Technical Catalogue
2008

Malleable cast iron fittings

+GF+

GEORG FISCHER
PIPING SYSTEMS

Quality malleable cast iron pipe fittings from Georg Fischer

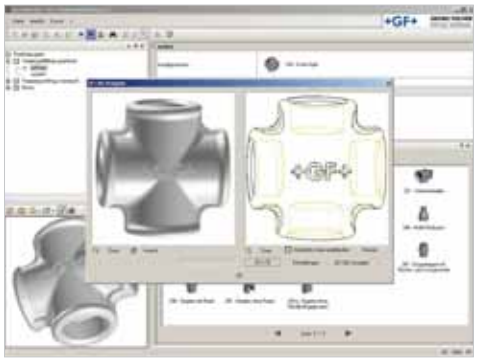
Georg Fischer supplies both a comprehesive range of malleable cast iron fittings and technical advice.

The PLUS of a great brand

- unique product range for building technology, public utilities, industrial systems and automation
- integrated overall and individual solutions
- perfected components made from metal and plastic
- development and manufacture in the same place
- international marketing, service and after-sales service
- environmental competence, as a result of economical and ecological compatible production processes

The PLUS in quality

- 140 years' experience in technology and service
- customer proximity/customer orientated
- process focused quality management
- certified according to EN ISO 9001:2000
- extensively automated hightech facilities
- committed and motivated qualified employees



The PLUS in profitability

- cost effective installations as a result of high product quality
- efficient, accurate pipework installation with the Georg Fischer z dimension method
- on the spot care and advice; practical training and comprehensive documentation
- Support for modern planning tools and logistic systems

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The technical data given in this publication are for general information purposes only.
They imply no warranty of whatever kind. Please consult our General Terms and Conditions of Supply.

General information

Product Standards

The international malleable cast iron pipe fittings standard ISO 49 and the European malleable cast iron pipe fittings standard EN 10242 apply. Both standards are similar to each other. The European fittings standard (EN 10242) has been adopted by most European countries as a national version (DIN EN 10242, ÖNORM EN 10242, SN EN 10242, BS EN 10242 etc.), the former national standards have been withdrawn (e.g. DIN 2950).
«Design Symbols» corresponding to the materials and thread combination are to be noticed as new elements of the fittings designation in accordance with both ISO 49 and also EN 10242.
For example, the following details of combination are abbreviated with the design symbol **«A»**:

Design Symbol	**Type of thread**		**Type of material**
	Taper external thread	Parallel internal thread	
A	**R**	**Rp**	**EN-GJMW-400-5**

In addition, for the first time EN 10242 requires a documented and certified quality management system in accordance with EN ISO 9001 or EN ISO 9002.

Georg Fischer meets these prerequisites and operates a certified QM system in accordance with EN ISO 9001.

Georg Fischer malleable cast iron fittings are manufactured from decarbonized annealed malleable cast iron type EN-GJMW-400-5 and in accordance with the current ISO 49 and EN 10242 comply with the fittings designated with the design symbol «A».

Designation at Georg Fischer

Elements of the designation

It no longer suffices merely to refer to the new supply standard for malleable cast iron fittings (see Product Standards). The greatly varying malleable cast iron qualities and the different thread combinations are specified using the newly introduced Design Symbols as an element of the order details for malleable cast iron fittings.

Georg Fischer malleable cast iron fittings (Design Symbol A) are ordered with the following details:

1. Shape (catalogue number)
2. Size of connection
3. Surface (black «B» or galvanised «G»)
4. Quantity

To avoid confusion with similar fittings of other materials or other thread combinations, we recommend using the 9 digit Georg Fischer code. Shape, surface and connection size are defined with this code number (see example designation):

Example of designation for:
Equal elbow with internal thread, fitting size 2, galvanized, Design Symbol «A»

At Georg Fischer:
Code no. 770 090 209
Cat. no. 90 2 G

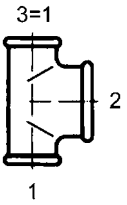
According to standard:
Elbow EN 10242 - A1 - 2 - Zn - A

Elbow	type of fitting
EN 10242 (ISO 49)	standard
A1	symbol
2	fitting size
Zn	surface finish hot dip zinc coated
A	Design Symbol

Size designation

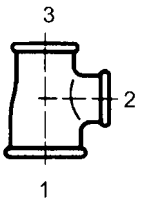
The naming of types of fittings starts from the simplest possible basic types such as bend, elbow, tee, cross etc.; basic features are also indicated.

The following rules apply for the sequence of connection sizes:



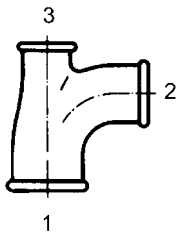
illustr. 1/A

- for **equal** fittings giving the individual connection size is sufficient.



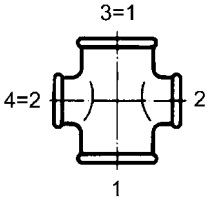
illustr. 1/B

- for **reducing fittings with 2 connections of different sizes** the connection size of the larger is given first, then that of the smaller connection. **Exception:** Elbow catalogue no. 92, first the connection size of the internal thread.



illustr. 1/C

- for **fittings with 3 or more connections (illustr. 1/A and 1/D)** it is necessary to give the size of the the throughput first, and in the case of equal connections on the run, followed by the size of the branch.



illustr. 1/D

- **for 3 different connections or sections reduced in run** the sequence for the designation of connections according to illustr. 1/B and 1/C applies.

Surface finish of fittings

Our Georg Fischer malleable cast iron fittings are supplied in black or hot dip galvanised finish, covered with a preservative for temporary prevention of a rust film. An exception are fittings marked in this catalogue with "**ST**" which are made of steel. If a galvanised finish is required, these fittings have to be electroplated for technical reasons.

Because of the considerably lower corrosion protection, electroplated coatings are not suitable for drinking water installations.

Under the European and International standard malleable cast iron pipe fittings must be free from polycyclic aromatic hydrocarbons.

Quality principles

The success of our business can only be ensured, if we meet the requirements of our customers with regard to product performance, quantity, delivery dates, prices and service. We define all this under the term «quality». Under quality we understand far more than the fabrication of products capable of performing their design requirements. At Georg Fischer, quality is a business culture; in research and development, for materials procurement and production and also in sales, logistics and after sales service.Transposing these quality principles is the aim of all employees.

The quality management system at Georg Fischer Fittings GmbH is certified to EN ISO 9001:2000.

We thus prove to our customers, as also to the organisations monitoring our quality, that at Georg Fischer quality is demanded and guaranteed. «Quality» a basic philosophy, which at George Fischer is based on a long-standing tradition and therefore represents a commitment for the present and the future.

Quality testing

Georg Fischer malleable cast iron fittings are individually tested within the framework of the existing standard. Pressure testing for pressure carrying unions is carried out on their piece parts.

Dimensions

The dimensions given are nominal values and are valid at the moment of printing - with the exception of errors and printing mistakes. In critical applications, please check for accuracy before proceeding.

Representation in the catalogue section

This technical catalogue documents all Georg Fischer fittings and/or piece parts. Items without a code No. are given for technical information and are not part of the usual supply range.

The individual types of fittings are represented in the catalogue by the **Symbol photo** and **Line drawings** showing important dimensions.
For standardised types the **EN and/or ISO symbol** for the fitting shape is also given after the catalogue number.

Symbols

EN ... the first column "EN" indicates the fittings standardised in European Standard EN 10242:
- ● ... standardised
- **-** ... not standardised

B ... black

G ... galvanised

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and are not suitable for drinking water installations.

Code ... Georg Fischer part number

ISO/EN ... symbol to ISO 49/EN 10242

R ... taper external thread, for connections to EN 10226-1 and/or ISO 7-1 sealing on the threads.

Rp ... parallel internal jointing thread for connections to EN 10226-1 and/or ISO 7-1 sealing on the threads.

G ... parallel internal fastening thread for connections to EN ISO 228-1 not sealing on the thread.

G ... B ... parallel external fastening thread, tolerance class B for connections to EN ISO 228-1 not sealing on the threads.

ET ... Piece part

s ... width across flat
The given measurement states the size of the screw-wrench that is to be used.

***** ... Notes

Product Range


1 1a 2 2a 3 40 41 50 51 53 54 60


85 87 90 92 94 95 96 97 98 100 101


102 103 120 121 130 131 132 133 134 135 137


165 180 220 221 223 240 241 245 246 260 270

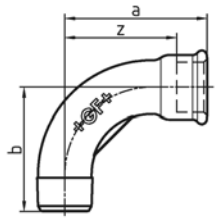

271 280 281 290 291 294 300 310 312 321


326 329 330 331 332 335 336 338 340 341 342


342a 344 346 370 371 372 373 374 376 378 471 526 529a

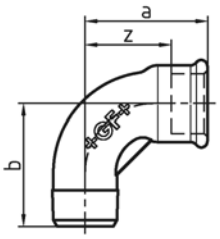

531 534 535 536 537 595 596 599a 901 933 933a 1330 1335

Malleable cast iron fittings



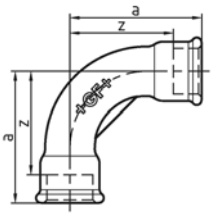
1
Long sweep bend 90°, ISO/EN G4

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]
•	B	⅛	**770 001 101**	35	32	28
•	G	⅛	**770 001 201**	35	32	28
•	B	¼	**770 001 102**	40	36	30
•	G	¼	**770 001 202**	40	36	30
•	B	⅜	**770 001 103**	48	42	38
•	G	⅜	**770 001 203**	48	42	38
•	B	½	**770 001 104**	55	48	42
•	G	½	**770 001 204**	55	48	42
•	B	¾	**770 001 105**	69	60	54
•	G	¾	**770 001 205**	69	60	54
•	B	1	**770 001 106**	85	75	68
•	G	1	**770 001 206**	85	75	68
•	B	1 ¼	**770 001 107**	105	95	86
•	G	1 ¼	**770 001 207**	105	95	86
•	B	1 ½	**770 001 108**	116	105	97
•	G	1 ½	**770 001 208**	116	105	97
•	B	2	**770 001 109**	140	130	116
•	G	2	**770 001 209**	140	130	116
•	B	2 ½	**770 001 110**	176	165	149
•	G	2 ½	**770 001 210**	176	165	149
•	B	3	**770 001 111**	205	190	175
•	G	3	**770 001 211**	205	190	175
•	B	4	**770 001 112**	260	245	224
•	G	4	**770 001 212**	260	245	224



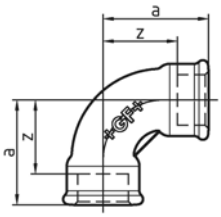
1a
Short bend 90°, ISO/EN D4

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]
•	B	¼	**770 011 102**	30	30	20
•	G	¼	**770 011 202**	30	30	20
•	B	⅜	**770 011 103**	36	36	26
•	G	⅜	**770 011 203**	36	36	26
•	B	½	**770 011 104**	45	45	32
•	G	½	**770 011 204**	45	45	32
•	B	¾	**770 011 105**	50	50	35
•	G	¾	**770 011 205**	50	50	35
•	B	1	**770 011 106**	63	63	46
•	G	1	**770 011 206**	63	63	46
•	B	1 ¼	**770 011 107**	76	76	57
•	G	1 ¼	**770 011 207**	76	76	57
•	B	1 ½	**770 011 108**	85	85	66
•	G	1 ½	**770 011 208**	85	85	66
•	B	2	**770 011 109**	102	102	78
•	G	2	**770 011 209**	102	102	78
-	B	2 ½	**770 011 110**	115	115	88
-	G	2 ½	**770 011 210**	115	115	88
-	B	3	**770 011 111**	127	127	97
-	G	3	**770 011 211**	127	127	97
-	B	4	**770 011 112**	165	165	129
-	G	4	**770 011 212**	165	165	129



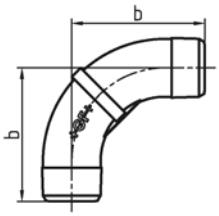
2
Long sweep bend 90°, ISO/EN G1

EN		Dim. [inch]	Code	a [mm]	z [mm]
•	B	¼	**770 002 102**	40	30
•	G	¼	**770 002 202**	40	30
•	B	⅜	**770 002 103**	48	38
•	G	⅜	**770 002 203**	48	38
•	B	½	**770 002 104**	55	42
•	G	½	**770 002 204**	55	42
•	B	¾	**770 002 105**	69	54
•	G	¾	**770 002 205**	69	54
•	B	1	**770 002 106**	85	68
•	G	1	**770 002 206**	85	68
•	B	1 ¼	**770 002 107**	105	86
•	G	1 ¼	**770 002 207**	105	86
•	B	1 ½	**770 002 108**	116	97
•	G	1 ½	**770 002 208**	116	97
•	B	2	**770 002 109**	140	116
•	G	2	**770 002 209**	140	116
•	B	2 ½	**770 002 110**	176	149
•	G	2 ½	**770 002 210**	176	149
•	B	3	**770 002 111**	205	175
•	G	3	**770 002 211**	205	175
•	B	4	**770 002 112**	260	224
•	G	4	**770 002 212**	260	224



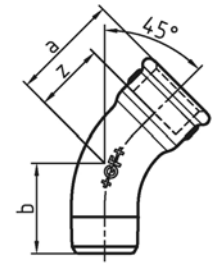
2a
Short bend 90°, ISO/EN D1

EN		Dim. [inch]	Code	a [mm]	z [mm]
•	B	¼	**770 012 102**	30	20
•	G	¼	**770 012 202**	30	20
•	B	⅜	**770 012 103**	36	26
•	G	⅜	**770 012 203**	36	26
•	B	½	**770 012 104**	45	32
•	G	½	**770 012 204**	45	32
•	B	¾	**770 012 105**	50	35
•	G	¾	**770 012 205**	50	35
•	B	1	**770 012 106**	63	46
•	G	1	**770 012 206**	63	46
•	B	1 ¼	**770 012 107**	76	57
•	G	1 ¼	**770 012 207**	76	57
•	B	1 ½	**770 012 108**	85	66
•	G	1 ½	**770 012 208**	85	66
•	B	2	**770 012 109**	102	78
•	G	2	**770 012 209**	102	78
-	B	2 ½	**770 012 110**	115	88
-	G	2 ½	**770 012 210**	115	88
-	B	3	**770 012 111**	127	97
-	G	3	**770 012 211**	127	97
-	B	4	**770 012 112**	165	129
-	G	4	**770 012 212**	165	129



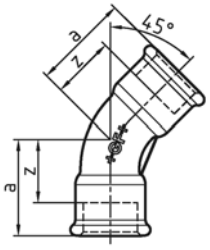
3
Long sweep bend 90°, ISO/EN G8

EN		Dim. [inch]	Code	b [mm]	
-	B	¼	**770 003 102**	33	
-	G	¼	**770 003 202**	33	
•	B	⅜	**770 003 103**	42	
•	G	⅜	**770 003 203**	42	
•	B	½	**770 003 104**	48	
•	G	½	**770 003 204**	48	
•	B	¾	**770 003 105**	60	
•	G	¾	**770 003 205**	60	
•	B	1	**770 003 106**	75	
•	G	1	**770 003 206**	75	
•	B	1 ¼	**770 003 107**	95	
•	G	1 ¼	**770 003 207**	95	
•	B	1 ½	**770 003 108**	105	
•	G	1 ½	**770 003 208**	105	
•	B	2	**770 003 109**	130	
•	G	2	**770 003 209**	130	
-	G	2 ½	**770 003 210**	165	



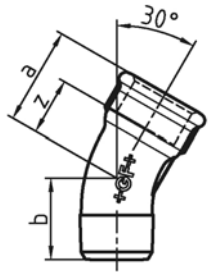
40
Long sweep bend 45°, ISO/EN G4/45°

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
•	B	¼	**770 040 102**	26	21	16	
•	G	¼	**770 040 202**	26	21	16	
•	B	⅜	**770 040 103**	30	24	20	
•	G	⅜	**770 040 203**	30	24	20	
•	B	½	**770 040 104**	36	30	23	
•	G	½	**770 040 204**	36	30	23	
•	B	¾	**770 040 105**	43	36	28	
•	G	¾	**770 040 205**	43	36	28	
•	B	1	**770 040 106**	51	42	34	
•	G	1	**770 040 206**	51	42	34	
•	B	1 ¼	**770 040 107**	64	54	45	
•	G	1 ¼	**770 040 207**	64	54	45	
•	B	1 ½	**770 040 108**	68	58	49	
•	G	1 ½	**770 040 208**	68	58	49	
•	B	2	**770 040 109**	81	70	57	
•	G	2	**770 040 209**	81	70	57	
•	B	2 ½	**770 040 110**	99	86	72	
•	G	2 ½	**770 040 210**	99	86	72	
•	B	3	**770 040 111**	113	100	83	
•	G	3	**770 040 211**	113	100	83	
-	B	4	**770 040 112**	141	130	105	
-	G	4	**770 040 212**	141	130	105	



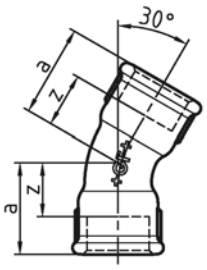
41
Long sweep bend 45°, ISO/EN G1/45°

EN		Dim. [inch]	Code	a [mm]	z [mm]	
•	B	⅜	**770 041 103**	30	20	
•	G	⅜	**770 041 203**	30	20	
•	B	½	**770 041 104**	36	23	
•	G	½	**770 041 204**	36	23	
•	B	¾	**770 041 105**	43	28	
•	G	¾	**770 041 205**	43	28	
•	B	1	**770 041 106**	51	34	
•	G	1	**770 041 206**	51	34	
•	B	1 ¼	**770 041 107**	64	45	
•	G	1 ¼	**770 041 207**	64	45	
•	B	1 ½	**770 041 108**	68	49	
•	G	1 ½	**770 041 208**	68	49	
•	B	2	**770 041 109**	81	57	
•	G	2	**770 041 209**	81	57	
•	B	2 ½	**770 041 110**	99	72	
•	G	2 ½	**770 041 210**	99	72	
•	B	3	**770 041 111**	113	83	
•	G	3	**770 041 211**	113	83	
-	G	4	**770 041 212**	141	105	



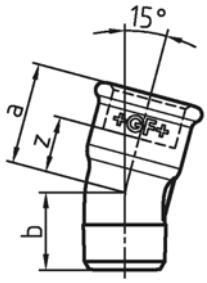
50
Bend 30°

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
-	G	½	**770 050 204**	30	24	17	
-	G	¾	**770 050 205**	36	30	21	
-	G	1	**770 050 206**	44	36	27	
-	G	1 ¼	**770 050 207**	52	44	33	
-	G	1 ½	**770 050 208**	56	46	37	
-	G	2	**770 050 209**	66	54	42	
-	G	2 ½	**770 050 210**	80	66	53	
-	G	3	**770 050 211**	92	77	62	
-	G	4	**770 050 212**	114	100	78	



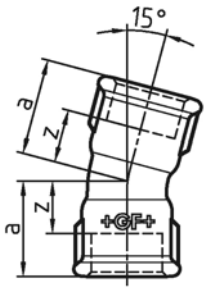
51
Bend 30°

EN		Dim. [inch]	Code	a [mm]	z [mm]
-	G	½	**770 051 204**	30	17
-	G	¾	**770 051 205**	36	21
-	G	1	**770 051 206**	44	27
-	G	1 ¼	**770 051 207**	52	33
-	G	1 ½	**770 051 208**	56	37
-	G	2	**770 051 209**	66	42



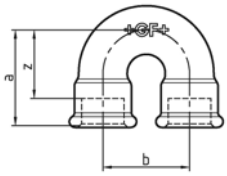
53
Bend 15°

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]
-	G	½	**770 053 204**	28	21	15
-	G	¾	**770 053 205**	33	25	18
-	G	1	**770 053 206**	37	29	20
-	G	1 ¼	**770 053 207**	43	34	24
-	G	1 ½	**770 053 208**	45	35	26
-	G	2	**770 053 209**	51	41	27
-	G	2 ½	**770 053 210**	62	52	35



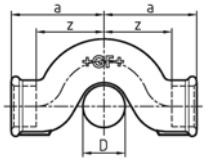
54
Bend 15°

EN		Dim. [inch]	Code	a [mm]	z [mm]
-	G	½	**770 054 204**	28	15
-	G	¾	**770 054 205**	33	18
-	G	1	**770 054 206**	37	20
-	G	1 ¼	**770 054 207**	45	26
-	G	1 ½	**770 054 208**	47	28
-	G	2	**770 054 209**	51	27



60
Return bend

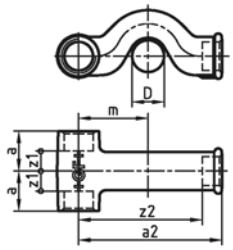
EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]
-	B	½	**770 060 104**	45	38	32
-	G	½	**770 060 204**	45	38	32
-	B	¾	**770 060 105**	52	50	37
-	G	¾	**770 060 205**	52	50	37
-	B	1	**770 060 106**	64	64	47
-	G	1	**770 060 206**	64	64	47
-	B	1 ¼	**770 060 107**	73	76	54
-	G	1 ¼	**770 060 207**	73	76	54
-	B	1 ½	**770 060 108**	80	89	61
-	G	1 ½	**770 060 208**	80	89	61
-	B	2	**770 060 109**	90	102	66
-	G	2	**770 060 209**	90	102	66



