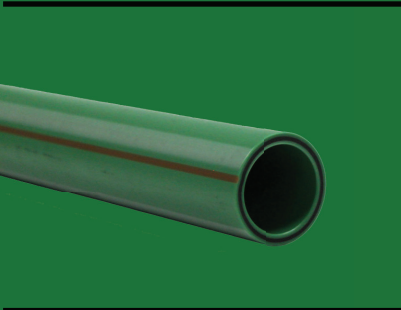


Asahitec™

Installation and Maintenance Manual For PP-RCT Pipes and Fittings



Pipe • Fittings • Valves • Installation

Another
Corrosion
Problem
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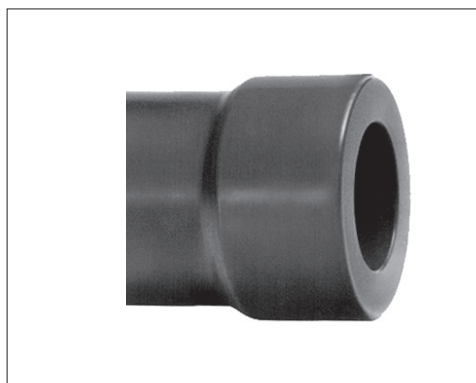


AsahitecTM

Installation & Maintenance Manual

For PP-RCT Pipes And Fittings

Accessories And Additional Parts



ClimatecTM

WatertecTM

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**Read all Instructions First
Before Installing or Operating
the Equipment !**



**Installation is to be performed
by Properly Trained and
Authorized Personnel Only !**



**Do not Drink Any Alcohol or Take Any Drugs
Before or During the Installation of the Products
and follow the Safety Instructions carefully !**

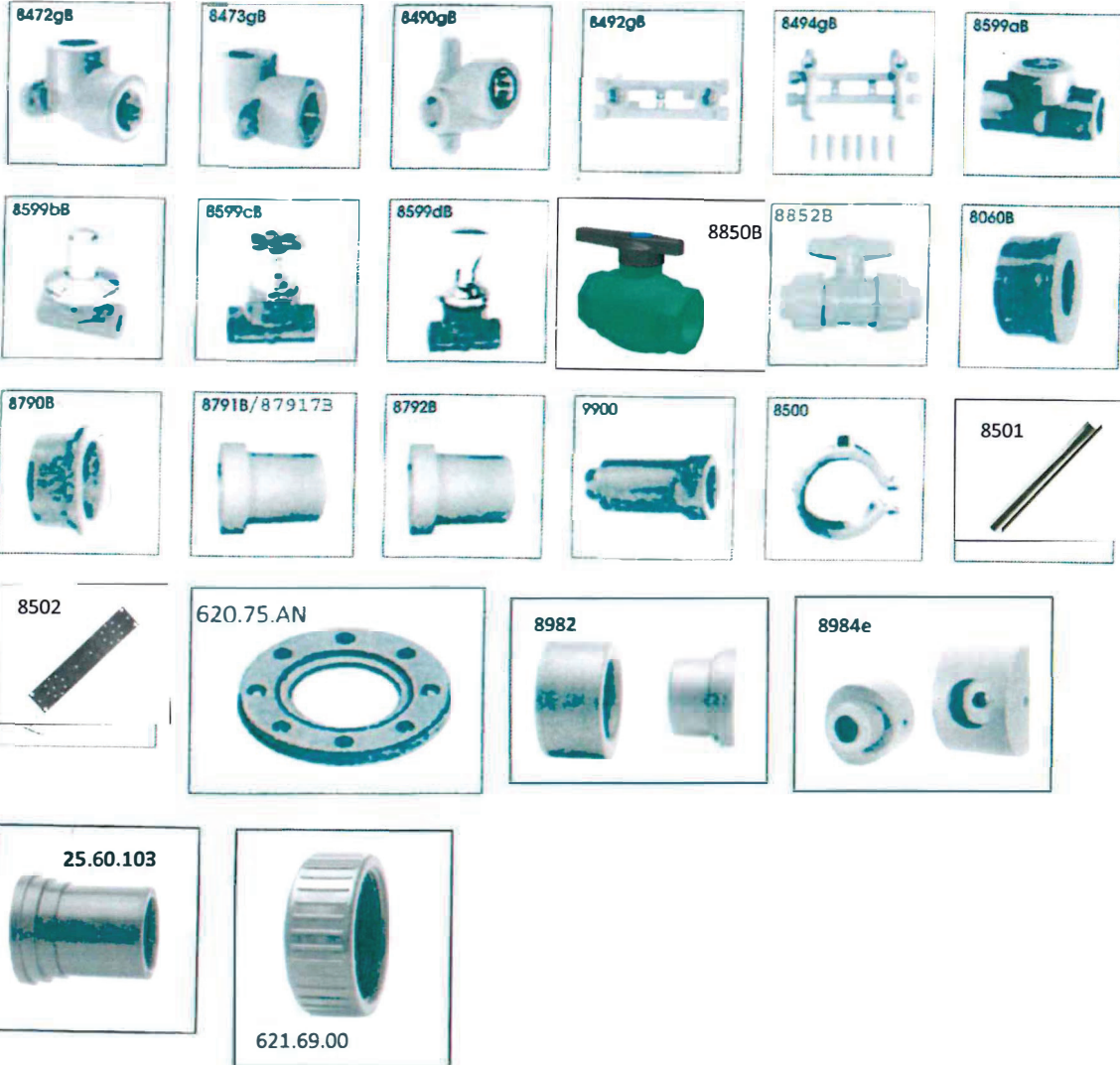



PP-RCT Pipes and Fittings to Which This Manual Applies





PP-RCT Pipes and Fittings to Which This Manual Applies



<p>Item no. 8850B Should Not be Used for Carrying Potable Water !</p>	
--	---

Preparations

Cut pipes square into sections. Thoroughly clean both joint faces, the pipe end and fitting socket, with alcohol and absorbent paper. Mark bush depth on the pipe. Bring the heating element of a suitable polywelder to 500°F. Check the established temperature settings before starting the welding process. Temperature tolerance $\pm 50^\circ\text{F}$. The temperature of the heating element of a suitable polywelder must be controlled by a suitable measuring device.

Before using a suitable polywelder read the Owner's manual carefully.

Do not start heating the joint parts before the heating temperature reaches 500°F. The mandrel and bush must be clean and have to be purified before each following welding process.

Flow Of Work - Socket Welding

Welding Procedure

Overview

The PP-RCT pipework is coupled by socket fusion welding. The pipes and fittings are connected overlapping lengthwise. The heating of the pipe ends and fitting faucets is done by a heating element of a suitable polywelder with fitted bushes. After the correct welding temperature has been reached, the joining can proceed. The pipe and fitting faucet diameters, as well as the respective heated bush diameters, are matched to build up the necessary pressure during the joining process.

The heating element of a suitable polywelder is electrically heated.

Push the pipe and fitting quickly and axially up to the stop of the mandrel and the marked insertion depth respectively and keep them fast without twisting. The heating of the joint faces is done according to the table in Fig. 1 (Page 10).

At the end of the heating period pull the pipe and the fitting from the heating element of the suitable polywelder and join them immediately axially aligned and without torsion. Mind the correct insertion depth (Fig. 1, Page 8). The pipe must be pushed in up to the marked insertion depth of the bush bottom. Fix the two joint parts again for the duration of the heating period.

Do not expose the welded joint to mechanical stress before the expiration of the cooling period (see Fig. 1, Page 10).

CAUTION

Do not expose the welded joint to mechanical stress before the cooling period is over !

PP-RCT Pipes and Fittings are to be Used only as Part of the Entire System.

PP-RCT Pipes are to be Used only with PP-RCT Fittings.

