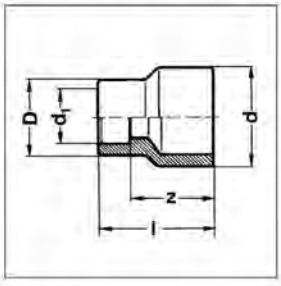


d - d_1 - d_2	D	D_1	l	l_1	z	z_1
25 - 20 - 25	34	29	32	32	16	17
32 - 20 - 32	43	29	38	36	20	21
32 - 25 - 32	43	34	38	36	20	20
40 - 20 - 40	52	43	44	39	24	24
40 - 25 - 40	52	43	44	40	23	24
40 - 32 - 40	52	43	44	40	23	22
50 - 25 - 50	65	43	52	46	28	30
50 - 32 - 50	65	43	52	46	28	28
50 - 40 - 50	85	85	62	62	39	35
63 - 25 - 63	85	43	62	62	35	46
63 - 32 - 63	85	43	62	62	35	44
63 - 40 - 63	85	85	62	62	35	42
63 - 50 - 63	85	85	62	62	35	39
75 - 32 - 75	100	43	71	71	41	53
75 - 40 - 75	100	65	71	71	41	51
75 - 50 - 75	100	65	71	71	41	48
75 - 63 - 75	100	101	71	71	41	44
90 - 63 - 90	85	83	83	50	50	53
90 - 75 - 90	120	100	83	83	50	53

PP-R – Reduktion mit Schweißstutzen und Schweißmuffe

PP-R – Reducer with welding socket and welding stub

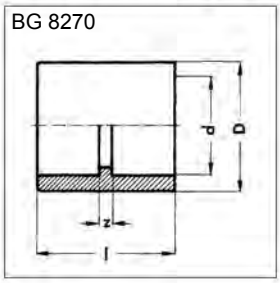
Réduction • Reduccion soldable • Редуктор



d - d_1	D	l	z
25 - 20	29	36	22
32 - 20	29	37	23
32 - 25	34	39	23
40 - 20	34	43	28
40 - 25	34	43	27
40 - 32	43	45	27
50 - 20	43	51	36
50 - 25	43	51	35
50 - 32	43	51	33
50 - 40	52	53	33
63 - 25	34	56	40
63 - 32	43	58	40
63 - 40	52	60	40
63 - 50	65	63	40
75 - 50	65	67	44
75 - 63	80	71	44
90 - 50	65	74	51
90 - 63	80	78	51
90 - 75	99	81	51
110 - 63	85	87	60
110 - 75	100	90	60
110 - 90	120	93	61

PP-R – Muffe
PP-R – Socket
Manchon • Manguito soldable • Муфта

BG 8270



d	D	l	z
20	29	34	5
25	34	37	5
32	43	41	5
40	52	46	5
50	65	52	5
63	84	60	5
75	99	65	5
90	120	76	10
110	148	80	6

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

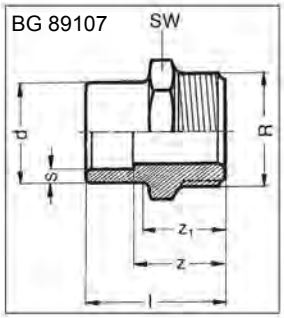
BG 8301



d	D	l
20	29	25
25	34	28
32	43	32
40	52	36
50	65	41
63	79	48
75	99	54
90	120	66
110	148	79

Übergangsnippel , Betriebsdruck 8 bar gilt für Wasser bei 20°C
Adapter Socket, operating pressure 8 bar for a water temperature of 20°C
Adaptador Socket, presión de trabajo 8 bar para una temperatura del agua de 20 ° C
Переходной ниппель , рабочее давление 8 бар применяется для воды при температуре 20°C

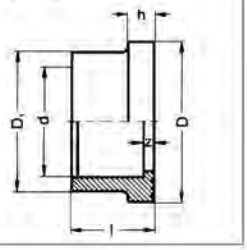
BG 89107



d - R	s	l	z	SW
25 - ½	2,3	45	29	26
25 - ¾	2,3	47	31	26
32 - ¾	3,0	47	31	34
32 - 1	3,0	48	35	34
40 - 1	3,7	58	36	44
40 - 1¼	3,7	59	39	44
50 - 1¼	4,6	63	43	49
50 - 1½	4,6	65	46	49
63 - 1½	5,8	72	52	65
63 - 2	5,8	76	52	65

