

# HDPE drainage

January 2011



 **MARLEY**  
akatherm

The Akatherm HDPE drainage system has been used for more than 40 years in areas of application where the drainage system has to meet high standards of **durability and reliability**. These standards are met by combining the excellent material properties of HDPE with homogeneous welded joints.



The range covers an extensive package of pipes and fittings in the diameters 40-315mm.

Their high impact resistance and wide temperature range make Marley Akatherm HDPE pipe system extremely suitable for draining waste water in utilities constructions like hospitals, hotels, schools as well as residential buildings.



For further technical advice including jointing techniques and installation advice, please contact our technical support team on 01622 852695.

## System overview

System overview ..... 1

## Properties

Material properties ..... 3

## Standards and quality

Standards and quality ..... 5

## Product range

General information ..... 6  
 Pipes..... 8  
 Reducers..... 9  
 Bends ..... 12  
 Elbows..... 15  
 Branches..... 16  
 Aerators Akavent..... 24  
 End caps..... 25  
 Electrofusion joints Akafusion ..... 26  
 Expansion sockets..... 27  
 Plug-in joints..... 28  
 Screw couplers ..... 30  
 Contraction sleeves..... 31  
 Flanged joints ..... 32  
 Wall-lavatory ..... 33  
 Control boxes Akafusion..... 37  
 Butt-welding machines ..... 38

## Joining methods

Electrofusion..... 40  
 Butt-welding..... 41  
 Plug-in joint..... 45  
 Expansion joint ..... 45  
 Flange joint..... 46  
 Contraction sleeve ..... 46

## Installation

Anchor point bracket..... 47  
 Anchor point bracket with expansion socket..... 47  
 Guide bracket..... 47  
 Bracket distance ..... 48

## Properties

### Material properties

	Unit	Test method	Value
<b>Density at 23°C</b>	g/cm <sup>3</sup>	ISO 1183	0.954
<b>Elasticity modulus</b>	N/mm <sup>2</sup>	ISO 527	850
<b>Bending creep modulus</b>	N/mm <sup>2</sup>	DIN 54852-Z4	1000
<b>Tensile strength at 23°C</b>	N/mm <sup>2</sup>	ISO 527	22
<b>Elongation at break</b>	%	ISO R 527	300
<b>Linear expansion coefficient</b>	mm/mK	DIN 53752	0.13 - 0.19
<b>Indentation hardness</b>	N/mm <sup>2</sup>	ISO 2039	36 - 46
<b>Ignition temperature</b>	°C	-	~350
<b>Thermal conductivity</b>	W/m . K	DIN 52612	0.37 - 0.43
<b>Shore hardness</b>		ISO 868	61
<b>Crystallite melting range</b>	°C		125 - 131
<b>Operational temperature range</b>	°C	-	-40 - +100
<b>Melt Flow Rate MFR 190/5</b>	g/10 min	ISO 1133	0.43










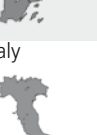


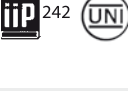




**HDPE drainage** **Properties**

Properties PE	Benefits
 Impact-resistant and tough	Unbreakable at temperatures > 5°C
 Elastic	Suitable for underground pipes through adjustment to local ground movement
 Thermal resistant	Application possible between -40°C and 100°C
 Smooth internal wall	Low blockage risk due to low deposit/residue effects
 Wear resistant	Lower costs due to relatively long life
 Weather-resistant / UV resistant	Application in open air unrestricted through colouring with carbon black
 Poor heat conductivity	No condensation during short periods of cooling
 Non-toxic	Environmentally friendly
 Insulating	Non-conductive
 Highly suitable for welding	Easy installation using butt-welding and electrofusion techniques
 Homogeneous welded joints	End load resistant and leak proof
 Prefabrication	Reduces on-site installation times
 Lightweight	Cost-saving in transport and handling

**Standards and quality** **HDPE drainage**

Akatherm specialist drainage systems are developed and produced according to the certified quality system ISO 9001:2000. All our products are complying with EN 1519, ISO 8770 and other relevant standards. The system has obtained numerous national approvals.

**Standards and approvals**

Country	Certificate of approval	Standard
United Kingdom 	Manufactured in compliance with BS EN 1519-1: 2000 BSI Kitemark Licence application in progress	
The Netherlands 		NEN 7018 NEN 7008
Belgium 		NBN EN 1519
Germany 		DIN EN 1519 DIN 19537
Denmark 		NKB Product Rules No. 8
Sweden 		NKB Product Rules No. 8
Italy 		UNI EN 1519
Austria 		ÖNORM EN 1519
Australia 		MP52 SPEC. 005

**Akatherm International and ISO 9001**

Akatherm International's quality management system is according to ISO 9001:2000 and is certified by Lloyds Register Quality Assurance.

The quality system comprises the complete work process at Akatherm. Not only the development and production is recorded but also the marketing and delivery of plastic pipe systems.



ISO 9001

**Environmental management ISO 14001**

Akatherm has integrated the ISO 14001:2004 environmental management system into her quality management. The ISO 14001 environmental management system is a standard which controls and improves Akatherm's overall environmental performance.

The system structurally focuses the attention to the environment during everyday operation. Two of the most important starting points are to make permanent environmental improvements and conformity with all rules and regulations.



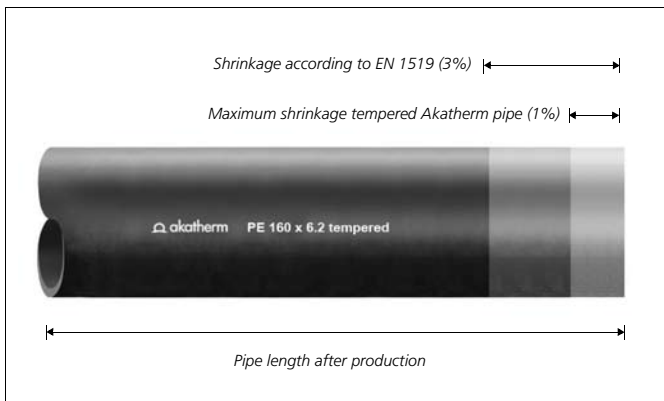
ISO 14001



**HDPE drainage** **Product range**

**Tempered pipe**

The Marley Akatherm HDPE pipe is tempered. This pipe is produced according to the standards EN 1519 and ISO 8770 but has undergone a heat treatment after extrusion. The result is less shrinkage when cooled down from high operational temperature. This gives less stress on joints resulting in a longer life for the pipe system.



**Linear expansion**

The Marley Akatherm HDPE material has a linear expansion coefficient of 0.13-0.19 mm/mK. We calculate with an expansion of 0.2 mm per meter pipe for every °C temperature difference. The total length variation can be calculated as follows:

$$\Delta l = L \times \lambda \times \Delta t$$

- $\Delta l$  = length change in mm
- $L$  = total length of pipe
- $\lambda$  = linear expansion coefficient
- $\Delta t$  = temperature difference in °C

*Example:*  
Pipe 10 meters with a maximum temperature of 60°C and a minimum temperature of -20°C. This results in an expansion of:

$$\Delta l = 10 \times 0,2 \times 80 = 160 \text{ mm}$$

Length changes can be accommodated by the expansion socket which can take up the expansion and contraction of a 5 meter length of pipe for temperatures between -20°C and 70°C.

**Electrofusion**

The Marley Akatherm products can be welded by electrofusion unless stated differently in the product table. This is the preferred method of on-site jointing.

**Butt welding and k-dimension**

All Marley Akatherm products can be welded using this jointing method. Fittings can be shortened by up to the k-dimension (indicated in the catalogue), still allowing butt-welding on a standard butt-welding machine.

**Testing the system**

The system should be inspected for any possible leaks in accordance with BS EN 12056. Air should be pumped into the system through a branch of a tee piece until a pressure equal to 38mm water gauge is achieved. The inlet valve should then be closed and the system should maintain the pressure for a minimum of three minutes.

For all chemical resistance enquiries please contact our technical support team on 01622 852695.

**Abbreviations**

Abbreviation	
<b>A</b>	Cross section area flow
<b>AG</b>	Article group
<b>Art. Nr.</b>	Article number
<b>D</b>	External dimension fitting part
<b>d<sub>1</sub>, d<sub>2</sub> ...</b>	External dimension fitting/pipe
<b>DN</b>	Nominal size
<b>e</b>	Wall thickness
<b>k<sub>1</sub>, k<sub>2</sub> ...</b>	Maximum length for shortening fittings
<b>L</b>	Total length fitting
<b>l<sub>1</sub>, l<sub>2</sub> ...</b>	Lengths of part of fitting
<b>q</b>	Packing quantity
<b>s</b>	Pipe class according to ISO-S (SDR-1)/2
<b>SDR</b>	Ratio diameter/wallthickness d <sub>1</sub> /e

**Product range** **HDPE drainage**

**Handling and storage**

**Fittings**

The fittings and electrofusion couplers need to be stored at a dry place. To prevent oxidation and contamination it is recommended to leave the fittings in their original packaging as long as possible.

**Pipes**

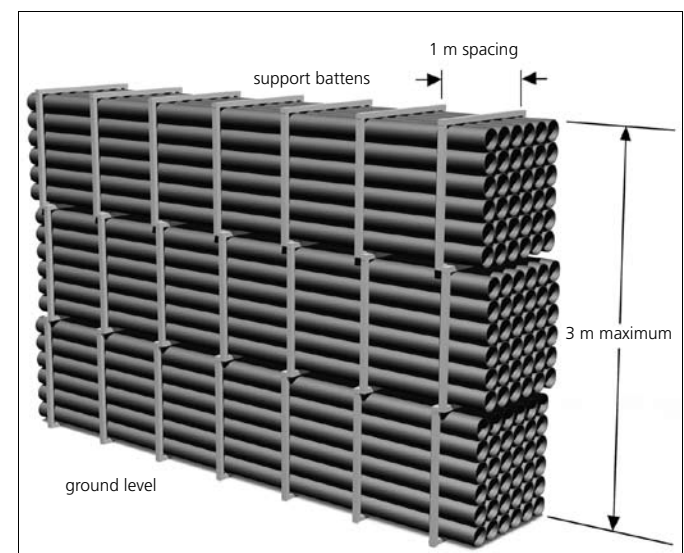
The high impact strength of Marley Akatherm HDPE provides some protection against damage but care should be taken at all stages of handling, transportation and storage.

Pipe must be transported by a suitable vehicle and properly loaded and unloaded, e.g. wherever possible moved by hand or mechanical lifting equipment. It must not be dragged across the ground. The storage should be flat, level and free from sharp stones

**Bundles**

Bundled packs of pipe should be stored on clear, level ground with the battens supported from the outside by timber or concrete blocks. For safety, bundled packs should not be stacked more than three high. Smaller pipes may be nested inside larger pipes. Side bracing should be provided to prevent stack collapse. Similar precautions should be taken with fittings and these should be kept packaged until required for use.

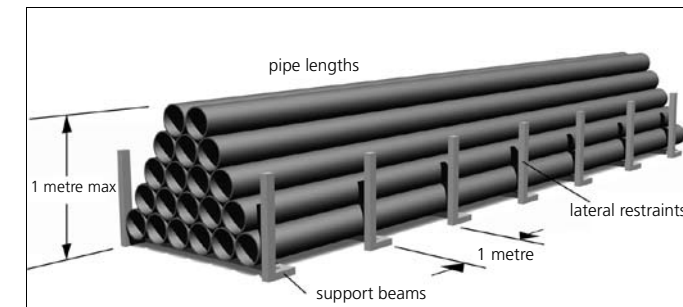
**Storage of bundles**



**Lengths**

Pipe lengths stored individually should be stacked in a pyramid not more than one metre high, with the bottom layer fully restrained by wedges. Where possible, the bottom layer of pipes should be laid on timber battens at one-metre centres. On site, pipes may be laid out individually in strings (where appropriate, protective barriers should be placed with adequate warning signs and lamps).

**Storage of loose pipes**



**Tools**

Tools need to be protected against moisture.

**Health and safety at work act and COSHH regulations**

Attention is drawn to the requirement in the UK of this act and to the 1988 Control of Substances Hazardous to Health (COSHH) Regulations. Marley Plumbing & Drainage cannot accept responsibility for accidents arising from the misuse of its products because of bad installation or incorrect application. Handling of HDPE has no detrimental health impact. It is recommended, however, that HDPE is not ingested or dust inhaled.

**Personal Protective Equipment (PPE)**

When welding HDPE, molten material is formed, which can cause burns to skin. Appropriated PPE should be worn.