Flow Of Work - Socket Welding



1. Measure and Cut Pipe with suitable pipe cutters to the correct length. Pipe must be squared 90°.

Before using a suitable pipe cutter read the Owner's manual carefully.

d in mm	Pipe Ø	Bush Depth=Insertion Depth
16	(3/8")	0.51"
20	(1/2")	0.57"
25	(3/4")	0.63"
32	(1")	0.71"
40	(1 1/4")	0.81"
50	(1 1/2")	0.93"
63	(2")	1.08"
75	(2 1/2")	1.18"
90	(3")	1.30"
110	(3 1/2")	1.46"
125	(4-1/2")	1.57"



2. Mark the bush depth on the welding distance to the end of the pipe.

Fig. 1 Bush depths for PP-RCT fittings

Flow Of Work - Socket Welding



3. Push the pipe end and the fitting to the heating element of a suitable Polywelder in axial direction. Heat pipe and fitting simultaneously.

Before using a suitable polywelder read the Owner's manual carefully.



4. The pipe and the fitting are to be removed from the suitable polywelder.



Directly after the cooling time the fused joints can fully work under pressure.

5. Join fitting and pipe in the axial direction. During joining do not turn the pipe end around its axis in the socket.

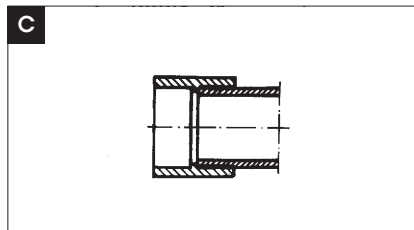
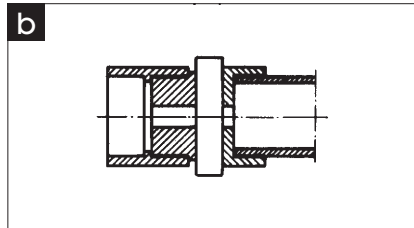
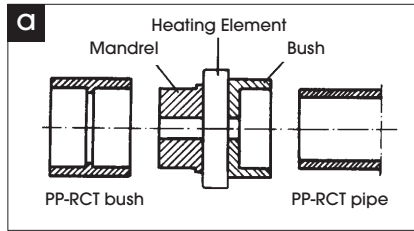
Flow Of Work - Socket Welding

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

a = Welding preparation

b = Warming up

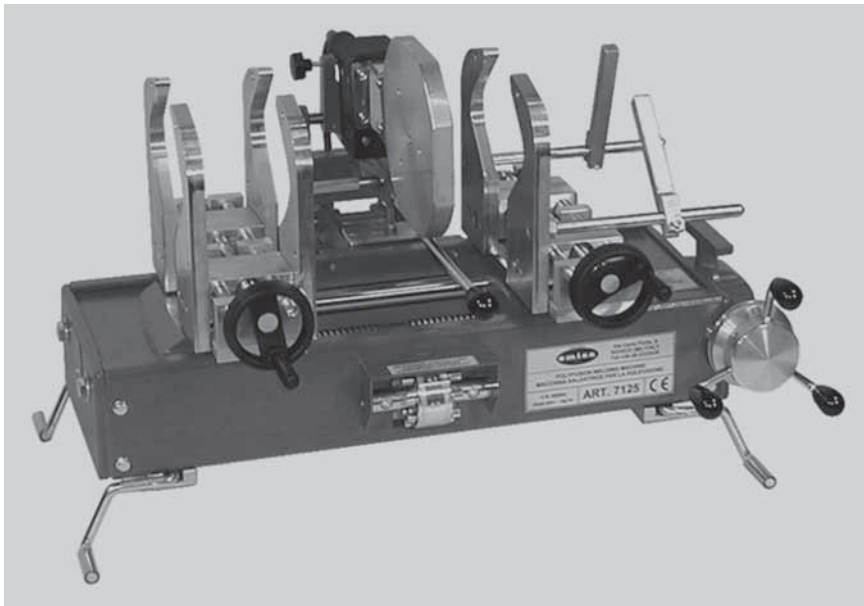
c = Welded joint



1	2	3	4
Pipe Outside Diameter in mm	Heating Phase sec.	Switch sec.	Cooling min.
16 (3/8")	5		
20 (1/2")	5	4	2
25 (3/4")	7		
32 (1")	8		
40 (1 1/4")	12	6	4
50 (1 1/2")	18		
63 (2")	24	8	6
75 (2 1/2")	30		
90 (3")	40	10	8
110 (3 1/2")	50		
125 (4-1/2")	60		

Fig. 1
Standard values for socket fusion welding at room temperature of around 68°F.
If room temperature is below +41°F, the heating phase should be increased by up to 100%.

Workflow - Socket Welding with a Welding Machine



Before using a suitable socket welding machine polywelder for bench read the Owner's manual carefully.



Setting of a suitable socket welding machine polywelder for bench:
Set the heating element in the holder. Mount the suitable welding tools (bush and mandrel) and install the clamping jaws.



Fig. 1 Pipes are measured and cut with suitable pipe cutters to the required length. Cutting should be perpendicular to the pipe axis (90°).

Before using a suitable pipe cutter read the Owner's manual carefully.

Workflow - Socket Welding with a Welding Machine

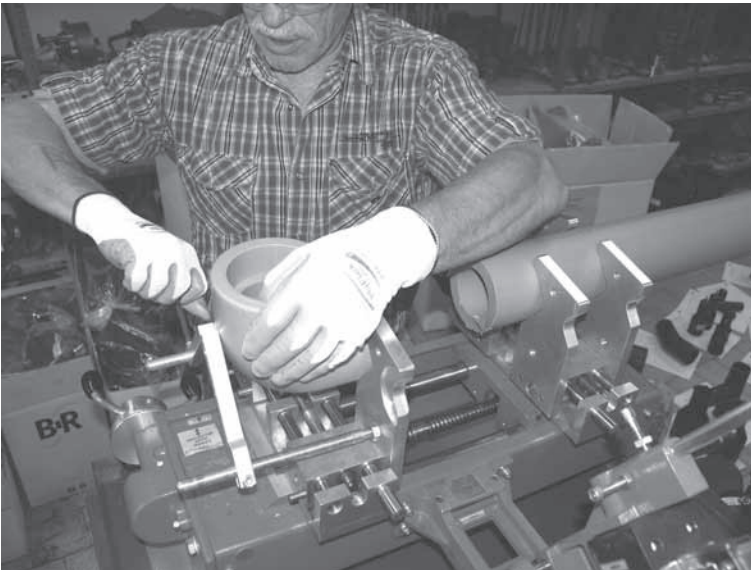


Fig. 2
Place and adjust the fitting in the clamping jaw and adjust the stop to hold the fitting.



Welding:

Switch on the suitable socket welding machine polywelder for bench and the energy control lamp turns on. The temperature control lamp goes off after reaching the operating temperature (500°F). Temperature Tolerance $\pm 50^\circ\text{F}$. The first welding should take place within 5 minutes after the welding temperature has been 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 fit properly into the welding tools. Move the slides with steady forward motion up to the point until the stop has been reached. The heating timer of the joint surfaces starts only after the stop has been reached. After completion of the heating time the slides will be split and the heating unit must be brought into a rest position as fast as possible. Move the machine slides with the hand wheel with a steady forward motion up to the stroke end so that the precise jointing depth between the pipe and the fitting is reached. The welding jointing may be removed from the clamping jaws only after cooling down. Unscrew the clamping jaw with the handle lock and take off the welded unit.