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

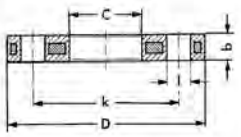
BG 8790



d	D	D_1	l	z	h
40	61	50	29	9	8
50	74	61	27	4	8
63	102	76	40	13	17
75	122	90	38	8	19
90	138	108	45	12	21
110	158	131	50	13	21

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

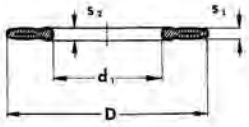
620.74.00



d	DN	D	k	b	c	l	AL
40	32	140	100	16	51	18	4
50	40	150	110	18	62	18	4
63	50	165	125	18	78	18	4
75	65	185	145	18	92	18	4
90	80	200	160	18	110	18	8
110	100	220	180	18	133	18	8

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

670.41.01



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

EPDM = Ethylen-Propylen-Dien-Monomer-Kautschuk für Trinkwasser zugelassen nach DVGW mit KTW-Empfehlung und mikrobiologischer Zulassung entspr. DVGW Arbeitsblatt W 270.
EPDM = Ethylen-Propylen-Dien-Monomer-Kautschuk approved for potable water acc. DVGW with KTW-Recommendation and micro-biological approval acc. DVGW W 270.
EPDM = Ethylen-Propylen-Dien-Monomer-Kautschuk admis pour l'eau potable selon DVGW avec recommendation KTW et admission microbiologique selon DVGW page W 270.

Properties	Measuring technique	Unit	PP - R 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
Density	ISO / R 1183	g/cm^3	0,895
Melting range	polarizing microscope	0°C 0° F	140 – 150 289 – 302
Yield stress Tensile strength Tensile expansion	ISO / R 527 feed speed Test bar	N/mm^2 N/mm^2 %	21 40 600
Bending stress at 3,5% Marginal fibre expansion	ISO 178 test specimen 5.1	N/mm^2	20
Modulus of elasticity	ISO 178	N/mm^2	800
Mechanical properties following impact bending test at 0° C	DIN 8078		no fracture
Expansion coefficient	VDE 0304 Part 1 § 4	K^{-1}	$1,5 \times 10^{-4}$
Thermal conductivity at 20° C/58° F	DIN 52612	W/m K	0,24
Specific heat at 20° C/68° F	adiabatic calorimeter	kJ/kg K	2,0
Pipe friction factor	––		0,007

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 that of steel pipes. This fact must by all means be taken into consideration in the laying process. Already in the pipe arrangement planning stage each possibility should therefore be fully utilized to compensate all extension processes within a pipe section.

The linear thermal expansion coefficient for PP-R is:

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

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

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

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

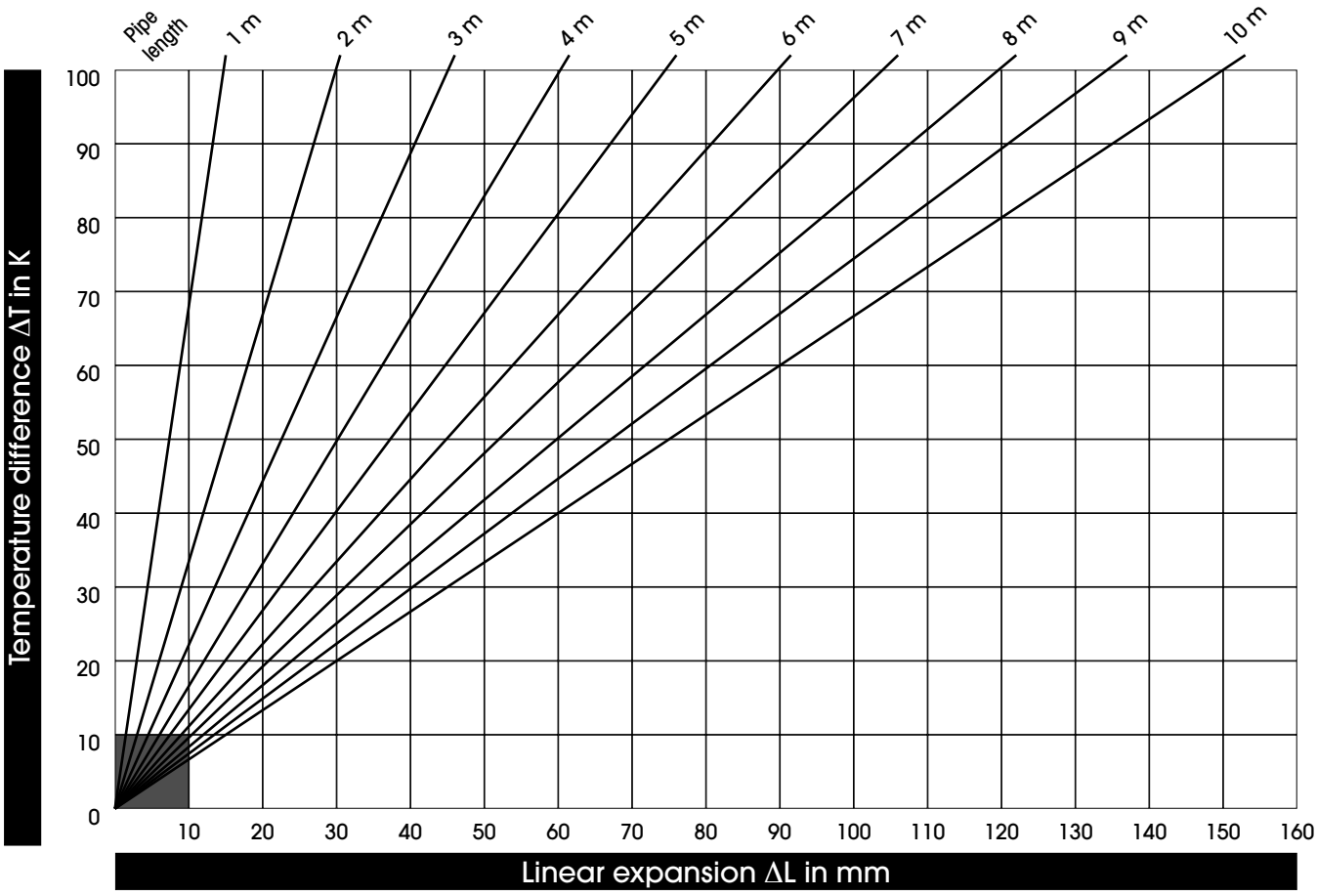
Example for a pipe length of 8m:

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 x 7° x 0,15 = 8,4 mm

To 2. Extension of the pipe: 8 m x 54° x 0,15 = 64,8 mm

Diagram and Chart to determine the temperature-dependent linear Expansion of PP-R



	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

Linear expansion ΔL in mm

Mostly the linear extension of a PP-R 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 compensation of a changed direction is not possible installation of an expansion bend is necessary. An axial compensation is mostly not suitable and uneconomical.

For spring deflexion of a pipeline the size of the bending limb has to be considered 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 L_s has to be considered.

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

L_s = Length of bending limb (mm)

d = Outside pipe diameter (mm)

DL = Linear deformation (mm)