**Physical contact**

HDPE is not considered to be a skin irritant. Where HDPE dust is generated by cutting or machining pipe or fittings, powder particles of HDPE dust may cause eye irritation by abrasion.

**Behaviour in Fire**

HDPE is a flammable material. It has, however, been installed throughout Europe for over 35 years and presents no greater risk of fire propagation than similar plastic based systems when installed in accordance with local regulations. Marley Plumbing & Drainage Unicollar firecollars are suitable for use with Marley Akatherm HDPE (up to 200mm) and these should be installed in accordance with the instructions provided.

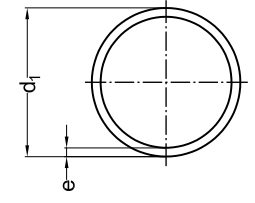
HDPE drainage Product range

Pipe tempered HDPE

Pipe length = 5 m



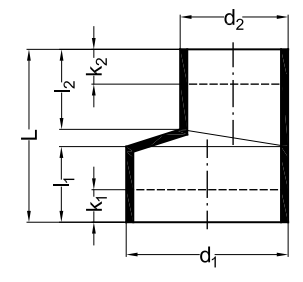
d <sub>1</sub>	Product code	s	e	A cm <sup>2</sup>
40	S 10 04 00	12,5	3,0	9,10
50	S 10 05 00	12,5	3,0	15,20
56	S 10 56 00	12,5	3,0	19,60
63	S 10 06 00	12,5	3,0	25,50
75	S 10 07 00	12,5	3,0	37,40
90	S 10 09 00	12,5	3,5	54,10
110	S 10 11 00	12,5	4,2	80,70
125	S 10 12 00	12,5	4,8	104,20
160	S 10 16 00	12,5	6,2	171,10
200	S 10 20 00	16	6,2	276,41
250	S 10 25 00	16	7,7	431,52
315	S 10 31 00	16	9,7	685,35



A cm<sup>2</sup> = cross sectional area of flow.

Product range HDPE drainage

Reducer eccentric HDPE



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	k <sub>1</sub>	k <sub>2</sub>
50/40	S 16 05 04	80	35	37	20	20
56/40	S 16 56 04	80	35	37	20	20
56/50	S 16 56 05	80	35	37	20	20
63/40	S 16 06 04	80	35	37	20	20
63/50	S 16 06 05	80	35	37	20	20
63/56	S 16 06 56	80	35	37	20	20
75/40	S 16 07 04	80	35	30	20	20
75/50	S 16 07 05	80	35	37	20	20
75/56	S 16 07 56	80	35	37	20	20
75/63	S 16 07 06	80	35	37	20	20
90/40	S 16 09 04	80	30	33	20	20
90/50	S 16 09 05	80	30	34	20	20
90/56	S 16 09 56	80	30	36	20	20
90/63	S 16 09 06	80	30	39	20	20
90/75	S 16 09 07	80	30	44	20	20
110/40	S 16 11 04	80	31	34	20	20
110/50	S 16 11 05	80	31	34	20	20
110/56	S 16 11 56	80	31	35	20	20
110/63	S 16 11 06	80	31	34	20	20
110/75	S 16 11 07	80	31	36	20	20
110/90	S 16 11 09	80	31	41	20	20
125/50	S 16 12 05	80	35	37	20	20
125/56	S 16 12 56	80	35	37	20	20
125/63	S 16 12 06	80	35	37	20	20
125/75	S 16 12 07	80	35	30	20	20
125/90	S 16 12 09	80	35	32	20	20
125/110	S 16 12 11	80	36	36	20	20
160/110	S 16 16 11	80	28	36	20	20
160/125	S 16 16 12	80	32	36	20	20

HDPE drainage

HDPE drainage

Reducer eccentric long HDPE

Reducer concentric HDPE

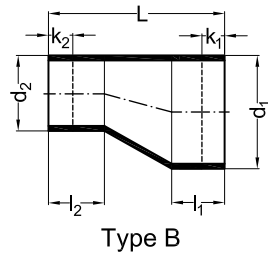
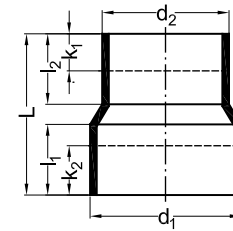
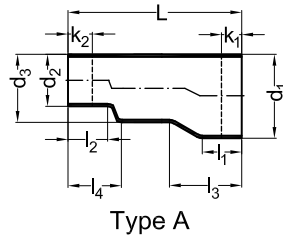


d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	d <sub>3</sub>	k <sub>1</sub>	k <sub>2</sub>
160/110	S 14 16 11 *	215	45	37	100	45	125	20	20
160/125	S 14 16 12 **	140	45	40				20	20
200/110	S 14 20 11 *	335	95	36	165	55	160	75	20
200/125	S 14 20 12 *	335	95	36	165	55	160	75	20
200/160	S 14 20 16 **	260	95	95				75	75
250/200	S 14 25 20 **	290	105	95				85	75
315/200	S 14 31 20 *	580	115	95	235	190	250	95	75
315/250	S 14 31 25 **	340	115	105				75	85

d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	k <sub>1</sub>	k <sub>2</sub>
50/40	S 15 05 04	80	30	30	15	15
56/40	S 15 56 04	80	30	30	15	15
56/50	S 15 56 05	80	30	30	15	15
63/40	S 15 06 04	80	30	30	15	15
63/50	S 15 06 05	80	30	30	15	15
63/56	S 15 06 56	80	30	30	15	15
75/40	S 15 07 04	80	30	30	15	15
75/50	S 15 07 05	80	30	30	15	15
75/56	S 15 07 56	80	30	30	15	15
75/63	S 15 07 06	80	30	30	15	15
90/40	S 15 09 04	80	30	30	15	15
90/50	S 15 09 05	80	30	28	15	15
90/56	S 15 09 56	80	30	30	15	15
90/63	S 15 09 06	80	30	30	15	15
90/75	S 15 09 07	80	30	28	15	15
110/40	S 15 11 04	80	30	30	15	15
110/50	S 15 11 05	80	30	30	15	15
110/56	S 15 11 56	80	30	30	15	15
110/63	S 15 11 06	80	30	30	15	15
110/75	S 15 11 07	80	30	30	15	15
110/90	S 15 11 09	80	30	30	15	15
125/50	S 15 12 05	80	30	30	15	15
125/56	S 15 12 56	80	30	30	15	15
125/63	S 15 12 06	80	30	30	15	15
125/75	S 15 12 07	80	30	30	15	15
125/90	S 15 12 09	80	30	30	15	15
125/110	S 15 12 11	80	35	30	15	15
160/110	S 15 16 11	80	35	30	15	15
160/125	S 15 16 12	80	34	38	15	15
200/160	S 15 20 16 *	149	50	40	40	30
250/160	S 15 25 16 *	194	60	40	50	30
250/200	S 15 25 20 *	182	60	50	50	40
315/200	S 15 31 20 *	230	90	80	80	70
315/250	S 15 31 25 *	230	90	90	80	80

\* type A  
\*\* type B

\* butt-weld only



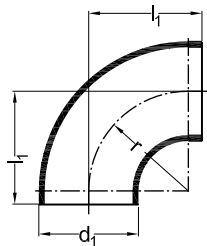
HDPE drainage

Bend 90° HDPE



d <sub>1</sub>	Product code	l <sub>1</sub>	r
160	S 11 16 91 *	160	160
200	S 11 20 91 *	205	200
250	S 11 25 91 *	290	265
315	S 11 31 91 *	340	300

\* butt-weld only

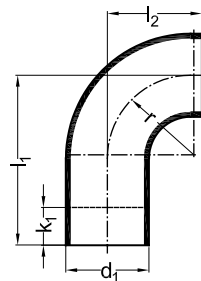


Bend 90° with long side HDPE



d <sub>1</sub>	Product code	l <sub>1</sub>	l <sub>2</sub>	r	k <sub>1</sub>
40	S 11 04 92 *	93	43	40	45
50	S 11 05 92 *	103	53	50	45
56	S 11 56 92 *	120	59	56	55
63	S 11 06 92 *	130	66	65	60
75	S 11 07 92 *	140	78	75	60
90	S 11 09 92 *	155	93	90	60
110	S 11 11 92 *	180	113	110	60
125	S 11 12 92 *	190	128	125	60

\* electrofusible at one side



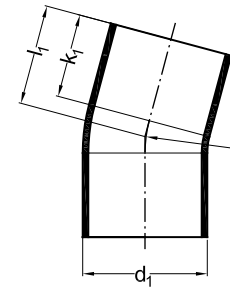
HDPE drainage

Bend 15° HDPE



d <sub>1</sub>	Product code	l <sub>1</sub>	r	k <sub>1</sub>
110	S 18 11 15 *	125	165	65
125	S 18 12 15 *	150	188	45
160	S 18 16 15 *	175	240	100
200	S 18 20 15 *	200	300	125
250	S 18 25 15 *	225	375	135
315	S 18 31 15 *	250	473	175

\* fabricated

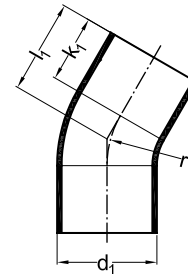


Bend 30° HDPE



d <sub>1</sub>	Product code	l <sub>1</sub>	r	k <sub>1</sub>
110	S 18 11 30 *	125	165	60
125	S 18 12 30 *	150	188	85
160	S 18 16 30 *	175	240	100
200	S 18 20 30 *	200	200	115
250	S 18 25 30 *	225	255	125
315	S 18 31 30 *	250	320	135

\* fabricated



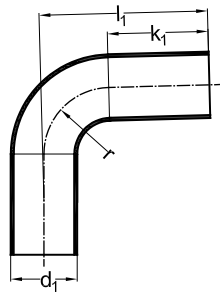


HDPE drainage

Bend 88,5° HDPE



d <sub>1</sub>	Product code	l <sub>1</sub>	r	k <sub>1</sub>
200	S 11 20 88	290	200	100
250	S 11 25 88	350	265	100
315	S 11 31 88	360	300	100

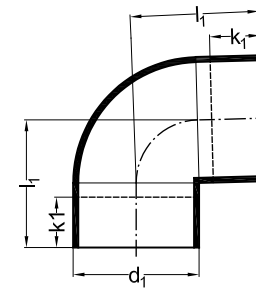


HDPE drainage

Elbow 88.5° HDPE



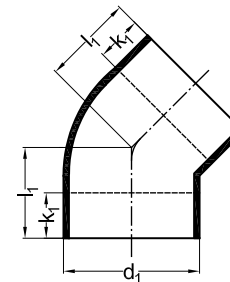
d <sub>1</sub>	Product code	l <sub>1</sub>	k <sub>1</sub>
40	S 12 04 88	55	25
50	S 12 05 88	60	20
56	S 12 56 88	65	20
63	S 12 06 88	70	20
75	S 12 07 88	75	20
90	S 12 09 88	80	20
110	S 12 11 88	95	25
125	S 12 12 88	100	25
160	S 12 16 88	120	25



Elbow 45° HDPE



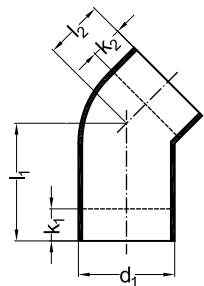
d <sub>1</sub>	Product code	l <sub>1</sub>	k <sub>1</sub>
40	S 12 04 45	40	20
50	S 12 05 45	45	20
56	S 12 56 45	45	20
63	S 12 06 45	50	20
75	S 12 07 45	50	20
90	S 12 09 45	55	20
110	S 12 11 45	60	25
125	S 12 12 45	65	25
160	S 12 16 45	69	20
200	S 12 20 45	173	60
250	S 12 25 45	182	60
315	S 12 31 45	195	60



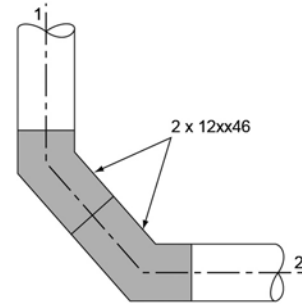
HDPE drainage

Elbow 45° with long side

HDPE



d <sub>1</sub>	Product code	l <sub>1</sub>	l <sub>2</sub>	k <sub>1</sub>	k <sub>2</sub>
75	S 12 07 46	145	50	120	25
90	S 12 09 46	150	55	120	25
110	S 12 11 46	155	60	120	25

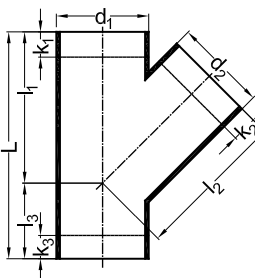


Elbows 45° with long side are applied for making the transition from stack to building drain acc. to EN 12056 (see drawing).

