Dimensional information

5

Comparison of Pipe Dimensions

Due to the smooth internal bore of INSTAFLEX pipe similar flow velocities produced by traditional materials can achieved with a smaller internal diameter INSTAFLEX pipe. The tables below provide a guide for the selection of pipe size x size i.e.

INSTAFLEX = 20 mm o.d.
Steel = $^1/_2$" o.d.
Copper = 18 mm o.d.

	INSTAFLEX PB Pipes										
o.d. (mm)	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**75**	**90**	**110**	**–**
ID (mm)	11.6	14.4	20.4	26.0	32.6	40.8	51.4	61.2	73.6	90.0	–

	Steel Pipes galvanized DIN 2440/44										
o.d. (inch)	**–**	**$^1/_2$**	**$^3/_4$**	**1**	**1$^1/_4$**	**1$^1/_2$**	**2**	**2$^1/_2$**	**3**	**–**	**4**
ID (mm)	–	16.0	21.6	27.2	35.9	41.8	53.0	68.8	80.8	–	105.3

	Copper Pipes DIN 1786/ISO 274										
o.d. (mm)	**15**	**18**	**22**	**28**	**35**	**42**	**54**	**–**	**76.1**	**88.9**	**108**
ID (mm)	13	16	20	25	32	39	50	–	72.0	85.0	103

z-Dimension Installation

Introduction

The z-dimension assembly method is used to aid the measurement of pipe lengths between fittings, developed by George Fischer together with experienced installers in the domestic and industrial installation sector. It has proven to be very successful for many years.

As a basis for efficient design, factory preparation and pre-assembly, this method saves the enterprising contractor a considerable amount of time and money. It makes:

● efficient use of employees
● administration easier
● calculations and accounting easier
● efficient use of machinery
● reduced stocks of fittings and pipes
● transportation easier, less material «distribution time».

The z-dimension method requires

● exact planning of pipe layout
● knowing the dimensions of valves, appliances and their location
● coordination of architect, designer, contractor as well as any others involved in the construction whose work could effect the pipe layout
● use of fittings with constant dimensional and axis accuracy, as those manufactured by George Fischer
● standard pipe connections, which can be easily installed with George Fischer fittings and pipes.

z-Dimension and Measuring Method

z-dimension and a uniform measuring method are at the core of this assembly method by George Fischer.

The z-dimension is the «construction measurement» of the installer. This allows him to calculate easily the exact pipe length between fitting and/or valves.

The basis for the calculation and application of the z-dimension is

> **Uniform Measuring**
> **Centreline - Centreline =**
> **M**

In order to work out the length the pipe needs to be cut to you need:

● the centreline to centreline pipe section, indicated by M
● the z-dimension for fittings and valves
● the construction height h for fittings with outer joint ends
● to take into consideration the jointing length x for pipe sections

The exact pipe length L can then be easily calculated.
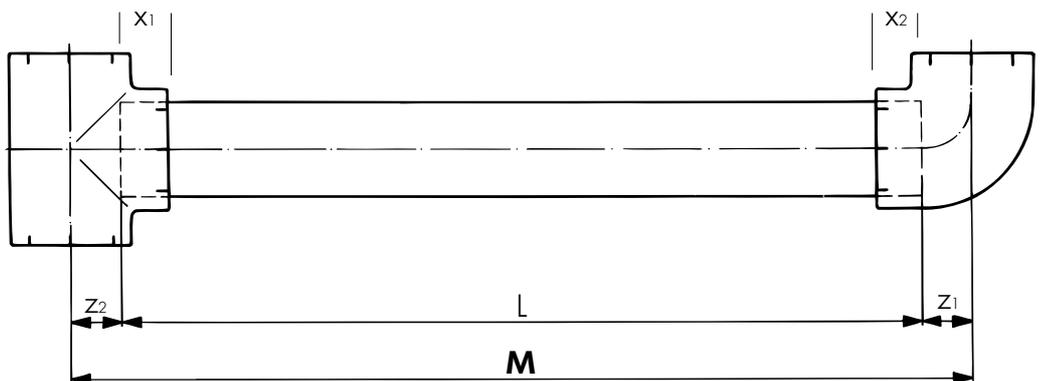
Measurement of Fitting

Fitting with inner joint end
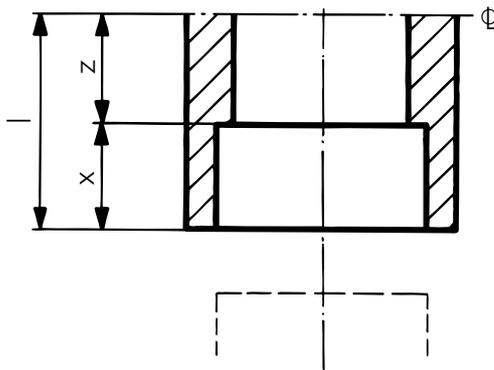
l = length of fitting from centreline
**z** = **z-dimension**
x = length of joint

$$z = l - x$$

The z-dimension is the difference between the construction length L and the joint length **x**.