85
Crossover

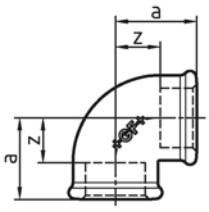
* D=¾

EN		Dim. [inch]	Code	a [mm]	D [inch]	z [mm]
-	B	⅜	**770 085 103**	38	⅜	28
-	G	⅜	**770 085 203**	38	⅜	28
-	B	½	**770 085 104**	47	½	34
-	G	½	**770 085 204**	47	½	34
*-	B	½	**770 085 115**	49	¾	36
*-	G	½	**770 085 215**	49	¾	36
-	B	¾	**770 085 105**	55	¾	40
-	G	¾	**770 085 205**	55	¾	40
-	B	1	**770 085 106**	70	1	53
-	G	1	**770 085 206**	70	1	53
-	B	1 ¼	**770 085 107**	85	1 ¼	66
-	G	1 ¼	**770 085 207**	85	1 ¼	66



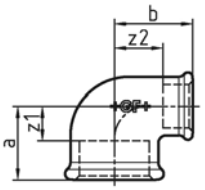
87
Tee with crossover branch

EN		Dim. [inch]	Code	a [mm]	a2 [mm]	z1 [mm]	z2 [mm]	D [inch]	m [mm]	
-	G	½	**770 087 204**	26	93	13	80	½	45	



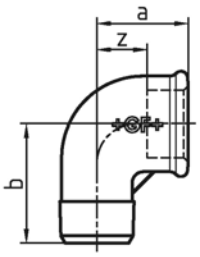
90
Elbow 90°, equal, ISO/EN A1

EN		Dim. [inch]	Code	a [mm]	z [mm]	
•	B	⅛	**770 090 101**	19	12	
•	G	⅛	**770 090 201**	19	12	
•	B	¼	**770 090 102**	21	11	
•	G	¼	**770 090 202**	21	11	
•	B	⅜	**770 090 103**	25	15	
•	G	⅜	**770 090 203**	25	15	
•	B	½	**770 090 104**	28	15	
•	G	½	**770 090 204**	28	15	
•	B	¾	**770 090 105**	33	18	
•	G	¾	**770 090 205**	33	18	
•	B	1	**770 090 106**	38	21	
•	G	1	**770 090 206**	38	21	
•	B	1 ¼	**770 090 107**	45	26	
•	G	1 ¼	**770 090 207**	45	26	
•	B	1 ½	**770 090 108**	50	31	
•	G	1 ½	**770 090 208**	50	31	
•	B	2	**770 090 109**	58	34	
•	G	2	**770 090 209**	58	34	
•	B	2 ½	**770 090 110**	69	42	
•	G	2 ½	**770 090 210**	69	42	
•	B	3	**770 090 111**	78	48	
•	G	3	**770 090 211**	78	48	
•	B	4	**770 090 112**	96	60	
•	G	4	**770 090 212**	96	60	



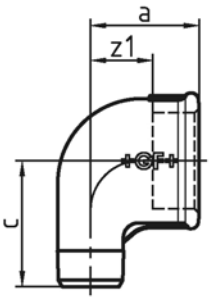
90
Elbow 90°, reducing, ISO/EN A1

EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	z1 [mm]	z2 [mm]
-	B	¼ - ⅛	**770 090 115**	20	20	10	13
-	G	¼ - ⅛	**770 090 215**	20	20	10	13
•	B	⅜ - ¼	**770 090 116**	23	23	13	13
•	G	⅜ - ¼	**770 090 216**	23	23	13	13
-	B	½ - ¼	**770 090 117**	24	24	11	14
-	G	½ - ¼	**770 090 217**	24	24	11	14
•	B	½ - ⅜	**770 090 118**	26	26	13	16
•	G	½ - ⅜	**770 090 218**	26	26	13	16
•	B	¾ - ⅜	**770 090 119**	28	28	13	18
•	G	¾ - ⅜	**770 090 219**	28	28	13	18
•	B	¾ - ½	**770 090 120**	30	31	15	18
•	G	¾ - ½	**770 090 220**	30	31	15	18
-	B	1 - ⅜	**770 090 145**	32	34	15	24
-	G	1 - ⅜	**770 090 245**	32	34	15	24
•	B	1 - ½	**770 090 121**	32	34	15	21
•	G	1 - ½	**770 090 221**	32	34	15	21
•	B	1 - ¾	**770 090 122**	35	36	18	21
•	G	1 - ¾	**770 090 222**	35	36	18	21
-	B	1 ¼ - ½	**770 090 132**	35	38	16	25
-	G	1 ¼ - ½	**770 090 232**	35	38	16	25
•	B	1 ¼ - ¾	**770 090 123**	36	41	17	26
•	G	1 ¼ - ¾	**770 090 223**	36	41	17	26
•	B	1 ¼ - 1	**770 090 124**	40	42	21	25
•	G	1 ¼ - 1	**770 090 224**	40	42	21	25
-	B	1 ½ - ¾	**770 090 125**	38	44	19	29
-	G	1 ½ - ¾	**770 090 225**	38	44	19	29
•	B	1 ½ - 1	**770 090 126**	42	46	23	29
•	G	1 ½ - 1	**770 090 226**	42	46	23	29
•	B	1 ½ - 1 ¼	**770 090 127**	46	48	27	29
•	G	1 ½ - 1 ¼	**770 090 227**	46	48	27	29
-	B	2 - 1	**770 090 128**	44	52	20	35
-	G	2 - 1	**770 090 228**	44	52	20	35
-	B	2 - 1 ¼	**770 090 129**	48	54	24	35
-	G	2 - 1 ¼	**770 090 229**	48	54	24	35
•	B	2 - 1 ½	**770 090 130**	52	55	28	36
•	G	2 - 1 ½	**770 090 230**	52	55	28	36
•	G	2 ½ - 2	**770 090 231**	61	66	34	42



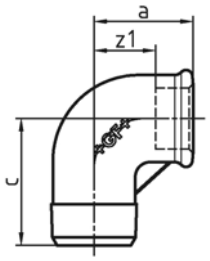
92
Elbow 90°, equal, ISO/EN A4

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]
•	B	⅛	**770 092 101**	19	25	12
•	G	⅛	**770 092 201**	19	25	12
•	B	¼	**770 092 102**	21	28	11
•	G	¼	**770 092 202**	21	28	11
•	B	⅜	**770 092 103**	25	32	15
•	G	⅜	**770 092 203**	25	32	15
•	B	½	**770 092 104**	28	37	15
•	G	½	**770 092 204**	28	37	15
•	B	¾	**770 092 105**	33	43	18
•	G	¾	**770 092 205**	33	43	18
•	B	1	**770 092 106**	38	52	21
•	G	1	**770 092 206**	38	52	21
•	B	1 ¼	**770 092 107**	45	60	26
•	G	1 ¼	**770 092 207**	45	60	26
•	B	1 ½	**770 092 108**	50	65	31
•	G	1 ½	**770 092 208**	50	65	31
•	B	2	**770 092 109**	58	74	34
•	G	2	**770 092 209**	58	74	34
•	B	2 ½	**770 092 110**	69	88	42
•	G	2 ½	**770 092 210**	69	88	42
•	B	3	**770 092 111**	78	98	48
•	G	3	**770 092 211**	78	98	48
•	B	4	**770 092 112**	96	118	60
•	G	4	**770 092 212**	96	118	60



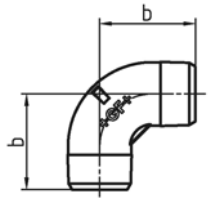
92
Elbow 90°, male thread reduced, ISO/EN A4

EN		Dim. (1-2) [inch]	Code	a [mm]	c [mm]	z1 [mm]
•	B	½ - ⅜	**770 092 116**	26	33	13
•	G	½ - ⅜	**770 092 216**	26	33	13
•	B	¾ - ½	**770 092 117**	30	40	15
•	G	¾ - ½	**770 092 217**	30	40	15
•	B	1 - ½	**770 092 130**	32	46	15
•	G	1 - ½	**770 092 230**	32	46	15
•	B	1 - ¾	**770 092 118**	35	46	18
•	G	1 - ¾	**770 092 218**	35	46	18
-	G	1 ¼ - ¾	**770 092 219**	44	51	17
•	B	1 ¼ - 1	**770 092 120**	40	56	21
•	G	1 ¼ - 1	**770 092 220**	40	56	21
-	B	1 ½ - 1	**770 092 121**	47	62	28
-	G	1 ½ - 1	**770 092 221**	47	62	28
-	B	1 ½ - 1 ¼	**770 092 122**	52	64	33
-	G	1 ½ - 1 ¼	**770 092 222**	52	64	33



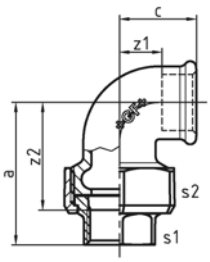
92
Elbow 90°, female thread reduced, ISO/EN A4

EN		Dim. (1-2) [inch]	Code	a [mm]	c [mm]	z1 [mm]
-	B	⅜ - ½	**770 092 124**	28	37	18
-	G	⅜ - ½	**770 092 224**	28	37	18
-	B	½ - ¾	**770 092 125**	34	42	21
-	G	½ - ¾	**770 092 225**	34	42	21
-	B	¾ - 1	**770 092 126**	39	50	24
-	G	¾ - 1	**770 092 226**	39	50	24
-	B	1 - 1 ¼	**770 092 127**	44	59	27
-	G	1 - 1 ¼	**770 092 227**	44	59	27



94
Elbow 90°

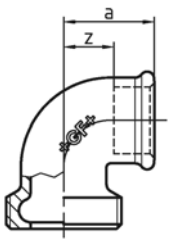
EN		Dim. [inch]	Code	b [mm]
-	B	⅜	**770 094 103**	29
-	G	⅜	**770 094 203**	29
-	B	½	**770 094 104**	37
-	G	½	**770 094 204**	37
-	B	¾	**770 094 105**	40
-	G	¾	**770 094 205**	40
-	B	1	**770 094 106**	47
-	G	1	**770 094 206**	47
-	B	1 ¼	**770 094 107**	56
-	G	1 ¼	**770 094 207**	56
-	B	1 ½	**770 094 108**	59
-	G	1 ½	**770 094 208**	59
-	B	2	**770 094 109**	68
-	G	2	**770 094 209**	68



95
Union elbow, flat seat, ISO/EN UA1

Supplied without sealing gaskets; a and z2 include the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.
* Inside hexagon

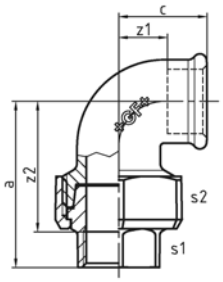
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	c [mm]	z1 [mm]	z2 [mm]	s1 [mm]	s2 [mm]
•	B	⅜	¾	**770 095 103**	52	25	15	42	*12	32
•	G	⅜	¾	**770 095 203**	52	25	15	42	*12	32
•	B	½	1	**770 095 104**	58	28	15	45	26	41
•	G	½	1	**770 095 204**	58	28	15	45	26	41
•	B	¾	1 ¼	**770 095 105**	62	33	18	47	31	48
•	G	¾	1 ¼	**770 095 205**	62	33	18	47	31	48
•	B	1	1 ½	**770 095 106**	72	38	21	55	38	55
•	G	1	1 ½	**770 095 206**	72	38	21	55	38	55
•	B	1 ¼	2	**770 095 107**	82	45	26	63	48	67
•	G	1 ¼	2	**770 095 207**	82	45	26	63	48	67
•	B	1 ½	2 ¼	**770 095 108**	90	50	31	71	54	74
•	G	1 ½	2 ¼	**770 095 208**	90	50	31	71	54	74
•	B	2	2 ¾	**770 095 109**	100	58	34	76	67	90
•	G	2	2 ¾	**770 095 209**	100	58	34	76	67	90



95 ET
Union bush to fig. 95

* Is usually not supplied as a separate piece.

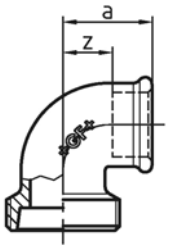
EN		Dim. Rp [inch]	G...B [inch]	Code	a [mm]	z [mm]
*-	B	⅜	¾	**-**	25	15
*-	G	⅜	¾	**-**	25	15
-	B	½	1	**770 695 104**	28	15
-	G	½	1	**770 695 204**	28	15
-	B	¾	1 ¼	**770 695 105**	33	18
-	G	¾	1 ¼	**770 695 205**	33	18
-	B	1	1 ½	**770 695 106**	38	21
-	G	1	1 ½	**770 695 206**	38	21
-	B	1 ¼	2	**770 695 107**	45	26
-	G	1 ¼	2	**770 695 207**	45	26
-	B	1 ½	2 ¼	**770 695 108**	50	31
-	G	1 ½	2 ¼	**770 695 208**	50	31
-	B	2	2 ¾	**770 695 109**	58	34
-	G	2	2 ¾	**770 695 209**	58	34



96
Union elbow, taper seat, ISO/EN UA11

Torque and notes for installation please find in "Technical Product Notes".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.
* Inside hexagon

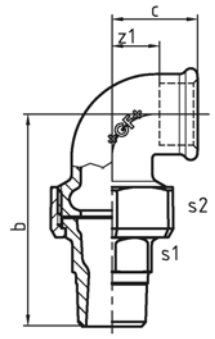
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	c [mm]	z1 [mm]	z2 [mm]	s1 [mm]	s2 [mm]
•	B	¼	⅝	**770 096 102**	48	21	11	38	*10	28
•	G	¼	⅝	**770 096 202**	48	21	11	38	*10	28
•	B	⅜	¾	**770 096 103**	52	25	15	42	*12	32
•	G	⅜	¾	**770 096 203**	52	25	15	42	*12	32
•	B	½	1	**770 096 104**	58	28	15	45	25	41
•	G	½	1	**770 096 204**	58	28	15	45	25	41
•	B	¾	1 ¼	**770 096 105**	62	33	18	47	32	48
•	G	¾	1 ¼	**770 096 205**	62	33	18	47	32	48
•	B	1	1 ½	**770 096 106**	72	38	21	55	38	55
•	G	1	1 ½	**770 096 206**	72	38	21	55	38	55
•	B	1 ¼	2	**770 096 107**	82	45	26	63	48	67
•	G	1 ¼	2	**770 096 207**	82	45	26	63	48	67
•	B	1 ½	2 ¼	**770 096 108**	90	50	31	71	54	74
•	G	1 ½	2 ¼	**770 096 208**	90	50	31	71	54	74
•	B	2	2 ¾	**770 096 109**	100	58	34	76	66	90
•	G	2	2 ¾	**770 096 209**	100	58	34	76	66	90
-	B	2 ½	3 ½	**770 096 110**	130	72	45	103	85	111
-	G	2 ½	3 ½	**770 096 210**	130	72	45	103	85	111
-	B	3	4	**770 096 111**	134	79	49	104	96	131
-	G	3	4	**770 096 211**	134	79	49	104	96	131



96 ET
Union bush to fig. 96

Is usually not supplied as a separate piece.

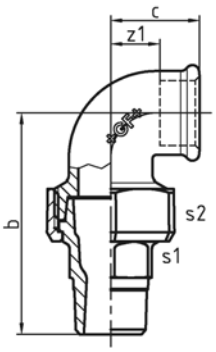
EN		Dim. Rp [inch]	G...B [inch]	Code	a [mm]	z [mm]
-	B	¼	⅝	-	21	11
-	G	¼	⅝	-	21	11
-	B	¼	⅝	-	25	15
-	G	¼	⅝	-	25	15
-	B	¼	⅝	-	28	15
-	G	¼	⅝	-	28	15
-	B	¾	1 ¼	-	33	18
-	G	¾	1 ¼	-	33	18
-	B	1	1 ½	-	38	21
-	G	1	1 ½	-	38	21
-	B	1 ¼	2	-	45	26
-	G	1 ¼	2	-	45	26
-	B	1 ½	2 ¼	-	50	31
-	G	1 ½	2 ¼	-	50	31
-	B	2	2 ¾	-	58	34
-	G	2	2 ¾	-	58	34
-	B	2 ½	3 ½	-	72	45
-	G	2 ½	3 ½	-	72	45
-	B	3	4	-	79	49
-	G	3	4	-	79	49



97
Union elbow, flat seat, ISO/EN UA2

Supplied without sealing gaskets; b includes the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

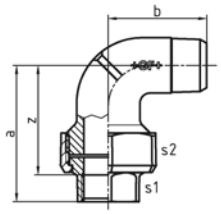
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	c [mm]	z1 [mm]	s1 [mm]	s2 [mm]
•	B	⅜	¾	**770 097 103**	65	25	15	19	32
•	G	⅜	¾	**770 097 203**	65	25	15	19	32
•	B	½	1	**770 097 104**	76	28	15	25	41
•	G	½	1	**770 097 204**	76	28	15	25	41
•	B	¾	1 ¼	**770 097 105**	82	33	18	32	48
•	G	¾	1 ¼	**770 097 205**	82	33	18	32	48
•	B	1	1 ½	**770 097 106**	93	38	21	39	55
•	G	1	1 ½	**770 097 206**	93	38	21	39	55
•	B	1 ¼	2	**770 097 107**	107	45	26	48	67
•	G	1 ¼	2	**770 097 207**	107	45	26	48	67
•	B	1 ½	2 ¼	**770 097 108**	115	50	31	54	74
•	G	1 ½	2 ¼	**770 097 208**	115	50	31	54	74
•	B	2	2 ¾	**770 097 109**	128	58	34	66	90
•	G	2	2 ¾	**770 097 209**	128	58	34	66	90



98
Union elbow, taper seat, ISO/EN UA12

Torque and notes for installation please find in "Technical Product Notes".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

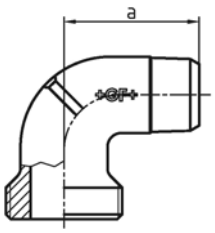
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	c [mm]	z1 [mm]	s1 [mm]	s2 [mm]
•	B	¼	⅝	**770 098 102**	61	21	11	15	28
•	G	¼	⅝	**770 098 202**	61	21	11	15	28
•	B	⅜	¾	**770 098 103**	65	25	15	20	32
•	G	⅜	¾	**770 098 203**	65	25	15	20	32
•	B	½	1	**770 098 104**	76	28	15	25	41
•	G	½	1	**770 098 204**	76	28	15	25	41
•	B	¾	1 ¼	**770 098 105**	82	33	18	32	48
•	G	¾	1 ¼	**770 098 205**	82	33	18	32	48
•	B	1	1 ½	**770 098 106**	94	38	21	38	55
•	G	1	1 ½	**770 098 206**	94	38	21	38	55
•	B	1 ¼	2	**770 098 107**	107	45	26	48	67
•	G	1 ¼	2	**770 098 207**	107	45	26	48	67
•	B	1 ½	2 ¼	**770 098 108**	115	50	31	54	74
•	G	1 ½	2 ¼	**770 098 208**	115	50	31	54	74
•	B	2	2 ¾	**770 098 109**	128	58	34	67	90
•	G	2	2 ¾	**770 098 209**	128	58	34	67	90
-	B	2 ½	3 ½	**770 098 110**	164	72	45	85	111
-	G	2 ½	3 ½	**770 098 210**	164	72	45	85	111
-	B	3	4	**770 098 111**	167	79	49	95	131
-	G	3	4	**770 098 211**	167	79	49	95	131



100
Union elbow, flat seat

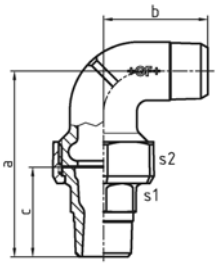
Supplied without sealing gaskets; a and z include the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

EN		Dim. [inch]	374 G [inch]	Code	a [mm]	b [mm]	z [mm]	s1 [mm]	s2 [mm]
-	B	½	1	**770 100 104**	58	39	45	26	41
-	G	½	1	**770 100 204**	58	39	45	26	41
-	B	¾	1 ¼	**770 100 105**	61	43	46	31	48
-	G	¾	1 ¼	**770 100 205**	61	43	46	31	48
-	B	1	1 ½	**770 100 106**	71	52	55	38	55
-	G	1	1 ½	**770 100 206**	71	52	55	38	55



100 ET
Union bush to fig. 100

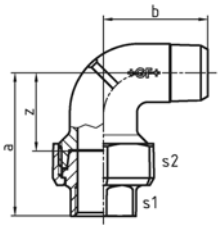
EN		Dim. R [inch]	G...B [inch]	Code	a [mm]
-	B	½	1	**770 600 104**	39
-	G	½	1	**770 600 204**	39
-	B	¾	1 ¼	**770 600 105**	43
-	G	¾	1 ¼	**770 600 205**	43
-	B	1	1 ½	**770 600 106**	52
-	G	1	1 ½	**770 600 206**	52



101
Union elbow, flat seat

Supplied without sealing gaskets; a includes the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

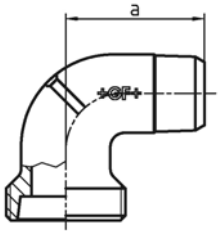
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	b [mm]	c [mm]	s1 [mm]	s2 [mm]
-	B	½	1	**770 101 104**	77	39	40	25	41
-	G	½	1	**770 101 204**	77	39	40	25	41
-	B	¾	1 ¼	**770 101 105**	81	43	42	32	48
-	G	¾	1 ¼	**770 101 205**	81	43	42	32	48
-	B	1	1 ½	**770 101 106**	93	52	47	39	55
-	G	1	1 ½	**770 101 206**	93	52	47	39	55



102
Union elbow, taper seat

Torque and notes for installation please find in "Technical Product Notes".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

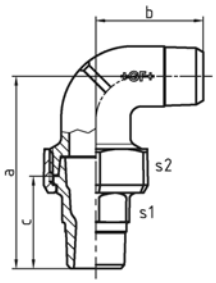
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	b [mm]	z [mm]	s1 [mm]	s2 [mm]
-	B	½	1	**770 102 104**	59	39	46	25	41
-	G	½	1	**770 102 204**	59	39	46	25	41
-	B	¾	1 ¼	**770 102 105**	61	43	46	32	48
-	G	¾	1 ¼	**770 102 205**	61	43	46	32	48
-	B	1	1 ½	**770 102 106**	71	52	54	38	55
-	G	1	1 ½	**770 102 206**	71	52	54	38	55



102 ET
Union bush to Fig. 102

Is usually not supplied as a separate piece.