1 stack  
2 building drain

Y-branch 45°

HDPE



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub> /l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>	k <sub>2</sub>	k <sub>3</sub>
40/40	S 30 04 04	135	90	45	30	30	25
50/40	S 30 05 04	165	110	55	45	45	40
50/50	S 30 05 05	165	110	55	20	20	35
56/40	S 30 56 04	180	120	60	35	30	60
56/50	S 30 56 05	180	120	60	30	30	40
56/56	S 30 56 56	180	120	60	25	25	40
63/40	S 30 06 04	195	130	65	40	45	45
63/50	S 30 06 05	195	130	65	30	30	50
63/56	S 30 06 56	195	130	65	25	25	45
63/63	S 30 06 06	195	130	65	20	20	40
75/40	S 30 07 04	210	140	70	60	50	65
75/50	S 30 07 05	210	140	70	40	30	70
75/56	S 30 07 56	210	140	70	35	25	55
75/63	S 30 07 06	210	140	70	35	25	45
75/75	S 30 07 07	210	140	70	25	25	40
90/40	S 30 09 04	240	160	80	65	55	75
90/50	S 30 09 05	240	160	80	50	40	80
90/56	S 30 09 56	240	160	80	45	35	75
90/63	S 30 09 06	240	160	80	40	30	70
90/75	S 30 09 07	240	160	80	35	30	65
90/90	S 30 09 09	240	160	80	20	20	50
110/40	S 30 11 04	270	180	90	75	60	95
110/50	S 30 11 05	270	180	90	55	50	95
110/56	S 30 11 56	270	180	90	45	40	90
110/63	S 30 11 06	270	180	90	40	35	85
110/75	S 30 11 07	270	180	90	35	30	75
110/90	S 30 11 09	270	180	90	30	25	65
110/110	S 30 11 11	270	180	90	20	20	55
125/50	S 30 12 05	300	200	100	115	60	75

-- continued over --

Y-branch 45°

HDPE drainage

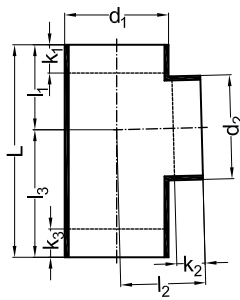
d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub> /l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>	k <sub>2</sub>	k <sub>3</sub>
125/56	S 30 12 56	300	200	100	110	50	45
125/63	S 30 12 06	300	200	100	60	45	105
125/75	S 30 12 07	300	200	100	50	40	95
125/90	S 30 12 09	300	200	100	35	30	30
125/110	S 30 12 11	300	200	100	25	25	25
125/125	S 30 12 12	300	200	100	20	20	20
160/50	S 30 16 05	*	375	250	120	115	65
160/56	S 30 16 56	*	375	250	120	115	65
160/63	S 30 16 06	*	375	250	120	115	65
160/75	S 30 16 07		375	250	120	115	65
160/90	S 30 16 09		375	250	110	105	55
160/110	S 30 16 11		375	250	50	40	45
160/125	S 30 16 12		375	250	10	20	40
160/160	S 30 16 16		375	250	10	15	25
200/75	S 30 20 07	540	360	180	95	160	175
200/90	S 30 20 09	540	360	180	80	150	165
200/110	S 30 20 11	540	360	180	65	140	150
200/125	S 30 20 12	540	360	180	55	130	140
200/160	S 30 20 16	540	360	180	35	85	115
200/200	S 30 20 20	700	430	270	160	160	230
250/110	S 30 25 11	*	660	440	220	150	215
250/125	S 30 25 12	*	660	440	220	140	205
250/160	S 30 25 16	*	660	440	220	120	180
250/200	S 30 25 20	*	660	440	220	90	150
250/250	S 30 25 25	*	900	600	300	160	250
315/110	S 30 31 11	*	840	560	280	235	305
315/125	S 30 31 12	*	840	560	280	220	290
315/160	S 30 31 16	*	840	560	280	200	270
315/200	S 30 31 20	*	840	560	280	175	240
315/250	S 30 31 25	*	840	560	280	140	205
315/315	S 30 31 31	*	950	610	340	170	280

\* fabricated

HDPE drainage

Branch 88.5°

HDPE



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub> /l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>	k <sub>2</sub>	k <sub>3</sub>	
40/40	S 20 04 04	130	55	75	25	25	45	
50/40	S 20 05 04	150	60	90	30	25	60	
50/50	S 20 05 05	150	60	90	25	25	55	
56/50	S 20 56 05	175	70	105	35	30	70	
56/56	S 20 56 56	175	70	105	30	30	65	
63/40	S 20 06 04	175	70	105	30	30	70	
63/50	S 20 06 05	175	70	105	35	30	70	
63/56	S 20 06 56	175	70	105	30	30	65	
63/63	S 20 06 06	175	70	105	30	30	60	
75/40	S 20 07 04	175	70	105	40	25	75	
75/50	S 20 07 05	175	70	105	35	25	70	
75/56	S 20 07 56	175	70	105	30	25	65	
75/63	S 20 07 06	175	70	105	25	25	60	
75/75	S 20 07 07	175	70	105	25	25	55	
90/40	S 20 09 04	200	80	120	45	25	85	
90/50	S 20 09 05	200	80	120	45	25	85	
90/56	S 20 09 56	200	80	120	40	25	85	
90/63	S 20 09 06	200	80	120	35	25	80	
90/75	S 20 09 07	200	80	120	30	25	75	
90/90	S 20 09 09	200	80	120	25	25	70	
110/40	S 20 11 04	225	90	135	60	25	100	
110/50	S 20 11 05	225	90	135	50	25	95	
110/56	S 20 11 56	225	90	135	45	25	90	
110/63	S 20 11 06	225	90	135	40	25	90	
110/75	S 20 11 07	225	90	135	35	25	85	
110/90	S 20 11 09	225	90	135	30	25	75	
110/110	S 20 11 11	225	90	135	20	20	65	
125/50	S 20 12 05	*	250	100	60	25	110	
125/56	S 20 12 56	*	250	100	55	25	105	
125/63	S 20 12 06	*	250	100	50	25	105	
125/75	S 20 12 07		250	100	45	25	100	
125/90	S 20 12 09		250	100	40	25	90	
125/110	S 20 12 11		250	100	30	20	80	
125/125	S 20 12 12		250	100	20	20	70	
160/50	S 20 16 05	*	350	140	75	30	145	
160/56	S 20 16 56	*	350	140	75	30	145	
160/63	S 20 16 06	*	350	140	65	30	140	
160/75	S 20 16 07	*	350	140	80	45	150	
160/90	S 20 16 09	*	350	140	55	30	125	
160/110	S 20 16 11		350	140	60	45	135	
160/125	S 20 16 12		350	140	50	45	125	
160/160	S 20 16 16		350	140	210	30	35	105
200/75	S 20 20 07	*	360	180	180	90	60	90
200/90	S 20 20 09	*	360	180	180	80	60	80
200/110	S 20 20 11	*	360	180	180	70	60	70
200/125	S 20 20 12	*	360	180	180	65	60	65
200/160	S 20 20 16	*	360	180	180	45	60	45
200/200	S 20 20 20	*	360	180	180	25	60	25
250/110	S 20 25 11	*	440	220	220	110	70	110
250/125	S 20 25 12	*	440	220	220	105	70	105
250/160	S 20 25 16	*	440	220	220	85	70	85
250/200	S 20 25 20	*	480	240	240	65	40	65
250/250	S 20 25 25	*	480	240	240	40	40	40
315/110	S 20 31 11	*	560	280	280	170	90	170
315/125	S 20 31 12	*	560	280	280	165	90	165

Branch 88.5°

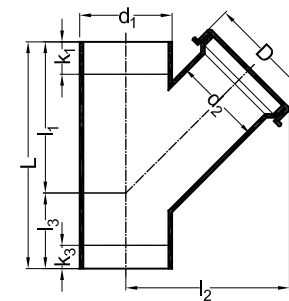
HDPE drainage

d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub> /l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>	k <sub>2</sub>	k <sub>3</sub>	
315/160	S 20 31 16	*	560	280	280	145	90	145
315/200	S 20 31 20	*	560	280	280	120	65	120
315/250	S 20 31 25	*	560	280	280	95	65	95
315/315	S 20 31 31	*	560	280	280	70	65	70

\* fabricated

Clean out branch 45°

HDPE



d <sub>1</sub> /d <sub>2</sub>	Product code	D	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>	k <sub>3</sub>
110/110	33 11 00	140	270	180	195	90	20	55
125/110	33 12 00	140	300	200	200	100	25	25
160/110	33 16 00	140	375	250	220	125	45	45

Clean out branches 45° can be applied in horizontal and vertical pipes.

-- continued over --

HDPE drainage

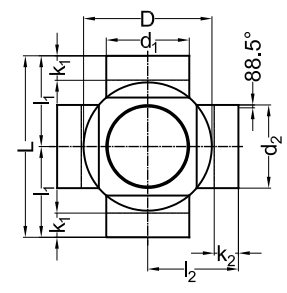
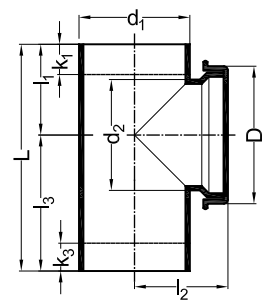
HDPE drainage

Clean out branch 90° HDPE

Ball Branches - General dimensions HDPE



d <sub>1</sub> /d <sub>2</sub>	Product code	D	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>	k <sub>3</sub>
40/40	S 23 04 00	64	130	55	80	75	25	45
50/50	S 23 05 00	72	150	60	72	90	25	55
56/56	S 23 56 00	83	175	70	100	105	30	65
63/63	S 23 06 00	87	175	70	100	105	30	60
75/75	S 23 07 00	91	175	70	100	105	25	55
90/90	S 23 09 00	118	200	80	100	120	25	70
110/110	S 23 11 00	140	225	90	115	135	20	65
125/110	S 23 12 00	140	250	100	123	150	20	80
160/110	S 23 16 00	140	350	140	140	210	60	135
200/110	S 23 20 00	140	360	180	160	180	90	90
250/110	S 23 25 00	140	440	220	185	220	110	110
315/110	S 23 31 00	140	560	280	220	280	170	170



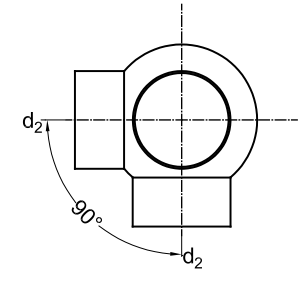
Branch 88.5° swept entry HDPE

Double ball branch 88.5° HDPE

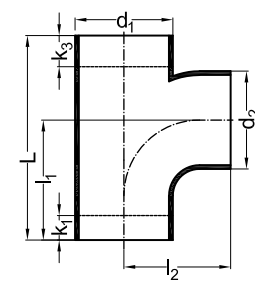
fabricated - 90°



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	D	k <sub>1</sub>	k <sub>2</sub>
110/50	S 24 11 14	240	120	130	170	30	20
110/56	S 24 11 15	240	120	130	170	30	20
110/63	S 24 11 16	240	120	130	170	30	20
110/75	S 24 11 17	240	120	130	170	30	20
110/90	S 24 11 19	240	120	130	170	30	20
110/110	S 24 11 01	240	120	110	170	30	30
125/75	S 24 12 17	260	130	145	190	30	20
125/110	S 24 12 01	260	130	125	190	30	40
125/125	S 24 12 12	260	130	125	190	30	40



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	k <sub>1</sub>	k <sub>3</sub>
110/110	S 25 11 11	230	140	120	90	20



HDPE drainage

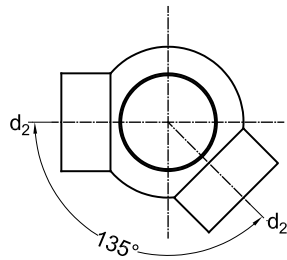
Double ball branch 88.5°

HDPE

fabricated - 135°



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	D	k <sub>1</sub>	k <sub>2</sub>
110/50	S 24 11 24	240	120	130	170	30	20
110/56	S 24 11 25	240	120	130	170	30	20
110/63	S 24 11 26	240	120	130	170	30	20
110/75	S 24 11 27	240	120	130	170	30	20
110/90	S 24 11 29	240	120	130	170	30	20
110/110	S 24 11 02	240	120	110	170	30	30
125/75	S 24 12 27	260	130	145	190	30	20
125/110	S 24 12 02	260	130	125	190	30	40
125/125	S 24 12 22	260	130	125	190	30	40