Elbow 90° with two inner joint ends (sockets)
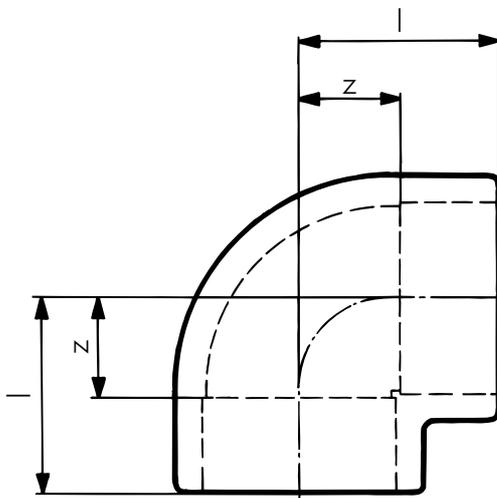
Fitting with outer joint end
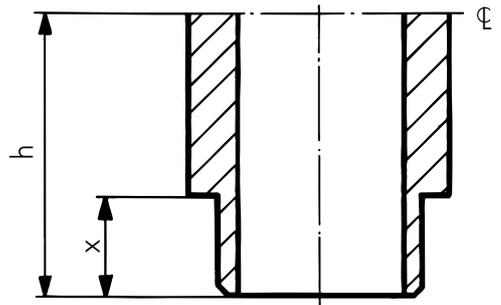
h = height of fitting
℄ = centreline

Elbow 90° with inner and outer joint ends (socket– spigot)
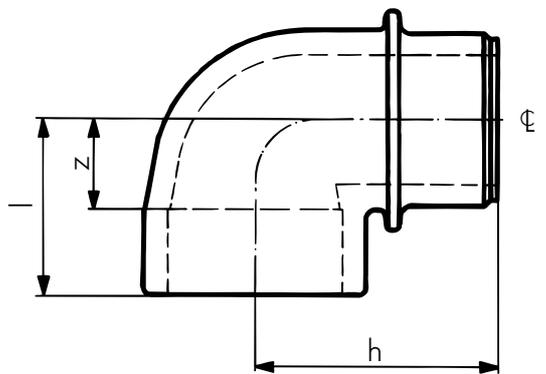

Inner joint ends are referred to as **sockets** and outer joint ends as **spigots**.

Type of joints available in pipe construction are:
- plug connections
- compression joints
- threaded unions
- soldered joints
- fusion joints
- solvent cement joints