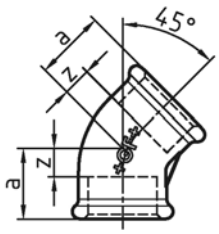
EN		Dim. R [inch]	G...B [inch]	Code	a [mm]
-	B	½	1	-	39
-	G	½	1	-	39
-	B	¾	1 ¼	-	43
-	G	¾	1 ¼	-	43
-	B	1	1 ½	-	52
-	G	1	1 ½	-	52



103
Union elbow, taper seat

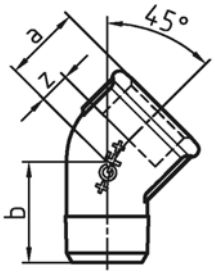
Torque and notes for installation please find in "Technical Product Notes".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

EN		Dim. [inch]	374 G [inch]	Code	a [mm]	b [mm]	c [mm]	s1 [mm]	s2 [mm]
-	B	½	1	**770 103 104**	76	39	40.5	25	39
-	G	½	1	**770 103 204**	76	39	40.5	25	39
-	B	¾	1 ¼	**770 103 105**	81	43	42.5	32	48
-	G	¾	1 ¼	**770 103 205**	81	43	42.5	32	48
-	B	1	1 ½	**770 103 106**	93	52	47.5	38	55
-	G	1	1 ½	**770 103 206**	93	52	47.5	38	55



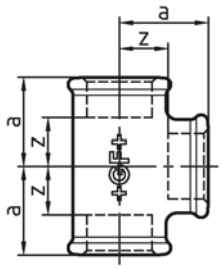
120
Elbow 45°, ISO/EN A1/45°

EN		Dim. [inch]	Code	a [mm]	z [mm]
•	B	⅜	**770 120 103**	20	10
•	G	⅜	**770 120 203**	20	10
•	B	½	**770 120 104**	22	9
•	G	½	**770 120 204**	22	9
•	B	¾	**770 120 105**	25	10
•	G	¾	**770 120 205**	25	10
•	B	1	**770 120 106**	28	11
•	G	1	**770 120 206**	28	11
•	B	1 ¼	**770 120 107**	33	14
•	G	1 ¼	**770 120 207**	33	14
•	B	1 ½	**770 120 108**	36	17
•	G	1 ½	**770 120 208**	36	17
•	B	2	**770 120 109**	43	19
•	G	2	**770 120 209**	43	19
-	B	2 ½	**770 120 110**	48	21
-	G	2 ½	**770 120 210**	48	21
-	B	3	**770 120 111**	54	24
-	G	3	**770 120 211**	54	24



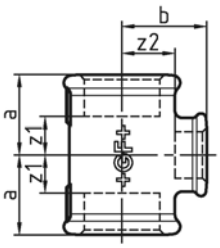
121
Elbow 45°, ISO/EN A4/45°

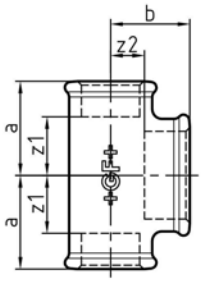
EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]
•	B	⅜	**770 121 103**	20	25	10
•	G	⅜	**770 121 203**	20	25	10
•	B	½	**770 121 104**	22	28	9
•	G	½	**770 121 204**	22	28	9
•	B	¾	**770 121 105**	25	32	10
•	G	¾	**770 121 205**	25	32	10
•	B	1	**770 121 106**	28	37	11
•	G	1	**770 121 206**	28	37	11
•	B	1 ¼	**770 121 107**	33	43	14
•	G	1 ¼	**770 121 207**	33	43	14
•	B	1 ½	**770 121 108**	36	46	17
•	G	1 ½	**770 121 208**	36	46	17
•	B	2	**770 121 109**	43	55	19
•	G	2	**770 121 209**	43	55	19
-	B	2 ½	**770 121 110**	46	54	19
-	G	2 ½	**770 121 210**	46	54	19
-	B	3	**770 121 111**	52	61	22
-	G	3	**770 121 211**	52	61	22



130
Tee, equal, ISO/EN B1

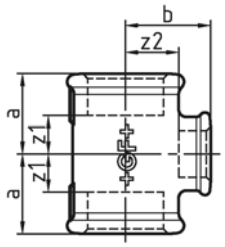
EN		Dim. [inch]	Code	a [mm]	z [mm]
•	B	⅛	**770 130 101**	19	12
•	G	⅛	**770 130 201**	19	12
•	B	¼	**770 130 102**	21	11
•	G	¼	**770 130 202**	21	11
•	B	⅜	**770 130 103**	25	15
•	G	⅜	**770 130 203**	25	15
•	B	½	**770 130 104**	28	15
•	G	½	**770 130 204**	28	15
•	B	¾	**770 130 105**	33	18
•	G	¾	**770 130 205**	33	18
•	B	1	**770 130 106**	38	21
•	G	1	**770 130 206**	38	21
•	B	1 ¼	**770 130 107**	45	26
•	G	1 ¼	**770 130 207**	45	26
•	B	1 ½	**770 130 108**	50	31
•	G	1 ½	**770 130 208**	50	31
•	B	2	**770 130 109**	58	34
•	G	2	**770 130 209**	58	34
•	B	2 ½	**770 130 110**	69	42
•	G	2 ½	**770 130 210**	69	42
•	B	3	**770 130 111**	78	48
•	G	3	**770 130 211**	78	48
•	B	4	**770 130 112**	96	60
•	G	4	**770 130 212**	96	60

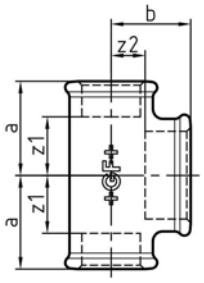




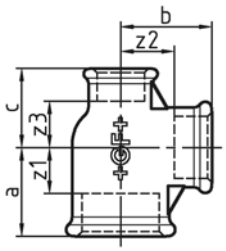
130
Tee, reducing or increasing on the branch, ISO/EN B1

EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	z1 [mm]	z2 [mm]	
•	B	⅜ - ¼	**770 130 115**	23	23	13	13	
•	G	⅜ - ¼	**770 130 215**	23	23	13	13	
•	B	⅜ - ½	**770 130 116**	26	26	16	13	
•	G	⅜ - ½	**770 130 216**	26	26	16	13	
•	B	½ - ¼	**770 130 117**	24	24	11	14	
•	G	½ - ¼	**770 130 217**	24	24	11	14	
•	B	½ - ⅜	**770 130 119**	26	26	13	16	
•	G	½ - ⅜	**770 130 219**	26	26	13	16	
•	B	½ - ¾	**770 130 121**	31	30	18	15	
•	G	½ - ¾	**770 130 221**	31	30	18	15	
•	B	½ - 1	**770 130 130**	34	32	21	15	
•	G	½ - 1	**770 130 230**	34	32	21	15	
•	B	¾ - ¼	**770 130 122**	26	27	11	17	
•	G	¾ - ¼	**770 130 222**	26	27	11	17	
•	B	¾ - ⅜	**770 130 124**	28	28	13	18	
•	G	¾ - ⅜	**770 130 224**	28	28	13	18	
•	B	¾ - ½	**770 130 127**	30	31	15	18	
•	G	¾ - ½	**770 130 227**	30	31	15	18	
•	B	¾ - 1	**770 130 132**	36	35	21	18	
•	G	¾ - 1	**770 130 232**	36	35	21	18	
•	B	1 - ¼	**770 130 133**	28	31	11	21	
•	G	1 - ¼	**770 130 233**	28	31	11	21	
•	B	1 - ⅜	**770 130 134**	30	32	13	22	
•	G	1 - ⅜	**770 130 234**	30	32	13	22	
•	B	1 - ½	**770 130 137**	32	34	15	21	
•	G	1 - ½	**770 130 237**	32	34	15	21	
•	B	1 - ¾	**770 130 140**	35	36	18	21	
•	G	1 - ¾	**770 130 240**	35	36	18	21	
•	B	1 - 1 ¼	**770 130 145**	42	40	25	21	
•	G	1 - 1 ¼	**770 130 245**	42	40	25	21	
•	B	1 - 1 ½	**770 130 159**	46	42	29	23	
•	G	1 - 1 ½	**770 130 259**	46	42	29	23	
•	B	1 ¼ - ⅜	**770 130 146**	32	36	13	26	
•	G	1 ¼ - ⅜	**770 130 246**	32	36	13	26	
•	B	1 ¼ - ½	**770 130 148**	34	38	15	25	
•	G	1 ¼ - ½	**770 130 248**	34	38	15	25	
•	B	1 ¼ - ¾	**770 130 151**	36	41	17	26	
•	G	1 ¼ - ¾	**770 130 251**	36	41	17	26	
•	B	1 ¼ - 1	**770 130 155**	40	42	21	25	
•	G	1 ¼ - 1	**770 130 255**	40	42	21	25	
•	B	1 ¼ - 1 ½	**770 130 161**	48	46	29	27	
•	G	1 ¼ - 1 ½	**770 130 261**	48	46	29	27	
•	B	1 ¼ - 2	**770 130 177**	54	48	35	24	
•	G	1 ¼ - 2	**770 130 277**	54	48	35	24	
-	B	1 ½ - ⅜	**770 130 162**	33	38	14	28	
-	G	1 ½ - ⅜	**770 130 262**	33	38	14	28	
•	B	1 ½ - ½	**770 130 164**	36	42	17	29	
•	G	1 ½ - ½	**770 130 264**	36	42	17	29	
•	B	1 ½ - ¾	**770 130 166**	38	44	19	29	
•	G	1 ½ - ¾	**770 130 266**	38	44	19	29	
•	B	1 ½ - 1	**770 130 169**	42	46	23	29	
•	G	1 ½ - 1	**770 130 269**	42	46	23	29	
•	B	1 ½ - 1 ¼	**770 130 172**	46	48	27	29	
•	G	1 ½ - 1 ¼	**770 130 272**	46	48	27	29	
•	B	1 ½ - 2	**770 130 179**	55	52	36	28	
•	G	1 ½ - 2	**770 130 279**	55	52	36	28	
•	B	2 - ½	**770 130 181**	38	48	14	35	
•	G	2 - ½	**770 130 281**	38	48	14	35	
•	B	2 - ¾	**770 130 183**	40	50	16	35	
•	G	2 - ¾	**770 130 283**	40	50	16	35	



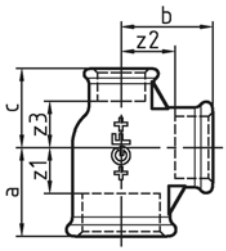


EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	z1 [mm]	z2 [mm]	
•	B	2 - 1	**770 130 185**	44	52	20	35	
•	G	2 - 1	**770 130 285**	44	52	20	35	
•	B	2 - 1 ¼	**770 130 188**	48	54	24	35	
•	G	2 - 1 ¼	**770 130 288**	48	54	24	35	
•	B	2 - 1 ½	**770 130 191**	52	55	28	36	
•	G	2 - 1 ½	**770 130 291**	52	55	28	36	
-	B	2 - 2 ½	**770 130 197**	66	61	42	34	
-	G	2 - 2 ½	**770 130 297**	66	61	42	34	
-	B	2 ½ - ½	**770 130 198**	41	56	14	43	
-	G	2 ½ - ½	**770 130 298**	41	56	14	43	
-	B	2 ½ - ¾	**770 130 199**	45	59	18	44	
-	G	2 ½ - ¾	**770 130 299**	45	59	18	44	
•	B	2 ½ - 1	**770 129 115**	47	60	20	43	
•	G	2 ½ - 1	**770 129 215**	47	60	20	43	
•	B	2 ½ - 1 ¼	**770 129 116**	52	62	25	43	
•	G	2 ½ - 1 ¼	**770 129 216**	52	62	25	43	
•	B	2 ½ - 1 ½	**770 129 118**	55	63	28	44	
•	G	2 ½ - 1 ½	**770 129 218**	55	63	28	44	
•	B	2 ½ - 2	**770 129 120**	61	66	34	42	
•	G	2 ½ - 2	**770 129 220**	61	66	34	42	
-	G	3 - ½	**770 129 224**	46	63	15	50	
-	G	3 - ¾	**770 129 225**	48	66	18	51	
•	G	3 - 1	**770 129 226**	51	67	21	50	
•	G	3 - 1 ¼	**770 129 227**	55	70	25	51	
•	G	3 - 1 ½	**770 129 228**	58	71	28	52	
•	G	3 - 2	**770 129 230**	64	73	34	49	
•	B	3 - 2 ½	**770 129 131**	72	76	42	49	
•	G	3 - 2 ½	**770 129 231**	72	76	42	49	
-	G	4 - 1	**770 129 233**	56	80	20	63	
-	G	4 - 1 ½	**770 129 235**	64	84	28	65	
•	G	4 - 2	**770 129 236**	70	86	34	62	
-	G	4 - 2 ½	**770 129 237**	77	89	41	62	
•	G	4 - 3	**770 129 238**	84	92	48	62	

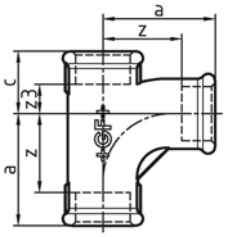


130
Tee, reducing or increasing on the branch, reducing on the run, ISO/EN B1

EN		Dim. (1-2-3) [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z2 [mm]	z3 [mm]	
•	B	½ - ⅜ - ⅜	**770 130 118**	26	26	25	13	16	15	
•	G	½ - ⅜ - ⅜	**770 130 218**	26	26	25	13	16	15	
•	B	½ - ½ - ⅜	**770 130 120**	28	28	26	15	15	16	
•	G	½ - ½ - ⅜	**770 130 220**	28	28	26	15	15	16	
•	B	¾ - ⅜ - ½	**770 130 123**	28	28	26	13	18	13	
•	G	¾ - ⅜ - ½	**770 130 223**	28	28	26	13	18	13	
•	B	¾ - ½ - ⅜	**770 130 125**	30	31	26	15	18	16	
•	G	¾ - ½ - ⅜	**770 130 225**	30	31	26	15	18	16	
•	B	¾ - ½ - ½	**770 130 126**	30	31	28	15	18	15	
•	G	¾ - ½ - ½	**770 130 226**	30	31	28	15	18	15	
•	B	¾ - ¾ - ⅜	**770 130 128**	33	33	28	18	18	18	
•	G	¾ - ¾ - ⅜	**770 130 228**	33	33	28	18	18	18	
•	B	¾ - ¾ - ½	**770 130 129**	33	33	31	18	18	18	
•	G	¾ - ¾ - ½	**770 130 229**	33	33	31	18	18	18	
-	B	¾ - 1 - ½	**770 130 131**	36	35	34	21	18	21	
-	G	¾ - 1 - ½	**770 130 231**	36	35	34	21	18	21	
•	B	1 - ½ - ½	**770 130 135**	32	34	28	15	21	15	
•	G	1 - ½ - ½	**770 130 235**	32	34	28	15	21	15	
•	B	1 - ½ - ¾	**770 130 136**	32	34	30	15	21	15	
•	G	1 - ½ - ¾	**770 130 236**	32	34	30	15	21	15	
•	B	1 - ¾ - ½	**770 130 138**	35	36	31	18	21	18	
•	G	1 - ¾ - ½	**770 130 238**	35	36	31	18	21	18	
•	B	1 - ¾ - ¾	**770 130 139**	35	36	33	18	21	18	
•	G	1 - ¾ - ¾	**770 130 239**	35	36	33	18	21	18	
•	B	1 - 1 - ⅜	**770 130 141**	38	38	32	21	21	22	
•	G	1 - 1 - ⅜	**770 130 241**	38	38	32	21	21	22	
•	B	1 - 1 - ½	**770 130 142**	38	38	34	21	21	21	
•	G	1 - 1 - ½	**770 130 242**	38	38	34	21	21	21	
•	B	1 - 1 - ¾	**770 130 143**	38	38	36	21	21	21	
•	G	1 - 1 - ¾	**770 130 243**	38	38	36	21	21	21	
-	B	1 - 1 ¼ - ¾	**770 130 144**	42	40	41	25	21	26	
-	G	1 - 1 ¼ - ¾	**770 130 244**	42	40	41	25	21	26	
•	B	1 ¼ - ½ - 1	**770 130 147**	34	38	32	15	25	15	
•	G	1 ¼ - ½ - 1	**770 130 247**	34	38	32	15	25	15	
•	B	1 ¼ - ¾ - ¾	**770 130 149**	36	41	33	17	26	18	
•	G	1 ¼ - ¾ - ¾	**770 130 249**	36	41	33	17	26	18	
•	B	1 ¼ - ¾ - 1	**770 130 150**	36	41	35	17	26	18	
•	G	1 ¼ - ¾ - 1	**770 130 250**	36	41	35	17	26	18	
•	B	1 ¼ - 1 - ¾	**770 130 153**	40	42	36	21	25	21	
•	G	1 ¼ - 1 - ¾	**770 130 253**	40	42	36	21	25	21	
•	B	1 ¼ - 1 - 1	**770 130 154**	40	42	38	21	25	21	
•	G	1 ¼ - 1 - 1	**770 130 254**	40	42	38	21	25	21	
•	B	1 ¼ - 1 ¼ - ½	**770 130 156**	45	45	38	26	26	25	
•	G	1 ¼ - 1 ¼ - ½	**770 130 256**	45	45	38	26	26	25	
•	B	1 ¼ - 1 ¼ - ¾	**770 130 157**	45	45	41	26	26	26	
•	G	1 ¼ - 1 ¼ - ¾	**770 130 257**	45	45	41	26	26	26	
•	B	1 ¼ - 1 ¼ - 1	**770 130 158**	45	45	42	26	26	25	
•	G	1 ¼ - 1 ¼ - 1	**770 130 258**	45	45	42	26	26	25	
-	B	1 ¼ - 1 ½ - 1	**770 130 160**	48	46	46	29	27	29	
-	G	1 ¼ - 1 ½ - 1	**770 130 260**	48	46	46	29	27	29	
•	B	1 ½ - ½ - 1 ¼	**770 130 163**	36	42	34	17	29	15	
•	G	1 ½ - ½ - 1 ¼	**770 130 263**	36	42	34	17	29	15	
•	B	1 ½ - ¾ - 1 ¼	**770 130 165**	38	44	36	19	29	17	
•	G	1 ½ - ¾ - 1 ¼	**770 130 265**	38	44	36	19	29	17	
•	B	1 ½ - 1 - 1	**770 130 167**	42	46	38	23	29	21	
•	G	1 ½ - 1 - 1	**770 130 267**	42	46	38	23	29	21	
•	B	1 ½ - 1 - 1 ¼	**770 130 168**	42	46	38	23	29	21	
•	G	1 ½ - 1 - 1 ¼	**770 130 268**	42	46	38	23	29	21	
•	B	1 ½ - 1 ¼ - 1	**770 130 170**	46	48	42	27	29	25	
•	G	1 ½ - 1 ¼ - 1	**770 130 270**	46	48	42	27	29	25	