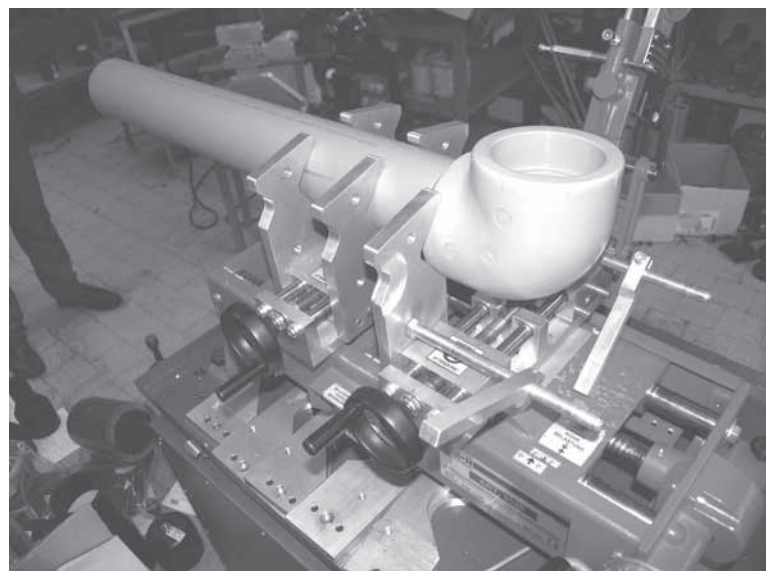


Fig. 3
Lay the pipe axially to the fitting and position it so that it is situated frontally to the fitting

Workflow - Socket Welding with a Welding Machine



Fig. 4
Move the machine slides with the handle lock to set the heating element into the center between pipe and fitting

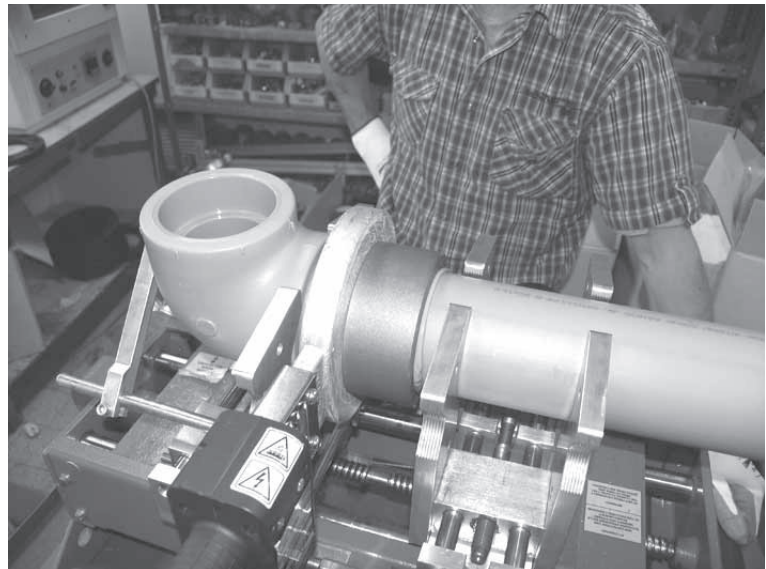


Fig. 5
Move the machine slides with the handle lock, warm up the pipe and the fitting in the welding tools



Fig. 6
Move the machine slides with the handle lock and remove the heating element.

Workflow - Socket Welding with a Welding Machine

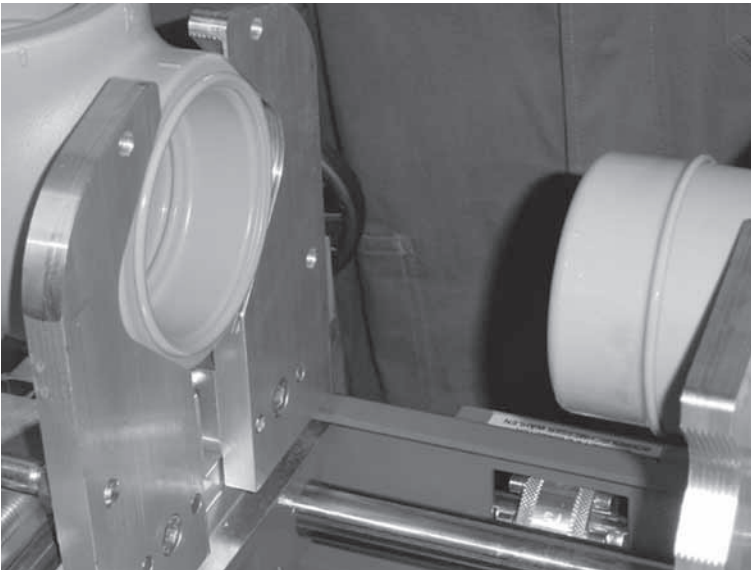


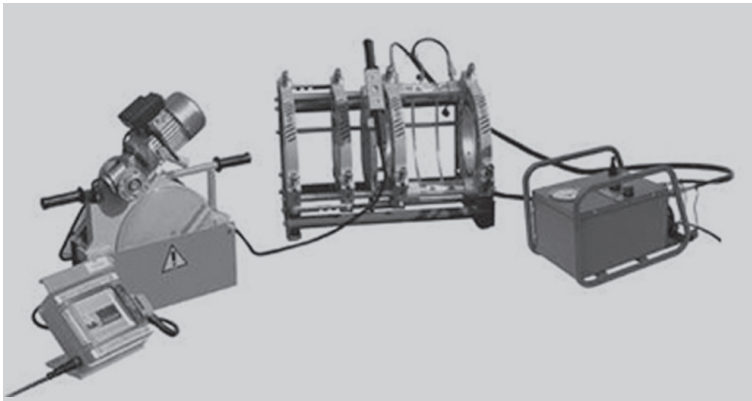
Fig. 7 After the warming time bond the pipe and the fitting.



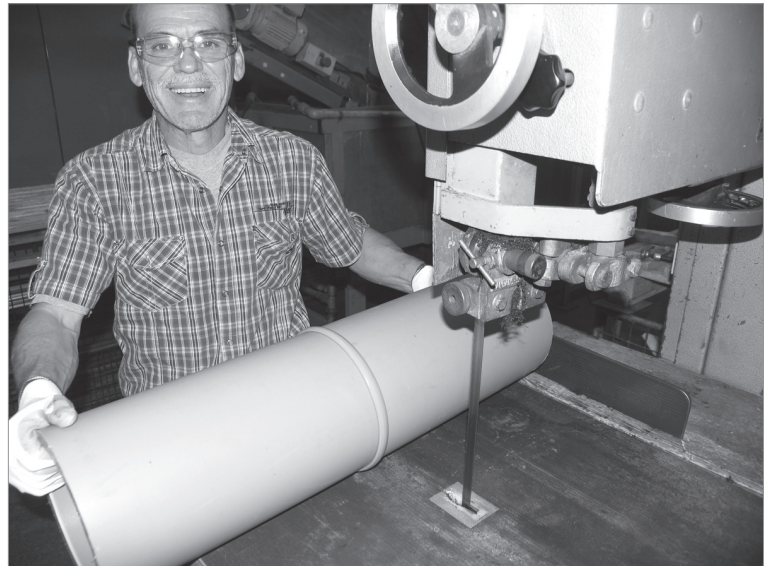
Fig. 8 Move the machine slides up to the stroke end.



Butt Welding with Heating Element



Before using a suitable butt welding machine read its Owner's manual thoroughly.



Before using a suitable sawing machine read the Owner's manual of the respective sawing machine manufacturer carefully.

Fig. 1 Cut the pipes with a suitable sawing machine to the required length.

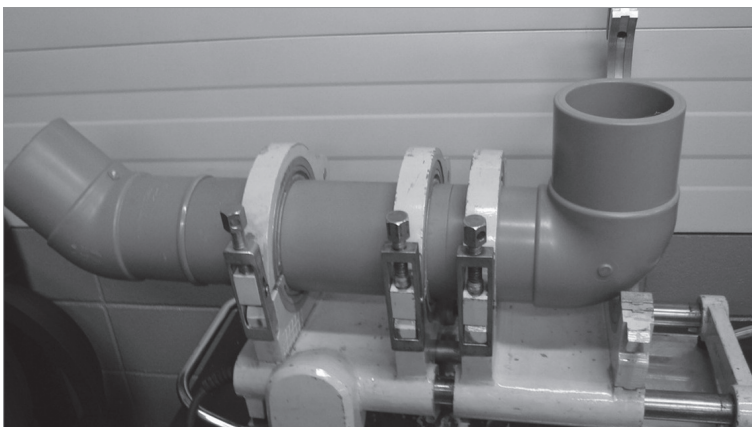


Fig. 2 The spigots of the fittings have to be planed by a suitable electrical planing tool. Ensure that the spigots of the fittings are always planed before every welding.