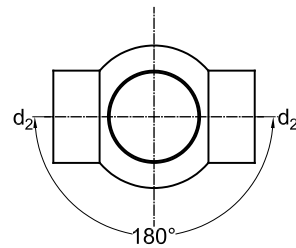
Double ball branch 88.5°

HDPE

fabricated - 180°



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	D	k <sub>1</sub>	k <sub>2</sub>
110/50	S 24 11 34	240	120	130	170	30	20
110/56	S 24 11 35	240	120	130	170	30	20
110/63	S 24 11 36	240	120	130	170	30	20
110/75	S 24 11 37	240	120	130	170	30	20
110/90	S 24 11 39	240	120	130	170	30	20
110/110	S 24 11 03	240	120	110	170	30	30
125/75	S 24 12 37	260	130	145	190	30	20
125/110	S 24 12 03	260	130	125	190	30	40
125/125	S 24 12 32	260	130	125	190	30	40



HDPE drainage

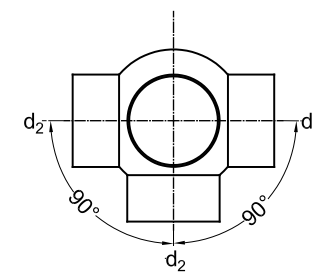
Triple ball branch 88.5°

HDPE

fabricated - 90°



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	D	k <sub>1</sub>	k <sub>2</sub>
110/50	S 34 11 14	240	120	130	170	30	20
110/56	S 34 11 15	240	120	130	170	30	20
110/75	S 34 11 17	240	120	130	170	30	20
110/90	S 34 11 19	240	120	130	170	30	20
110/110	S 34 11 01	240	120	110	170	30	30
125/75	S 34 12 17	260	130	145	190	30	20
125/110	S 34 12 01	260	130	125	190	30	40
125/125	S 34 12 12	260	130	125	190	30	40



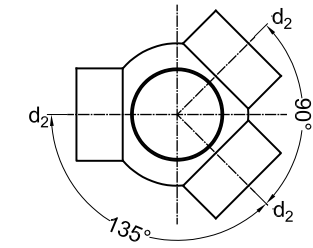
Triple ball branch 88.5°

HDPE

fabricated - 135°



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	D	k <sub>1</sub>	k <sub>2</sub>
110/50	S 34 11 24	240	120	130	170	30	20
110/56	S 34 11 25	240	120	130	170	30	20
110/75	S 34 11 27	240	120	130	170	30	20
110/90	S 34 11 29	240	120	130	170	30	20
110/110	S 34 11 02	240	120	110	170	30	30
125/75	S 34 12 27	260	130	145	190	30	20
125/110	S 34 12 02	260	130	125	190	30	40
125/125	S 34 12 22	260	130	125	190	30	40





HDPE drainage

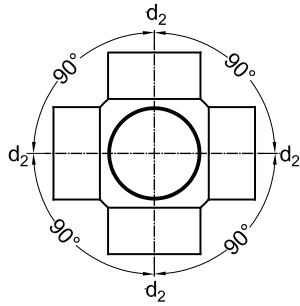
Fourfold ball branch 88.5°

HDPE

fabricated - 90°



d <sub>1</sub> /d <sub>2</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	D	k <sub>1</sub>	k <sub>2</sub>
110/50	S 44 11 14	240	120	130	170	30	20
110/56	S 44 11 15	240	120	130	170	30	20
110/75	S 44 11 17	240	120	130	170	30	20
110/90	S 44 11 19	240	120	130	170	30	20
110/110	S 44 11 01	240	120	110	170	30	30
125/75	S 44 12 17	260	130	145	190	30	20
125/110	S 44 12 01	260	130	125	190	30	40
125/125	S 44 12 12	260	130	125	190	30	40



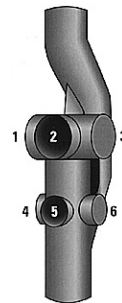
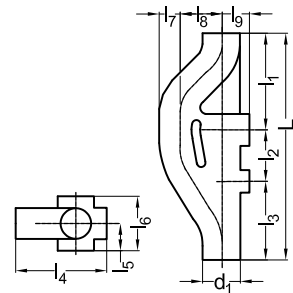
Aerator Akavent

HDPE



d <sub>1</sub>	Product code	L	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	l <sub>6</sub>	l <sub>7</sub>	l <sub>8</sub>	l <sub>9</sub>
110	S 60 11 07 *	750	320	170	260	275	90	180	55	130	90
160	S 60 16 07 *	715	320	160	235	310	100	200	75	125	110

\* 1/2/3 = max. Ø 110 mm - 4/5/6 = max. Ø 75 mm  
butt-weld only



The Akavent aerator interrupts the fall of the wastewater on every floor resulting in a reduction of the speed. The vent pipe is obsolete and the unique design increases the capacity of the riser.  
The Akavent aerator will be delivered with closed caps. After removing the caps, the required branches can be butt-welded to the aerator. When the connection will be made with snap socket Art. Nr. 40x10 a tight-fit plug-in connection is created. Then a transition to other material is also possible.

HDPE drainage

End cap

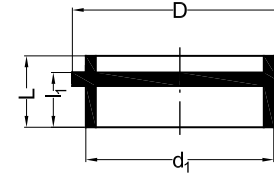
HDPE



d <sub>1</sub>	Product code	D	L	l <sub>1</sub>
40	S 67 04 07 *	46	15	11
50	S 67 05 07 *	57	16	12
56	S 67 56 07 *	64	16	12
63	S 67 06 07 *	71	18	14
75	S 67 07 07 *	85	21	16
90	S 67 09 07 *	100	19	19
110	S 67 11 07 *	120	19	19

\* butt-weld only

End cap size 125-315 see Art. Nr. 67xx09.



End cap

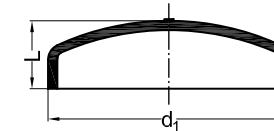
HDPE



d <sub>1</sub>	Product code	L
125	S 67 12 09 *	35
160	S 67 16 09 *	45
200	S 67 20 09 *	55
250	S 67 25 09 *	30
315	S 67 31 09 *	30

\* butt-weld only

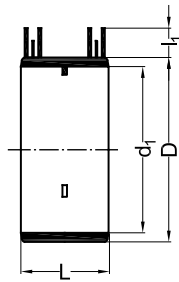
Sizes 40-110 see Art. Nr. 67xx07.



HDPE drainage

Electrofusion coupler Akafusion

HDPE  
Akafusion



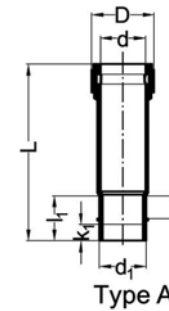
d <sub>1</sub>	Product code	D	L	I <sub>1</sub>	System
40	S 41 04 95	52	54	22	5A/80s
50	S 41 05 95	62	54	22	5A/80s
56	S 41 56 95	68	54	22	5A/80s
63	S 41 06 95	75	54	22	5A/80s
75	S 41 07 95	87	54	22	5A/80s
90	S 41 09 95	102	56	22	5A/80s
110	S 41 11 95	122	58	22	5A/80s
125	S 41 12 95	137	66	22	5A/80s
160	S 41 16 95	172	66	22	5A/80s
200	S 41 20 65	233	175	31	220V/420s
250	S 41 25 65	283	175	31	220V/420s
315	S 41 31 65	349	175	31	220V/420s

The Akafusion electrofusion couplers are delivered with centre stops. These stops can easily be removed with a knife, so that the coupler can be used as a slide-coupler. Before welding, cut pipe ends squarely with a pipe cutting tool, remove the oxide film with a scraper and mark the insertion depth. The couplers can easily be welded with our Akafusion control box and other suitable control boxes.

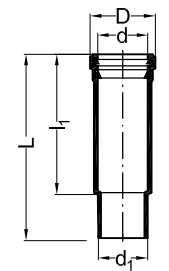
HDPE drainage

Expansion socket electrofusion  
with protection plug

HDPE  
SBR seal



Type A



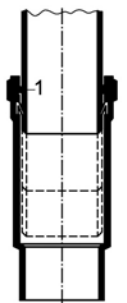
Type B

d <sub>1</sub>	Product code	D	d	L	I <sub>1</sub>	k <sub>1</sub>
40	S 40 04 20	58	41	172	135	
50	S 40 05 20	68	51	172	135	
56	S 40 56 20	74	57	172	135	
63	S 40 06 20 *	78	64	155	135	
75	S 42 07 20	100	76	256	75	35
90	S 42 09 20	116	91	256	75	35
110	S 42 11 20	137	112	256	75	35
125	S 42 12 20	153	127	256	75	35
160	S 42 16 20	189	162	265	75	35
200	S 40 20 60 **	230	202	460	230	
250	S 40 25 60 **	300	253	480	250	
315	S 40 31 60 **	370	319	510	270	

\* butt-weld only

\*\* without protection plug

Type A: d<sub>1</sub> = 75-160      Type B: d<sub>1</sub> = 40-63 and 200-315



The expansion sockets can absorb length changes of pipes with a max. length of 6 m. A temperature difference of 10°C will result in expansion or contraction of 8 mm. The insertion depths at ambient temperature of 0°C and 20°C are indicated on the sockets Ø 75-160 mm.

1 sealing ring

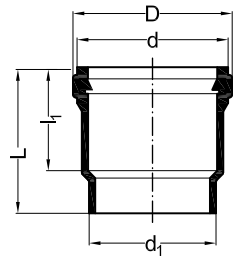
HDPE drainage

Plug-in socket with protection plug HDPE  
SBR seal



d <sub>1</sub>	Product code	D	d	L	I <sub>1</sub>
40	S 42 04 50 *	53	41	73	54
50	S 42 05 50 *	67	51	75	54
56	S 42 56 50 *	72	57	80	54
63	S 42 06 50 *	84	64	93	69
75	S 42 07 50 *	96	76	95	69
90	S 42 09 50 *	110	91	95	69
110	S 42 11 50 *	131	111	95	69
125	S 42 12 50 *	150	126	94	70
160	S 42 16 50 *	190	162	130	105

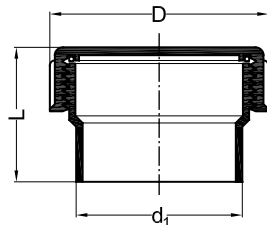
\* butt-weld only



Inspection screw lock long HDPE  
SBR seal



d <sub>1</sub>	Product code	D	L
40	S 66 04 10	63	73
50	S 66 05 10	73	71
56	S 66 56 10	81	74
63	S 66 06 10	89	74
75	S 66 07 10	111	106
90	S 66 09 10	128	106
110	S 66 11 10	145	106



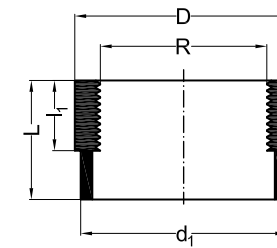
HDPE drainage

Female thread adaptor short HDPE



d <sub>1</sub>	Product code	R	L	I <sub>1</sub>	D
40	S 91 04 79 *	3/4"	38	30	40
40	S 91 04 80 *	1"	38	30	45
40	S 91 04 81 *	1 1/4"	38	30	55
50	S 91 05 80 *	1"	38	30	50
50	S 91 05 81 *	1 1/4"	38	30	55
50	S 91 05 82 *	1 1/2"	38	30	63
63	S 91 06 82 *	1 1/2"	38	30	63
63	S 91 06 83 *	2"	38	30	75

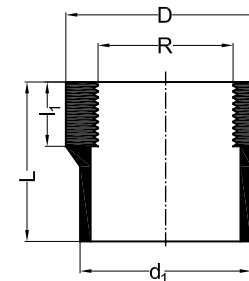
\* butt-weld only



Female thread adaptor long HDPE



d <sub>1</sub>	Product code	R	L	I <sub>1</sub>	D
40	S 92 04 78	1/2"	55	30	40
40	S 92 04 79	3/4"	70	30	40
40	S 92 04 80	1"	70	30	45
40	S 92 04 81	1 1/4"	70	30	55
50	S 92 05 80	1"	70	30	50
50	S 92 05 81	1 1/4"	70	30	55
50	S 92 05 82	1 1/2"	70	30	63
63	S 92 06 82	1 1/2"	70	30	63
63	S 92 06 83	2"	70	30	75
75	S 92 07 84	2 1/2"	70	30	90