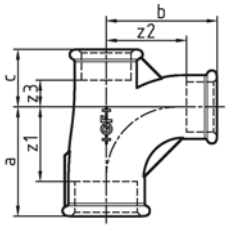


EN		Dim. (1-2-3) [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z2 [mm]	z3 [mm]
•	B	1 ½ - 1 ¼ - 1 ¼	**770 130 171**	46	48	45	27	29	26
•	G	1 ½ - 1 ¼ - 1 ¼	**770 130 271**	46	48	45	27	29	26
•	B	1 ½ - 1 ½ - ½	**770 130 173**	50	50	42	31	31	29
•	G	1 ½ - 1 ½ - ½	**770 130 273**	50	50	42	31	31	29
•	B	1 ½ - 1 ½ - ¾	**770 130 174**	50	50	44	31	31	29
•	G	1 ½ - 1 ½ - ¾	**770 130 274**	50	50	44	31	31	29
•	B	1 ½ - 1 ½ - 1	**770 130 175**	50	50	46	31	31	29
•	G	1 ½ - 1 ½ - 1	**770 130 275**	50	50	46	31	31	29
•	B	1 ½ - 1 ½ - 1 ¼	**770 130 176**	50	50	48	31	31	29
•	G	1 ½ - 1 ½ - 1 ¼	**770 130 276**	50	50	48	31	31	29
-	B	1 ½ - 2 - 1 ¼	**770 130 178**	56	54	56	37	30	37
-	G	1 ½ - 2 - 1 ¼	**770 130 278**	56	54	56	37	30	37
-	B	2 - ½ - 1 ½	**770 130 180**	38	48	38	14	35	19
-	G	2 - ½ - 1 ½	**770 130 280**	38	48	38	14	35	19
•	B	2 - ¾ - 1 ½	**770 130 182**	40	50	38	16	35	19
•	G	2 - ¾ - 1 ½	**770 130 282**	40	50	38	16	35	19
•	B	2 - 1 - 1 ½	**770 130 184**	44	52	42	20	35	23
•	G	2 - 1 - 1 ½	**770 130 284**	44	52	42	20	35	23
•	B	2 - 1 ¼ - 1 ¼	**770 130 186**	48	54	45	24	35	26
•	G	2 - 1 ¼ - 1 ¼	**770 130 286**	48	54	45	24	35	26
•	B	2 - 1 ¼ - 1 ½	**770 130 187**	48	54	46	24	35	27
•	G	2 - 1 ¼ - 1 ½	**770 130 287**	48	54	46	24	35	27
•	B	2 - 1 ½ - 1 ½	**770 130 190**	52	55	50	28	36	31
•	G	2 - 1 ½ - 1 ½	**770 130 290**	52	55	50	28	36	31
-	B	2 - 2 - ½	**770 130 192**	58	58	48	34	34	35
-	G	2 - 2 - ½	**770 130 292**	58	58	48	34	34	35
•	B	2 - 2 - ¾	**770 130 193**	58	58	50	34	34	35
•	G	2 - 2 - ¾	**770 130 293**	58	58	50	34	34	35
•	B	2 - 2 - 1	**770 130 194**	58	58	52	34	34	35
•	G	2 - 2 - 1	**770 130 294**	58	58	52	34	34	35
•	B	2 - 2 - 1 ¼	**770 130 195**	58	58	54	34	34	35
•	G	2 - 2 - 1 ¼	**770 130 295**	58	58	54	34	34	35
•	B	2 - 2 - 1 ½	**770 130 196**	58	58	55	34	34	36
•	G	2 - 2 - 1 ½	**770 130 296**	58	58	55	34	34	36
-	B	2 ½ - 2 - 2	**770 129 119**	67	72	62	40	48	38
-	G	2 ½ - 2 - 2	**770 129 219**	67	72	62	40	48	38
-	G	2 ½ - 2 ½ - 1	**770 129 221**	71	71	71	44	44	54
-	G	2 ½ - 2 ½ - 1 ½	**770 129 222**	69	69	64	42	42	45
-	G	2 ½ - 2 ½ - 2	**770 129 223**	73	73	68	46	46	34
-	G	3 - 2 - 2	**770 129 229**	64	73	60	34	49	36
-	G	3 - 3 - 2	**770 129 232**	78	79	72	48	49	48



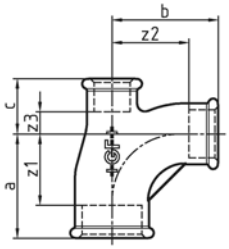
131
Pitcher tee, equal, ISO/EN E1

EN		Dim. [inch]	Code	a [mm]	c [mm]	z [mm]	z3 [mm]
•	B	½	**770 131 104**	45	24	32	11
•	G	½	**770 131 204**	45	24	32	11
•	B	¾	**770 131 105**	50	28	35	13
•	G	¾	**770 131 205**	50	28	35	13
•	B	1	**770 131 106**	63	33	46	16
•	G	1	**770 131 206**	63	33	46	16
•	B	1 ¼	**770 131 107**	76	40	57	21
•	G	1 ¼	**770 131 207**	76	40	57	21
•	B	1 ½	**770 131 108**	85	43	66	24
•	G	1 ½	**770 131 208**	85	43	66	24
•	B	2	**770 131 109**	102	53	78	29
•	G	2	**770 131 209**	102	53	78	29
-	B	2 ½	**770 131 110**	115	62	88	35
-	G	2 ½	**770 131 210**	115	62	88	35
-	B	3	**770 131 111**	127	70	97	40
-	G	3	**770 131 211**	127	70	97	40
-	B	4	**770 131 112**	165	87	129	51
-	G	4	**770 131 212**	165	87	129	51



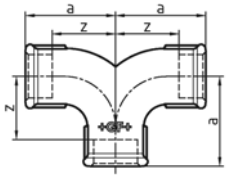
131
Pitcher tee, reducing on the branch, ISO/EN E1

EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z2 [mm]	z3 [mm]
•	B	¾ - ½	**770 131 116**	47	48	25	32	35	10
•	G	¾ - ½	**770 131 216**	47	48	25	32	35	10
•	B	1 - ½	**770 131 119**	49	51	28	32	38	11
•	G	1 - ½	**770 131 219**	49	51	28	32	38	11
•	B	1 - ¾	**770 131 121**	53	54	30	36	39	13
•	G	1 - ¾	**770 131 221**	53	54	30	36	39	13
•	B	1 ¼ - ½	**770 131 122**	51	56	30	32	43	11
•	G	1 ¼ - ½	**770 131 222**	51	56	30	32	43	11
•	B	1 ¼ - ¾	**770 131 123**	55	58	33	36	43	14
•	G	1 ¼ - ¾	**770 131 223**	55	58	33	36	43	14
•	B	1 ¼ - 1	**770 131 125**	66	68	36	47	51	17
•	G	1 ¼ - 1	**770 131 225**	66	68	36	47	51	17
-	B	1 ½ - ½	**770 131 140**	52	58	29	33	45	10
-	G	1 ½ - ½	**770 131 240**	52	58	29	33	45	10
•	B	1 ½ - ¾	**770 131 126**	55	61	33	36	46	14
•	G	1 ½ - ¾	**770 131 226**	55	61	33	36	46	14
•	B	1 ½ - 1	**770 131 127**	66	71	36	47	54	17
•	G	1 ½ - 1	**770 131 227**	66	71	36	47	54	17
•	B	1 ½ - 1 ¼	**770 131 128**	77	79	41	58	60	22
•	G	1 ½ - 1 ¼	**770 131 228**	77	79	41	58	60	22
-	B	2 - ¾	**770 131 129**	69	75	39	45	60	15
-	G	2 - ¾	**770 131 229**	69	75	39	45	60	15
•	B	2 - 1	**770 131 130**	70	77	40	46	60	16
•	G	2 - 1	**770 131 230**	70	77	40	46	60	16
•	B	2 - 1 ¼	**770 131 131**	80	85	45	56	66	21
•	G	2 - 1 ¼	**770 131 231**	80	85	45	56	66	21
•	B	2 - 1 ½	**770 131 132**	91	94	48	67	75	24
•	G	2 - 1 ½	**770 131 232**	91	94	48	67	75	24
-	G	2 ½ - 1 ¼	**770 131 233**	103	108	58	76	89	31
-	B	3 - 2	**770 131 135**	138	143	69	108	119	39
-	G	3 - 2	**770 131 235**	138	143	69	108	119	39



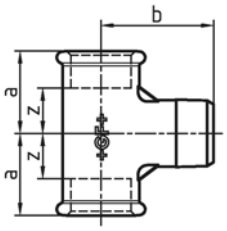
131
Pitcher tee, equal or reducing on the branch and run, ISO/EN E1

EN		Dim. (1-2-3) [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z2 [mm]	z3 [mm]
•	B	¾ - ½ - ½	**770 131 115**	47	48	24	31	34	11
•	G	¾ - ½ - ½	**770 131 215**	47	48	24	31	34	11
•	B	¾ - ¾ - ½	**770 131 117**	49	49	27	34	34	14
•	G	¾ - ¾ - ½	**770 131 217**	49	49	27	34	34	14
-	B	1 - ½ - ¾	**770 131 118**	49	51	25	32	38	10
-	G	1 - ½ - ¾	**770 131 218**	49	51	25	32	38	10
•	B	1 - ¾ - ¾	**770 131 120**	53	54	28	36	39	13
•	G	1 - ¾ - ¾	**770 131 220**	53	54	28	36	39	13



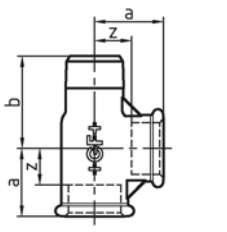
132
Twin elbow, equal, ISO/EN E2

EN		Dim. [inch]	Code	a [mm]	z [mm]
•	B	½	**770 132 104**	45	32
•	G	½	**770 132 204**	45	32
•	B	¾	**770 132 105**	50	35
•	G	¾	**770 132 205**	50	35
•	B	1	**770 132 106**	63	46
•	G	1	**770 132 206**	63	46
•	B	1 ¼	**770 132 107**	76	57
•	G	1 ¼	**770 132 207**	76	57
•	B	1 ½	**770 132 108**	85	66
•	G	1 ½	**770 132 208**	85	66
•	B	2	**770 132 109**	102	78
•	G	2	**770 132 209**	102	78



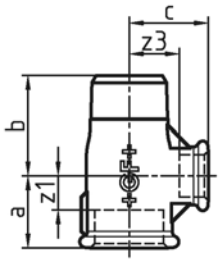
133
Tee, equal

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]
-	B	⅜	**770 133 103**	22	31	12
-	G	⅜	**770 133 203**	22	31	12
-	B	½	**770 133 104**	25	38	12
-	G	½	**770 133 204**	25	38	12
-	B	¾	**770 133 105**	33	45	18
-	G	¾	**770 133 205**	33	45	18
-	B	1	**770 133 106**	39	53	22
-	G	1	**770 133 206**	39	53	22



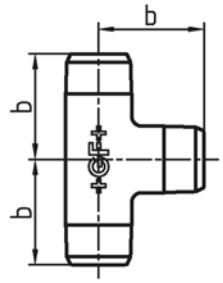
134
Tee, equal

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]
-	B	¼	**770 134 102**	22	28	12
-	G	¼	**770 134 202**	22	28	12
-	B	⅜	**770 134 103**	24	32	14
-	G	⅜	**770 134 203**	24	32	14
-	B	½	**770 134 104**	27	37	14
-	G	½	**770 134 204**	27	37	14
-	B	¾	**770 134 105**	33	43	17
-	G	¾	**770 134 205**	33	43	17
-	B	1	**770 134 106**	37	50	20
-	G	1	**770 134 206**	37	50	20
-	B	1 ¼	**770 134 107**	45	58	26
-	G	1 ¼	**770 134 207**	45	58	26
-	B	1 ½	**770 134 108**	50	65	31
-	G	1 ½	**770 134 208**	50	65	31
-	B	2	**770 134 109**	59	69	35
-	G	2	**770 134 209**	59	69	35



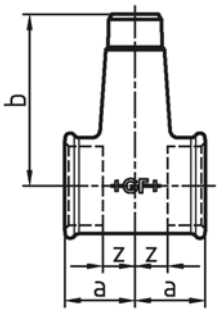
134
Tee, reducing on branch

EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z3 [mm]
-	B	½ - ¼	**770 134 116**	24	34	24	11	14
-	G	½ - ¼	**770 134 216**	24	34	24	11	14
-	B	¾ - ½	**770 134 118**	30	40	30	15	17
-	G	¾ - ½	**770 134 218**	30	40	30	15	17
-	B	1 - ½	**770 134 119**	32	44	35	15	22
-	G	1 - ½	**770 134 219**	32	44	35	15	22



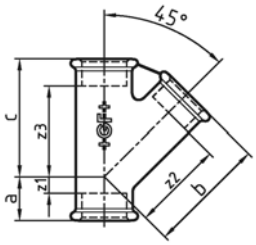
135
Tee, equal

EN		Dim. [inch]	Code	b [mm]
-	B	½	**770 135 104**	37
-	G	½	**770 135 204**	37
-	B	¾	**770 135 105**	43
-	G	¾	**770 135 205**	43
-	B	1	**770 135 106**	48
-	G	1	**770 135 206**	48



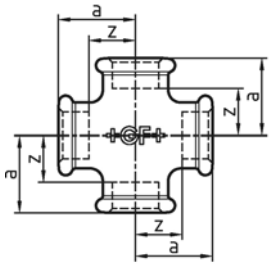
137
Distribution Tee reducing on branch

EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	z [mm]
-	G	1 ¼ - ¾	**770 137 216**	35	85	16
-	G	1 ¼ - 1	**770 137 217**	35	75	16
-	G	1 ½ - 1	**770 137 219**	40	86	21



165
Tee 45°, equal

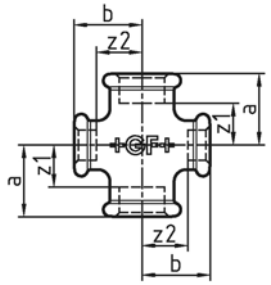
EN		Dim. [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z2 [mm]	z3 [mm]
-	B	⅜	**770 165 103**	16	46	46	6	36	36
-	B	½	**770 165 104**	23	54	54	10	41	41
-	G	½	**770 165 204**	23	54	54	10	41	41
-	B	¾	**770 165 105**	24	64	64	9	49	49
-	G	¾	**770 165 205**	24	64	64	9	49	49
-	B	1	**770 165 106**	28	77	77	11	60	60
-	G	1	**770 165 206**	28	77	77	11	60	60
-	B	1 ¼	**770 165 107**	34	91	91	14	72	72
-	G	1 ¼	**770 165 207**	34	91	91	14	72	72
-	B	1 ½	**770 165 108**	34	98	98	15	79	79
-	G	1 ½	**770 165 208**	34	98	98	15	79	79
-	B	2	**770 165 109**	40	106	106	16	82	82
-	G	2	**770 165 209**	40	106	106	16	82	82



180
Cross, equal, ISO/EN C1

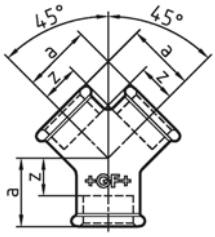
* Available as long as our stock will last

EN		Dim. [inch]	Code	a [mm]	z [mm]	
•	B	¼	**770 180 102**	21	11	
•	G	¼	**770 180 202**	21	11	
•	B	⅜	**770 180 103**	25	15	
•	G	⅜	**770 180 203**	25	15	
•	B	½	**770 180 104**	28	15	
•	G	½	**770 180 204**	28	15	
•	B	¾	**770 180 105**	33	18	
•	G	¾	**770 180 205**	33	18	
•	B	1	**770 180 106**	38	21	
•	G	1	**770 180 206**	38	21	
•	B	1 ¼	**770 180 107**	45	26	
•	G	1 ¼	**770 180 207**	45	26	
•	B	1 ½	**770 180 108**	50	31	
•	G	1 ½	**770 180 208**	50	31	
•	B	2	**770 180 109**	58	34	
•	G	2	**770 180 209**	58	34	
•	B	2 ½	**770 180 110**	69	42	
•	G	2 ½	**770 180 210**	69	42	
•	B	3	**770 180 111**	78	48	
•	G	3	**770 180 211**	78	48	
*•	B	4	**770 180 112**	96	60	
•	G	4	**770 180 212**	96	60	



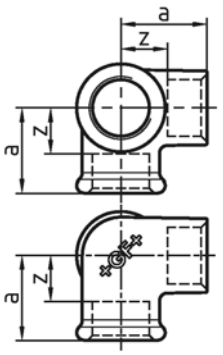
180
Cross, reducing, ISO/EN C1

EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	z1 [mm]	z2 [mm]	
•	B	¾ - ½	**770 180 115**	30	31	15	18	
•	G	¾ - ½	**770 180 215**	30	31	15	18	
•	B	1 - ½	**770 180 116**	32	34	15	21	
•	G	1 - ½	**770 180 216**	32	34	15	21	
•	B	1 - ¾	**770 180 117**	35	36	18	21	
•	G	1 - ¾	**770 180 217**	35	36	18	21	
•	B	1 ¼ - 1	**770 180 118**	40	42	21	25	
•	G	1 ¼ - 1	**770 180 218**	40	42	21	25	
•	B	1 ½ - 1	**770 180 120**	42	46	23	29	
•	G	1 ½ - 1	**770 180 220**	42	46	23	29	
-	B	2 - 1	**770 180 121**	44	52	20	35	
-	G	2 - 1	**770 180 221**	44	52	20	35	



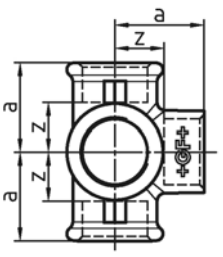
220
Y-piece

EN		Dim. [inch]	Code	a [mm]	z [mm]
-	B	⅜	**770 220 103**	24	14
-	G	⅜	**770 220 203**	24	14
-	B	½	**770 220 104**	27	14
-	G	½	**770 220 204**	27	14
-	B	¾	**770 220 105**	33	18
-	G	¾	**770 220 205**	33	18
-	B	1	**770 220 106**	40	23
-	G	1	**770 220 206**	40	23



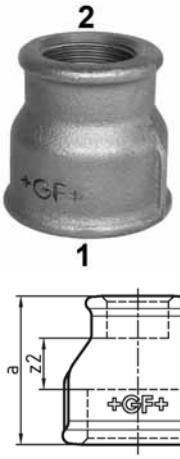
221
Side outlet elbow, ISO/EN Za1

EN		Dim. [inch]	Code	a [mm]	z [mm]
•	B	⅜	**770 221 103**	25	15
•	G	⅜	**770 221 203**	25	15
•	B	½	**770 221 104**	28	15
•	G	½	**770 221 204**	28	15
•	B	¾	**770 221 105**	33	18
•	G	¾	**770 221 205**	33	18
•	B	1	**770 221 106**	38	21
•	G	1	**770 221 206**	38	21
-	B	1 ¼	**770 221 107**	45	26
-	G	1 ¼	**770 221 207**	45	26
-	B	1 ½	**770 221 108**	50	31
-	G	1 ½	**770 221 208**	50	31
-	B	2	**770 221 109**	58	34
-	G	2	**770 221 209**	58	34



223
Side outlet tee, ISO/EN Za2

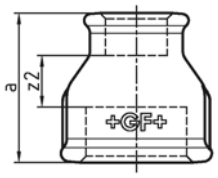
EN		Dim. [inch]	Code	a [mm]	z [mm]
•	B	½	**770 223 104**	28	15
•	G	½	**770 223 204**	28	15
•	B	¾	**770 223 105**	33	18
•	G	¾	**770 223 205**	33	18
•	B	1	**770 223 106**	38	21
•	G	1	**770 223 206**	38	21



240
Socket, reducing, ISO/EN M2

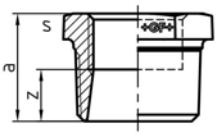
ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations. Steel parts are hexagonal instead of beaded at the end no. 1.