- flange adaptors

Application Examples
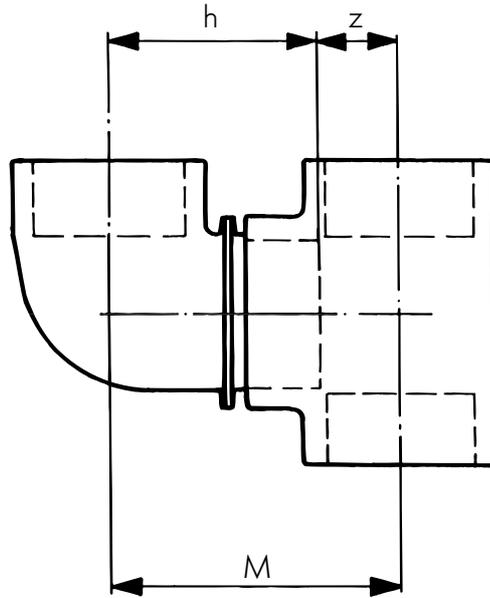
$$M = h + z$$
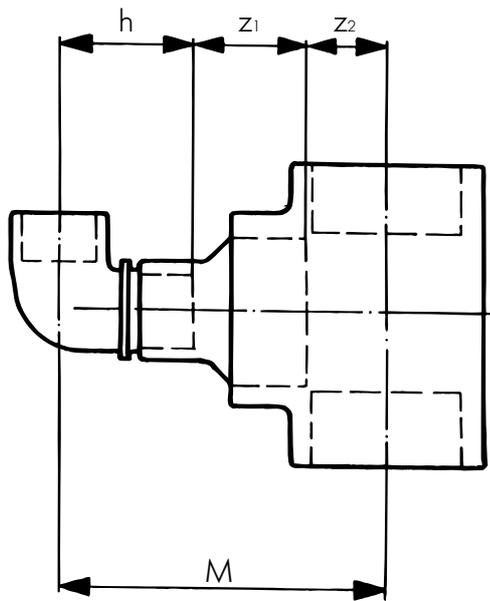
$$M = h + z_1 + z_2$$
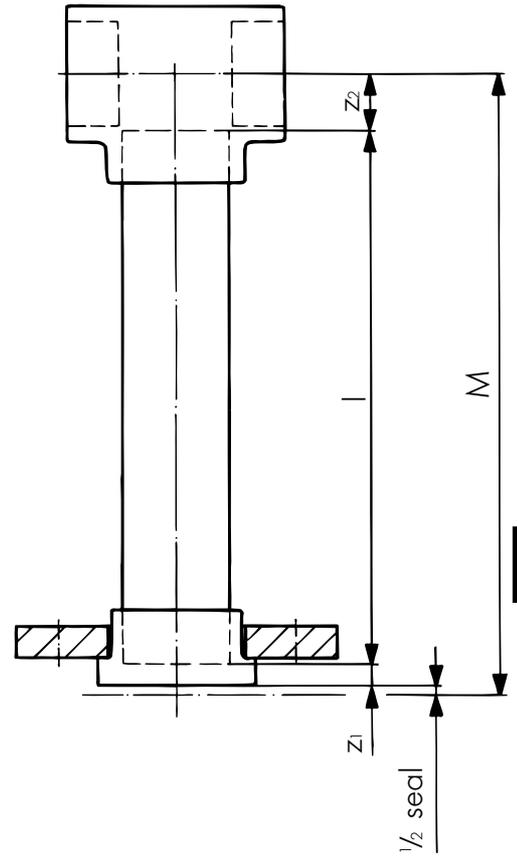
$$M = l + z_1 + z_2 + \tfrac{1}{2} \text{ seal}$$
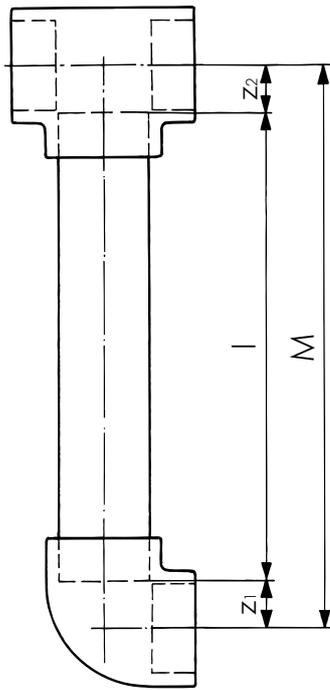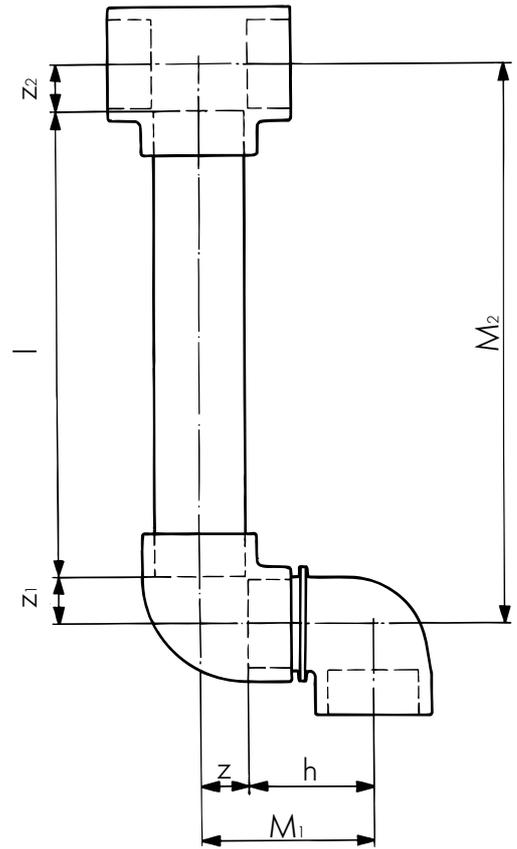
$$M = l + z_1 + z_2$$
$$l = M - (z_1 + z_2)$$