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

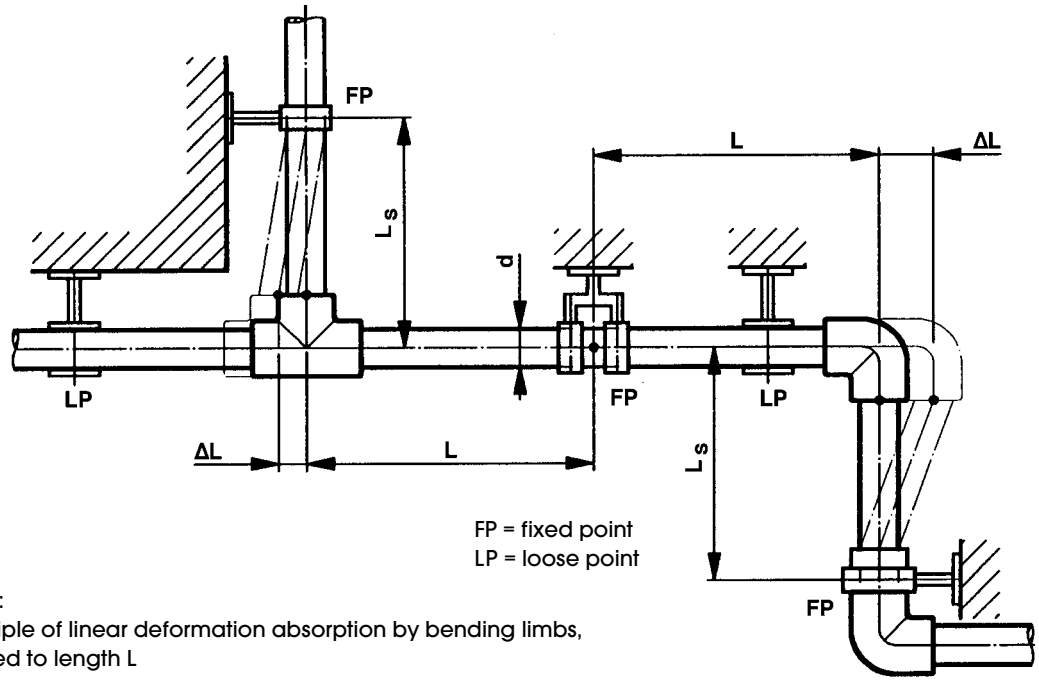


Fig. 6:
Principle of linear deformation absorption by bending limbs, related to length L

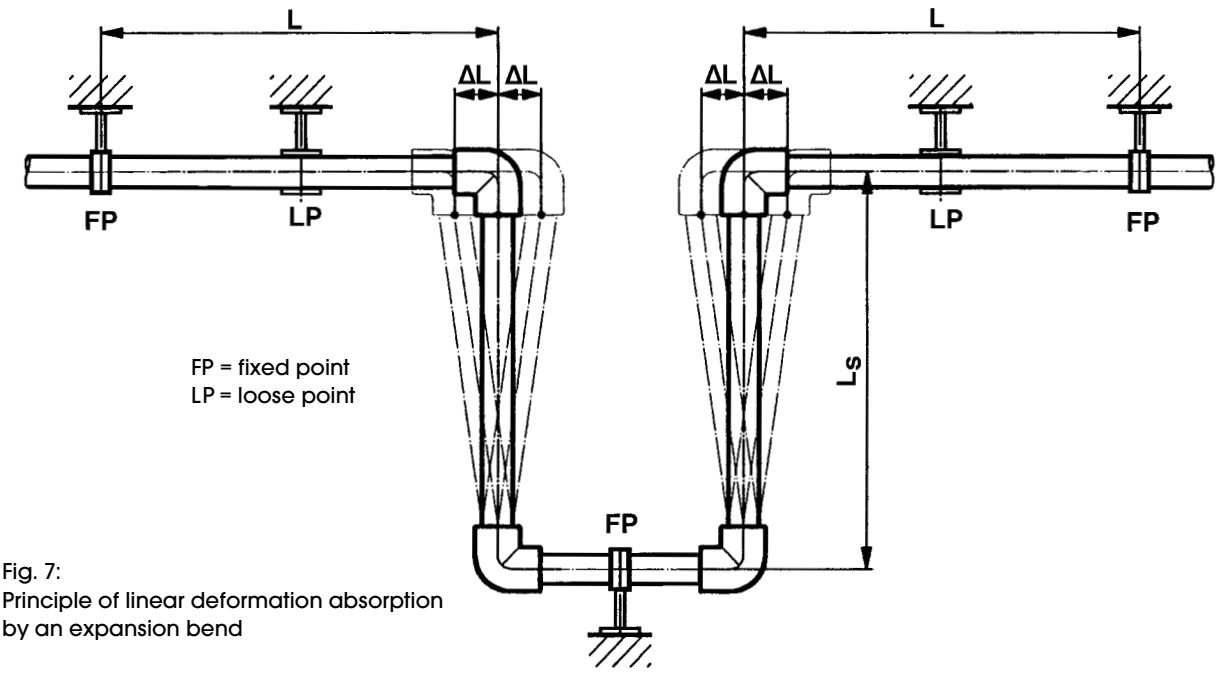


Fig. 7:
Principle of linear deformation absorption by an expansion bend

Construction of Expansion Bends

Expansion bends can easily be made right at the site.
Besides of the required pipe length 4 elbows (8090)
are needed.
To construct an expansion bend the bending limb L_s is calculated depending 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.

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:

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

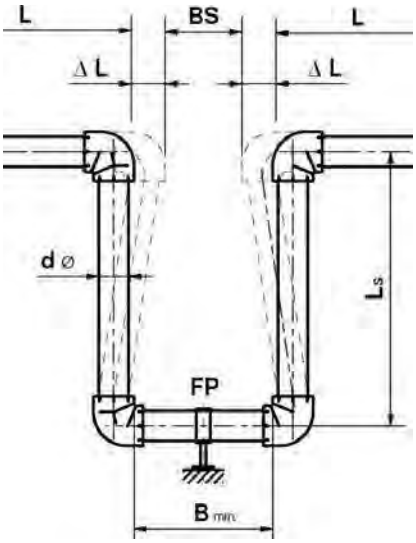
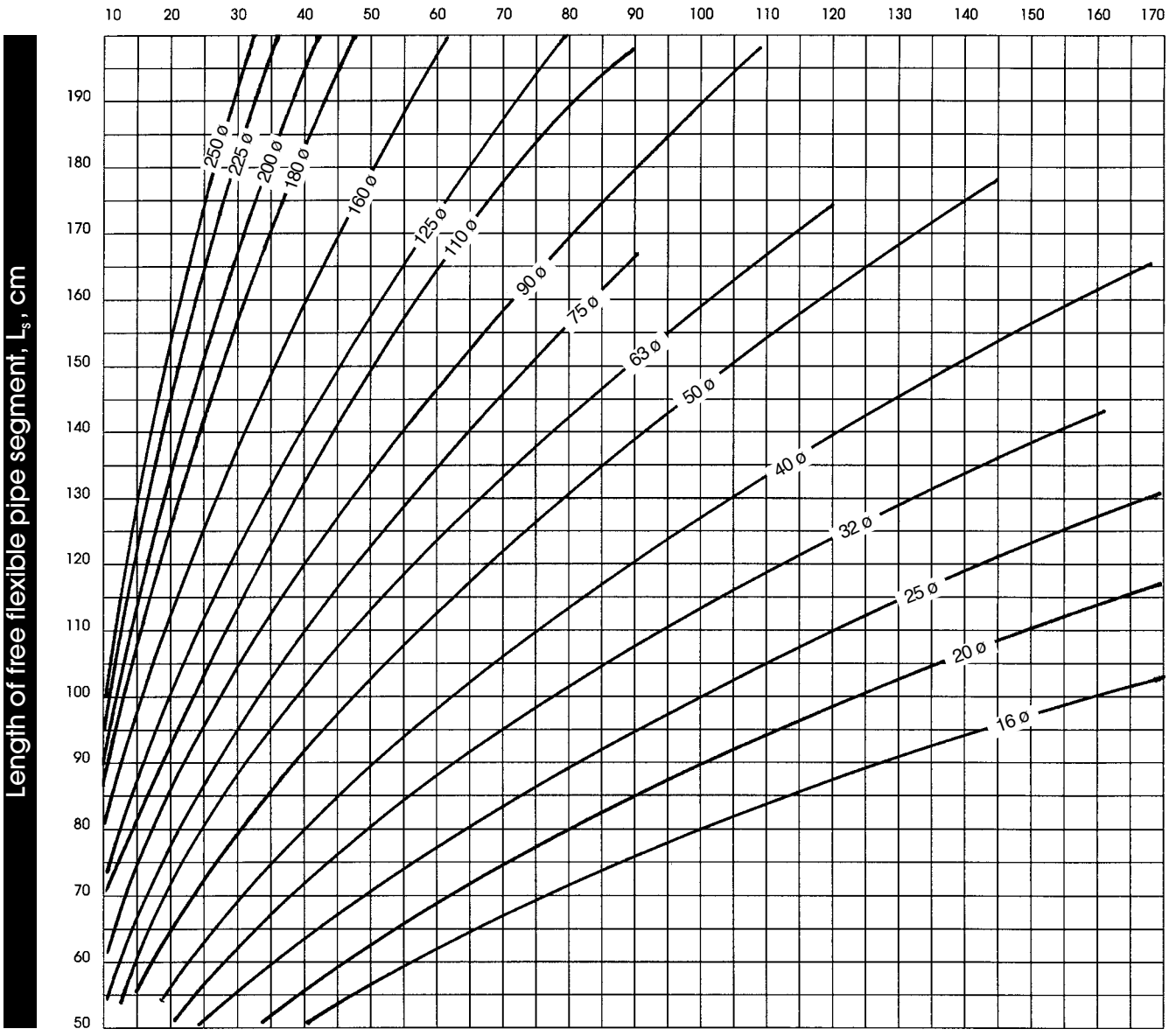