EN		Dim. (1-2) [inch]	Code	a [mm]	s [mm]	z2 [mm]	
ST•	B	¼ - ⅛	**770 240 115**	27	17	10	
ST•	G	¼ - ⅛	**770 240 215**	27	17	10	
ST•	B	⅜ - ⅛	**770 240 116**	30	22	13	
ST•	G	⅜ - ⅛	**770 240 216**	30	22	13	
ST•	B	⅜ - ¼	**770 240 117**	30	22	10	
ST•	G	⅜ - ¼	**770 240 217**	30	22	10	
•	B	½ - ¼	**770 240 118**	36		13	
•	G	½ - ¼	**770 240 218**	36		13	
•	B	½ - ⅜	**770 240 119**	36		13	
•	G	½ - ⅜	**770 240 219**	36		13	
•	B	¾ - ¼	**770 240 120**	39		14	
•	G	¾ - ¼	**770 240 220**	39		14	
•	B	¾ - ⅜	**770 240 121**	39		14	
•	G	¾ - ⅜	**770 240 221**	39		14	
•	B	¾ - ½	**770 240 122**	39		11	
•	G	¾ - ½	**770 240 222**	39		11	
•	B	1 - ⅜	**770 240 123**	45		18	
•	G	1 - ⅜	**770 240 223**	45		18	
•	B	1 - ½	**770 240 124**	45		15	
•	G	1 - ½	**770 240 224**	45		15	
•	B	1 - ¾	**770 240 125**	45		13	
•	G	1 - ¾	**770 240 225**	45		13	
-	B	1 ¼ - ⅜	**770 240 126**	50		21	
-	G	1 ¼ - ⅜	**770 240 226**	50		21	
•	B	1 ¼ - ½	**770 240 127**	50		18	
•	G	1 ¼ - ½	**770 240 227**	50		18	
•	B	1 ¼ - ¾	**770 240 128**	50		16	
•	G	1 ¼ - ¾	**770 240 228**	50		16	
•	B	1 ¼ - 1	**770 240 129**	50		14	
•	G	1 ¼ - 1	**770 240 229**	50		14	
•	B	1 ½ - ½	**770 240 130**	55		23	
•	G	1 ½ - ½	**770 240 230**	55		23	
•	B	1 ½ - ¾	**770 240 131**	55		21	
•	G	1 ½ - ¾	**770 240 231**	55		21	
•	B	1 ½ - 1	**770 240 132**	55		19	
•	G	1 ½ - 1	**770 240 232**	55		19	
•	B	1 ½ - 1 ¼	**770 240 133**	55		17	
•	G	1 ½ - 1 ¼	**770 240 233**	55		17	
•	B	2 - ½	**770 240 134**	65		28	
•	G	2 - ½	**770 240 234**	65		28	
•	B	2 - ¾	**770 240 135**	65		26	
•	G	2 - ¾	**770 240 235**	65		26	
•	B	2 - 1	**770 240 136**	65		24	
•	G	2 - 1	**770 240 236**	65		24	
•	B	2 - 1 ¼	**770 240 137**	65		22	
•	G	2 - 1 ¼	**770 240 237**	65		22	
•	B	2 - 1 ½	**770 240 138**	65		22	
•	G	2 - 1 ½	**770 240 238**	65		22	
-	B	2 ½ - 1	**770 240 139**	74		30	
-	G	2 ½ - 1	**770 240 239**	74		30	
•	B	2 ½ - 1 ¼	**770 240 140**	74		28	
•	G	2 ½ - 1 ¼	**770 240 240**	74		28	
•	B	2 ½ - 1 ½	**770 240 141**	74		28	
•	G	2 ½ - 1 ½	**770 240 241**	74		28	
•	B	2 ½ - 2	**770 240 142**	74		23	
•	G	2 ½ - 2	**770 240 242**	74		23	
-	B	3 - 1 ½	**770 240 143**	80		31	
-	G	3 - 1 ½	**770 240 243**	80		31	
•	B	3 - 2	**770 240 144**	80		26	

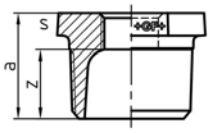


EN		Dim. (1-2) [inch]	Code	a [mm]	s [mm]	z2 [mm]	
•	G	3 - 2	**770 240 244**	80		26	
•	B	3 - 2 ½	**770 240 145**	80		23	
•	G	3 - 2 ½	**770 240 245**	80		23	
•	B	4 - 2	**770 240 146**	94		34	
•	G	4 - 2	**770 240 246**	94		34	
•	B	4 - 2 ½	**770 240 147**	94		31	
•	G	4 - 2 ½	**770 240 247**	94		31	
•	B	4 - 3	**770 240 148**	94		28	
•	G	4 - 3	**770 240 248**	94		28	

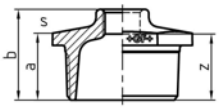
Form I



Form II



Form III

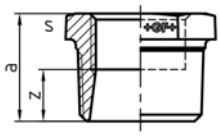


241
Reducing bush, ISO/EN N4

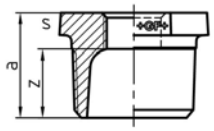
Forms I, II, III are available only as marked under column "Form", Form I can also be supplied with continuous internal thread (=241D).
ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.

EN		Dim. (1-2) [inch]	Form	Code	a [mm]	b [mm]	z [mm]	s [mm]
ST•	B	¼ - ⅛	I	**770 241 115**	20		13	17
ST•	G	¼ - ⅛	I	**770 241 215**	20		13	17
ST•	B	⅜ - ⅛	I	**770 241 116**	20		13	19
ST•	G	⅜ - ⅛	I	**770 241 216**	20		13	19
ST•	B	⅜ - ¼	I	**770 241 117**	20		10	19
ST•	G	⅜ - ¼	I	**770 241 217**	20		10	19
•	B	½ - ⅛	II	**770 241 118**	24		17	23
•	G	½ - ⅛	II	**770 241 218**	24		17	23
•	B	½ - ¼	I	**770 241 119**	24		14	23
•	G	½ - ¼	I	**770 241 219**	24		14	23
•	B	½ - ⅜	I	**770 241 120**	24		14	23
•	G	½ - ⅜	I	**770 241 220**	24		14	23
•	B	¾ - ¼	II	**770 241 121**	26		16	30
•	G	¾ - ¼	II	**770 241 221**	26		16	30
•	B	¾ - ⅜	II	**770 241 122**	27		16	30
•	G	¾ - ⅜	II	**770 241 222**	27		16	30
•	B	¾ - ½	I	**770 241 123**	26		13	30
•	G	¾ - ½	I	**770 241 223**	26		13	30
•	B	1 - ¼	II	**770 241 124**	29		19	36
•	G	1 - ¼	II	**770 241 224**	29		19	36
•	B	1 - ⅜	II	**770 241 125**	29		19	36
•	G	1 - ⅜	II	**770 241 225**	29		19	36
•	B	1 - ½	II	**770 241 126**	29		16	36
•	G	1 - ½	II	**770 241 226**	29		16	36
•	B	1 - ¾	II	**770 241 127**	29		14	36
•	G	1 - ¾	II	**770 241 227**	29		14	36
•	B	1 ¼ - ⅜	II	**770 241 128**	31		21	46
•	G	1 ¼ - ⅜	II	**770 241 228**	31		21	46
•	B	1 ¼ - ½	II	**770 241 129**	31		18	46
•	G	1 ¼ - ½	II	**770 241 229**	31		18	46
•	B	1 ¼ - ¾	II	**770 241 130**	31		16	46
•	G	1 ¼ - ¾	II	**770 241 230**	31		16	46
•	B	1 ¼ - 1	II	**770 241 131**	31		14	46
•	G	1 ¼ - 1	II	**770 241 231**	31		14	46
•	B	1 ½ - ⅜	II	**770 241 132**	31		21	50
•	G	1 ½ - ⅜	II	**770 241 232**	31		21	50
•	B	1 ½ - ½	II	**770 241 133**	31		18	50
•	G	1 ½ - ½	II	**770 241 233**	31		18	50
•	B	1 ½ - ¾	II	**770 241 134**	31		16	50
•	G	1 ½ - ¾	II	**770 241 234**	31		16	50
•	B	1 ½ - 1	II	**770 241 135**	31		14	50
•	G	1 ½ - 1	II	**770 241 235**	31		14	50
•	B	1 ½ - 1 ¼	I	**770 241 136**	33		12	50
•	G	1 ½ - 1 ¼	I	**770 241 236**	33		12	50
•	B	2 - ½	III	**770 241 137**	35	48	35	65
•	G	2 - ½	III	**770 241 237**	35	48	35	65
•	B	3 - ¾	III	**770 241 138**	35	48	33	65
•	G	2 - ¾	III	**770 241 238**	35	48	33	65
•	B	2 - 1	II	**770 241 139**	37		20	65
•	G	2 - 1	II	**770 241 239**	37		20	65
•	B	2 - 1 ¼	II	**770 241 140**	37		18	65
•	G	2 - 1 ¼	II	**770 241 240**	37		18	65
•	B	2 - 1 ½	II	**770 241 141**	37		18	65
•	G	2 - 1 ½	II	**770 241 241**	37		18	65
•	B	2 ½ - 1	III	**770 241 142**	40	54	37	80
•	G	2 ½ - 1	III	**770 241 242**	40	54	37	80
•	B	2 ½ - 1 ¼	III	**770 241 143**	40	54	37	80
•	G	2 ½ - 1 ¼	III	**770 241 243**	40	54	37	80

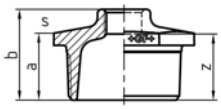
Form I



Form II



Form III

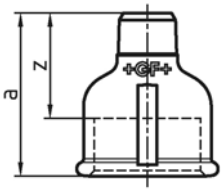


EN		Dim. (1-2) [inch]	Form	Code	a [mm]	b [mm]	z [mm]	s [mm]	
•	B	2 ½ - 1 ½	II	**770 241 144**	40		21	80	
•	G	2 ½ - 1 ½	II	**770 241 244**	40		21	80	
•	B	2 ½ - 2	II	**770 241 145**	40		16	80	
•	G	2 ½ - 2	II	**770 241 245**	40		16	80	
•	B	3 - 1	III	**770 241 146**	44	59	42	95	
•	G	3 - 1	III	**770 241 246**	44	59	42	95	
•	B	3 - 1 ¼	III	**770 241 147**	44	59	40	95	
•	G	3 - 1 ¼	III	**770 241 247**	44	59	40	95	
•	B	3 - 1 ½	III	**770 241 148**	44	59	40	95	
•	G	3 - 1 ½	III	**770 241 248**	44	59	40	95	
•	B	3 - 2	II	**770 241 149**	44		20	95	
•	G	3 - 2	II	**770 241 249**	44		20	95	
•	B	3 - 2 ½	II	**770 241 150**	44		17	96	
•	G	3 - 2 ½	II	**770 241 250**	44		17	96	
•	B	4 - 2	III	**770 241 151**	51	69	45	120	
•	G	4 - 2	III	**770 241 251**	51	69	45	120	
•	B	4 - 2 ½	III	**770 241 152**	51	69	42	120	
•	G	4 - 2 ½	III	**770 241 252**	51	69	42	120	
•	B	4 - 3	II	**770 241 153**	51		21	120	
•	G	4 - 3	II	**770 241 253**	51		21	120	

245
Hexagon nipple, reducing, ISO/EN N8

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.

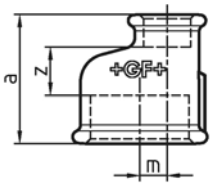
EN		Dim. (1-2) [inch]	Code	a [mm]	s [mm]	
ST-	B	¼ - ⅛	**770 245 115**	35	17	
ST-	G	¼ - ⅛	**770 245 215**	35	17	
ST-	B	⅜ - ⅛	**770 245 116**	34	19	
ST-	G	⅜ - ⅛	**770 245 216**	34	19	
ST•	B	⅜ - ¼	**770 245 117**	38	19	
ST•	G	⅜ - ¼	**770 245 217**	38	19	
•	B	½ - ¼	**770 245 118**	44	27	
•	G	½ - ¼	**770 245 218**	44	27	
•	B	½ - ⅜	**770 245 119**	44	22	
•	G	½ - ⅜	**770 245 219**	44	22	
-	B	¾ - ¼	**770 245 120**	43	30	
-	G	¾ - ¼	**770 245 220**	43	30	
•	B	¾ - ¼	**770 245 121**	47	30	
•	G	¾ - ⅜	**770 245 221**	47	30	
•	B	¾ - ½	**770 245 122**	47	31	
•	G	¾ - ½	**770 245 222**	47	31	
•	B	1 - ½	**770 245 123**	53	36	
•	G	1 - ½	**770 245 223**	53	36	
•	B	1 - ¾	**770 245 124**	53	36	
•	G	1 - ¾	**770 245 224**	53	36	
•	B	1 ¼ - ½	**770 245 125**	57	46	
•	G	1 ¼ - ½	**770 245 225**	57	46	
•	B	1 ¼ - ¾	**770 245 126**	57	46	
•	G	1 ¼ - ¾	**770 245 226**	57	46	
•	B	1 ¼ - 1	**770 245 127**	57	46	
•	G	1 ¼ - 1	**770 245 227**	57	46	
•	B	1 ½ - ¾	**770 245 128**	59	50	
•	G	1 ½ - ¾	**770 245 228**	59	50	
•	B	1 ½ - 1	**770 245 129**	59	50	
•	G	1 ½ - 1	**770 245 229**	59	50	
•	B	1 ½ - 1 ¼	**770 245 130**	59	50	
•	G	1 ½ - 1 ¼	**770 245 230**	59	50	
•	B	2 - 1	**770 245 131**	68	65	
•	G	2 - 1	**770 245 231**	68	65	
•	B	2 - 1 ¼	**770 245 132**	68	65	
•	G	2 - 1 ¼	**770 245 232**	68	65	
•	B	2 - 1 ½	**770 245 133**	68	65	
•	G	2 - 1 ½	**770 245 233**	68	65	
-	B	2 ½ - 1 ½	**770 245 134**	75	80	
-	G	2 ½ - 1 ½	**770 245 234**	75	80	
•	B	2 ½ - 2	**770 245 135**	75	80	
•	G	2 ½ - 2	**770 245 235**	75	80	
•	B	3 - 2	**770 245 136**	83	95	
•	G	3 - 2	**770 245 236**	83	95	
•	B	3 - 2 ½	**770 245 137**	83	95	
•	G	3 - 2 ½	**770 245 237**	83	95	
-	B	4 - 3	**770 245 138**	93	120	
-	G	4 - 3	**770 245 238**	93	120	



246
Socket, reducing, ISO/EN M4

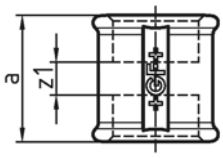
ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations. Steel parts are hexagonal instead of beaded at the end no. 1.

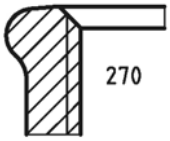
EN		Dim. (1-2) [inch]	Code	a [mm]	s [mm]	z [mm]	
ST-	B	¼ - ⅛	**770 246 115**	32	17	22	
ST-	G	¼ - ⅛	**770 246 215**	32	17	22	
ST•	B	⅜ - ¼	**770 246 116**	35	22	25	
ST•	G	⅜ - ¼	**770 246 216**	35	22	25	
•	B	½ - ¼	**770 246 117**	43		30	
•	G	½ - ¼	**770 246 217**	43		30	
•	B	½ - ⅜	**770 246 118**	43		30	
•	G	½ - ⅜	**770 246 218**	43		30	
•	B	¾ - ⅜	**770 246 119**	48		33	
•	G	¾ - ⅜	**770 246 219**	48		33	
•	B	¾ - ½	**770 246 120**	48		33	
•	G	¾ - ½	**770 246 220**	48		33	
•	B	1 - ½	**770 246 121**	55		38	
•	G	1 - ½	**770 246 221**	55		38	
•	B	1 - ¾	**770 246 122**	55		38	
•	G	1 - ¾	**770 246 222**	55		38	
-	B	1 ¼ - ½	**770 246 123**	60		41	
-	G	1 ¼ - ½	**770 246 223**	60		41	
•	B	1 ¼ - ¾	**770 246 124**	60		41	
•	G	1 ¼ - ¾	**770 246 224**	60		41	
•	B	1 ¼ - 1	**770 246 125**	60		41	
•	G	1 ¼ - 1	**770 246 225**	60		41	
-	B	1 ½ - ¾	**770 246 126**	60		41	
-	G	1 ½ - ¾	**770 246 226**	60		41	
•	B	1 ½ - 1	**770 246 127**	63		44	
•	G	1 ½ - 1	**770 246 227**	63		44	
•	B	1 ½ - 1 ¼	**770 246 128**	63		44	
•	G	1 ½ - 1 ¼	**770 246 228**	63		44	
-	B	2 - 1	**770 246 129**	70		46	
-	G	2 - 1	**770 246 229**	70		46	
•	B	2 - 1 ¼	**770 246 130**	70		46	
•	G	2 - 1 ¼	**770 246 230**	70		46	
•	B	2 - 1 ½	**770 246 131**	70		46	
•	G	2 - 1 ½	**770 246 231**	70		46	
-	B	2 ½ - 1 ½	**770 246 132**	83		56	
-	G	2 ½ - 1 ½	**770 246 232**	83		56	
-	B	2 ½ - 2	**770 246 133**	80		53	
-	G	2 ½ - 2	**770 246 233**	80		53	
-	B	3 - 2	**770 246 134**	87		57	
-	G	3 - 2	**770 246 234**	87		57	
-	B	3 - 2 ½	**770 246 135**	91		61	
-	G	3 - 2 ½	**770 246 235**	91		61	



260
Socket eccentric, reducing

EN		Dim. (1-2) [inch]	Code	a [mm]	z [mm]	m [mm]
-	B	¾ - ½	**770 260 122**	41	13	3.0
-	G	¾ - ½	**770 260 222**	41	13	3.0
-	B	1 - ½	**770 260 115**	45	15	6.0
-	G	1 - ½	**770 260 215**	45	15	6.0
-	B	1 - ¾	**770 260 116**	45	13	3.5
-	G	1 - ¾	**770 260 216**	45	13	3.5
-	B	1 ¼ - ½	**770 260 117**	50	18	11.0
-	G	1 ¼ - ½	**770 260 217**	50	18	11.0
-	B	1 ¼ - ¾	**770 260 118**	50	16	8.0
-	G	1 ¼ - ¾	**770 260 218**	50	16	8.0
-	B	1 ¼ - 1	**770 260 119**	50	14	5.0
-	G	1 ¼ - 1	**770 260 219**	50	14	5.0
-	B	1 ½ - ½	**770 260 120**	56	24	14.0
-	G	1 ½ - ½	**770 260 220**	56	24	14.0
-	B	1 ½ - ¾	**770 260 123**	56	22	11.0
-	G	1 ½ - ¾	**770 260 223**	56	22	11.0
-	B	1 ½ - 1	**770 260 121**	56	20	8.0
-	G	1 ½ - 1	**770 260 221**	56	20	8.0
-	B	1 ½ - 1 ¼	**770 260 124**	56	18	3.0
-	G	1 ½ - 1 ¼	**770 260 224**	56	18	3.0
-	B	2 - ½	**770 260 125**	65	28	20.0
-	G	2 - ½	**770 260 225**	65	28	20.0
-	B	2 - ¾	**770 260 126**	65	26	17.0
-	G	2 - ¾	**770 260 226**	65	26	17.0
-	B	2 - 1	**770 260 127**	65	24	14.0
-	G	2 - 1	**770 260 227**	65	24	14.0
-	B	2 - 1 ¼	**770 260 128**	65	22	10.0
-	G	2 - 1 ¼	**770 260 228**	65	22	10.0
-	B	2 - 1 ½	**770 260 129**	65	22	7.0
-	G	2 - 1 ½	**770 260 229**	65	22	7.0
-	B	2 ½ - 2	**770 260 130**	74	23	8.0
-	G	2 ½ - 2	**770 260 230**	74	23	8.0

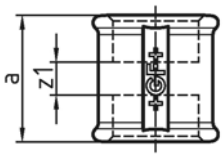


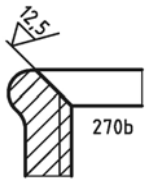


270
Socket, ISO/EN M2

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations. Steel parts are hexagonal instead of beaded at the end no. 1.

EN		Dim. [inch]	Code	a [mm]	s [mm]	z1 [mm]
ST•	B	⅛	**770 270 101**	25	17	11
ST•	G	⅛	**770 270 201**	25	17	11
ST•	B	¼	**770 270 102**	27	19	7
ST•	G	¼	**770 270 202**	27	19	7
•	B	⅜	**770 270 103**	30		10
•	G	⅜	**770 270 203**	30		10
•	B	½	**770 270 104**	36		10
•	G	½	**770 270 204**	36		10
•	B	¾	**770 270 105**	39		9
•	G	¾	**770 270 205**	39		9
•	B	1	**770 270 106**	45		11
•	G	1	**770 270 206**	45		11
•	B	1 ¼	**770 270 107**	50		12
•	G	1 ¼	**770 270 207**	50		12
•	B	1 ½	**770 270 108**	55		17
•	G	1 ½	**770 270 208**	55		17
•	B	2	**770 270 109**	65		17
•	G	2	**770 270 209**	65		17
•	B	2 ½	**770 270 110**	74		20
•	G	2 ½	**770 270 210**	74		20
•	B	3	**770 270 111**	80		20
•	G	3	**770 270 211**	80		20
•	B	4	**770 270 112**	94		22
•	G	4	**770 270 212**	94		22

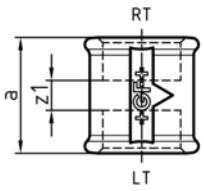




270b
Socket, equal

Is usually not supplied as a separate piece.
One side with larger chamfer, thread = fastening thread to ISO 228.

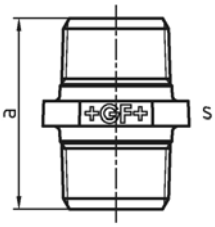
EN		Dim. [inch]	Code	a [mm]	z1 [mm]
-	G	½	-	36	10
-	G	¾	-	39	9
-	G	1	-	45	11
-	G	1 ¼	-	50	12
-	G	1 ½	-	55	17
-	G	2	-	65	17



271
Socket, right and left hand thread, ISO/EN M2 R-L

RT ... right hand thread, LT ... left hand thread

EN		Dim. [inch]	Code	a [mm]	z1 [mm]
•	B	⅜	**770 271 103**	30	10
•	G	⅜	**770 271 203**	30	10
•	B	½	**770 271 104**	36	10
•	G	½	**770 271 204**	36	10
•	B	¾	**770 271 105**	39	9
•	G	¾	**770 271 205**	39	9
•	B	1	**770 271 106**	45	11
•	G	1	**770 271 206**	45	11
•	B	1 ¼	**770 271 107**	50	12
•	G	1 ¼	**770 271 207**	50	12
•	B	1 ½	**770 271 108**	55	17
•	G	1 ½	**770 271 208**	55	17
-	B	2	**770 271 109**	65	17
-	G	2	**770 271 209**	65	17



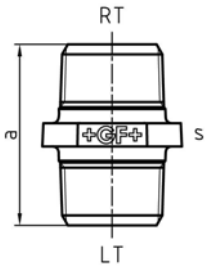
280
Hexagon nipple, ISO/EN N8

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.