$$M_1 = h + z$$
$$M_2 = l + z_1 + z_2$$
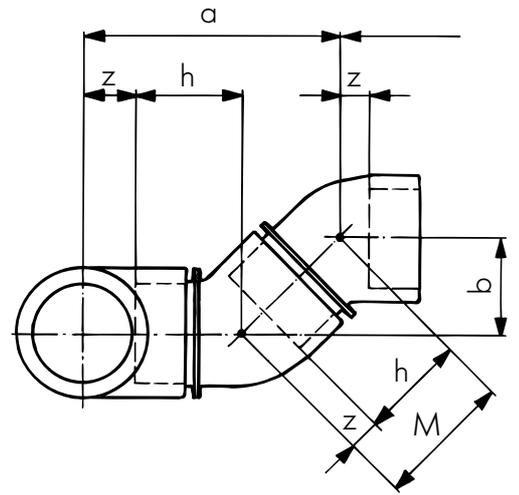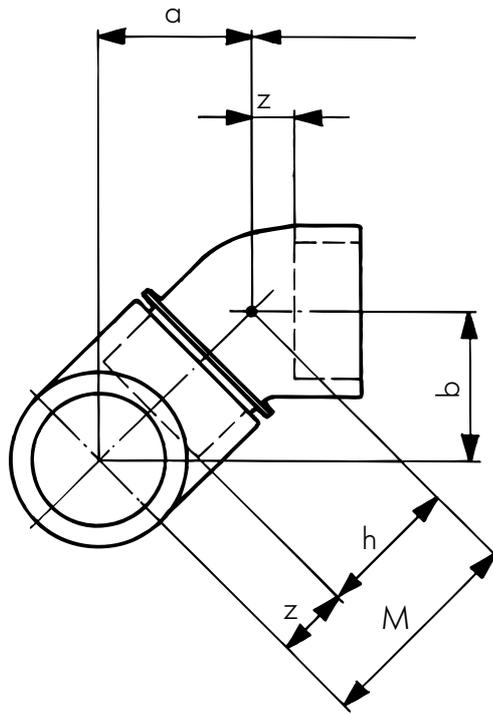
∠ 45°
M = z + h
b = M x 0.707
a = M x 0.707 + (z + h)

∠ 45°
M = h + z
a or b = M x 0.707

∠ 45°
M = z + h
a or b = M x 0.707

∠ 45°
M = a or b x 1.414
M = l + 2z
l = M − 2z

5
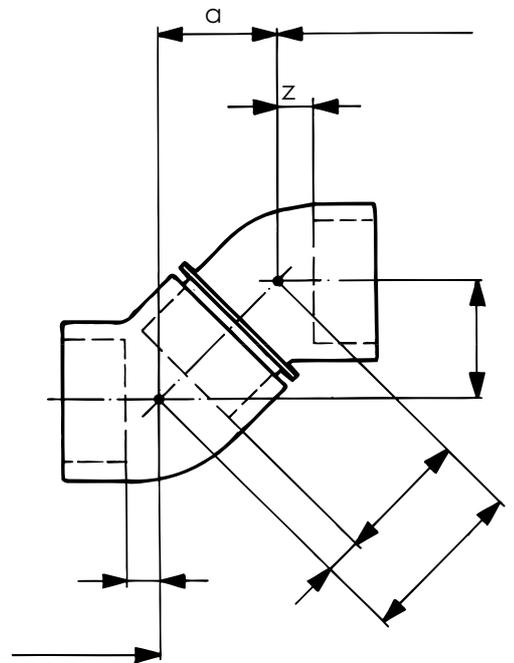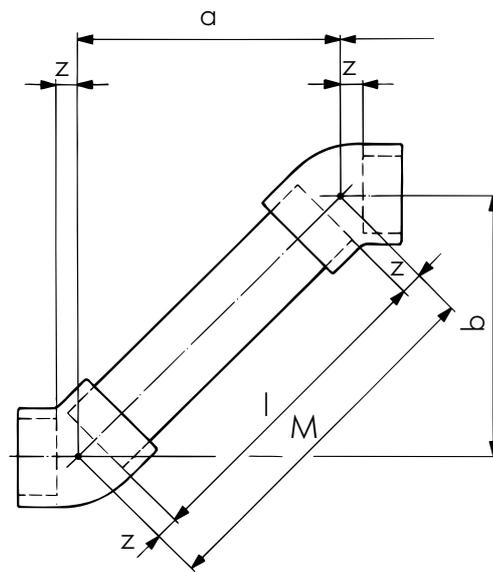
Conclusions for Practical Use

The z-dimension assembly method by George Fischer is the proven basis for small-scale and industrial pre-assembly of threaded pipe installations.

It combines various processes to produce a fast and efficient way of using materials, labour and of avoiding unnecessary assembly steps. It makes economic and high-quality solutions possible .

This requires :
● Dividing the piping system and installation into manageable sections.
● Dividing installation into pre-assembly (in the workshop or on site) and site assembly work. It is advantageous to prepare as much as possible before going on site in the workshop.
● Preparing all the important pipe dimensions, so that pre-assembly can be done in quick succession.

The most important rule is:
Use as much information on pipe sections as possible from the installation drawings.

When sections must be prepared on site (to compensate for variations in the structure):
Always measure along the path of the pipes.

The z-dimension assembly method by George Fischer enables:
● pre-assembly
● efficient use of materials, labour and machinery
● shorter assembly times
● quick adjustments to construction progress and site conditions
● independence of construction schedules
● better control of outside contracts
● better conditions for renovation work
● more accuracy with less effort
● consistent quality

To be able to exploit these advantages to the fullest, installation planning must be given equal priority in project planning. Efficient construction begins in the planning stage with complete details and coordinated information.