Before using a suitable electrical planing tool read the Owner's manual carefully.

Butt Welding with Heating Element



Welding Procedure

During butt welding with heating elements the areas to be joined are fitted with pressure at the location of the heating element (adjusting with merging pressure) until the specified bead height is reached. Continue heating up to the welding temperature with reduced pressure (14.5 ± 1.5 psi) then, after removing the heating element, join the pieces with merging pressure (Adaption).

Fig. 3 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 $410^{\circ}\text{F} \pm 50^{\circ}\text{F}$.

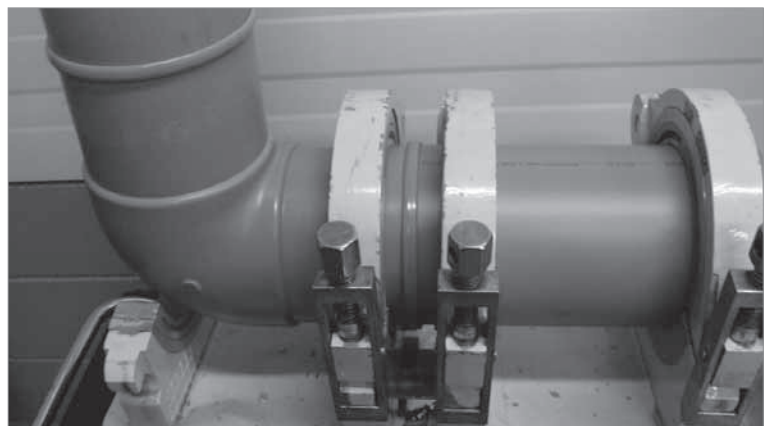
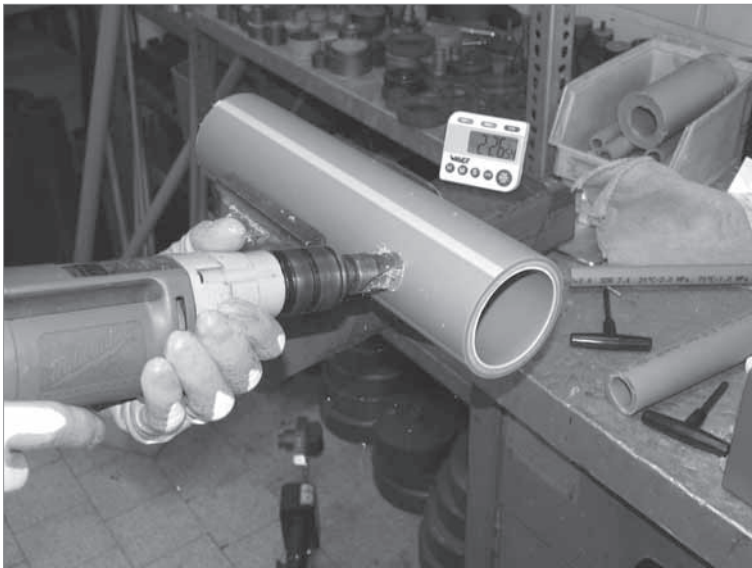


Fig. 4 After a double bead has been formed, the welding is uniform which indicates a successful welding.

Instructions for PP-RCT Welding Saddle Processing



Additional extension of existing pipe systems:
Direct connection of existing consumer pipe to a utility line. Alternative to T-pieces.

Welding Preparations:
Heat up the heating unit to 500° F.
Check the preset temperature prior to the welding process. Temperature Tolerance $\pm 50^\circ$ F.
The welding elements must be clean and should be cleaned prior to every welding process.

Fig. 1 Drilling through the pipe wall.
This task shall be carried out with an electric drill technically suitable for this task, thereby utilizing a suitable borer.

Before using an electric drill technically suitable for this task read the manual of the resp. electric drill carefully.



Fig. 2 Push in the heat nozzle of a suitable welding saddle tool in the drill as well as the connecting piece of the welding saddle in the heating socket of a suitable polywelder.
The heating time for all dimensions is about 30 seconds.

Before using a suitable welding saddle tool for polywelder read the Owner's manual carefully.

Before using a suitable polywelder read the Owner's manual carefully.



Fig. 3 Push the connecting piece of the welding saddle quickly into the heated bore hole.
Push the fitting for about 15 seconds onto the pipe.

After a cooling time of about 10 minutes the fused joint can be operated under pressure.

The appropriate branch connections will be assembled through socket fusion welding or by using female or male adapters with the welding saddle.

Electrofusion Socket Welding – The Fast Connection



Preparing the Welding Surfaces.

Cut the PP-RCT pipe ends rectangularly to the pipe axis with a suitable pipe cutter. Remove in chips the outer surface oxide layer with a suitable scraper and purify with non-fuzzing, absorbent paper and purifying agent (e. g. alcohol).

Fig. 1 Cut the pipe perpendicularly with a suitable pipe cutter.

Before using a suitable pipe cutter read the Owner's manual carefully.

CAUTION	
	Safety gloves required



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

Before using a suitable scraper or peeling tool read the Owner's manual carefully.



Fig. 3 For dimensions bigger than 3" (O.D.) we recommend using a peeling tool similar to the one shown above for removing the outside oxide layer.

CAUTION	
	Watch your fingers & hands

CAUTION	
	Watch your fingers & hands



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

CAUTION	
	Safety gloves required

Electrofusion Socket Welding – The Fast Connection



Mounting of the Electrofusion Welding Sockets. Mark the socket depth on the pipe. After having finished all preparatory work, take the electrofusion socket out of its packaging; do not touch the inner surfaces of the socket. Then push the socket slowly onto the pipe to the marked position.

Fig. 5 Mark up the bush depth.



Repair Work with the Electrofusion Welding Socket.

Remove the defective pipe by cutting a rectangular section of at least 3 - 4 times the socket length to its axis. Fit the new pipe piece into the gap and prepare the ends of the old pipe and new pipe piece as described before. Unpack two electrofusion sockets and push them completely over the two ends of the new pipe piece. Now fit in the new pipe piece and move the sockets to the marks on the old pipe.

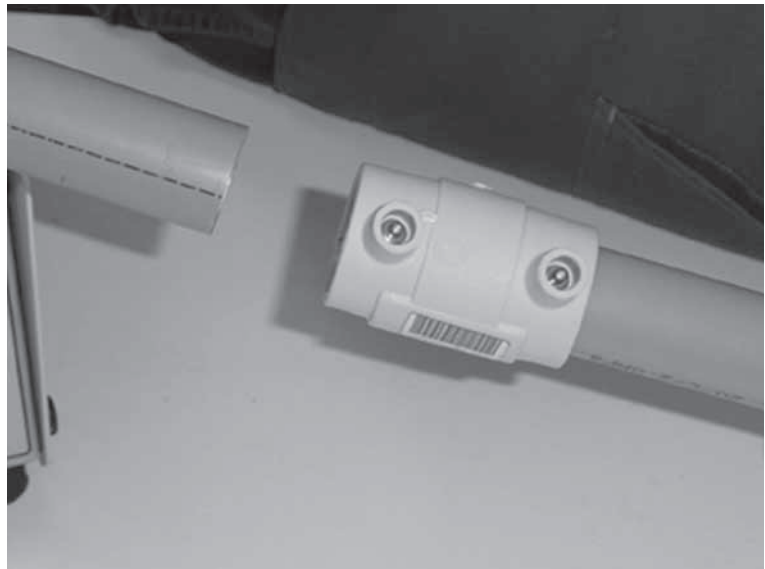


Fig. 6 Push in the electrofusion socket art. 8271B up to the marked position on the pipe.