EN		Dim. [inch]	Code	a [mm]	s [mm]
ST•	B	⅛	**770 280 101**	29	17
ST•	G	⅛	**770 280 201**	29	17
ST•	B	¼	**770 280 102**	36	19
ST•	G	¼	**770 280 202**	36	19
•	B	⅜	**770 280 103**	38	22
•	G	⅜	**770 280 203**	38	22
•	B	½	**770 280 104**	44	28
•	G	½	**770 280 204**	44	28
•	B	¾	**770 280 105**	47	33
•	G	¾	**770 280 205**	47	33
•	B	1	**770 280 106**	53	42
•	G	1	**770 280 206**	53	42
•	B	1 ¼	**770 280 107**	57	50
•	G	1 ¼	**770 280 207**	57	50
•	B	1 ½	**770 280 108**	59	55
•	G	1 ½	**770 280 208**	59	55
•	B	2	**770 280 109**	68	70
•	G	2	**770 280 209**	68	70
•	B	2 ½	**770 280 110**	75	85
•	G	2 ½	**770 280 210**	75	85
•	B	3	**770 280 111**	83	100
•	G	3	**770 280 211**	83	100
•	B	4	**770 280 112**	95	131
•	G	4	**770 280 212**	95	131

281
Hexagon nipple, right and left hand thread, ISO/EN N8 R-L

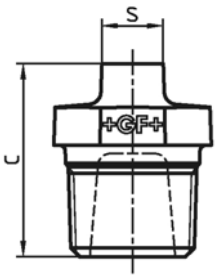
RT ... right hand thread, LT ... left hand thread



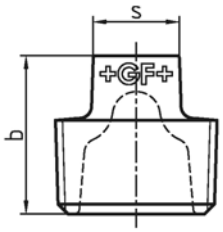
EN		Dim. [inch]	Code	a [mm]	s [mm]
-	G	⅜	**770 281 203**	38	22
•	B	½	**770 281 104**	44	28
•	G	½	**770 281 204**	44	28
•	B	¾	**770 281 105**	47	33
•	G	¾	**770 281 205**	47	33
•	B	1	**770 281 106**	53	42
•	G	1	**770 281 206**	53	42
-	B	1 ¼	**770 281 107**	57	50
-	G	1 ¼	**770 281 207**	57	50
-	B	1 ½	**770 281 108**	59	55
-	G	1 ½	**770 281 208**	59	55
-	B	2	**770 281 109**	68	70
-	G	2	**770 281 209**	68	70

290
Plug, beaded, ISO/EN T9

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.
* Solid



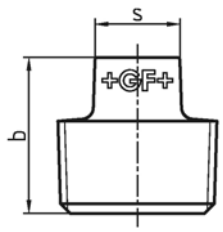
EN		Dim. [inch]	Code	c [mm]	s [mm]
ST *•	B	⅛	**770 290 101**	20	7
ST *•	G	⅛	**770 290 201**	20	7
ST *•	B	¼	**770 290 102**	24	8
ST *•	G	¼	**770 290 202**	24	8
•	B	⅜	**770 290 103**	28	10
•	G	⅜	**770 290 203**	28	10
•	B	½	**770 290 104**	32	11
•	G	½	**770 290 204**	32	11
•	B	¾	**770 290 105**	37	17
•	G	¾	**770 290 205**	37	17
•	B	1	**770 290 106**	41	19
•	G	1	**770 290 206**	41	19
•	B	1 ¼	**770 290 107**	47	22
•	G	1 ¼	**770 290 207**	47	22
•	B	1 ½	**770 290 108**	47	22
•	G	1 ½	**770 290 208**	47	22
•	B	2	**770 290 109**	53	27
•	G	2	**770 290 209**	53	27
•	B	2 ½	**770 290 110**	64	32
•	G	2 ½	**770 290 210**	64	32
•	B	3	**770 290 111**	71	36
•	G	3	**770 290 211**	71	36
•	B	4	**770 290 112**	81	41
•	G	4	**770 290 212**	81	41



291
Plug, plain, ISO/EN T8

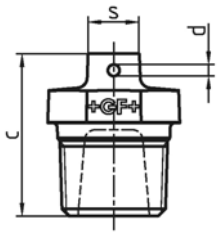
ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.
* Solid

EN		Dim. [inch]	Code	b [mm]	s [mm]	
ST *•	B	⅛	**770 291 101**	16.0	7	
ST *•	G	⅛	**770 291 201**	16.0	7	
ST *•	B	¼	**770 291 102**	18.0	8	
ST *•	G	¼	**770 291 202**	18.0	8	
ST *•	B	⅜	**770 291 103**	20.0	10	
ST *•	G	⅜	**770 291 203**	20.0	10	
•	B	½	**770 291 104**	24.0	11	
•	G	½	**770 291 204**	24.0	11	
•	B	¾	**770 291 105**	25.5	17	
•	G	¾	**770 291 205**	25.5	17	
•	B	1	**770 291 106**	33.0	19	
•	G	1	**770 291 206**	33.0	19	
•	B	1 ¼	**770 291 107**	36.0	22	
•	G	1 ¼	**770 291 207**	36.0	22	
•	B	1 ½	**770 291 108**	37.0	22	
•	G	2 ½	**770 291 208**	37.0	22	
•	B	2	**770 291 109**	44.0	27	
•	G	2	**770 291 209**	44.0	27	
•	B	2 ½	**770 291 110**	52.0	32	
•	G	2 ½	**770 291 210**	52.0	32	
•	B	3	**770 291 111**	59.0	36	
•	G	3	**770 291 211**	59.0	36	
•	B	4	**770 291 112**	66.0	41	
•	G	4	**770 291 212**	66.0	41	



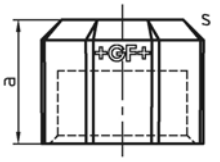
291a
Plug, plain, solid

EN		Dim. [inch]	Code	b [mm]	s [mm]	
-	B	¾	**770 292 105**	28	17	
-	G	¾	**770 292 205**	28	17	
-	B	1	**770 292 106**	33	19	
-	G	1	**770 292 206**	33	19	
-	B	1 ¼	**770 292 107**	36	22	
-	G	1 ¼	**770 292 207**	36	22	
-	B	1 ½	**770 292 108**	38	23	
-	G	1 ½	**770 292 208**	38	23	
-	B	2	**770 292 109**	44	27	
-	G	2	**770 292 209**	44	27	



294
Plug, with hole in square head

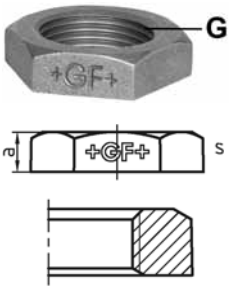
EN		Dim. [inch]	Code	c [mm]	s [mm]	d [mm]
-	B	½	**770 294 104**	32	11	4
-	G	½	**770 294 204**	32	11	4
-	B	¾	**770 294 105**	37	17	4
-	G	¾	**770 294 205**	37	17	4
-	B	1	**770 294 106**	41	19	5
-	G	1	**770 294 206**	41	19	5
-	B	1 ¼	**770 294 107**	47	22	5
-	G	1 ¼	**770 294 207**	47	22	5
-	B	1 ½	**770 294 108**	47	22	5
-	G	1 ½	**770 294 208**	47	22	5
-	B	2	**770 294 109**	53	27	5
-	G	2	**770 294 209**	53	27	5



300
Cap, ISO/EN T1

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.

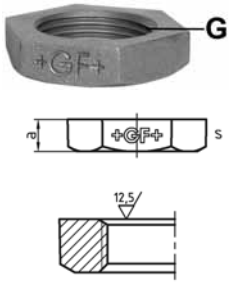
EN		Dim. [inch]	Code	a [mm]	s [mm]	
ST•	B	⅛	**770 300 101**	14	14	hexagon
ST•	G	⅛	**770 300 201**	14	14	hexagon
ST•	B	¼	**770 300 102**	17	17	hexagon
ST•	G	¼	**770 300 202**	17	17	hexagon
ST•	B	⅜	**770 300 103**	18	22	hexagon
ST•	G	⅜	**770 300 203**	18	22	hexagon
•	B	½	**770 300 104**	24	26	hexagon
•	G	½	**770 300 204**	24	26	hexagon
•	B	¾	**770 300 105**	26	32	hexagon
•	G	¾	**770 300 205**	26	32	hexagon
•	B	1	**770 300 106**	29	38	octagon
•	G	1	**770 300 206**	29	38	octagon
•	B	1 ¼	**770 300 107**	36	47	octagon
•	G	1 ¼	**770 300 207**	36	47	octagon
•	B	1 ½	**770 300 108**	36	53	octagon
•	G	1 ½	**770 300 208**	36	53	octagon
•	B	2	**770 300 109**	37	68	octagon
•	G	2	**770 300 209**	37	68	octagon
•	B	2 ½	**770 300 110**	41	86	octagon
•	G	2 ½	**770 300 210**	41	86	octagon
•	B	3	**770 300 111**	50	96	octagon
•	G	3	**770 300 211**	50	96	octagon
•	B	4	**770 300 112**	52	128	octagon
•	G	4	**770 300 212**	52	128	octagon



310
Backnut, ISO/EN P4

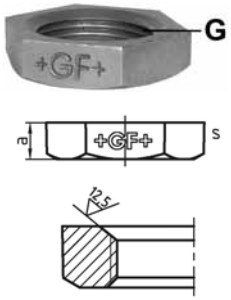
ST ... these types of fittings are made from steel (galvanised finish = electroplated).

EN		G...B [inch]	Code	a [mm]	s [mm]
ST•	B	⅛	**770 310 101**	7.0	19
ST•	G	⅛	**770 310 201**	7.0	19
ST•	B	¼	**770 310 102**	7.5	22
ST•	G	¼	**770 310 202**	7.5	22
ST•	B	⅜	**770 310 103**	8.0	27
ST•	G	⅜	**770 310 203**	8.0	27
•	B	½	**770 310 104**	9.0	32
•	G	½	**770 310 204**	9.0	32
•	B	¾	**770 310 105**	10.0	36
•	G	¾	**770 310 205**	10.0	36
•	B	1	**770 310 106**	11.5	46
•	G	1	**770 310 206**	11.5	46
•	B	1 ¼	**770 310 107**	13.0	56
•	G	1 ¼	**770 310 207**	13.0	56
•	B	1 ½	**770 310 108**	14.0	60
•	G	1 ½	**770 310 208**	14.0	60
•	B	2	**770 310 109**	16.0	73
•	G	2	**770 310 209**	16.0	73
•	B	2 ½	**770 310 110**	19.0	95
•	G	2 ½	**770 310 210**	19.0	95
•	B	3	**770 310 111**	22.0	105
•	G	3	**770 310 211**	22.0	105



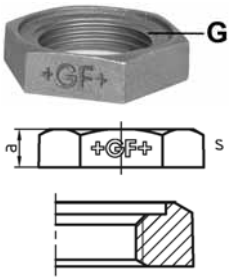
310a
Backnut, with one machined face, ISO/EN P4

EN		G...B [inch]	Code	a [mm]	s [mm]
•	B	½	**770 309 104**	8.5	32
•	G	½	**770 309 204**	8.5	32
•	B	¾	**770 309 105**	9.5	36
•	G	¾	**770 309 205**	9.5	36
•	B	1	**770 309 106**	11.5	46
•	G	1	**770 309 206**	11.5	46
•	B	1 ¼	**770 309 107**	12.5	56
•	G	1 ¼	**770 309 207**	12.5	56
•	B	1 ½	**770 309 108**	13.5	60
•	G	1 ½	**770 309 208**	13.5	60
•	B	2	**770 309 109**	15.5	73
•	G	2	**770 309 209**	15.5	73



310b
Backnut, strongly faced on one end, ISO/EN P4

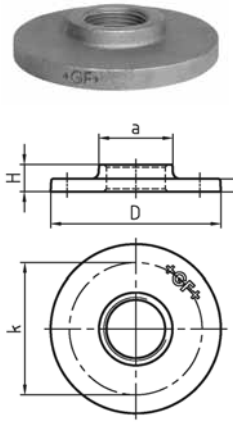
EN		G...B [inch]	Code	a [mm]	s [mm]
•	G	½	**770 308 204**	9.0	32
•	G	¾	**770 308 205**	10.0	36
•	G	1	**770 308 206**	11.5	46
•	G	1 ¼	**770 308 207**	13.0	56
•	G	1 ½	**770 308 208**	14.0	60
•	G	2	**770 308 209**	16.0	73



312
Backnut, recessed, ISO/EN P4

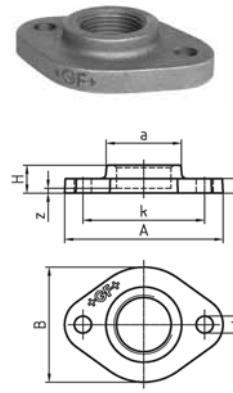
ST ... these types of fittings are made from steel (galvanised finish = electroplated).

EN		G...B [inch]	Code	a [mm]	s [mm]
ST•	B	¼	**770 312 102**	7.5	22
ST•	G	¼	**770 312 202**	7.5	22
ST•	B	⅜	**770 312 103**	8.0	27
ST•	G	⅜	**770 312 203**	8.0	27
•	B	½	**770 312 104**	9.0	32
•	G	½	**770 312 204**	9.0	32
•	B	¾	**770 312 105**	10.0	37
•	G	¾	**770 312 205**	10.0	37
•	B	1	**770 312 106**	12.0	46
•	G	1	**770 312 206**	12.0	46
•	B	1 ¼	**770 312 107**	13.0	55
•	G	1 ¼	**770 312 207**	13.0	55
•	B	1 ½	**770 312 108**	14.0	60
•	G	1 ½	**770 312 208**	14.0	60
•	B	2	**770 312 109**	16.0	73
•	G	2	**770 312 209**	16.0	73



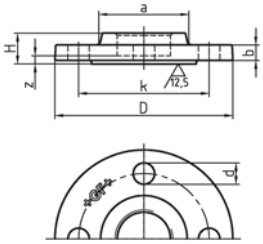
321
Screwed flange, undrilled

EN		Dim. [inch]	PN	Code	a [mm]	b [mm]	k [mm]	H [mm]	D [mm]
-	B	½	PN 1	**770 320 104**	28	5	55	13	80
-	G	½	PN 1	**770 320 204**	28	5	55	13	80
-	B	¾	PN 1	**770 320 105**	38	6	65	14	90
-	G	¾	PN 1	**770 320 205**	38	6	65	14	90
-	B	1	PN 1	**770 320 106**	47	9	75	17	100
-	G	1	PN 1	**770 320 206**	47	9	75	17	100
-	B	1 ¼	PN 1	**770 320 107**	51	10	90	21	120
-	G	1 ¼	PN 1	**770 320 207**	51	10	90	21	120
-	B	1 ½	PN 1	**770 320 108**	56	10	100	21	130
-	G	1 ½	PN 1	**770 320 208**	56	10	100	21	130
-	B	2	PN 1	**770 320 109**	68	11	110	22	140
-	G	2	PN 1	**770 320 209**	68	11	110	22	140



326
Screwed flange, drilled, 2 holes

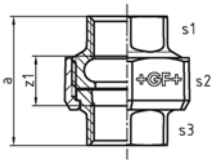
EN		Dim. [inch]	PN	Code	a [mm]	b [mm]	d [mm]	k [mm]	z [mm]	A [mm]	B [mm]	H [mm]
-	B	½	PN 10	**770 326 104**	32	11	11.5	55	4	80	45	17
-	G	½	PN 10	**770 326 204**	32	11	11.5	55	4	80	45	17
-	B	¾	PN 10	**770 326 105**	38	11	11.5	65	4	90	64	19
-	G	¾	PN 10	**770 326 205**	38	11	11.5	65	4	90	64	19
-	B	1	PN 10	**770 326 106**	46	11	11.5	75	3	100	72	20
-	G	1	PN 10	**770 326 206**	46	11	11.5	75	3	100	72	20
-	B	1 ¼	PN 10	**770 326 107**	56	12	14.0	90	3	120	85	22
-	G	1 ¼	PN 10	**770 326 207**	56	12	14.0	90	3	120	85	22
-	B	1 ½	PN 10	**770 326 108**	63	13	14.0	100	4	130	95	23
-	G	1 ½	PN 10	**770 326 208**	63	13	14.0	100	4	130	95	23
-	B	2	PN 10	**770 326 109**	77	13	14.0	110	0	140	100	24
-	G	2	PN 10	**770 326 209**	77	13	14.0	110	0	140	100	24



329
Screwed flange, drilled, 4 holes

Diameter of pitch circle and sealing face compatible to EN 1092-2 and DIN 2566.
* 8 holes

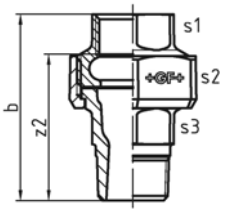
EN		Dim. [inch]	PN	Code	a [mm]	b [mm]	d [mm]	k [mm]	z [mm]	H [mm]	D [mm]
-	B	½	PN 16	**770 329 104**	35	14	14	65	7	20	95
-	G	½	PN 16	**770 329 204**	35	14	14	65	7	20	95
-	B	¾	PN 16	**770 329 105**	45	16	14	75	9	24	105
-	G	¾	PN 16	**770 329 205**	45	16	14	75	9	24	105
-	B	1	PN 16	**770 329 106**	52	17	14	85	7	24	115
-	G	1	PN 16	**770 329 206**	52	17	14	85	7	24	115
-	B	1 ¼	PN 16	**770 329 107**	60	17	18	100	7	26	140
-	G	1 ¼	PN 16	**770 329 207**	60	17	18	100	7	26	140
-	B	1 ½	PN 16	**770 329 108**	72	13	18	110	8	26	150
-	G	1 ½	PN 16	**770 329 208**	72	13	18	110	8	26	150
-	B	2	PN 16	**770 329 109**	87	16	18	125	5	29	165
-	G	2	PN 16	**770 329 209**	87	16	18	125	5	29	165
-	B	2 ½	PN 16	**770 329 110**	100	16	18	145	5	32	185
-	G	2 ½	PN 16	**770 329 210**	100	16	18	145	5	32	185
-	B	3	PN 10	**770 329 111**	115	18	18	160	6	36	200
-	G	3	PN 10	**770 329 211**	115	18	18	160	6	36	200
*-	B	3	PN 16	**770 329 115**	115	18	18	160	6	36	200
*-	G	3	PN 16	**770 329 215**	115	18	18	160	6	36	200
*-	B	4	PN 16	**770 329 112**	140	20	18	180	2	38	220
*-	G	4	PN 16	**770 329 212**	140	20	18	180	2	38	220



330
Union flat seat, ISO/EN U1

Dim. 1/2 to 2 only are supplied with sealing gaskets; a and z1 include the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.
* Inside hexagon

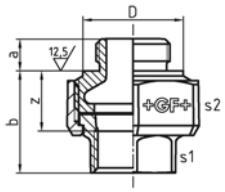
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	z1 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
•	B	¼	⅝	**770 330 102**	42	22	19	28	*10
•	G	¼	⅝	**770 330 202**	42	22	19	28	*10
•	B	⅜	¾	**770 330 103**	47	27	22	32	*12
•	G	⅜	¾	**770 330 203**	47	27	22	32	*12
•	B	½	1	**770 330 104**	48	22	26	41	26
•	G	½	1	**770 330 204**	48	22	26	41	26
•	B	¾	1 ¼	**770 330 105**	52	22	31	48	31
•	G	¾	1 ¼	**770 330 205**	52	22	31	48	31
•	B	1	1 ½	**770 330 106**	59	25	38	55	38
•	G	1	1 ½	**770 330 206**	59	25	38	55	38
•	B	1 ¼	2	**770 330 107**	65	27	48	67	48
•	G	1 ¼	2	**770 330 207**	65	27	48	67	48
•	B	1 ½	2 ¼	**770 330 108**	70	32	54	74	54
•	G	1 ½	2 ¼	**770 330 208**	70	32	54	74	54
•	B	2	2 ¾	**770 330 109**	80	32	66	90	67
•	G	2	2 ¾	**770 330 209**	80	32	66	90	67
•	B	2 ½	3 ½	**770 330 110**	85	31	85	111	85
•	G	2 ½	3 ½	**770 330 210**	85	31	85	111	85
•	B	3	4	**770 330 111**	96	36	96	130	96
•	G	3	4	**770 330 211**	96	36	96	130	96
-	B	4	5	**770 330 112**	111	39	120	151	122
-	G	4	5	**770 330 212**	111	39	120	151	122



331
Union flat seat, ISO/EN U2

Supplied without sealing gaskets; b and z2 include the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