Attention: pre-assembled pipe combinations should never be so bulky that they cannot be easily transported or installed on site.

Note: The z-dimension method is not synonymous with prefabrication; it can be used wherever pipes with fittings are installed.

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z-dimension method for different materials

Taking into consideration the varying characteristics of metal or plastic piping systems, the z-dimension method by George Fischer can also be used with all of them.

Fitting Combinations

Fittings with socket fusion joints

Elbow 90°

T-equal

Dimension o.d. mm	M
16	44
20	49
25	58
32	68
40	80
50	96
63	116

Elbow 45°

Elbow 90° / T-equal
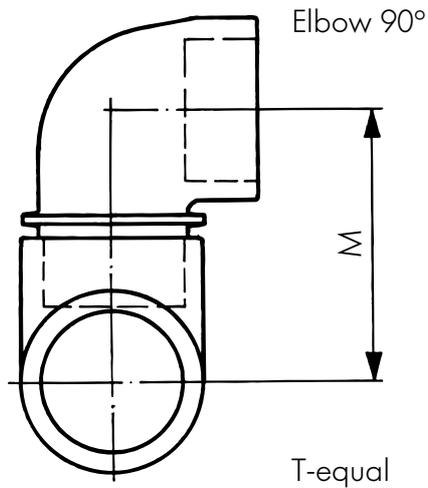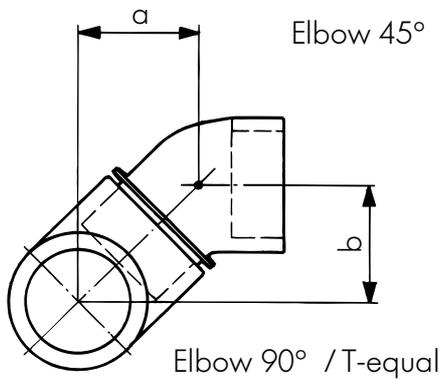
Dimension o.d. mm	a/b
16	27
20	30
25	35
32	41
40	48
50	56
63	68

Elbow 90°

Elbow 90°

Dimension o.d. mm	M
16	44
20	49
25	58
32	68
40	80
50	96
63	116

Elbow 45°

Elbow 45°
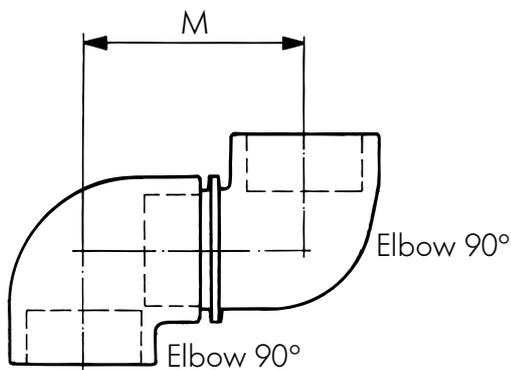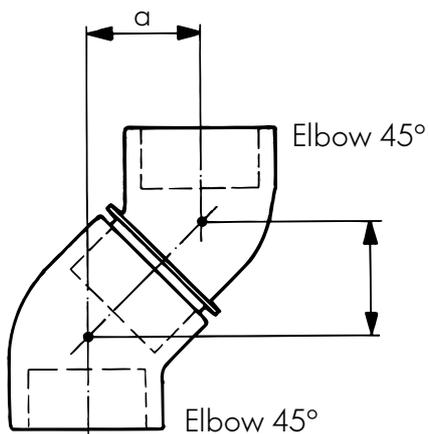
Dimension o.d. mm	a/b
16	25
20	26
25	30
32	35
40	41
50	47
63	56

5

Elbow 90°

M

T-red
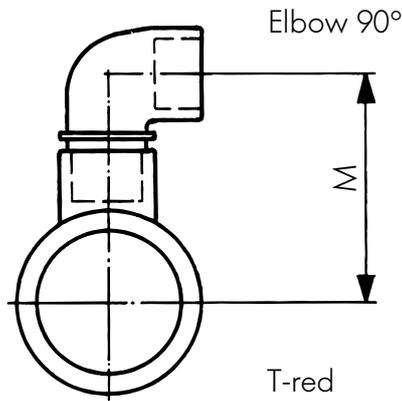
Dimension o.d. mm	M	
20-16	47	
25-16	51	
25-20	53	
32-16	57	
32-20	59	
32-25	64	
40-25	70	
50-25	77	
63-25	88	