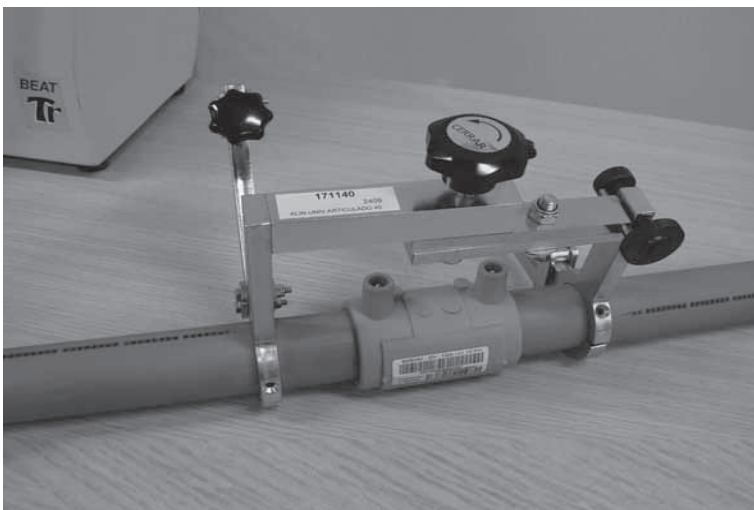


Fig. 7 Align the pipes and the electrofusion socket by using a suitable aligning tool.

Before using a suitable aligning tool read the Owner's manual carefully.

Electrofusion Socket Welding – The Fast Connection

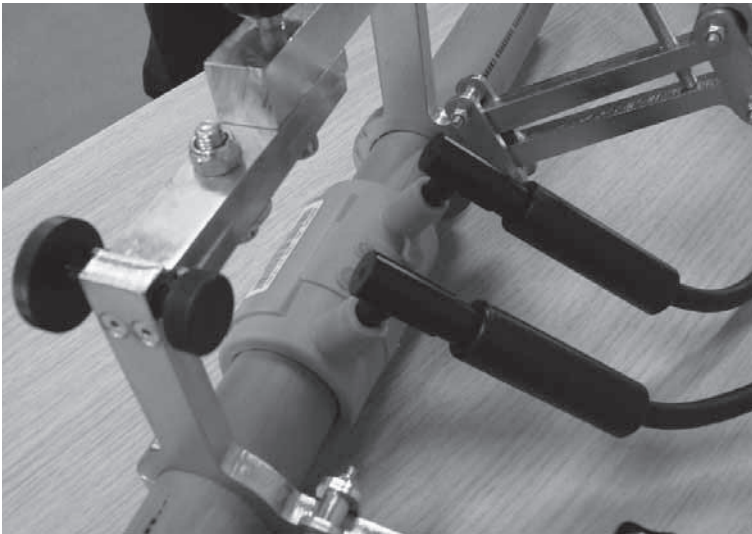


Fig. 8 Plug in the cable plugs in the contact bushings of a suitable electrofusion machine.

Connecting the Socket Cord.

Position the electrofusion welding sockets in a way offering the easiest connection of the cord plugs to the contact bushes. Having checked that the required generator voltage is available, switch on the device and put the cord plugs on to the contact bushes.

Set the diameter of the pipes to be connected and start the welding process with the switch. The suitable electrofusion machine automatically calculates and controls the required welding time and shows the welding indicators after trouble-free welding.

The welding indicator does not indicate the welding quality. Its value may differ depending on the slot width between the electrofusion welding socket and the pipe.

Before using a suitable electrofusion machine read the Owner's manual carefully.

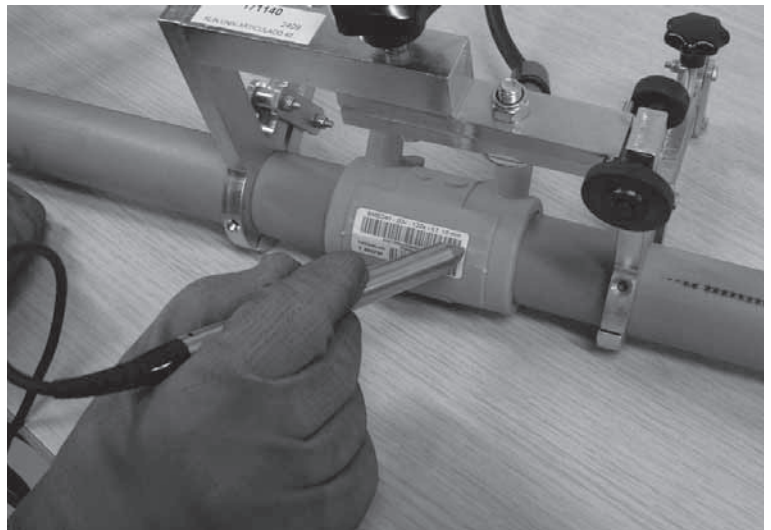


Fig. 9 The welding data can be seen on the barcode label of the socket. The data can be read by a barcode reader which should be part of a suitable electrofusion machine



Fig. 10 Start the welding device from the switch.

Cooling Time

Observe the required cooling time.

The cooling time is indicated on the bar code. All dimensions of electrofusion sockets contain a bar code showing welding time, working voltage and cooling time.

Installation Instructions

The kind and number of pipe fixings depends, among other things, on the pipe size and linear expansion. Locating points shall divide the pipes into individual pipe sections that allow expansion or contraction. The arrangement of such sections is done by loose clips. The clip distances or spans depend on the operating conditions, pipe material, and the weight of the filled pipe. In practical use, the spans given in figures 1, 2 and 3 proved to be appropriate distances.

Piping system pipes often require pipes to be bypassed. Bow-shaped connections (Fig. 1) are a good solution in such cases. As with the expansion bends, bow-shaped connections can easily be made by using parts of the Banninger product portfolio; just take 2 elbows 45° I - A (8040B) and one pipe bend (8002aB).

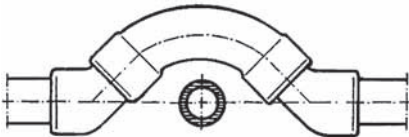


Fig. 1: Bow-shaped connection

For ceiling installation the use of galvanized or coated metal shells (Fig. 2) is recommended. In such a case, the fixing distances are to be extended accordingly.



Fig. 2: Pipe in shell

d in mm	Spans L depending on T°F				
	68°F	86°F	104°F	122°F	140°F
20 (1/2")	26	24	23	22	21
25 (3/4")	29	28	26	25	24
32 (1")	34	32	30	29	28
40 (1 1/4")	40	38	35	34	32
50 (1 1/2")	45	43	40	39	37
63 (2")	50	48	46	44	43
75 (2 1/2")	55	52	50	48	47
90 (3")	60	57	54	53	51
110 (3 1/2")	66	63	60	58	56
125 (4-1/2")	75	71	68	66	63
160 (6")	88	84	80	78	75
200 (8")	99	94	90	87	84
250 (10")	110	105	100	97	94
315 (12")	124	118	113	109	105
355 (14")	131	125	119	116	112

Fig. 1: Spans for PP-RCT Pipes, No. 8160B

d in mm	Spans L depending on T°F						
	68°F	86°F	104°F	122°F	140°F	158°F	176°F
20 (1/2")	28	26	25	24	23	22	21
25 (3/4")	32	30	28	27	26	25	24
32 (1")	36	34	32	30	29	28	27
40 (1 1/4")	41	39	37	35	34	32	31
50 (1 1/2")	47	44	42	41	39	38	36
63 (2")	52	50	47	46	44	43	41
75 (2 1/2")	57	54	52	50	48	47	45
90 (3")	62	60	57	55	53	52	50
110 (3 1/2")	69	65	63	61	58	57	55
125 (4-1/2")	77	74	71	68	66	64	62
160 (6")	88	84	80	78	75	73	71
200 (8")	99	94	90	87	84	82	79
250 (10")	110	105	100	97	94	91	88

Fig. 2: Spans for PP-RCT Fiber Pipes Watertec, No. 8200F



d in mm	Spans L depending on T°F						
	68°F	86°F	104°F	122°F	140°F	158°F	176°F
20 (1/2")	28	26	25	24	23	22	21
25 (3/4")	32	30	28	27	26	25	24
32 (1")	36	34	32	30	29	28	27
40 (1 1/4")	40	38	35	34	32	31	30
50 (1 1/2")	45	43	40	39	37	36	34
63 (2")	50	48	46	44	43	41	39
75 (2 1/2")	55	52	50	48	47	45	44
90 (3")	60	57	54	53	51	50	48
110 (3 1/2")	66	63	60	58	56	55	53
125 (4-1/2")	75	71	68	66	63	62	60
160 (6")	81	78	74	72	68	66	63
200 (8")	91	87	83	80	77	75	72
250 (10")	101	97	92	89	86	84	81

Fig. 3: Spans for PP-RCT Fiber Pipes Climatec, No. 8160F

Please note that Spans for Pipes from 16" and above (un-reinforced Pipe) and 12" and above (reinforced Pipe) shall be requested in case of a project specifically.