HDPE drainage

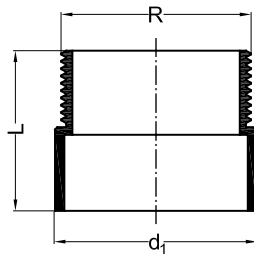
Male thread adaptor short

HDPE



d <sub>1</sub>	Product code	R	L
40	S 96 04 78 *	½"	30
40	S 96 04 79 *	¾"	30
40	S 96 04 80 *	1"	30
40	S 96 04 81 *	1 ¼"	30
50	S 96 05 80 *	1"	35
50	S 96 05 81 *	1 ¼"	35
50	S 96 05 82 *	1 ½"	35
63	S 96 06 82 *	1 ½"	40
63	S 96 06 83 *	2"	40

\* butt-weld only

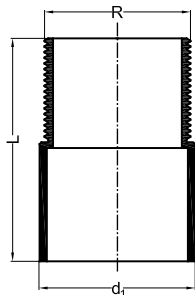


Male thread adaptor long

HDPE



d <sub>1</sub>	Product code	R	L
40	S 97 04 78	½"	60
40	S 97 04 79	¾"	60
40	S 97 04 80	1"	60
40	S 97 04 81	1 ¼"	60
50	S 97 05 80	1"	65
50	S 97 05 81	1 ¼"	65
50	S 97 05 82	1 ½"	65
63	S 97 06 82	1 ½"	70
63	S 97 06 83	2"	70
75	S 97 07 84	2 ½"	70

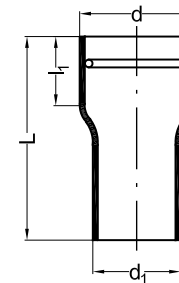


HDPE drainage

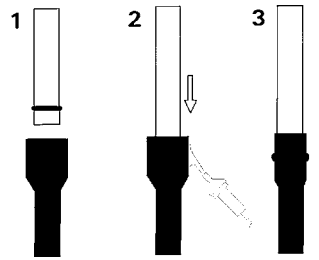
Contraction sleeve with O-ring

HDPE

NBR O-ring



d <sub>1</sub> /d	Product code	L	l <sub>1</sub>	d <sub>x</sub>
40/50	S 55 04 01	210	65	41-44
40/70	S 55 04 02	210	65	57-64
50/70	S 55 05 03	210	65	57-64
50/80	S 55 05 04	210	60	67-74
56/75	S 55 56 01	210	70	62-69
63/85	S 55 06 03	210	70	75-79
75/90	S 55 07 01	210	75	80-84
75/100	S 55 07 02	210	75	90-94
90/110	S 55 09 02	210	75	94-98
110/125	S 55 11 02	210	100	102-111
110/135	S 55 11 03	210	100	110-120
110/150	S 55 11 04	210	90	115-136
125/155	S 55 12 01	210	85	120-140
125/170	S 55 12 02	210	85	135-155
160/200	S 55 16 02	220	90	155-165
200/225	S 55 20 01	300	150	185-207
250/280	S 55 25 01	300	150	236-260



d<sub>x</sub> = connecting range

Contraction sleeves are applied for jointing PE to concrete, clayware, copper, stainless steel etc. (see drawing).

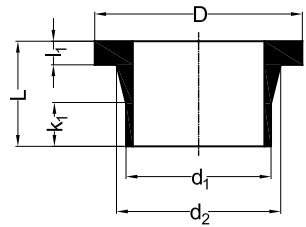
1 Slip the seal over the pipe end.

2 Then slide the contraction sleeve over the pipe end with seal and heat it with for instance hot air.

3 The sleeve will shrink and fit over the pipe end.

HDPE drainage

Stub flange HDPE

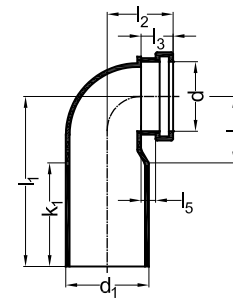


d <sub>1</sub>	Product code	d <sub>2</sub>	D	L	l <sub>1</sub>	k <sub>1</sub>
40	S 47 04 02 *	50	78	50	10	15
50	S 47 05 02 *	61	88	50	10	15
56	S 47 56 02 *	70	102	60	14	15
63	S 47 06 02 *	75	102	50	14	15
75	S 47 07 02 *	89	120	50	16	15
90	S 47 09 02	105	136	80	17	20
110	S 47 11 02	125	158	80	18	30
125	S 47 12 02	132	158	80	18	30
160	S 47 16 02	175	210	80	18	30
200	S 47 20 02 *	232	268	100	18	40
250	S 47 25 02 *	285	320	100	20	40
315	S 47 31 02 *	335	370	100	20	40

\* butt-weld only

Properties HDPE drainage

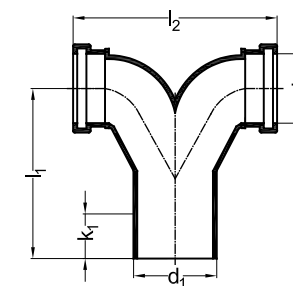
Wall-lavatory bend 90° with protection plug HDPE  
SBR seal



d <sub>1</sub> /d	Product code	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	l <sub>5</sub>	k <sub>1</sub>
90/90	S 50 09 84	225	76	34	83	17	120
110/90	S 50 11 85	225	76	34	95	17	120
110/110	S 50 11 82 *	225	75	30	92	19	120
110/110	S 50 11 83 *	300	75	30	92	19	195

\* NBR O-ring

Double wall-lavatory bend 90° (vertical) with protection plug HDPE



d <sub>1</sub> /d	Product code	l <sub>1</sub>	l <sub>2</sub>	k <sub>1</sub>
110/90	S 50 09 34 *	225	275	80
110/110	S 50 11 34 **	185	270	60

\* EPDM O-ring

\*\* NBR O-ring



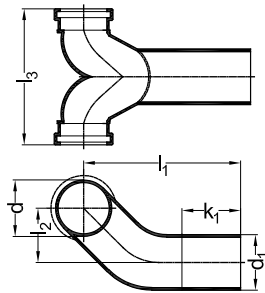
**HDPE drainage** **Properties**

**Double wall-lavatory bend 90° (horizontal) with protection plug** HDPE



d <sub>1</sub> /d	Product code		l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>
110/90	S 50 09 35 *		360	100	275	200
110/110	S 50 11 35 **		360	100	270	200

\* EPDM O-ring  
\*\* NBR O-ring



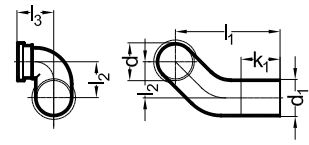
**Wall-lavatory bend 90° (horizontal) left with protection plug** HDPE

SBR seal



d <sub>1</sub> /d	Product code		l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>
90/90	S 50 09 32		300	100	75	140
110/90	S 50 10 32		350	100	75	170
110/110	S 50 11 32 *		350	100	75	170

\* NBR O-ring



**Properties** **HDPE drainage**

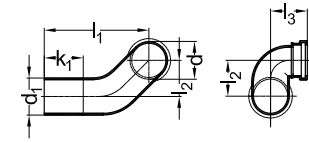
**Wall-lavatory bend 90° (horizontal) right with protection plug** HDPE

SBR seal



d <sub>1</sub> /d	Product code		l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	k <sub>1</sub>
90/90	S 50 09 33		300	100	75	140
110/90	S 50 10 33		350	100	75	170
110/110	S 50 11 33 *		350	100	75	170

\* NBR O-ring



**Wall-lavatory socket** HDPE

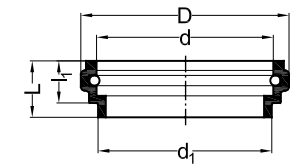
SBR seal



d <sub>1</sub>	Product code		d	D	L	l <sub>1</sub>
90	S 50 09 51 *		90	113	49	38
110	S 50 11 51 *		90	111	31	20
110	S 50 11 71 *		110	130	45	28

\* butt-weld only

Art. Nr. 501151 = EPDM O-ring.  
Art. Nr. 501171 = NBR O-ring.

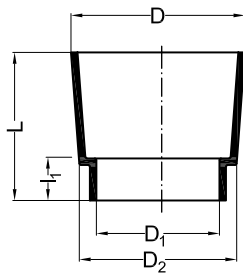


HDPE drainage Properties

Protection plug HDPE



d <sub>1</sub>	Product code	D	D <sub>1</sub>	D <sub>2</sub>	L	I <sub>1</sub>
90	S 43 09 19	109	90	103	98	27,0
110	S 43 11 19	130	105	119	98	23,5



Tools HDPE drainage

Control box Akafusion CB315 Akafusion



d <sub>1</sub>	Product code	Dim.	V~	Hz	kg	A max	W max
40-315	S 41 98 00	270x245x175	230	50/60	4,3	10	2300

The Akafusion CB315 control box is suitable for welding electrofusion couplers from d<sub>1</sub> 40-160 mm (with yellow cable) and electrofusion couplers from d<sub>1</sub> 200-315 mm (with blue cable). Yellow and blue output leads are standard supplied with control boxes product code S 41 98 00.

Control box Akafusion CB315 Akafusion



d <sub>1</sub>	Product code	Dim.	V~	Hz	kg	A max	W max
40-315	S 41 98 40	320x310x320	110	50/60	27	10	2300

The Akafusion CB315 control box is suitable for welding electrofusion couplers from d<sub>1</sub> 40-160 mm (with yellow cable) and electrofusion couplers from d<sub>1</sub> 200-315 mm (with blue cable). Yellow and blue output leads are standard supplied with control boxes product code S 41 98 40.

Spare output leads for control box Akafusion CB315 Akafusion



d <sub>1</sub>	Product code	System	Colour
40-160	S 41 98 51	5A/80s	yellow
200-315	S 41 98 52	220V/420s	blue

Cable for simultaneous welding with electrofusion machine Akafusion CB315 Akafusion



d <sub>1</sub>	Product code	System	Colour
d <sub>1</sub> +x<200	S 41 98 55	5A/80s	yellow

The sum of the diameters of the electrofusion couplers < 200 mm.

HDPE drainage Tools

Butt-welding machine 250C



d <sub>1</sub>	Product code	L	B	H	kg
75-250	S 49 30 00	835	565	760	160

*d<sub>1</sub> = 75-90-110-125-160-200-250.  
Suitable for welding Y-branches 45°.*

Butt-welding machine 315C



d <sub>1</sub>	Product code	L	B	H	kg
90-315	S 49 40 00	1200	680	1045	187

*d<sub>1</sub> = 90-110-125-160-200-250-315.  
Suitable for welding Y-branches 45°.*

Tools HDPE drainage

Welding plate



Product code
S 49 00 10

*For welding pipe and fittings up to 110 mm size.  
The welding plate is delivered including case and holder.*

Pipe scraper manual



Product code
S 41 96 00

**Joining methods** **Properties**

**Electrofusion**



Electrofusion, the most simple and rapid joining technique, is mainly used on construction sites for a highly efficient method of assembly for pipes, fittings and prefabricated sections.

**Electrofusion couplers**

The PE range includes couplers in the diameters 40 to 315 mm. The couplers are extremely suitable for applications in waste water and rainwater drainage, with the following features:

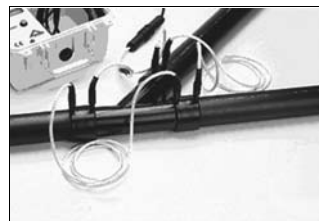
1. Injection molded with excellent dimensional accuracy and stability.
2. One welding indicator on each welding surface for checking both welding connections.
3. Centre stops easy to remove in order to use the coupler as a slide-over coupler.
4. Resistance wires fixed to the surface for an optimal heat transfer and therefore a high quality welding connection.
5. Yellow edge surrounding the welding indicators of the diameters 200, 250 and 315 mm for better visibility.

**Electrofusion control box**

The Akafusion control box CB315 can not only weld Akatherm electrofusion couplers in the diameter range 40 to 160 mm but also the diameters 200, 250 and 315 mm. The new techniques applied in the electronics (such as integrated circuit boards) and the case material make it a solid and reliable control box.