Fig. 8



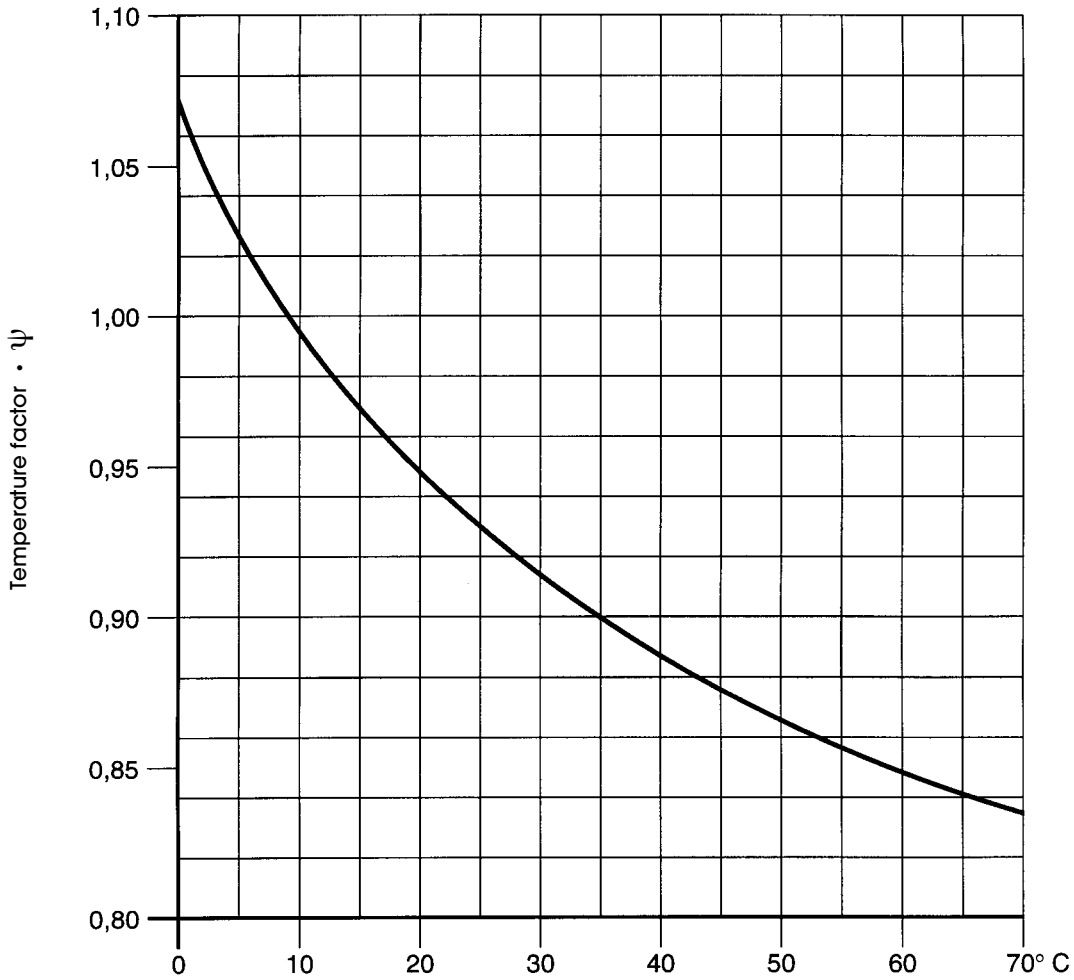


Fig. 2: Temperature of the flow medium

For the individual fitting resistance the 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.

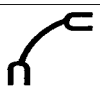
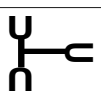
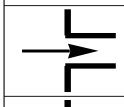
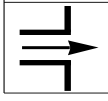
Outside pipe diameter d mm	20 25	32 40	50 63	≧63
Fitting Type	Drag coefficient ζ			
	1,5	1,0	0,6	0,5
	2,0	1,7	1,1	0,8
	0,3			
	1,5			
 Stream in	0,5			
 Stream out	1,0			

Fig. 3: Pressure drop in fittings

Welding Procedure

The **Bänninger** PP-R 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

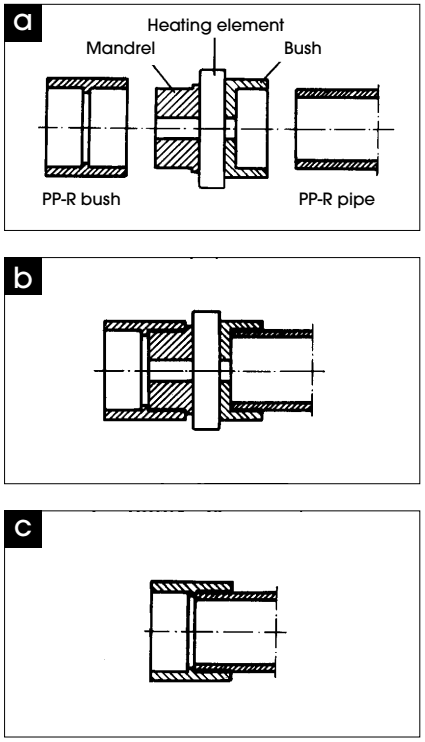
Cut pipes square into sections.
Thoroughly clean both joint faces, the pipe end and socket with spirit and absorbent paper. Mark socket depth on the pipe.
Bring the heating element to 260° C.
Check the set temperature before the welding process.
Temperature tolerance ± 10° C.
The heating element should 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.