Elbow 45°

a

b

T-red
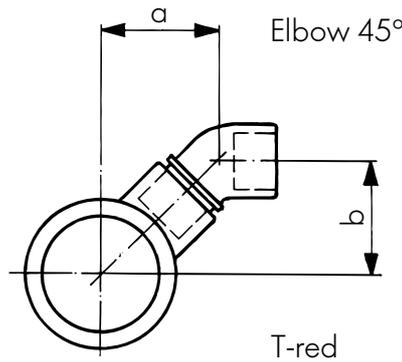
Dimension o.d. mm	a/b	
20-16	30	
25-16	32	
25-20	33	
32-16	37	
32-20	37	
32-25	39	
40-25	43	
50-40-25	48	
63-40-25	56	

Minimum Distance between Fittings

a

z

Elbow 45°

z

b

L

M

z

T-equal or Elbow 90°
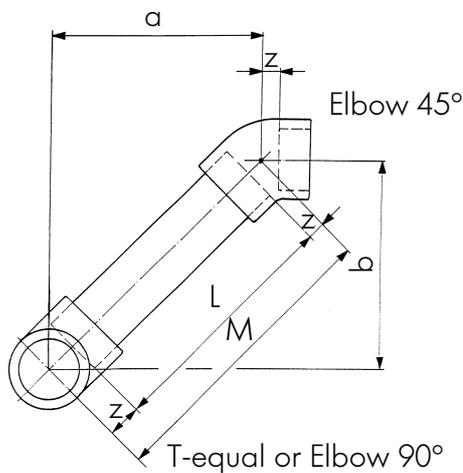
Dimension o.d. mm	a/b	M min.	L
16	39	55	40
20	42	60	40
25	47	66	45
32	55	78	50
40	64	90	55
50	71	100	60
63	85	120	70
75	99	140	80
90	117	165	93
110	138	195	107

Elbow 45°

M

L

a

b

T-equal or Elbow 90° & Reducer
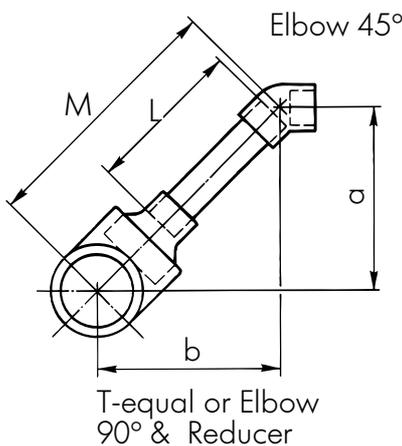
Dimension o.d. mm	a/b	M min.	L
20-16	52	73	39
25-16	54	77	39
25-20	55	78	39
32-25	66	94	47
40-32	74	105	51
50-40	92	130	59
63-50	103	145	64
75-63	120	170	72
90-75	138	195	85
110-90	163	230	97

Elbow 45°

Elbow 45°
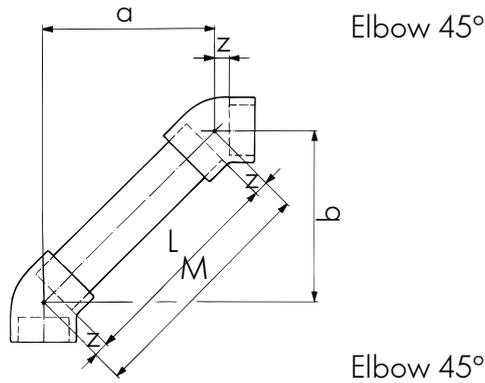
Dimension o.d. mm	a/b	M min.	L
16	35	50	38
20	37	52	38
25	42	60	46
32	50	70	50
40	57	80	56
50	60	85	57
63	71	100	66
75	85	120	84
90	95	135	93
110	113	160	110

Elbow 90°

T-equal or Elbow 90°
& Reducer
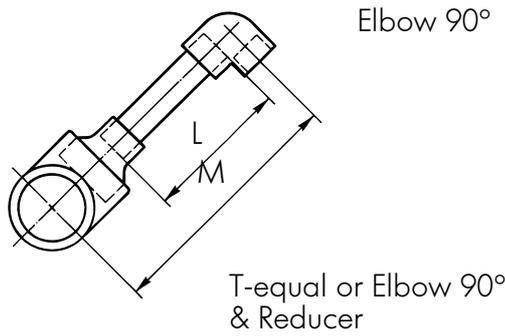
Dimension o.d. mm	M min.	L
20-16	78	40
25-16	82	40
25-20	85	40
32-25	102	48
40-32	115	53
50-40	140	59
63-50	160	67
75-63	195	80
90-75	225	91
110-90	270	107