Installation Instructions

According to the scheme shown on Page 21, Fig. 4 proved to be appropriate.

d in mm	Spans L depending on T°F						
	68°F	86°F	104°F	122°F	140°F	158°F	176°F
20 (1/2")	28	26	24	23	22	21	20
25 (3/4")	32	30	28	27	26	25	24
32 (1")	37	35	33	31	30	29	28
40 (1 1/4")	43	41	38	36	35	33	32
50 (1 1/2")	48	45	43	42	40	39	37
63 (2")	53	51	48	47	45	44	43
75 (2 1/2")	58	56	53	51	49	48	46
90 (3")	64	61	58	56	54	53	51
110 (3 1/2")	70	67	64	62	60	58	56
125 (4-1/2")		80	76	72	70	67	66

Fig. 4: Spans for PP-RCT Pipes, No. 8200B

Processing Instructions for Repairing Plug

Application Area:
Repairing pipes damaged by drills.

Preparations:
Empty and uncover the damaged pipe. Select a suitable polywelder and a suitable welding tool, clean it before every welding process. Install the welding tools according to the instructions in the manual of the resp. welding tools. Pre-heat the heating unit to 500° F (±50° F). Check the temperature before the welding process.

Selection of welding elements:
Suitable repairing-set: d=7 mm (0.28")
For Welding of holes up to 0.24"

Suitable repairing-set: d=11 mm (0.43")
For Welding of holes up to 0.39"

Mark the degree of the insertion depth (wall thickness) on the repairing plug.
Fix distance tool according to the wall thickness of the pipe and tighten the screw.

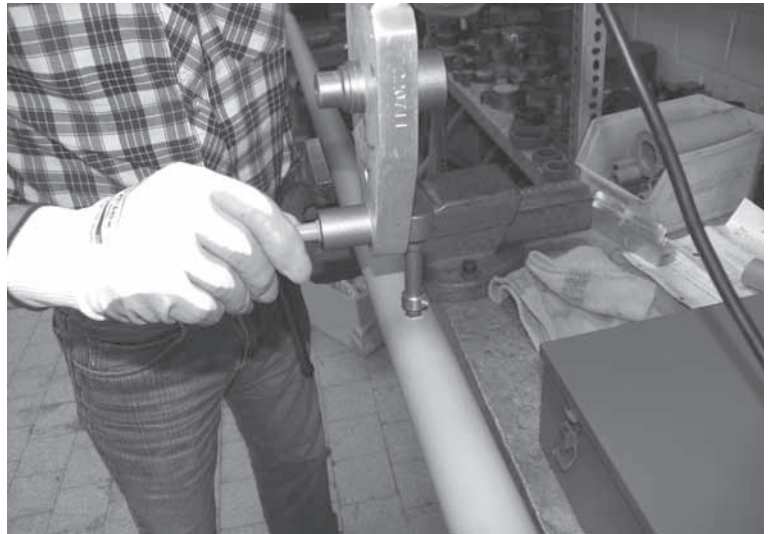


Fig. 1 Pre-heat the borehole and the welding plugs with the repairing-set for 15 seconds.



Fig. 2 Remove the welding device and insert the repairing plug precisely without twisting it.

Before using a suitable repairing-set for polywelder read the Owner's manual carefully.

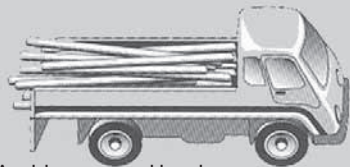
Before using a suitable polywelder read the Owner's manual carefully.

Before using a suitable welding tool for polywelder read the Owner's manual carefully.



Fig. 3 After a cooling time of approx. 5 minutes, remove the protruding end of the repairing plug.

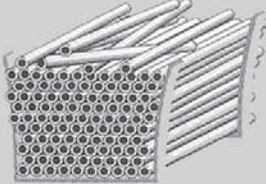
Wrong



Avoid unsecured loads

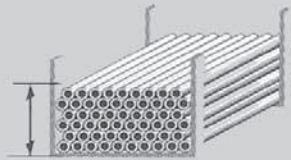
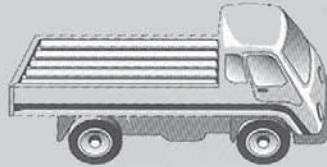


Avoid uncoordinated off-loading

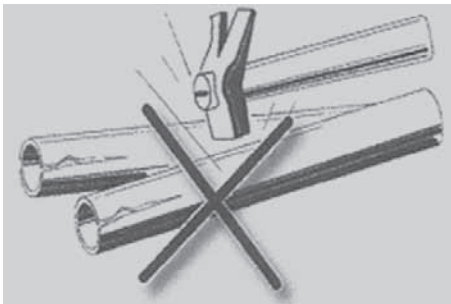


Avoid improper storage

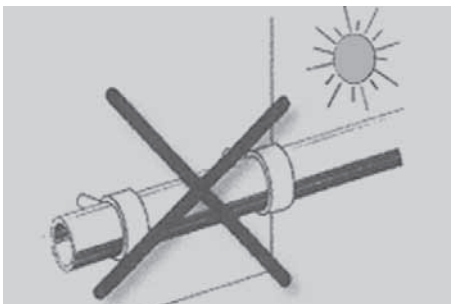
Correct



Prevent damage to the pipe ends



At temperatures lower than 32° F, pipes are less flexible and more prone to breakage. Prevent impacts (especially against pipe ends), excessive loads, crushing or bending. Handle pipes with care at low temperatures.



UV radiation can have an impact on polymeric plastic products. Protect pipes against weathering and UV radiation to prevent damages. Use plastic bags or cardboard boxes, that are included in the delivery.

Technical Information

Material:

PP-RCT (Polypropylene Random-Copolymerisate) of high molecular weight and stabilized to high temperature.

Joining:

Socket-welding by heating elements. Tools and devices for socket welding by heating elements.

Dimensions:

Pipes:

According to ASTM F2389 (Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems).

Fittings:

According to ASTM F2389 (Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems). Injection moulded.

Operating pressure:

The regulations and guidelines regarding different fields of application are to be observed.

Orders:

When ordering, always state the dimensions and the order number in addition to the designation of the piece required.

Example:

Elbow 90°, d 32mm (1"), No. 8090B

Marking:

The fittings are marked as follows:

Example:

B•R, d, PP-RCT, 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



Technical Data and Specifications



Max. Operating Pressures

	Temperature	Operating Years					
		1	5	10	25	50	100
		Max. Operating Pressure (psi)					
8160B PP-RCT Pipe 73° F/220 psi, 180° F/78 psi	68° F	240	232	229	224	221	219
	104° F	178	172	169	166	163	160
	140° F	129	124	121	118	117	-
	158° F	108	104	101	100	98	-
	176° F	89	87	85	82	-	-
	203° F	68	63	62	-	-	-

8200F PP-RCT Fiber Pipe Watertec 73° F/280 psi, 180° F/100 psi (until d = 125 mm, 4")	68° F	362	350	346	340	335	330
	104° F	269	261	256	250	248	243
	140° F	195	188	184	179	176	-
	158° F	163	158	155	150	147	-
	176° F	137	130	129	124	-	-
	203° F	102	97	95	-	-	-