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.



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

Pipe Ø d (mm)	Bush depth=Insertion depth (mm)
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

Fig. 15:
Bush depths for PP-R fittings

Quantity and distance of fastening the pipe clamps depends – among other factors – on the longitudinal elongation.
Purpose of the fixed points is to divide the pipeline into sections in which elongation resp. contraction is possible.
The sections are lead by pipe clamps.
The distance of the clamps (support distance) resp. the spans depend on the operating conditions,
the raw material of the pipe and the weight oft he pipeline including the filling.

d	20°C	30°C	40°C	50°C	60°C	70°C	80°C
20	64	60	57	54	51	50	47
25	73	69	65	62	59	57	54
32	86	81	76	73	69	67	64
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

Support distance for PP-R pipe BG 8100

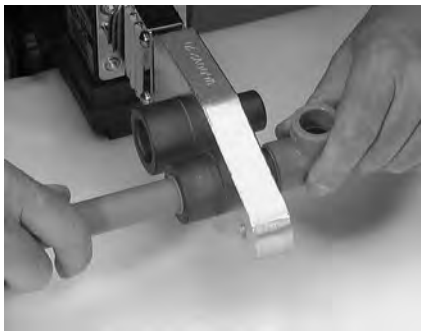
Proceeding Socket Welding



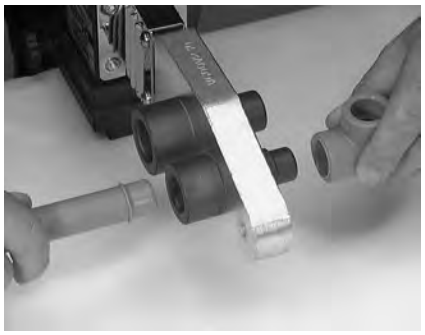
1. Pipes are measured and cut to the required length. Cutting should be rectancular to the pipe axis (90°).



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



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.

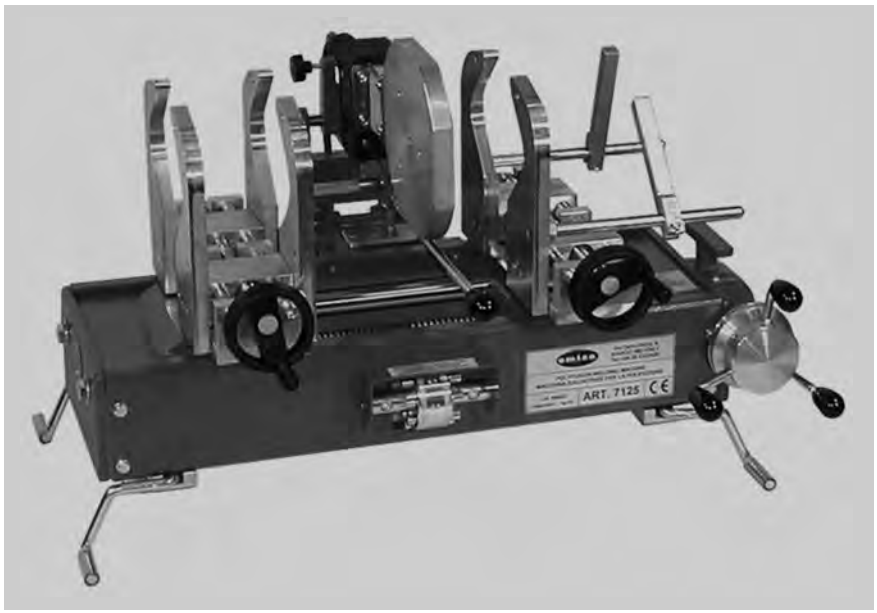


6. Adapt and join pipe and fitting within the max. allowed period without turning the parts against each other.

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.