Elbow 90°

T-equal or Elbow 90°
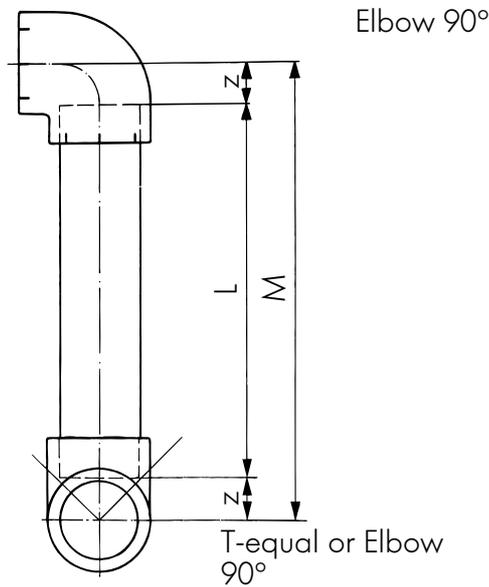
Dimension o.d. mm	M min.	L
16	60	40
20	66	40
25	76	48
32	88	52
40	100	56
50	115	63
63	140	72
75	165	81
90	195	93
110	230	104

5

Minimum Distance between Centers M for Socket Fusion Machine* Jointing
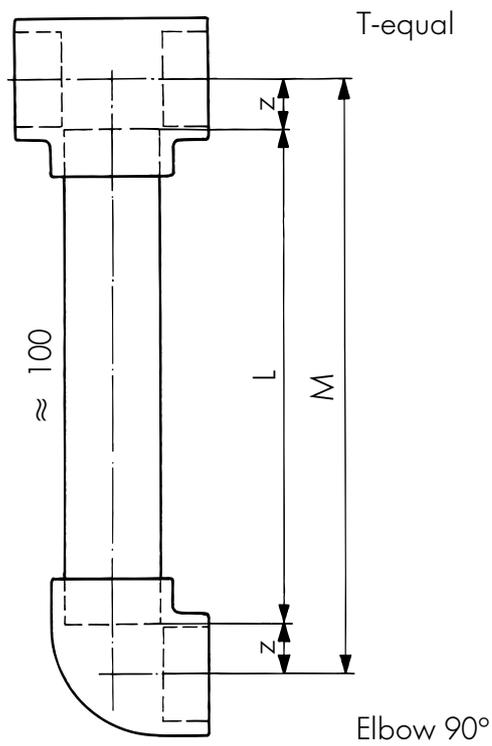
Dimension o.d. mm	M min.	L
16	150	130
20	156	130
25	164	136
32	176	140
40	188	144
50	202	150
63	224	156
* Fusion Machine 5120		

T-equal

Elbow 90°

Fitting Combinations with PB Manifold

Pipe Lengths for Position Change

Elbow 90°

Elbow 90°
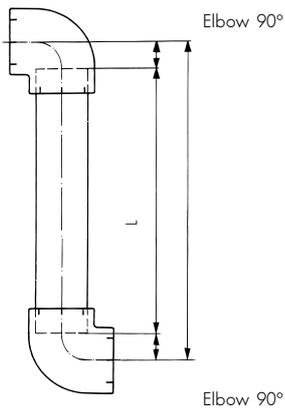
	Dimension o.d. mm									
M	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**75**	**90**	**110**
	Pipe Lengths L									
80	60	54	52	44	–	–	–	–	–	–
100	80	74	72	64	56	–	–	–	–	–
120	100	94	92	84	76	68	–	–	–	–
150	130	124	122	114	106	98	82	–	–	–
180	160	154	152	144	136	128	112	96	–	–
210	190	184	182	174	166	158	142	126	108	–
250	230	224	222	214	206	198	182	166	148	124

Elbow 45°

T-equal / Elbow 90°

	Dimension o.d. mm										
a/b	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**75**	**90**	**110**	**M**
	Pipe Lengths L										
80	97	97	92	85	79	73	–	–	–	–	113
100	125	121	120	113	107	101	90	–	–	–	141
120	154	150	149	142	136	130	119	110	–	–	170
150	196	192	191	184	178	172	161	152	140	124	212
180	238	224	233	226	220	214	203	194	182	166	254
210	281	277	276	269	263	257	246	237	225	209	297
250	337	333	332	325	319	313	302	293	281	265	353

Elbow 45°

Elbow 45°

	Dimension o.d. mm										
a/b	**16**	**20**	**25**	**32**	**40**	**50**	**63**	**75**	**90**	**110**	**M**
	Pipe Lengths L										
80	101	99	99	93	89	85	79	–	–	–	113
100	129	127	127	121	117	113	107	105	99	–	141
120	158	156	156	150	146	142	136	134	128	120	170
150	200	198	198	192	188	184	178	176	170	162	212
180	242	240	240	234	230	226	220	218	212	204	254
210	285	283	283	277	273	269	263	261	255	247	297
250	341	339	339	333	329	325	319	317	311	303	353