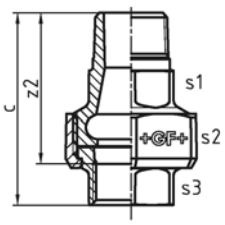
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	z2 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
•	B	¼	⅝	**770 331 102**	55	45	19	28	15
•	G	¼	⅝	**770 331 202**	55	45	19	28	15
•	B	⅜	¾	**770 331 103**	58	48	22	32	19
•	G	⅜	¾	**770 331 203**	58	48	22	32	19
•	B	½	1	**770 331 104**	66	53	26	41	23
•	G	½	1	**770 331 204**	66	53	26	41	23
•	B	¾	1 ¼	**770 331 105**	72	57	31	48	30
•	G	¾	1 ¼	**770 331 205**	72	57	31	48	30
•	B	1	1 ½	**770 331 106**	80	63	38	55	36
•	G	1	1 ½	**770 331 206**	80	63	38	55	36
•	B	1 ¼	2	**770 331 107**	90	71	48	67	48
•	G	1 ¼	2	**770 331 207**	90	71	48	67	48
•	B	1 ½	2 ¼	**770 331 108**	95	76	54	74	54
•	G	1 ½	2 ¼	**770 331 208**	95	76	54	74	54
•	B	2	2 ¾	**770 331 109**	107	83	66	90	66
•	G	2	2 ¾	**770 331 209**	107	83	66	90	66
-	B	2 ½	3 ½	**770 331 110**	118	91	85	111	85
-	G	2 ½	3 ½	**770 331 210**	118	91	85	111	85
-	B	3	4	**770 331 111**	131	101	96	130	95
-	G	3	4	**770 331 211**	131	101	96	130	95



332
Union flat seat

Supplied without sealing gaskets; b and z include the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

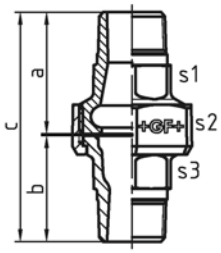
EN		Dim. Rp/G [inch]	374 G [inch]	Code	a [mm]	b [mm]	z [mm]	s1 [mm]	s2 [mm]	D [mm]
-	B	¾	1 ¼	**770 332 105**	12	39	24	31	48	36
-	G	¾	1 ¼	**770 332 205**	12	39	24	31	48	36
-	B	1	1 ½	**770 332 106**	14	42	25	38	55	43
-	G	1	1 ½	**770 332 206**	14	42	25	38	55	43
-	B	1 ¼	2	**770 332 107**	16	50	31	48	67	53
-	G	1 ¼	2	**770 332 207**	16	50	31	48	67	53



335
Union flat seat

Supplied without sealing gaskets; c includes the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

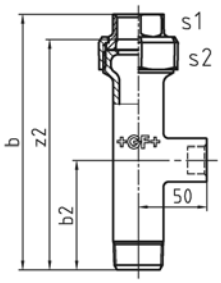
EN		Dim. [inch]	374 G [inch]	Code	c [mm]	z2 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
-	B	½	1	**770 335 104**	66	53	26	41	26
-	G	½	1	**770 335 204**	66	53	26	41	26
-	B	¾	1 ¼	**770 335 105**	72	57	32	48	31
-	G	¾	1 ¼	**770 335 205**	72	57	32	48	31
-	B	1	1 ½	**770 335 106**	82	65	38	55	38
-	G	1	1 ½	**770 335 206**	82	65	38	55	38
-	B	1 ¼	2	**770 335 107**	90	71	48	67	48
-	G	1 ¼	2	**770 335 207**	90	71	48	67	48
-	B	1 ½	2 ¼	**770 335 108**	95	76	54	74	54
-	G	1 ½	2 ¼	**770 335 208**	95	76	54	74	54



336
Union flat seat

Supplied without sealing gaskets; c includes the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

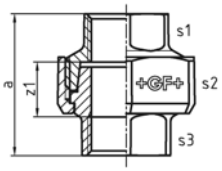
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	b [mm]	c [mm]	s1 [mm]	s2 [mm]	s3 [mm]
-	B	½	1	**770 336 104**	43	40	85	26	41	23
-	G	½	1	**770 336 204**	43	40	85	26	41	23
-	B	¾	1 ¼	**770 336 105**	48	42	92	32	48	30
-	G	¾	1 ¼	**770 336 205**	48	42	92	32	48	30
-	B	1	1 ½	**770 336 106**	54	47	103	38	55	36
-	G	1	1 ½	**770 336 206**	54	47	103	38	55	36
-	B	1 ¼	2	**770 336 107**	57	55	114	48	67	48
-	G	1 ¼	2	**770 336 207**	57	55	114	48	67	48
-	B	1 ½	2 ¼	**770 336 108**	61	57	120	54	74	54
-	G	1 ½	2 ¼	**770 336 208**	61	57	120	54	74	54



338
Distribution union flat seat

Supplied without sealing gaskets; b includes the seal thickness as per table "Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

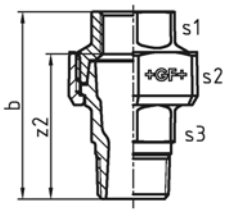
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	b2 [mm]	z2 [mm]	s1 [mm]	s2 [mm]
-	G	¾	1 ¼	**770 338 220**	177	74	160	31	48
-	G	1	1 ½	**770 338 221**	174	67	155	38	55
-	G	1 ¼	2	**770 338 222**	174	59	153	48	67



340
Union taper seat, ISO/EN U11

Torque and notes for installation please find in "Technical Product Notes".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.
* Inside hexagon
** Version

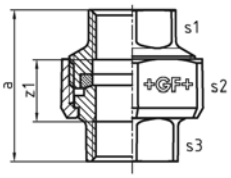
EN		Dim. [inch]	**	374 G [inch]	Code	a [mm]	z1 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
•	B	⅛		½	**770 340 101**	38	24	15	26	15
•	G	⅛		½	**770 340 201**	38	24	15	26	15
•	B	¼		⅝	**770 340 102**	42	22	19	28	*10
•	G	¼		⅝	**770 340 202**	42	22	19	28	*10
•	B	⅜		¾	**770 340 103**	48	28	22	32	*12
•	G	⅜		¾	**770 340 203**	48	28	22	32	*12
•	B	½		1	**770 340 104**	48	22	26	41	25
•	G	½		1	**770 340 204**	48	22	26	41	25
•	B	½	s	1 ⅛	**770 340 120**	48	22	26	44	26
•	G	½	s	1 ⅛	**770 340 220**	48	22	26	44	26
•	B	¾		1 ¼	**770 340 105**	52	22	31	48	32
•	G	¾		1 ¼	**770 340 205**	52	22	31	48	32
•	B	1		1 ½	**770 340 106**	58	24	38	55	38
•	G	1		1 ½	**770 340 206**	58	24	38	55	38
•	B	1 ¼		2	**770 340 107**	65	27	48	67	48
•	G	1 ¼		2	**770 340 207**	65	27	48	67	48
•	B	1 ½		2 ¼	**770 340 108**	70	32	54	74	54
•	G	1 ½		2 ¼	**770 340 208**	70	32	54	74	54
•	B	2		2 ¾	**770 340 109**	78	30	66	90	66
•	G	2		2 ¾	**770 340 209**	78	30	66	90	66
•	B	2 ½		3 ½	**770 340 110**	90	36	85	111	85
•	G	2 ½		3 ½	**770 340 210**	90	36	85	111	85
•	B	3		4	**770 340 111**	101	41	96	130	96
•	G	3		4	**770 340 211**	101	41	96	130	96
•	B	4		5	**770 340 112**	114	42	120	151	120
•	G	4		5	**770 340 212**	114	42	120	151	120



341
Union taper seat, ISO/EN U12

Torque and notes for installation please find in "Technical Product Notes".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

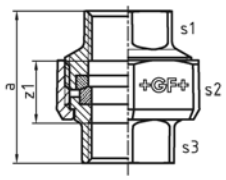
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	z2 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
•	B	¼	⅝	**770 341 102**	55	45	19	28	15
•	G	¼	⅝	**770 341 202**	55	45	19	28	15
•	B	⅜	¾	**770 341 103**	59	49	22	32	20
•	G	⅜	¾	**770 341 203**	59	49	22	32	20
•	B	½	1	**770 341 104**	66	53	26	41	23
•	G	½	1	**770 341 204**	66	53	26	41	23
•	B	¾	1 ¼	**770 341 105**	72	57	31	48	30
•	G	¾	1 ¼	**770 341 205**	72	57	31	48	30
•	B	1	1 ½	**770 341 106**	80	63	38	55	36
•	G	1	1 ½	**770 341 206**	80	63	38	55	36
•	B	1 ¼	2	**770 341 107**	90	71	48	67	48
•	G	1 ¼	2	**770 341 207**	90	71	48	67	48
•	B	1 ½	2 ¼	**770 341 108**	96	77	54	74	54
•	G	1 ½	2 ¼	**770 341 208**	96	77	54	74	54
•	B	2	2 ¾	**770 341 109**	106	82	66	90	66
•	G	2	2 ¾	**770 341 209**	106	82	66	90	66
•	B	2 ½	3 ½	**770 341 110**	122	95	85	111	85
•	G	2 ½	3 ½	**770 341 210**	122	95	85	111	85
•	B	3	4	**770 341 111**	134	104	96	130	95
•	G	3	4	**770 341 211**	134	104	96	130	95
-	B	4	5	**770 341 112**	153	117	120	151	120
-	G	4	5	**770 341 212**	153	117	120	151	120



342
Union, spherical seat/taper seat Bronze to Iron, ISO/EN U11

Torque and notes for installation please find in "Technical Product Notes".
Not suitable for drinking water installation!
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

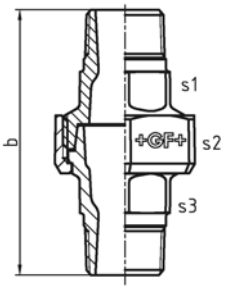
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	z1 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
•	B	½	1 ⅛	**770 342 104**	48	22	26	44	26
•	G	½	1 ⅛	**770 342 204**	48	22	26	44	26
•	B	¾	1 ¼	**770 342 105**	52	23	31	48	31
•	G	¾	1 ¼	**770 342 205**	52	23	31	48	31
•	B	1	1 ½	**770 342 106**	58	24	38	55	38
•	G	1	1 ½	**770 342 206**	58	24	38	55	38
•	B	1 ¼	2	**770 342 107**	65	27	48	67	48
•	G	1 ¼	2	**770 342 207**	65	27	48	67	48
•	B	1 ½	2 ¼	**770 342 108**	70	32	54	73	54
•	G	1 ½	2 ¼	**770 342 208**	70	32	54	73	54
•	B	2	2 ¾	**770 342 109**	78	32	66	90	66
•	G	2	2 ¾	**770 342 209**	78	32	66	90	66



342a
Union, spherical seat/taper seat Bronze to Bronze, ISO/EN U11

Torque and notes for installation please find in "Technical Product Notes".
Not suitable for drinking water installation!
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

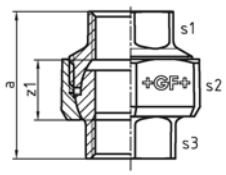
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	z1 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
•	B	½	1 ⅛	**770 345 104**	48	22	26	44	26
•	G	½	1 ⅛	**770 345 204**	48	22	26	44	26
•	B	¾	1 ¼	**770 345 105**	52	23	31	48	31
•	G	¾	1 ¼	**770 345 205**	52	23	31	48	31
•	B	1	1 ½	**770 345 106**	58	24	38	55	38
•	G	1	1 ½	**770 345 206**	58	24	38	55	38
•	B	1 ¼	2	**770 345 107**	65	27	48	67	48
•	G	1 ¼	2	**770 345 207**	65	27	48	67	48
•	B	1 ½	2 ¼	**770 345 108**	75	32	54	73	54
•	G	1 ½	2 ¼	**770 345 208**	75	32	54	73	54
•	B	2	2 ¾	**770 345 109**	85	32	66	90	66
•	G	2	2 ¾	**770 345 209**	85	32	66	90	66



344
Union taper seat

Torque and notes for installation please find in "Technical Product Notes".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

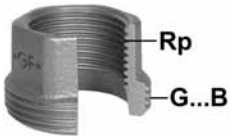
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	s1 [mm]	s2 [mm]	s3 [mm]
-	B	¼	⅝	**770 344 102**	69	18	28	15
-	G	¼	⅝	**770 344 202**	69	18	28	15
-	B	⅜	¾	**770 344 103**	75	22	32	20
-	G	⅜	¾	**770 344 203**	75	22	32	20
-	B	½	1	**770 344 104**	85	26	39	23
-	G	½	1	**770 344 204**	85	26	39	23
-	B	¾	1 ¼	**770 344 105**	93	32	48	30
-	G	¾	1 ¼	**770 344 205**	93	32	48	30
-	B	1	1 ½	**770 344 106**	103	38	55	36
-	G	1	1 ½	**770 344 206**	103	38	55	36
-	B	1 ¼	2	**770 344 107**	114	48	67	48
-	G	1 ¼	2	**770 344 207**	114	48	67	48
-	B	1 ½	2 ¼	**770 344 108**	123	54	74	54
-	G	1 ½	2 ¼	**770 344 208**	123	54	74	54
-	B	2	2 ¾	**770 344 109**	136	66	90	67
-	G	2	2 ¾	**770 344 209**	136	66	90	67

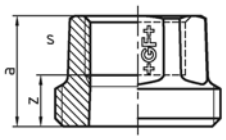


346
Union, spherical seat angular deviation max. 6°, ISO/EN U11

Torque and notes for installation please find in "Technical Product Notes".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

EN		Dim. [inch]	374 G [inch]	Code	a [mm]	z1 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
•	B	½	1 ⅛	**770 346 104**	48	22	26	44	26
•	G	½	1 ⅛	**770 346 204**	48	22	26	44	26
•	B	¾	1 ¼	**770 346 105**	52	23	31	48	31
•	G	¾	1 ¼	**770 346 205**	52	23	31	48	31
•	B	1	1 ½	**770 346 106**	58	24	38	55	38
•	G	1	1 ½	**770 346 206**	58	24	38	55	38
•	B	1 ¼	2	**770 346 107**	65	27	48	67	48
•	G	1 ¼	2	**770 346 207**	65	27	48	67	48
•	B	1 ½	2 ¼	**770 346 108**	75	32	54	73	54
•	G	1 ½	2 ¼	**770 346 208**	75	32	54	73	54
•	B	2	2 ¾	**770 346 109**	85	32	66	90	66
•	G	2	2 ¾	**770 346 209**	85	32	66	90	66

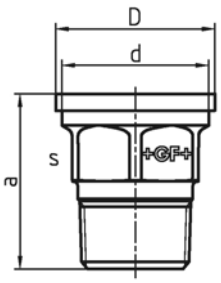




370
Union bush flat seat

* Is usually not supplied as a separate piece.
** Version

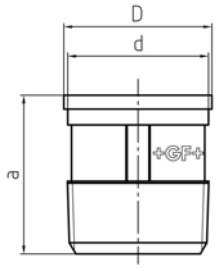
EN		Dim. Rp [inch]	**	G...B [inch]	Code	a [mm]	z [mm]	s [mm]		
*-	B	¼		⅝	-	21	11	19	hexagon	
*-	G	¼		⅝	-	21	11	19	hexagon	
*-	B	⅜		¾	-	23	13	22	hexagon	
*-	G	⅜		¾	-	23	13	22	hexagon	
-	B	½		1	**770 370 119**	25	12	26	hexagon	
-	G	½		1	**770 370 219**	25	12	26	hexagon	
-	B	½	s	1 ⅛	**770 370 120**	25	12	26	hexagon	
-	G	½	s	1 ⅛	**770 370 220**	25	12	26	hexagon	
-	B	¾		1 ¼	**770 370 105**	28	13	32	hexagon	
-	G	¾		1 ¼	**770 370 205**	28	13	32	hexagon	
-	B	1		1 ½	**770 370 106**	31	14	38	hexagon	
-	G	1		1 ½	**770 370 206**	31	14	38	hexagon	
-	B	1 ¼		2	**770 370 107**	33	14	48	hexagon	
-	G	1 ¼		2	**770 370 207**	33	14	48	hexagon	
-	B	1 ½		2 ¼	**770 370 108**	36	17	54	hexagon	
-	G	1 ½		2 ¼	**770 370 208**	36	17	54	hexagon	
-	B	2		2 ¾	**770 370 109**	42	18	66	hexagon	
-	G	2		2 ¾	**770 370 209**	42	18	66	hexagon	
-	B	2 ½		3 ½	**770 370 110**	41	14	85	octagon	
-	G	2 ½		3 ½	**770 370 210**	41	14	85	octagon	
-	B	3		4	**770 370 111**	48	18	96	octagon	
-	G	3		4	**770 370 211**	48	18	96	octagon	
*-	B	4		5	-	62	26	122	octagon	
*-	G	4		5	-	62	26	122	octagon	



371
Union end flat seat, equal

G ... refers to the thread size G of the union nut 374, which can be combined with the union end.
* Is usually not supplied as a separate piece.

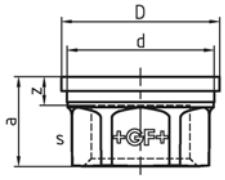
EN		Dim. R [inch]	G [inch]	Code	a [mm]	d [mm]	s [mm]		
*-	B	¼	⅝	-	32	18.1	15	hexagon	
*-	G	¼	⅝	-	32	18.1	15	hexagon	
*-	B	⅜	¾	-	34	21.6	19	octagon	
*-	G	⅜	¾	-	34	21.6	19	octagon	
-	B	½	1	**770 371 104**	40	27.0	23	hexagon	
-	G	½	1	**770 371 204**	40	27.0	23	hexagon	
-	B	¾	1 ¼	**770 371 105**	42	35.5	30	hexagon	
-	G	¾	1 ¼	**770 371 205**	42	35.5	30	hexagon	
-	B	1	1 ½	**770 371 106**	47	40.9	36	hexagon	
-	G	1	1 ½	**770 371 206**	47	40.9	36	hexagon	
-	B	1 ¼	2	**770 371 107**	57	52.4	48	hexagon	
-	G	1 ¼	2	**770 371 207**	57	52.4	48	hexagon	
-	B	1 ½	2 ¼	**770 371 108**	57	58.4	54	hexagon	
-	G	1 ½	2 ¼	**770 371 208**	57	58.4	54	hexagon	
-	B	2	2 ¾	**770 371 109**	62	73.4	66	hexagon	
-	G	2	2 ¾	**770 371 209**	62	73.4	66	hexagon	
-	B	2 ½	3 ½	**770 371 110**	75	91.9	85	octagon	
-	G	2 ½	3 ½	**770 371 210**	75	91.9	85	octagon	
-	B	3	4	**770 371 111**	80	104.4	95	octagon	
-	G	3	4	**770 371 211**	80	104.4	95	octagon	



371
Union end flat seat, reducing

Union end for 374 1 d=42.5
G ... refers to the thread size G of the union nut 374, which can be combined with the union end.

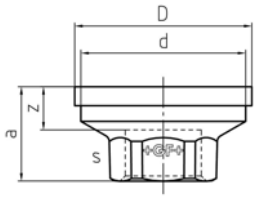
EN		Dim. R [inch]	G [inch]	Code	a [mm]	d [mm]		
-	B	1 - 1 ¼	1 ½	**770 371 115**	47	42.2	round	



372
Union end flat seat, equal

G ... refers to the thread size G of the union nut 374, which can be combined with the union end.
* Is usually not supplied as a separate piece.
** Version
I hex = Internal hexagon

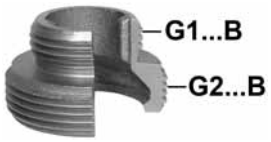
EN		Dim. Rp [inch]	**	G [inch]	Code	a [mm]	d [mm]	z [mm]	s [mm]		
*-	B	¼		⅝	**-**	20.0	18.1	10.0	10	I hex	
*-	G	¼		⅝	**-**	20.0	18.1	10.0	10	I hex	
*-	B	⅜		¾	**-**	22.0	21.6	12.0	12	I hex	
*-	G	⅜		¾	**-**	22.0	21.6	12.0	12	I hex	
-	B	½		1	**770 372 119**	22.0	27.1	9.0	25	hexagon	
-	G	½		1	**770 372 219**	22.0	27.1	9.0	25	hexagon	
-	B	½	s	1 ⅛	**770 372 104**	22.0	31.5	9.0	26	hexagon	
-	G	½	s	1 ⅛	**770 372 204**	22.0	31.5	9.0	26	hexagon	
-	B	¾		1 ¼	**770 372 105**	22.0	35.5	7.0	31	hexagon	
-	G	¾		1 ¼	**770 372 205**	22.0	35.5	7.0	31	hexagon	
-	B	1		1 ½	**770 372 106**	26.0	40.9	9.0	38	hexagon	
-	G	1		1 ½	**770 372 206**	26.0	40.9	9.0	38	hexagon	
-	B	1 ¼		2	**770 372 107**	31.0	52.4	12.0	48	hexagon	
-	G	1 ¼		2	**770 372 207**	31.0	52.4	12.0	48	hexagon	
-	B	1 ½		2 ¼	**770 372 108**	32.5	58.4	13.5	54	hexagon	
-	G	1 ½		2 ¼	**770 372 208**	32.5	58.4	13.5	54	hexagon	
-	B	2		2 ¾	**770 372 109**	35.0	73.4	11.0	67	hexagon	
-	G	2		2 ¾	**770 372 209**	35.0	73.4	11.0	67	hexagon	
-	B	2 ½		3 ½	**770 372 110**	39.0	91.9	12.0	85	octagon	
-	G	2 ½		3 ½	**770 372 210**	39.0	91.9	12.0	85	octagon	
-	B	3		4	**770 372 111**	45.0	104.4	15.0	96	octagon	
-	G	3		4	**770 372 211**	45.0	104.4	15.0	96	octagon	
*-	B	4		5	**-**	46.0	128.7	12.0	122	octagon	
*-	G	4		5	**-**	46.0	128.7	12.0	122	octagon	

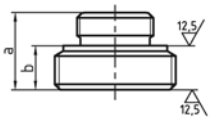


372
Union end flat seat, reducing

G ... refers to the thread size G of the union nut 374, which can be combined with the union end.