Proceeding – Socket Welding with a Welding Machine

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



The socket welding machine No. 8988 consists of:

- Basic unit with movable slides
- Heating element
- Prism clamping jaws
- Socket and mandrels 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 into 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

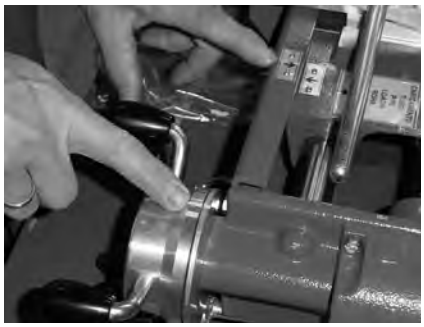


Fig. 5
Adjust the position of the slides



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

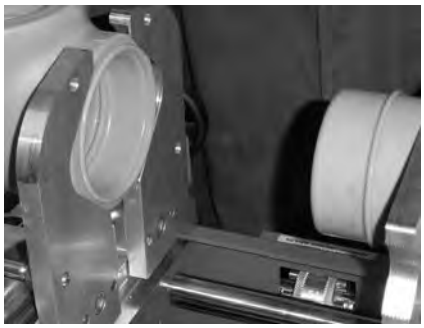


Fig. 10
After the warming time join pipe and fitting

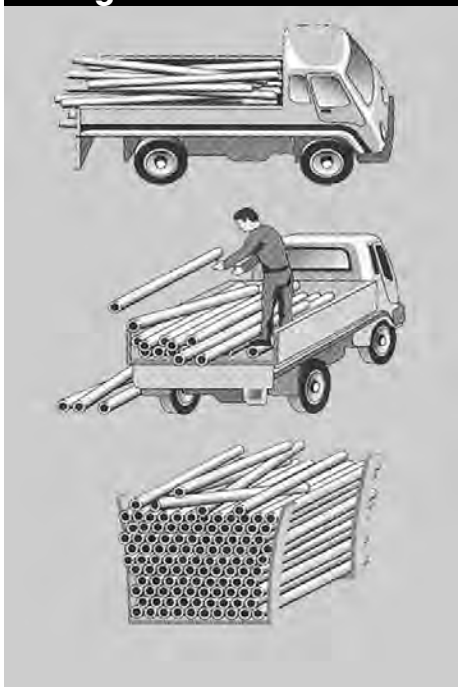


Fig. 11
Move the machine slides up to stroke end



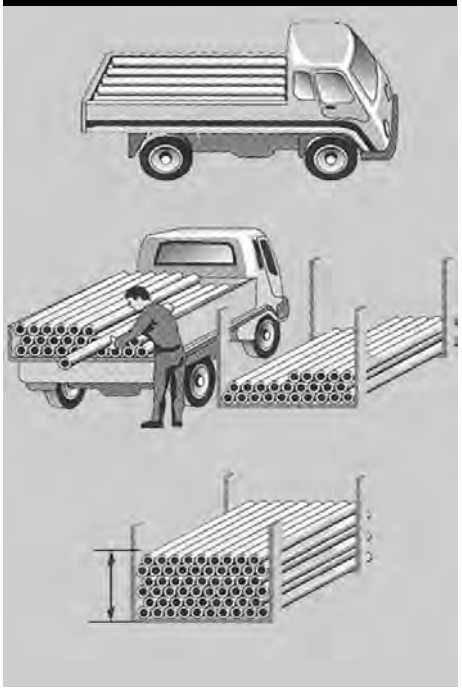
Fig. 12
Remove the welding joint after the end of the cooling time from the clamping jaws

Wrong



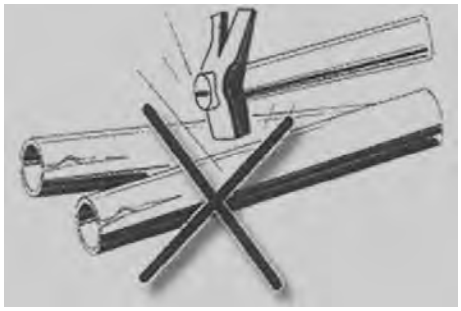
Prevent impacts
(especially against pipe ends)

Correct

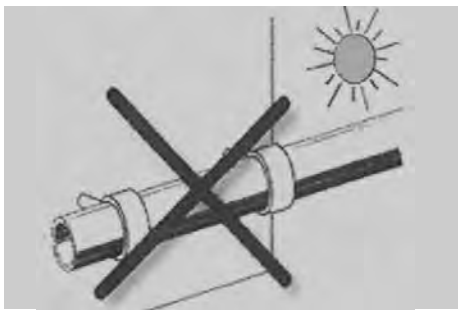


Prevent excessive loads

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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