8200F PP-RCT Fiber Pipe Watertec 73° F/220 psi, 180° F/78 psi (from d = 160mm, 6")	68° F	288	279	275	269	266	262
	104° F	214	207	204	200	197	192
	140° F	155	149	146	143	140	-
	158° F	130	124	123	120	117	-
	176° F	108	104	101	100	-	-
	203° F	81	76	75	-	-	-

8160F PP-RCT Fiber Pipe Climatec 73° F/220 psi, 180° F/78 psi (until d = 125 mm, 4")	68° F	288	279	275	269	266	262
	104° F	214	207	204	200	194	192
	140° F	155	149	146	143	140	-
	158° F	130	124	123	120	117	-
	176° F	108	104	101	100	-	-
	203° F	81	76	75	-	-	-

8160F PP-RCT Fiber Pipe Climatec 73° F/139 psi, 180° F/50 psi (from d = 160mm, 6")	68° F	181	175	174	169	168	165
	104° F	134	130	127	126	123	121
	140° F	97	94	92	89	88	-
	158° F	82	78	76	75	73	-
	176° F	68	65	63	62	-	-
	203° F	50	47	47	-	-	-

Max. Operating Pressures

		Operating Years					
		1	5	10	25	50	100
Temperature		Max. Operating Pressure (psi)					
8200B PP-RCT Pipe 73° F/280 psi, 180° F/100 psi	68° F	381	368	364	357	352	348
	104° F	284	274	270	264	260	255
	140° F	206	197	194	190	186	---
	158° F	173	165	162	158	155	---
	176° F	144	138	135	132	---	---
	203° F	107	103	100	---	---	---

MANUFACTURER'S LIMITED REPRESENTATIONS AND WARRANTIES

Bänninger Kunststoff-Produkte GmbH

Bänningerstraße 1
35447 Reiskirchen Germany

Phone: +49 (0)6408-89-0

Fax: +49 (0)6408-6756

Email: sales@baenninger-inc.com

WARRANTY AND LIMITATIONS:

1.1 These Limited Representations and Warranties are applicable to all end-customers (the "Customers" and each, individually, a "Customer") purchasing products (the "Products") manufactured by Bänninger Kunststoff-Produkte GmbH (the "Company"). The Company warrants that for the Warranty Period (as defined below), the Products will be free from defects in materials and workmanship under normal use, and will conform to the Company's published specifications of the Products. Notwithstanding the foregoing, the Company retains its right to deviate from its published specifications due to the latest innovations and improvements in function, design and materials of the Products. The foregoing warranty is subject to the proper storage, transportation, use and maintenance of the Products by the Company and to the proper installation of the Products by an entity certified by the Company and does not include defects due to normal wear and tear or deterioration.

1.2 Customer shall give the Company prompt written notice of any non-conformities or visible defects regarding the Products and contact the Company in writing concerning return or exchange, as the case may be. Failure to provide prompt notice shall void this warranty.

1.3 Customer shall notify the Company in writing of any defects of the Products. The Company's sole obligation under the foregoing warranty is, at the Company's discretion, to repair, to replace or exchange the Product or to refund the purchase price. Any repaired, replaced or exchanged Products shall be subject to the warranty set forth in 1.1 following the repair, the replacement or the exchange. If the Company has received notification from Customer, and no defects of the Product could be discovered, Customer shall bear the costs that the Company incurred as a result of the notice.

1.4 With respect to orders made to custom, any defects of the Products caused by Customer's specifications are excluded from the warranty set forth in 1.1.

1.5 The Company also makes no warranty that the Products manufactured under an order made to custom do not infringe the intellectual property or other proprietary rights of any third party and Customer is solely responsible for assuring that such Products do not so infringe.

1.6 The “Warranty Period” shall be the greater of (a) a period of one (1) year from the invoice date and (b) if a final pressure test is successfully completed by Customer and such test is certified and witnessed by a representative of the Company, then the Warranty Period shall be ten (10) years from the manufacturing date.

1.7 The Company does not authorize any person or party to assume or create for it any other obligation or liability in connection with the Products except as set forth herein.

1.8 All requests and notices under this Warranty shall be directed to:

Asahi/America, Inc.
Attn: Customer Service
655 Andover Street,
Lawrence, MA 01843
Tel: 781-321-5409 • Fax: 978-685-3010

GENERAL TERMS AND CONDITIONS OF SALE AND DELIVERY



Baenninger, Inc.
54 W 40th Street (Bryant Park)
New York, NY 10018

Fax: (646) 530-8286

Email: sales@baenninger-inc.com

These General Terms and Conditions of Sale and Delivery (these “Terms”) are applicable to all U.S. customers (the “Customers” and each, individually, a “Customer”) of Baenninger, Inc., a Delaware corporation (the “Company”).

1. Terms and Conditions of Sale:

1.1. Company shall sell and deliver to Customer and Customer shall purchase and accept from Company the products (herein, the “Products”) described on or in any confirmed order, agreement or quotation, or any combination thereof (the “Order”), pursuant to the terms and conditions of the Order and those specified below, which taken together shall constitute the entire agreement between Company and Customer regarding the Products (herein, this “Agreement”).

1.2. No other terms or conditions shall be of any effect unless otherwise specifically agreed to by Company in a separate written agreement duly signed by an officer of the Company. Customer will be deemed to have assented to all Terms if any part of the Products is accepted by the Customer. If Customer finds any Term not acceptable, Customer must so notify the Company at once and must reject the Products delivered under this Agreement. Any additional or different terms or conditions contained in Customer's order or response hereto shall be deemed objected to by Company and shall be of no effect. No general terms and conditions of a Customer shall at any time form a part of the content of any contract or agreement between the Customer and the Company, even if they are not further expressly rejected by the Company.

1.3. Unless otherwise agreed in writing, all quotations for Products are valid for a period of three (3) months from the date of issue. Subsequent modifications in quantity or quality, if such are requested by Customer, generally will cause a modification of the quoted price. Drawings and samples enclosed with any quotation remain the property of Company. All drawings and samples shall be treated confidentially by Customer and must be returned to Company after usage.

1.4. No Order is binding upon the Company until the earlier of acceptance of the Order in writing or the delivery of the Products to the Customer. Company shall provide written acknowledgment of acceptance or rejection of all orders within three (3) business days. Notwithstanding any prior acceptance of an Order by Company, Company shall have no obligation if the Customer is in breach of any of its obligations hereunder, or any other agreement between the Customer and Company, at the time Company’s performance was due.

1.5. All verbal agreements concerning the terms of any Order, including agreements made by telephone, shall have no force and effect unless and until acknowledged by the Company in writing. The term ‘writing’ shall include communication by telefax and email.

1.6. Customer shall bear all costs associated with the cancellation or modification of the Order.

2. Prices:

2.1. All price quotations are EX WORKS (per Incoterms 2010) from Company's German Facilities.

2.2. The price of the Products shall be the Company's prices at the time of the order. A price list is available on request.

2.3. Company may, without notice to Customer, increase the price of the Products by the amount of any new or increased tax or duty (excluding franchise, net income and excess profits taxes) which Company may be required to pay on the manufacture, sale, transportation, delivery, export, import or use of the Products or the materials required for their manufacture or which affects the cost of such materials.

3. Terms of Payment:

3.1. Unless otherwise agreed to in writing by the Company, the amount invoiced shall be due and payable within one hundred twenty (120) business days from the date of the invoice. The payment shall be made by check or wire transfer to the account indicated on the invoice.

3.2. If the Customer fails to make payment on or before the date required, Customer shall pay interest to the Company at the rate of one and one-half percent (1.5%) per month or such lesser amount permitted by law. The specification or charging of interest shall not be deemed an agreement to extend credit.

3.3. If Customer fails to observe these Terms or the terms of any other agreements between Company and Customer, or if Customer becomes insolvent, all balances then due and owing to the Company shall become due immediately, notwithstanding any agreed upon payment periods. Any Orders that have been confirmed by the Company, but not yet filled, shall in such cases become cancelable at the sole discretion of Company.

3.4. Customer does not enjoy a right of set-off under any circumstances.

4. Delivery Terms:

4.1. Title to and risk of loss for the Products shall pass to Customer upon delivery thereof on board of the truck of Customer's carrier at Company's German Facilities.