**Multiple welding**

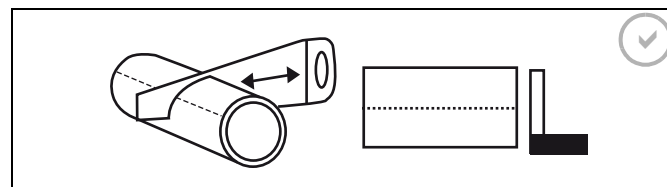
The CB315 is capable of welding several electrofusion couplers simultaneously in the same time that is needed for producing one electrofusion weld. The combined diameters of the couplers to be joined should not exceed 200 mm. For example in the case of a 45° 75/50 mm tee, both the diameters 75 mm and the branch 50 mm can be welded at once.



**Joining procedure**

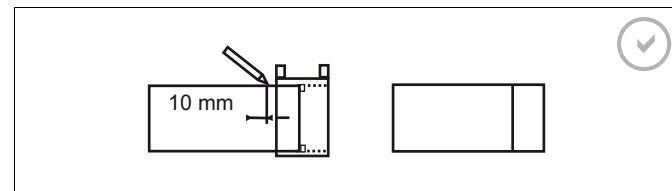
**1. Cut the pipe square**

The pipe ends must be cut square to ensure that the heating element in the coupler is completely covered by the pipe or fitting.



**2. Mark insertion depth + 10 mm**

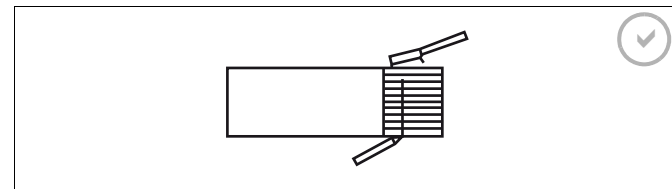
This is to ensure that across the full welding zone the oxidised layer will be removed.



**3. Scrape pipe and mark insertion depth again**

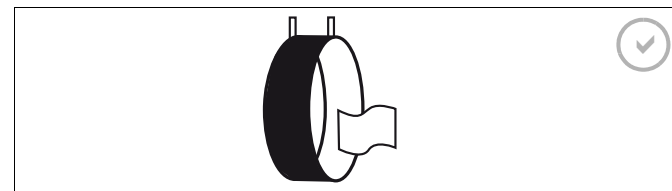
The outer surface of the pipe (approx. 0.2 mm deep) must be scraped for the full distance that will be covered by the coupler to remove any surface 'oxidation'.

The insertion depth should be marked again to safeguard full insertion.



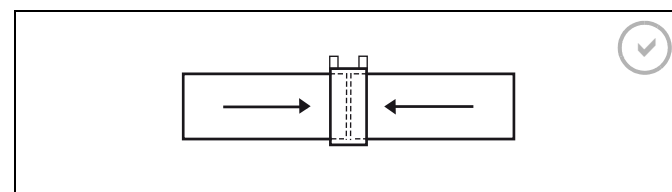
**4. Clean coupler**

Before assembling the pipes into the coupler ensure that all surfaces are clean and dry.

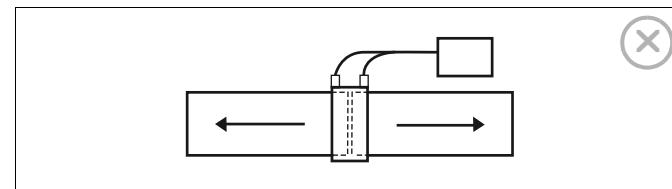


**5. Insert pipe and/or fitting up to pipe stop**

Ensure that the pipe is pushed as straight as possible into the fitting.

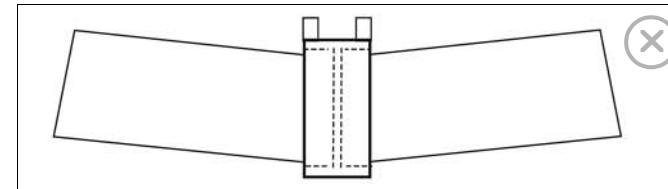


**6. Prevent joint movement during welding**

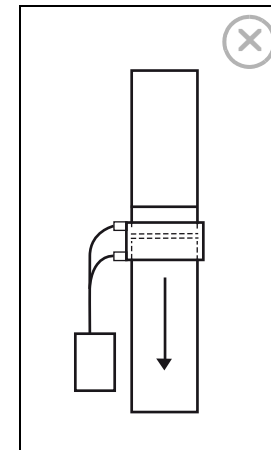


**Properties** **Joining methods**

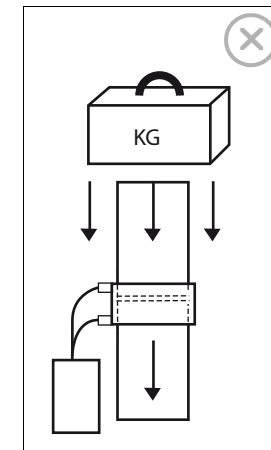
**7. Prevent misalignment**



**8. Prevent coupler from sliding down when installed vertical**



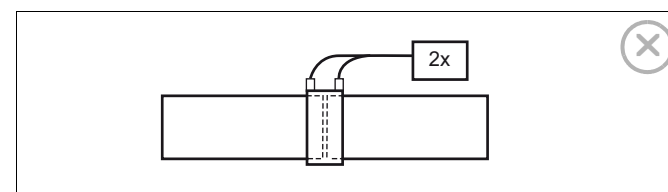
**9. Prevent load on vertical pipesystem**



After connecting the cables of the control box the welding process can be commenced by pushing the start button. The CB315 control box adapts the welding time to the ambient temperature. When it is colder than 20°C the welding time is extended and when the ambient temperature exceeds 20°C the welding time is shortened. For welding times and cooling down time see table below.

The joint assembly should not be disturbed during the fusion cycle and for the specified cooling time afterwards.

dimension d <sub>1</sub>	system	weld time	cooling time
mm		sec	min
40-160	Constant current 5A	80	20
200-315	Constant voltage 220V	420	30



**10. Don't weld coupler twice**

**Butt-welding**



Butt-welding is a very economical and reliable joining technique for making welded joints, requiring only butt-welding equipment. All Akatherm pipes and fittings can be joined by this welding method. Fittings for which a k-dimension is shown in the table can be shortened by not more than this amount. Butt-welding is extremely suitable for prefabricating pipe sections and for making special fittings.

**Preparations**

The following guidelines are of importance when making a proper butt-weld:

- Establish a work space where the jointing can be done without being effected by major weather conditions.
- Check the equipment functions properly. Welding equipment used on site deserves special attention.
- The fittings and or pipes need to be aligned in the welding machine. Mis-alignment can be up to 10% of the wall thickness.
- Clean the heating element before each jointing operation with a lint-free cloth and suitable cleaner (see instructions welding machine).
- Cut the pipe and/or fitting with a pipe cutter to make the end square.
- Make sure that once the pipe and/or fitting ends have been machined, they do not get dirty. Do not touch them with your hands. The surface needs to be clear of oil, grease and dirt.
- Put the pipe parts into the welding machine to facilitate a firm hold during the jointing process.
- A digital thermometer can be used to check the temperature of the heating plate. The temperature should be checked at several points around the plate and should be between 200°C and 220°C. Maximum deviation between points is given in the table.

Used surface of heating element for welding diameter d <sub>1</sub>	Δt <sub>tot</sub>
d <sub>1</sub> = 40-160	8°C
d <sub>1</sub> = 200-315	10°C

*Maximum temperature variation heating element*

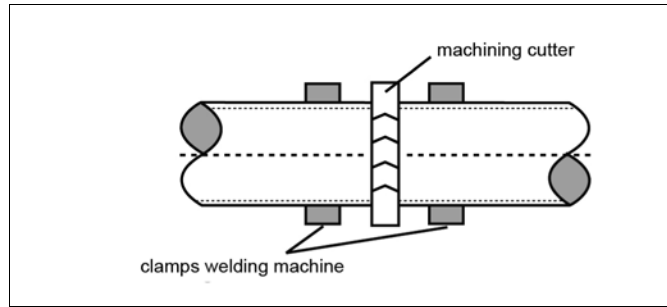
**Jointing methods** **Properties**

**Welding process**

The butt-welding of Akatherm HDPE operates according to the following steps:

**Machining the surface**

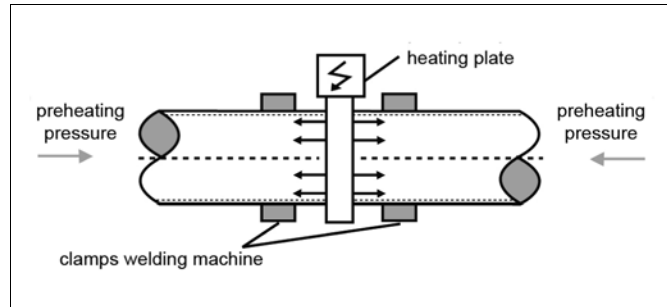
Both sides should be machined until they run parallel. When the machining is finished, open the carriages (the plastic shavings must be continuous and uniform in both sides to weld). Take off the milling cutter. Verify the alignment between the machined surfaces. Remove the plastic shaving. Do not dirty or touch the machined surfaces.



Machining the surface

**Preheating under pressure**

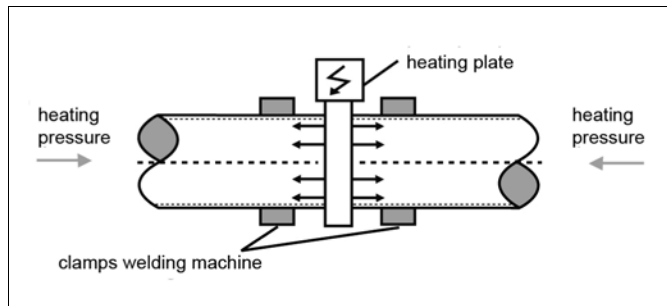
Press the two ends to be jointed gradually to the heating element until a bead is created. The size of the bead is a good indication that the appropriate pressure and time is used. For pressure and bead size see the table on the next page.



Preheating under pressure

**Heating up with less pressure**

HDPE is a good insulator, therefore at this stage it is necessary that the correct heating depth of the pipe ends is obtained. Only a small amount of pressure 0.01 N/mm<sup>2</sup> is required to maintain the contact of the pipe ends with the heating element. The heat will gradually spread through the pipe/fitting end. The size of the bead will increase a little. The time and pressure needed for this phase can be found in the table on the next page.



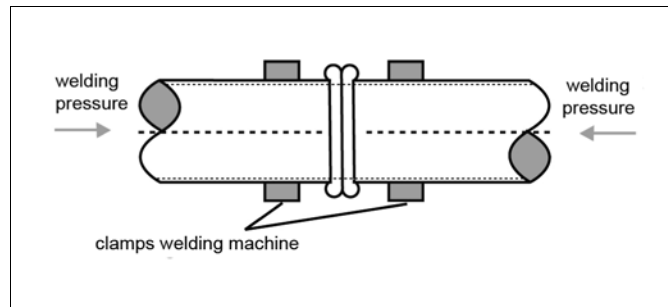
Obtaining correct heating depth

**Change over**

Remove the heating element from the jointing areas and immediately make those areas touch each other. Do not push the pipe ends abruptly onto each other. The removal of the heating element needs to be done quickly to prevent the pipe ends from cooling down. The times for changing over can be found in the table on the next page.