5

z-Dimension

Elbow 90°
Elbow 90° Socket-spigot
T-equal 90°
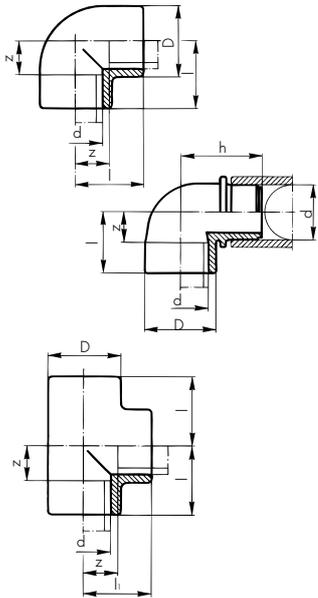
Dimension o.d. mm	z	Measurements				D
			h	l		
16	10		34	25		22
20	13		36	28		26
25	14		44	32		32
32	18		50	38		40
40	22		58	44		51
50	26		70	51		64
63	34		82	62		81
75	42		–	75		92
90	51		–	88		114
110	63		–	106		134

All dimensions in mm

Elbow 45°
Elbow 45° Socket-spigot

16 – 110mm o.d.

16 – 63 mm o.d.
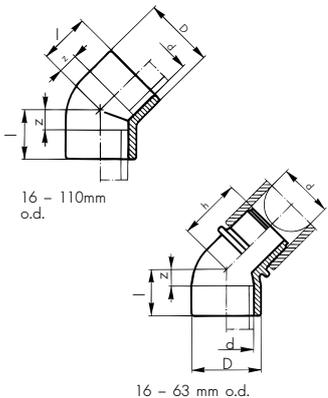
Dimension o.d. mm	z	Measurements				D
			h	l		
16	6		29	21		22
20	7		30	22		26
25	7		35	25		32
32	10		40	30		40
40	12		46	34		51
50	14		53	39		64
63	17		62	45		81
75	18		–	51		92
90	21		–	58		114
110	25		–	68		134

T-reducing. 90°
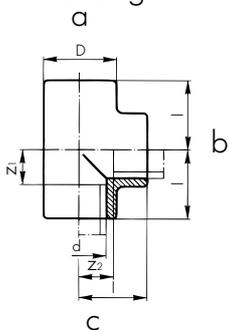
Dimension o.d. mm a-b-c D	Measurements				l	l_1
	z_1	z_2				
20-16-20	13	13		28	28	26
20-16-16	13	13		28	28	26
20-20-16	13	13		28	28	26
25-16-25	14	17		32	32	32
25-20-25	14	17		32	32	32
25-20-20	14	17		32	32	32
25-25-20	17	17		32	32	32
32-16-32	18	23		38	–	40
32-20-32	18	23		38	–	40
32-25-32	18	20		38	–	40
40-25-40	22	26		44	44	51
50-25-50	26	33		51	51	64
63-25-63	34	44		62	62	81

Reducer
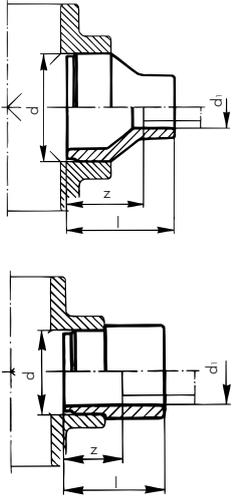
Dimension o.d. mm	z	Measurements		l	
20-16	15			30	
25-16	18			30	
25-20	18			33	
32-20	25			40	
32-25	22			40	
40-20	27			42	
40-25	24			42	
40-32	22			42	
50-20	40			55	
50-25	37			55	
50-32	35			55	
50-40	33			55	
63-20	43			58	
63-25	40			58	
63-32	38			58	
63-40	36			58	
63-50	33			58	
75-63	39			67	
90-75	40			72	
110-63	58			86	
110-75	53			86	
110-90	50			86	

Flange adaptor flat
Flange adaptor with groove
Flange adaptor with spigot
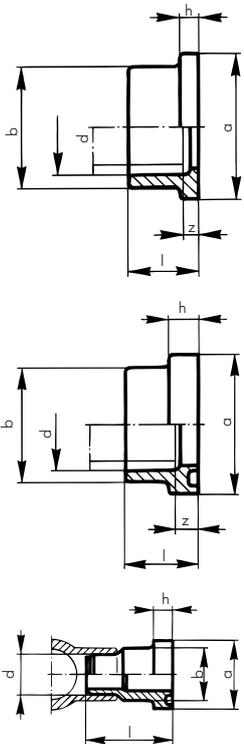
Dimension o.d. mm	flat		with groove		with spigot	
	z	l	z	l	h	
16	5	20	8	23	42	
20	5	20	8	23	42	
25	5	23	8	26		
32	5	25	8	28	–	
40	5	27	10	32	–	
50	5	30	10	35	–	
63	5	33	10	38	–	
75	4	35	9	40	–	
90	6	42	11	47	–	
110	7	49	13	55	–	