4.2. Company will make deliveries of the Products in the quantities ordered as near as reasonably possible to Customer's requested delivery dates.

4.3. Company shall use its reasonable efforts to deliver the Products to Customer by the agreed upon date, however, time shall not be of the essence.

4.4. In cases of deliveries of Products manufactured to Customer's specification ("Special Orders") and unless otherwise agreed to in writing, all tools, models, plans, blueprints or other devices and/or documents used and/or developed by Company (the "Tools") in order to fulfill any Special Order are the property of the Company, even if the cost of development and/or manufacturing of such tools, models, plans, blueprints or other devices and/or

5. Limitation of Liability:

5.1. EXCEPT FOR THE OBLIGATIONS OF BAENNINGER SET FORTH IN §8(7) OF THE DISTRIBUTION AGREEMENT BETWEEN THE PARTIES DATED _____ (THE “DISTRIBUTION AGREEMENT”), LIABILITY FOR BREACH OF CONFIDENTIALITY OR AS OTHERWISE EXPRESSLY AGREED UPON, UNDER NO CIRCUMSTANCES SHALL EITHER PARTY HAVE ANY LIABILITY, WHETHER DIRECTLY OR BY WAY OF INDEMNITY, FOR SPECIAL, INCIDENTAL, INDIRECT, CONSEQUENTIAL, PUNITIVE, OR EXEMPLARY DAMAGES, INCLUDING, LOSS OF PROFITS OR LOSS OF FUTURE BUSINESS OR REPUTATION, WHETHER BASED ON BREACH OF CONTRACT, WARRANTY, TORT, STRICT OR PRODUCTS LIABILITY, INFRINGEMENT OF PATENTS, TRADE SECRETS, TRADEMARKS, COPYRIGHTS OR OTHER PROPRIETARY RIGHTS OR ANY OTHER LEGAL THEORY IN CONNECTION WITH THE PURCHASE, INSTALLATION OR USE OF THE CONTRACTUAL PRODUCTS.

5.2. IN ADDITION, AND EXCEPT FOR THE OBLIGATIONS SET FORTH IN §8(7) OF THE DISTRIBUTION AGREEMENT, COMPANY’S LIABILITY – WHETHER BASED UPON CONTRACT, TORT, EQUITY, NEGLIGENCE OR ANY OTHER LEGAL CONCEPT, BUT OTHER THAN FOR FRAUD OR WILLFUL MISCONDUCT, SHALL IN NO EVENT EXCEED THE AMOUNT OF THIRTY MILLION EUROS AS TO EACH YEAR OF THE TERM OF THIS AGREEMENT. IT IS AGREED AND ACKNOWLEDGED THAT THE PROVISIONS OF THIS AGREEMENT ALLOCATE THE RISKS BETWEEN COMPANY AND CUSTOMER, THAT COMPANY’S PRICING REFLECTS THIS ALLOCATION OF RISK, AND BUT FOR THIS ALLOCATION AND LIMITATION OF LIABILITY, COMPANY WOULD NOT HAVE ENTERED INTO THIS AGREEMENT.

5.3. IN JURISDICTIONS THAT LIMIT THE SCOPE OF OR PRECLUDE LIMITATIONS OR EXCLUSION OF REMEDIES OR DAMAGES, OR OF LIABILITY, SUCH AS LIABILITY FOR GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OR DO NOT ALLOW IMPLIED WARRANTIES TO BE EXCLUDED, THE LIMITATION OR EXCLUSION OF WARRANTIES, REMEDIES, DAMAGES OR LIABILITY SET FORTH ABOVE ARE INTENDED TO APPLY TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW. THE PARTIES MAY ALSO HAVE OTHER RIGHTS THAT VARY BY STATE, COUNTRY OR OTHER JURISDICTION.

6. Force Majeure:

6.1. Company shall not be liable to Customer or any other person for any failure or delay in the performance of any obligation under this Agreement due to events beyond its reasonable control, including, but not limited to, fire, storm, flood, earthquake, explosion, accident, acts of the public enemy, wars, riots and public disorder, sabotage, strikes, lockouts, labor disputes, labor shortages, work slowdown, stoppages or delays, shortages or failures or delays of energy, materials, supplies or equipment, transportation embargoes or delays, acts

of God, breakdown in machinery or equipment, and, except as otherwise set forth in this Agreement, acts or regulations or priorities of the federal, state or local governments.

6.2. Customer shall not be liable to Company or any other person for any failure or delay in the performance of any obligation under this Agreement due to events beyond its reasonable control, including, but not limited to, fire, storm, flood, earthquake, explosion, accident, acts of the public enemy, wars, riots and public disorder, sabotage, strikes, lockouts, labor disputes, labor shortages, work slowdown, stoppages or delays, shortages or failures or delays of energy, materials, supplies or equipment, transportation embargoes or delays, acts of God, breakdown in machinery or equipment, and, except as otherwise set forth in this Agreement, acts or regulations or priorities of the federal, state or local governments.

6.3. When the event operating to excuse performance by either party shall cease, this Agreement shall continue in full force until all deliveries have been completed.

7. Miscellaneous Terms:

7.1. This Agreement and all claims arising out of or related to this Agreement, including tort claims, shall be governed by and construed in accordance with the laws of the State of New York, without giving effect to any choice or conflict of law provision or rule that would cause the application of the laws of any jurisdiction other than New York. The application of the Convention on Contracts for the International Sale of Goods (CISG) is hereby excluded.

7.2. Any controversy or claim arising out of or relating to this Agreement, or the negotiation or breach thereof, shall be exclusively settled by arbitration in accordance with the International Arbitration Rules of the American Arbitration Association ("AAA"). The award shall be final and binding. Judgment upon the award rendered by the arbitrator or the arbitrators may be entered in any court having jurisdiction thereof. The arbitration shall be held in New York, New York, shall be conducted in the English language, and shall be conducted (i) if the amount in dispute is less than two hundred fifty thousand dollars (\$250,000), before a single arbitrator mutually agreeable to Company and Customer, or if no agreement can be reached, then selected by the AAA, or (ii) if the amount in dispute is two hundred fifty thousand dollars (\$250,000) or more, before three (3) arbitrators. The arbitrator(s) shall make detailed findings of fact and law in writing in support of his, her or their decision, and shall award reimbursement of attorney's fees and other costs of arbitration to the prevailing party, in such manner as the arbitrator shall deem appropriate.

7.3. If any provision contained in this Agreement is held by final judgment of a court of competent jurisdiction to be invalid, illegal or unenforceable, such invalid, illegal or unenforceable provision shall be severed from the remainder of this Agreement, and the remainder of this Agreement shall be enforced. In addition, the invalid, illegal or unenforceable provision shall be deemed to be automatically modified, and, as so modified, to be included in this Agreement, such modification being made to the minimum extent necessary to render the provision valid, legal and enforceable. Notwithstanding the foregoing, however, if the severed or modified provision concerns all or a portion of the essential consideration to be delivered under this Agreement by one party to the other, the remaining provisions of this Agreement shall also be modified to the extent necessary to equitably adjust the parties' respective rights and obligations hereunder.

7.4. In the event of a violation or threatened violation of Company's proprietary rights, Company shall have the right, in addition to such other remedies as may be available pursuant to law or this Agreement, to temporary or permanent injunctive relief enjoining such



act or threatened act. The parties acknowledge and agree that legal remedies for such violations or threatened violations are inadequate and that Company would suffer irreparable harm.

7.5. The parties hereto are independent contractors and nothing in this Agreement will be construed as creating a joint venture, employment or agency relationship between the parties.

7.6. This Agreement, including the Distribution Agreement, shall apply to all sales of the Products to Customer.

7.7. This Agreement, including the Distribution Agreement, contains the entire agreement of the parties with respect to the subject matter of this Agreement, and supersedes all prior agreements between them, whether oral or written, of any nature whatsoever with respect to the subject matter hereof. This Agreement is binding upon the parties hereto, their successors and permitted assigns.

* * * * *

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