**Welding and cooling**

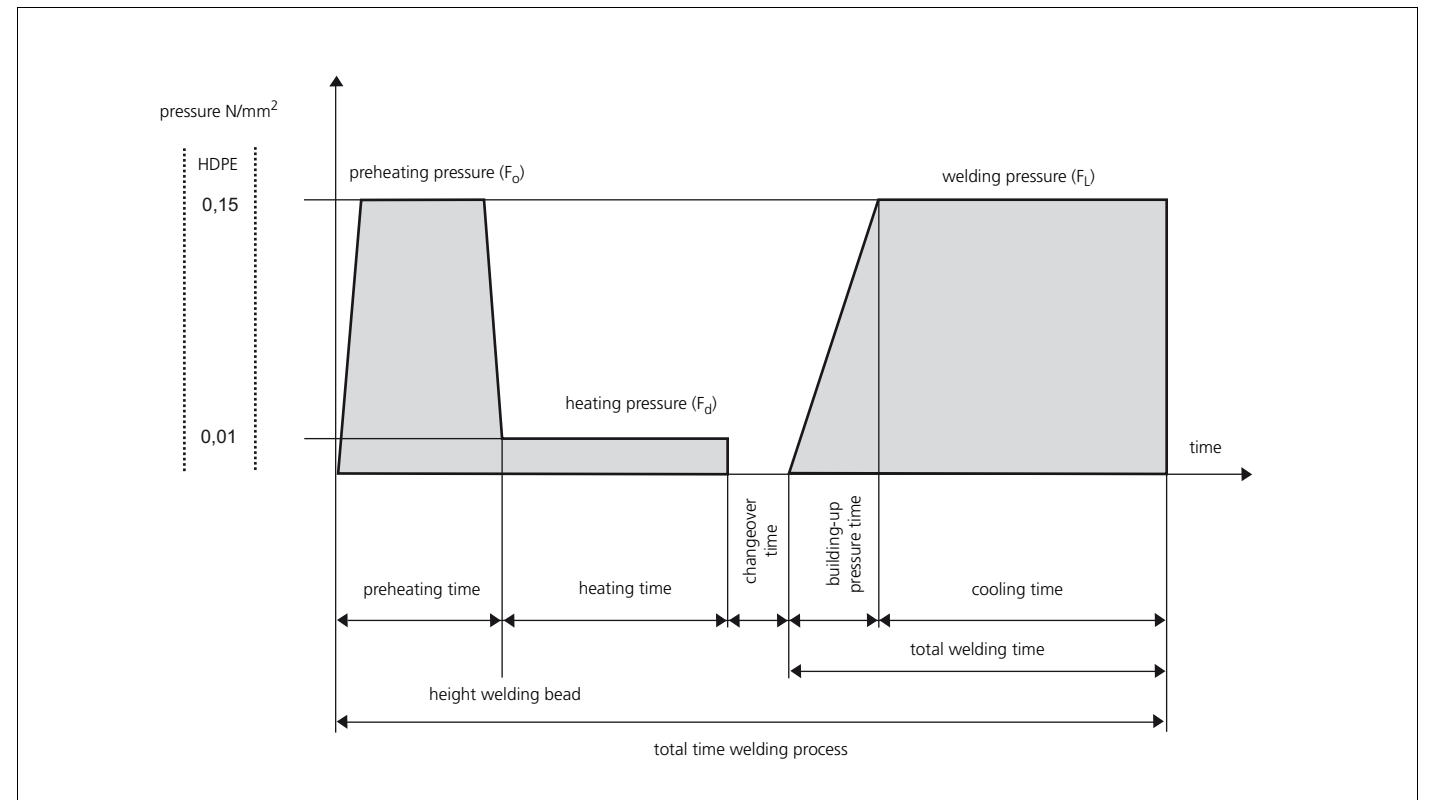
After the jointing areas have made contact they should be joined with a gradual increase in pressure up to the specified value. Keep the specified welding pressure at a constant level during the cooling period. Do not cool artificially.



Welding and cooling

The welded components can be removed from the machine when 50% of the cooling period has elapsed, providing that this is done carefully, with no load or strain being placed on the joint. The joint must then be left undisturbed for the remainder of the cooling period.

**Properties** **Jointing methods**



Diameter d <sub>1</sub>	Wall thickness e	Preheating pressure / welding pressure (0,15 N/mm <sup>2</sup> )	Heating pressure (0,01 N/mm <sup>2</sup> )	Height welding bead	Heating time	Changeover time	Building-up pressure time	Cooling time
mm	mm	F <sub>O</sub> /F <sub>L</sub> N	F <sub>d</sub> N	mm	sec	sec	sec	min
40	3.0	55	4	0.5	29	4	4	4
50	3.0	70	5	0.5	30	4	4	4
56	3.0	75	5	0.5	30	4	4	4
63	3.0	85	6	0.5	31	4	4	4
75	3.0	105	7	0.5	32	5	5	4
90	3.5	145	10	0.5	35	5	5	4
110	4.2	210	14	0.5	42	5	5	6
125	4.8	275	18	1.0	48	5	5	6
160	6.2	450	30	1.0	62	6	6	9
110	3.4	175	12	0.5	35	5	5	4
125	3.9	225	15	0.5	39	5	5	5
160	4.9	370	25	1.0	49	5	5	7
200	6.2	570	38	1.0	62	6	6	9
250	7.8	900	60	1.5	77	6	6	11
315	9.7	1400	93	1.5	77	6	6	11
200	7.7	700	47	1.5	77	6	6	11
250	9.6	1090	73	1.5	97	7	7	13
315	12.1	1730	115	2.0	121	6	8	16

Welding parameters Akatherm HDPE drainage

In this table the welding parameters can be found for Akatherm HDPE. The exact regulation of the welding machine depends on its mechanical resistance. The tables provided with the machine are to be used for regulating the machine.



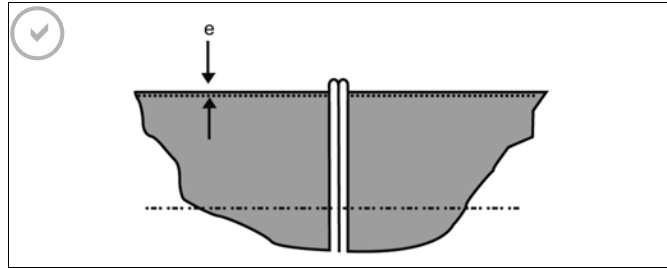
**Joining methods** **Properties**

**Evaluating the butt-weld joint**

The butt-weld can be evaluated using destructive and non destructive evaluation methods. For these evaluations special equipment has to be used. Butt-welds can easily be judged by a visual inspection making this the recommended method for a first evaluation.

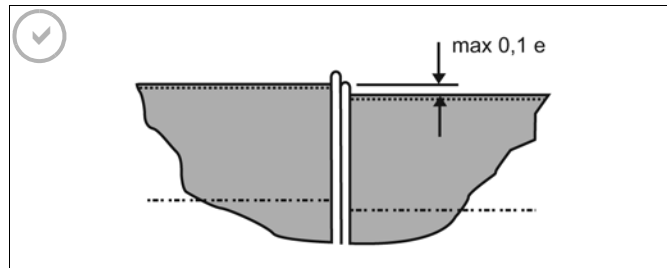
The shape of the welding bead is an indication for the proper operation of the welding process. Both welding beads should have the same shape and size. The width of the welding bead should approximately be 0.5 x the height. Differences between the beads can be caused by the difference in HDPE material used in the welded components. Despite the differences in welding bead the butt can be of sufficient strength.

In the next illustration a good weld is shown with a uniform welding bead. At a visual inspection this would be classified as an "acceptable" weld.



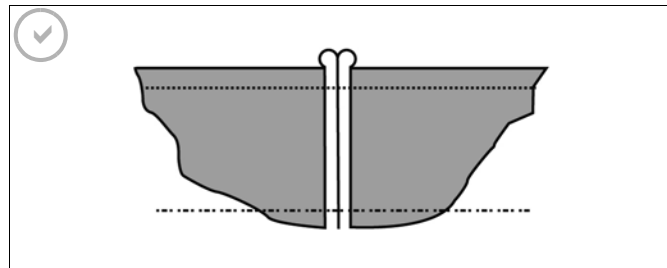
Butt-weld with even welding beads (acceptable)

Mis-alignment between fittings and pipe can occur for several reasons. Oval pipe ends or irregular necking of the pipe can cause an incomplete fit. If this is less than 10% of the wall thickness the weld can still be classified as "acceptable" (see next illustration).



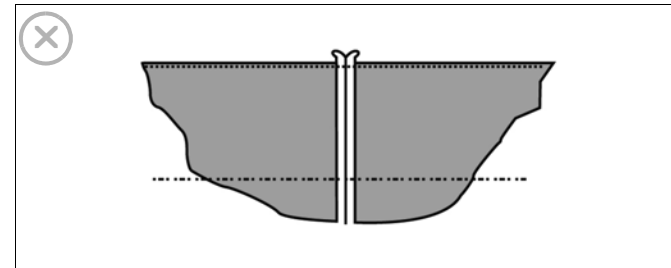
Butt-weld with mis-alignment of pipe (acceptable)

The next illustration shows a joint with beads that are too big. The uniformity indicates a good joint preparation. Heat supply and jointing pressure settings, however, are too high. A purely visual assessment would still classify the weld as "acceptable".



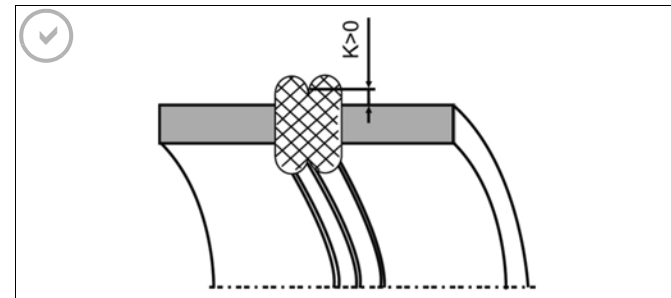
Butt-weld with big welding beads (acceptable)

When there is either insufficient heating up or too low welding pressure there are hardly any beads. In cases like this thick walled pipes often form shrinking cavities. The weld must be classified as "not acceptable".



Butt-weld (not acceptable)

In the next illustration a cross-section of a regular, round fusion bead, free of notches or sagging is shown. Special attention should be paid to the fact that the collar value 'K' is greater than 0.



Cross section of a good butt-weld

**Properties** **Joining methods**

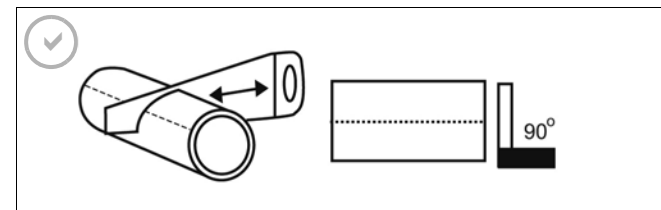
**Plug-in joint**



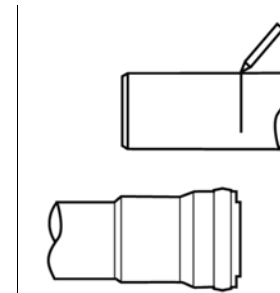
A plug-in joint is an easy to make, detachable and non pull-tight jointing method.

Jointing process:

**Cut pipe square and remove burr**



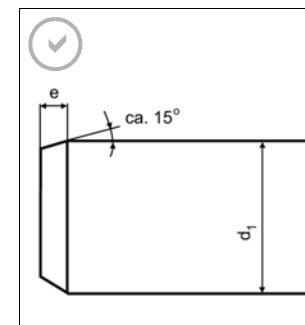
**Mark insertion depth**



**Plug in socket:**  
The pipe needs to be inserted in the plug in socket using the full insertion depth.

A plug-in joint is not to be used to accommodate the expansion and contraction of a pipe system.

**Chamfer pipe end**



The pipe-end needs to be chamfered under an angle of 15°. To get an even cut and chamfer a chamfering tool should be used.

**Make joint**

Lubricate the pipe end and insert the pipe up to the marked insertion depth.

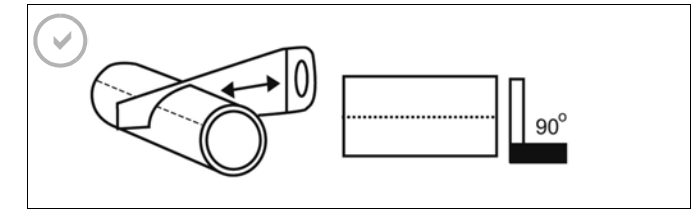
**Expansion joint**



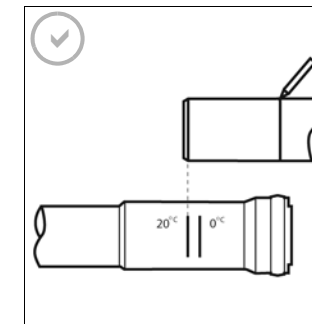
Expansion sockets can absorb length changes of pipes with a max. length of 5 m.

Jointing process:

**Cut pipe square and remove burr**



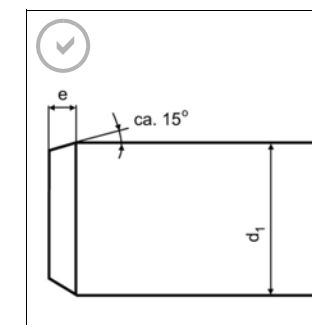
**Mark insertion depth**



An expansion socket counteracts the variation in length caused by the thermal expansion and shrinkage of the pipe.

Depending on the ambient temperature the insertion depth varies. The right insertion depth for both 0°C and 20°C is indicated on the expansion socket.

**Chamfer pipe end**



The pipe-end needs to be chamfered under an angle of 15°. To get an even cut and chamfer a chamfering tool should be used.

**Make joint**

Lubricate the pipe end and insert the pipe up to the marked insertion depth.

**Joining methods** **Properties**

**Flange joint**



The flanged joint is a detachable joint not that common in soil and waste systems. It is the ideal joining method to connect the system onto flanged equipment and to install valves. The joint can be made by the following steps:

- Mount backing ring over pipe or fitting
- Weld stub flange to fitting or pipe
- Apply seal
- Mount bolts, nuts and washers and tighten nuts with the bolt torque mentioned in the next table.

d <sub>1</sub> (mm)	Bolt torque (Nm)
40	20
50	30
56	35
63	35
75	40
90	40
110	40
125	40
160	60
200	70
250	80
315	100

*Bolt torque for non-pressure applications*

**Contraction sleeve**



A simple transition to other materials than HDPE can be made using the contraction sleeve. The sleeve provides a non pull-tight connection and is installed as follows:

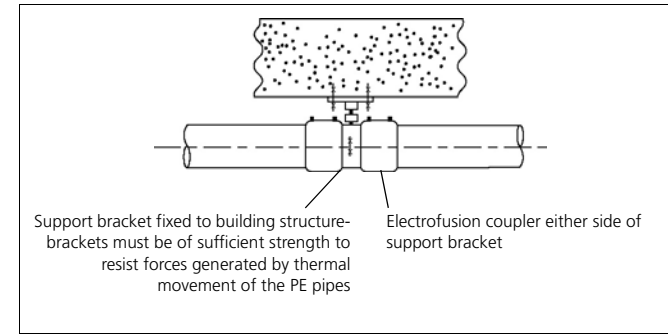
- Mark insertion depth on the connecting pipe.
- Connect contraction sleeve to HDPE pipe or fitting using electrofusion or butt fusion.
- Mount the O-ring in the middle of the insertion zone.
- Heat up the contraction sleeve evenly with a torch or an industrial heater. Diameters above 125 mm are best heated up using a second heat source.

**Properties** **Installation**

For the installation of Akatherm PE pipe systems several bracketing systems can be used:

**Anchor point bracket**

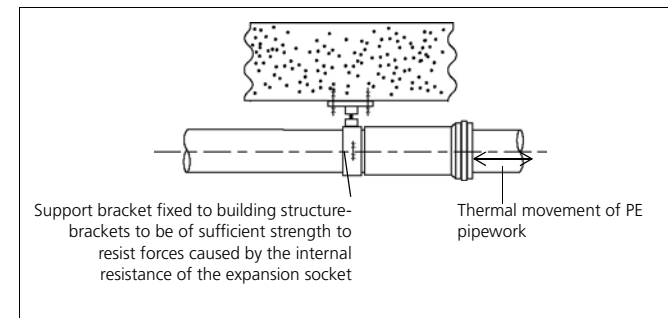
This method of bracketing is used for rigid installations. The expansion forces are transferred to the buildingstructure.



*Anchor bracket with 2 electrofusion couplers Art. Nr. 41xx95*

**Anchor bracket with expansion socket**

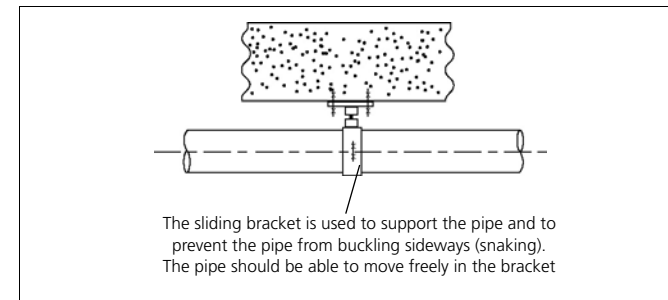
This method of installation is used for flexible installations where the expansion force is not transferred to the building structure. Only the force caused by the internal resistance of the expansion socket is transferred.



*Anchor with expansion socket*

**Guide bracket**

The guide bracket is used to support the pipe and to prevent the pipe from buckling sideways when in a rigid installation. The pipe can freely move in the bracket.



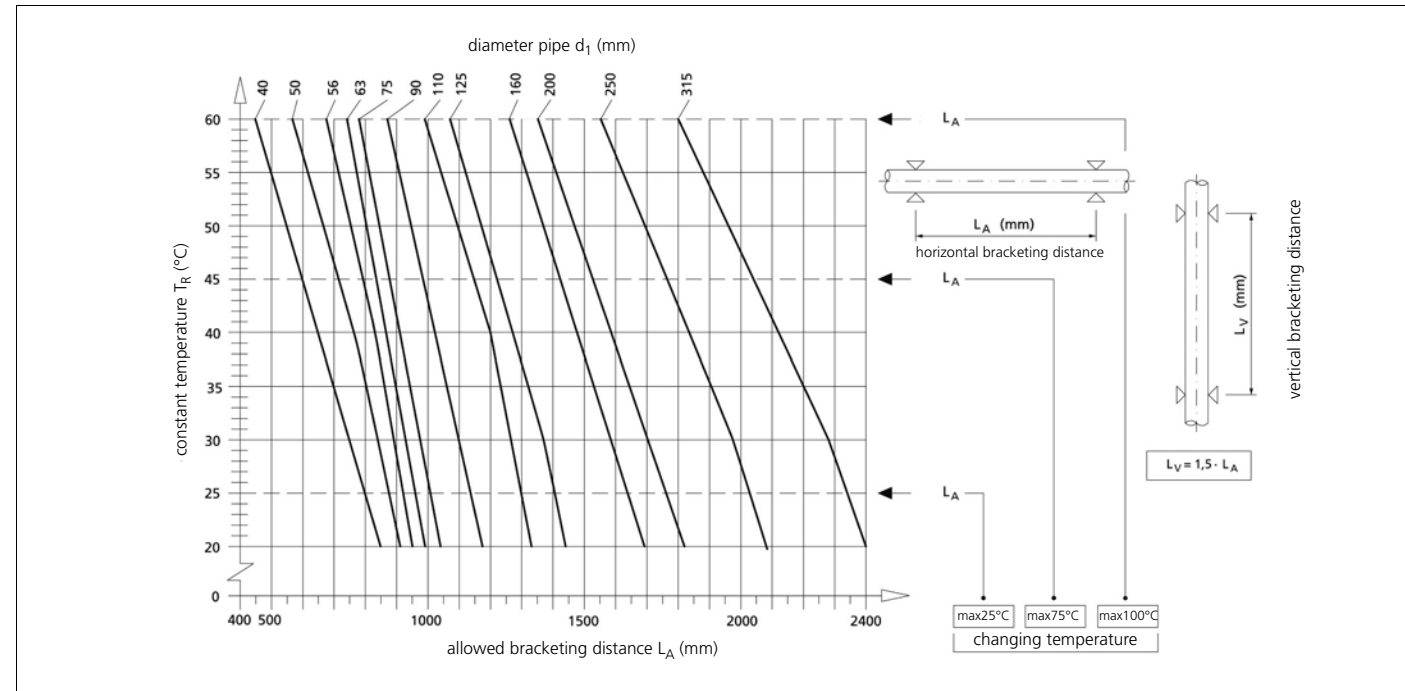
*Guide bracket*

**Installation**

**Properties**

**Bracket distance**

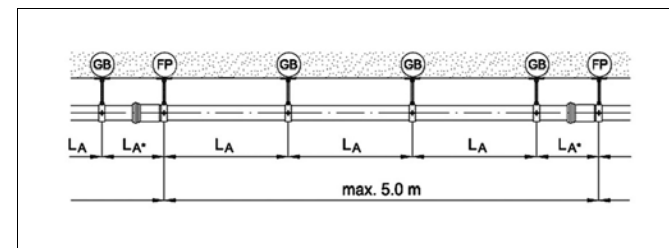
The bracket distances for Akatherm PE pipes are largely dependent on the working temperature of the pipe system. Also the filling rate of the pipe plays a role. A fully filled pipe has a different bracket distance.



Bracket distances for vertical and horizontal PE pipe systems with standard filling

**Horizontal installation with expansion sockets without support trays**

The bracket directly in front of the expansion socket has a shorter bracket distance ( $L_{A^*}$ ). This makes a better guidance into the expansion socket possible (see image). The bracketing distances for this application can be found in table below. The maximum distance between 2 expansion sockets is 5 m.



Horizontal pipework GB= guide bracket FP= fixed point  $L_A$  = bracket distance  $L_{A^*}$  = bracket distance for expansion unit

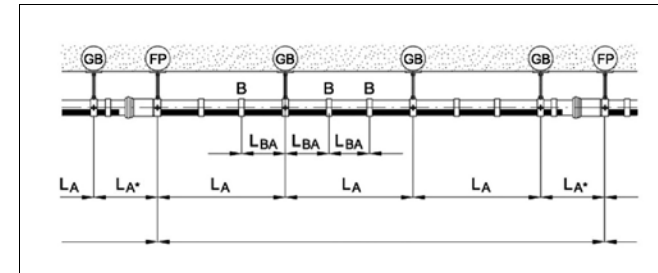
$d_1$	$L_A$	$L_{A^*}$
75	0.8 m	0.4 m
90	0.9 m	0.5 m
110	1.1 m	0.6 m
125	1.3 m	0.7 m
160	1.6 m	0.8 m
200	2.0 m	1.0 m
250	2.0 m	1.0 m
315	2.0 m	1.0 m

Bracket distances horizontal installation with expansion sockets

**Properties**

**Horizontal installation with expansion sockets and support trays**

In this kind of installation the pipe is extra supported by support trays. The distance between the brackets can be larger. The support shells are installed on to the pipe with straps. For distances see table below.



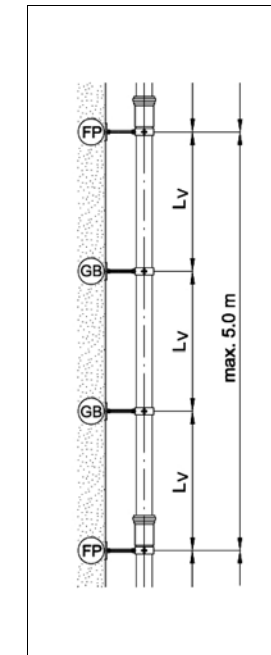
Horizontal pipework with support tray GB= guide bracket FP= fixed point B= tray band  $L_A$  = bracket distance  $L_{A^*}$  = bracket distance for expansion unit  $L_{BA}$  = spacing for bands

$d_1$	$L_A$	$L_{A^*}$	$L_{BA}$
75	1.2 m	0.6 m	0.5 m
90	1.4 m	0.7 m	0.5 m
110	1.7 m	0.9 m	0.5 m
125	1.9 m	1.0 m	0.5 m
160	2.4 m	1.2 m	0.5 m
200	3.0 m	1.5 m	0.5 m
250	3.0 m	1.5 m	0.5 m
315	3.0 m	1.5 m	0.5 m

Bracket distances horizontal installation with expansion sockets and support trays

**Installation**

**Vertical installation: to the wall**



For the vertical installation the bracketing distance is in general 1,5 times the distance of the horizontal bracketing. There is no separate bracketing distance for immediately in front of the expansion socket because there is no sagging of the pipe and the insertion is always in line.

Vertical installation GB = guide bracket FP = fixed point  $L_V$  = vertical support distance

$d_1$	$L_V$
50	1.0 m
56	1.0 m
63	1.0 m
75	1.2 m
90	1.4 m
110	1.7 m
125	1.9 m
160	2.4 m
200	3.0 m
250	3.0 m
315	3.0 m

Bracket distances vertical installation with expansion sockets



#### Head Office

Lenham, Maidstone, Kent ME17 2DE  
Telephone: 01622 858888  
Fax: 01622 858725  
[marley.co.uk](http://marley.co.uk)

#### Scotland

Birkenshaw Industrial Estate  
Uddingston, Glasgow G71 5PA  
Telephone: 01698 815231  
Fax: 01698 810307

#### Export Division

Lenham, Maidstone  
Kent ME17 2DE England  
Telephone: +44 (0)1622 858888  
Fax: +44 (0)1622 850778

#### Further information

For Technical advice  
please call **01622 852695**  
For general enquiries and details of your  
nearest stockist please call the customer  
services department on **01622 852585**  
email: [marketing@marleyext.com](mailto:marketing@marleyext.com)

an *OAliaxis* company