EN		Dim. Rp [inch]	G [inch]	Code	a [mm]	d [mm]	z [mm]	s [mm]		
-	B	1 - ¾	1 ½	**770 372 115**	25.0	41.0	10.0	32	hexagon	
-	G	1 - ¾	1 ½	**770 372 215**	25.0	41.0	10.0	32	hexagon	
-	B	1 ¼ - ¾	2	**770 372 133**	30.0	52.5	15.0	32	hexagon	
-	G	1 ¼ - ¾	2	**770 372 233**	30.0	52.5	15.0	32	hexagon	
-	B	1 ¼ - 1	2	**770 372 116**	30.5	52.5	13.5	38	hexagon	
-	G	1 ¼ - 1	2	**770 372 216**	30.5	52.5	13.5	38	hexagon	

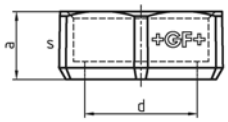




373
Union bush flat seat

Sealing gaskets for sealing surface as per table "Sealing Gasket Dimension" (catalogue no. 332, symbol ○).
* Is usually not supplied as a separate piece.

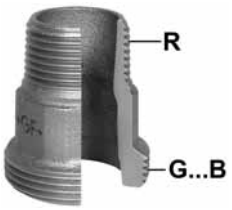
EN		G1...B [inch]	G2...B [inch]	Code	a [mm]	b [mm]
*-	G	½	1	-	23	13
-	B	¾	1 ¼	**770 373 105**	27	15
-	G	¾	1 ¼	**770 373 205**	27	15
-	B	1	1 ½	**770 373 106**	29	15
-	G	1	1 ½	**770 373 206**	29	15
-	B	1 ¼	2	**770 373 107**	33	17
-	G	1 ¼	2	**770 373 207**	33	17

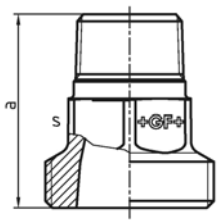


374
Union nut

* Is usually not supplied as a separate piece.
** Version
*** Union nut for 371 1 - 1¼

EN		Dim. [inch]	**	Dim. G [inch]	Code	a [mm]	d [mm]	s [mm]	
*-	B	⅛		½	-	15	16.6	26	hexagon
*-	G	⅛		½	-	15	16.6	26	hexagon
*-	B	¼	s	⅝	-	15	18.4	28	hexagon
*-	G	¼	s	⅝	-	15	18.4	28	hexagon
*-	B	¼		¾	-	16	21.9	32	hexagon
*-	G	¼		¾	-	16	21.9	32	hexagon
-	B	⅜		¾	**770 374 116**	16	21.9	32	hexagon
-	G	⅜		¾	**770 374 216**	16	21.9	32	hexagon
-	B	⅜	s	⅞	**770 374 118**	17	24.9	36	hexagon
-	G	⅜	s	⅞	**770 374 218**	17	24.9	36	hexagon
-	B	½		1	**770 374 119**	18	27.3	41	hexagon
-	G	½		1	**770 374 219**	18	27.3	41	hexagon
-	B	½	s	1 ⅛	**770 374 120**	19	31.8	44	hexagon
-	G	½	s	1 ⅛	**770 374 220**	19	31.8	44	hexagon
-	B	¾		1 ¼	**770 374 105**	20	35.8	48	hexagon
-	G	¾		1 ¼	**770 374 205**	20	35.8	48	hexagon
-	B	¾	34,4	1 ¼	**770 374 135**	20	34.4	48	hexagon
-	B	1	s	1 ½	**770 374 106**	22	41.3	55	hexagon
-	G	1	s	1 ½	**770 374 206**	22	41.3	55	hexagon
-	B	1		1 ½	**770 960 180**	22	41.3	55	octagon
***-	B	1	42,5	1 ½	**770 374 121**	22	42.5	55	hexagon
-	B	1 ¼		2	**770 374 107**	24	52.8	67	hexagon
-	G	1 ¼		2	**770 374 207**	24	52.8	67	hexagon
-	B	1 ½		2 ¼	**770 374 108**	25	58.8	74	hexagon
-	G	1 ½		2 ¼	**770 374 208**	25	58.8	74	hexagon
-	B	2		2 ¾	**770 374 109**	27	73.8	90	hexagon
-	G	2		2 ¾	**770 374 209**	27	73.8	90	hexagon
-	B	2 ½		3 ½	**770 374 110**	30	92.3	111	octagon
-	G	2 ½		3 ½	**770 374 210**	30	92.3	111	octagon
-	B	3		4	**770 374 111**	31	104.8	131	octagon
-	G	3		4	**770 374 211**	31	104.8	131	octagon
*-	B	4		5	-	35	129.2	151	octagon
*-	G	4		5	-	35	129.2	151	octagon

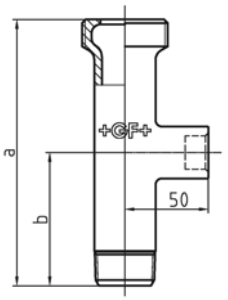




376
Union bush flat seat

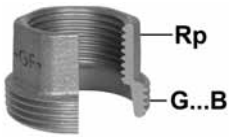
** Version

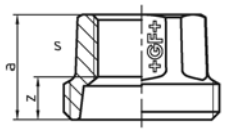
EN		Dim. R [inch]	**	G...B [inch]	Code	a [mm]	s [mm]		
-	B	½		1	**770 376 105**	43.0	26	hexagon	
-	G	½		1	**770 376 205**	43.0	26	hexagon	
-	B	½	s	1 ⅛	**770 376 125**	41.5	26	hexagon	
-	G	½	s	1 ⅛	**770 376 225**	41.5	26	hexagon	
-	B	¾		1 ¼	**770 376 106**	48.0	32	hexagon	
-	G	¾		1 ¼	**770 376 206**	48.0	32	hexagon	
-	B	1		1 ½	**770 376 107**	54.0	38	hexagon	
-	G	1		1 ½	**770 376 207**	54.0	38	hexagon	
-	B	1 ¼		2	**770 376 108**	57.0	48	hexagon	
-	G	1 ¼		2	**770 376 208**	57.0	48	hexagon	
-	B	1 ½		2 ¼	**770 376 109**	61.0	54	hexagon	
-	G	1 ½		2 ¼	**770 376 209**	61.0	54	hexagon	



378
Distribution union bush, flat seat

EN		Dim. R [inch]	G...B [inch]	Code	a [mm]	b [mm]	
-	G	¾	1 ¼	**770 378 220**	153	74	
-	G	1	1 ½	**770 378 221**	146	67	
-	G	1 ¼	2	**770 378 222**	141	59	

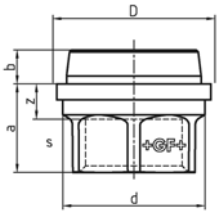




380
Union bush taper seat

** Version
Is usually not supplied as a separate piece.

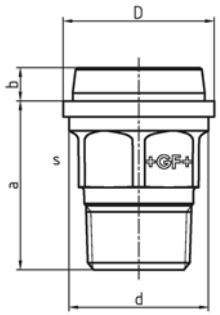
EN		Dim. Rp [inch]	**	G...B [inch]	Code	a [mm]	z [mm]	s [mm]		
-	B	⅛		½	-	19	12	15	hexagon	
-	G	⅛		½	-	19	12	15	hexagon	
-	B	¼		⅝	-	21	11	19	hexagon	
-	G	¼		⅝	-	21	11	19	hexagon	
-	B	⅜		¾	-	23	13	22	hexagon	
-	G	⅜		¾	-	23	13	22	hexagon	
-	B	½		1	-	25	11	26	hexagon	
-	G	½		1	-	25	11	26	hexagon	
-	B	½	s	1 ⅛	-	25	11	26	hexagon	
-	G	½	s	1 ⅛	-	25	11	26	hexagon	
-	B	¾		1 ¼	-	28	13	32	hexagon	
-	G	¾		1 ¼	-	28	13	32	hexagon	
-	B	1		1 ½	-	31	14	38	hexagon	
-	G	1		1 ½	-	31	14	38	hexagon	
-	B	1 ¼		2	-	33	14	48	hexagon	
-	G	1 ¼		2	-	33	14	48	hexagon	
-	B	1 ½		2 ¼	-	36	17	54	hexagon	
-	G	1 ½		2 ¼	-	36	17	54	hexagon	
-	B	2		2 ¾	-	42	18	66	hexagon	
-	G	2		2 ¾	-	42	18	66	hexagon	
-	B	2 ½		3 ½	-	41	14	85	octagon	
-	G	2 ½		3 ½	-	41	14	85	octagon	
-	B	3		4	-	48	18	96	octagon	
-	G	3		4	-	48	18	96	octagon	
-	B	4		5	-	62	26	120	octagon	
-	G	4		5	-	62	26	120	octagon	



381
Union end taper seat

Is usually not supplied as a separate piece.
G ... refers to the thread size G of the union nut 374, which can be combined with the union end.
** Version
I hex = Internal hexagon

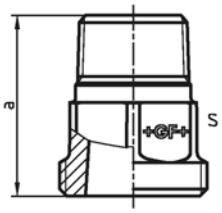
EN		Dim. Rp [inch]	**	G [inch]	Code	a [mm]	b [mm]	d [mm]	z [mm]	s [mm]	
-	B	⅛		½	-	17.5	6.5	15.8	10.5	15	hexagon
-	G	⅛		½	-	17.5	6.5	15.8	10.5	15	hexagon
-	B	¼		⅝	-	20.5	6.0	18.1	10.5	10	I hex
-	G	¼		⅝	-	20.5	6.0	18.1	10.5	10	I hex
-	B	⅜		¾	-	22.0	6.5	21.6	12.0	12	I hex
-	G	⅜		¾	-	22.0	6.5	21.6	12.0	12	I hex
-	B	½		1	-	22.5	7.5	27.0	9.5	25	octagon
-	G	½		1	-	22.5	7.5	27.0	9.5	25	octagon
-	B	½	s	1 ⅛	-	21.0	8.0	31.5	8.0	26	hexagon
-	G	½	s	1 ⅛	-	21.0	8.0	31.5	8.0	26	hexagon
-	B	¾		1 ¼	-	22.5	8.0	35.5	6.5	31	hexagon
-	G	¾		1 ¼	-	22.5	8.0	35.5	6.5	31	hexagon
-	B	1		1 ½	-	26.5	8.5	40.9	8.5	38	hexagon
-	G	1		1 ½	-	26.5	8.5	40.9	8.5	38	hexagon
-	B	1 ¼		2	-	31.5	9.0	52.4	12.0	48	hexagon
-	G	1 ¼		2	-	31.5	9.0	52.4	12.0	48	hexagon
-	B	1 ½		2 ¼	-	33.0	9.5	58.4	14.0	54	hexagon
-	G	1 ½		2 ¼	-	33.0	9.5	58.4	14.0	54	hexagon
-	B	2		2 ¾	-	35.5	11.5	73.4	10.5	66	hexagon
-	G	2		2 ¾	-	35.5	11.5	73.4	10.5	66	hexagon
-	B	2 ½		3 ½	-	42.5	13.5	91.9	15.5	85	octagon
-	G	2 ½		3 ½	-	42.5	13.5	91.9	15.5	85	octagon
-	B	3		4	-	45.5	14.5	104.4	15.5	96	octagon
-	G	3		4	-	45.5	14.5	104.4	15.5	96	octagon
-	B	4		5	-	46.5	15.5	128.7	10.5	120	octagon
-	G	4		5	-	46.5	15.5	128.7	10.5	120	octagon



382
Union end taper seat

Is usually not supplied as a separate piece.
G ... refers to the thread size G of the union nut 374, which can be combined with the union end.

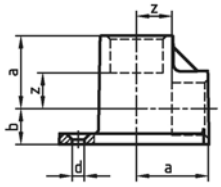
EN		Dim. R [inch]	G [inch]	Code	a [mm]	b [mm]	d [mm]	s [mm]	
-	B	¼	⅝	-	32.0	6.0	18.1	15	hexagon
-	G	¼	⅝	-	32.0	6.0	18.1	15	hexagon
-	B	⅜	¾	-	34.0	6.5	21.6	19	octagon
-	G	⅜	¾	-	34.0	6.5	21.6	19	octagon
-	B	½	1	-	40.5	7.5	27.0	23	hexagon
-	G	½	1	-	40.5	7.5	27.0	23	hexagon
-	B	¾	1 ¼	-	43.8	8.0	35.5	30	hexagon
-	G	¾	1 ¼	-	43.8	8.0	35.5	30	hexagon
-	B	1	1 ½	-	49.5	8.5	40.9	36	hexagon
-	G	1	1 ½	-	49.5	8.5	40.9	36	hexagon
-	B	1 ¼	2	-	56.0	9.0	52.4	48	hexagon
-	G	1 ¼	2	-	56.0	9.0	52.4	48	hexagon
-	B	1 ½	2 ¼	-	58.0	9.5	58.4	54	hexagon
-	G	1 ½	2 ¼	-	58.0	9.5	58.4	54	hexagon
-	B	2	2 ¾	-	62.5	11.5	73.4	66	hexagon
-	G	2	2 ¾	-	62.5	11.5	73.4	66	hexagon
-	B	2 ½	3 ½	-	75.5	13.5	91.9	85	octagon
-	G	2 ½	3 ½	-	75.5	13.5	91.9	85	octagon
-	B	3	4	-	80.5	14.5	104.4	95	octagon
-	G	3	4	-	80.5	14.5	104.4	95	octagon
-	B	4	5	-	87.0	15.5	128.7	120	hexagon
-	G	4	5	-	87.0	15.5	128.7	120	hexagon

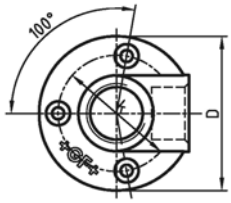


383
Union bush taper seat

Is usually not supplied as a separate piece.

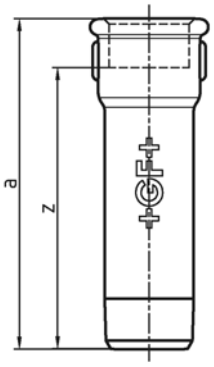
EN		Dim. R [inch]	G...B [inch]	Code	a [mm]	s [mm]		
-	B	¼	⅝	-	35	19	hexagon	
-	G	¼	⅝	-	35	19	hexagon	
-	B	⅜	¾	-	39	22	hexagon	
-	G	⅜	¾	-	39	22	hexagon	
-	B	½	1	-	44	26	hexagon	
-	G	½	1	-	44	26	hexagon	
-	B	¾	1 ¼	-	48	32	hexagon	
-	G	¾	1 ¼	-	48	32	hexagon	
-	B	1	1 ½	-	54	38	hexagon	
-	G	1	1 ½	-	54	38	hexagon	
-	B	1 ¼	2	-	58	48	hexagon	
-	G	1 ¼	2	-	58	48	hexagon	
-	B	1 ½	2 ¼	-	61	54	hexagon	
-	G	1 ½	2 ¼	-	61	54	hexagon	
-	B	2	2 ¾	-	71	66	hexagon	
-	G	2	2 ¾	-	71	66	hexagon	





471
Bracket elbow

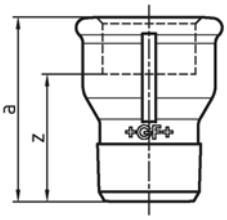
EN		Dim. [inch]	Code	a [mm]	b [mm]	d [mm]	z [mm]	k [mm]	D [mm]	
-	G	⅜	**770 471 203**	25	12	4.5	15	41.5	60	
-	G	½	**770 471 204**	28	14	5.5	15	44.5	62	
-	G	¾	**770 471 205**	33	17	5.5	18	53.5	70	



526
Extension tube

* Due to overall fitting length, the length of the external thread does not comply with the standard.

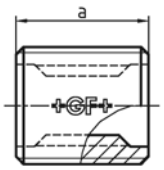
EN		Dim. [inch]	Length [mm]	Code	a [mm]	z [mm]
-	B	⅜	100	**770 526 119**	100	90
-	G	⅜	100	**770 526 219**	100	90
*-	B	½	30	**770 526 120**	30	17
*-	G	½	30	**770 526 220**	30	17
-	B	½	50	**770 526 121**	50	37
-	G	½	50	**770 526 221**	50	37
-	B	½	60	**770 526 122**	60	47
-	G	½	60	**770 526 222**	60	47
-	B	½	70	**770 526 123**	70	57
-	G	½	70	**770 526 223**	70	57
-	B	½	80	**770 526 124**	80	67
-	G	½	80	**770 526 224**	80	67
-	B	½	100	**770 526 125**	100	87
-	G	½	100	**770 526 225**	100	87
-	B	½	120	**770 526 126**	120	107
-	G	½	120	**770 526 226**	120	107
*-	B	¾	30	**770 526 127**	30	15
*-	G	¾	30	**770 526 227**	30	15
*-	B	¾	40	**770 526 128**	40	25
*-	G	¾	40	**770 526 228**	40	25
-	B	¾	60	**770 526 129**	60	45
-	G	¾	60	**770 526 229**	60	45
-	B	¾	70	**770 526 130**	70	55
-	G	¾	70	**770 526 230**	70	55
-	B	¾	80	**770 526 131**	80	65
-	G	¾	80	**770 526 231**	80	65
-	B	¾	100	**770 526 132**	100	85
-	G	¾	100	**770 526 232**	100	85
*-	B	1	40	**770 526 133**	40	23
*-	G	1	40	**770 526 233**	40	23
-	B	1	80	**770 526 134**	80	63
-	G	1	80	**770 526 234**	80	63
-	B	1	100	**770 526 135**	100	83
-	G	1	100	**770 526 235**	100	83



529a
Extension socket, left and right hand thread, ISO/EN M4

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations. Steel parts are hexagonal instead of beaded.

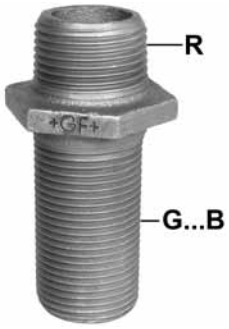
EN		Dim. [inch]	Code	a [mm]	s [mm]	z [mm]
ST-	B	¼	**770 529 102**	28	17	18
ST-	G	¼	**770 529 202**	28	17	18
ST-	B	⅜	**770 529 103**	35	22	25
ST•	G	⅜	**770 529 203**	35	22	25
•	B	½	**770 529 104**	43		30
•	G	½	**770 529 204**	43		30
•	B	¾	**770 529 105**	48		33
•	G	¾	**770 529 205**	48		33
•	B	1	**770 529 106**	55		38
•	G	1	**770 529 206**	55		38
-	B	1 ¼	**770 529 107**	60		41
-	G	1 ¼	**770 529 207**	60		41
-	B	1 ½	**770 529 108**	63		44
-	G	1 ½	**770 529 208**	63		44
-	B	2	**770 529 109**	70		46
-	G	2	**770 529 209**	70		46

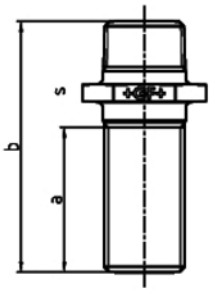


531
Nipple

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.

EN		G...B [inch]	Code	a [mm]
ST-	B	⅜	**770 970 145**	23
ST-	G	⅜	**770 970 245**	23
ST-	B	½	**770 970 146**	25
ST-	G	½	**770 970 246**	25
ST-	B	¾	**770 970 147**	30
ST-	G	¾	**770 970 247**	30
ST-	B	1	**770 970 148**	35
ST-	G	1	**770 970 248**	35

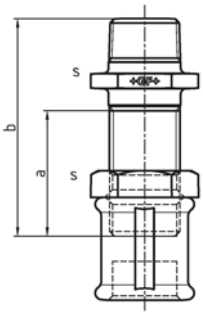




534
Longscrew hexagon nipple

Hot dip galvanised, thread electroplated.

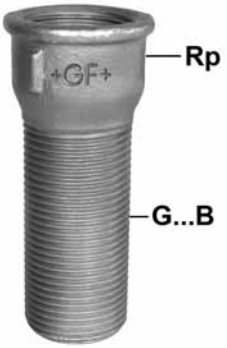
EN		Dim. [inch]	Code	a [mm]	b [mm]	s [mm]
-	G	½	**770 534 204**	46	77	32
-	G	¾	**770 534 205**	49	82	36
-	G	1	**770 534 206**	56	92	46

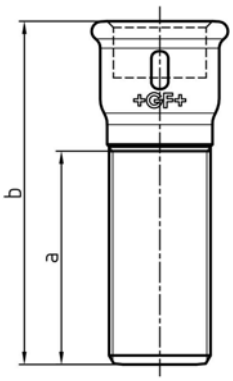


535
Longscrew hexagon nipple, complete

* Large chamfer (gasket chamber)

EN		Dim. [inch]	Code	a [mm]	b [mm]	s [mm]	
-	G	½	**770 535 204**	46	77	32	
-	G	¾	**770 535 205**	49	82	36	
-	G	1	**770 535 206**	56	92	46	

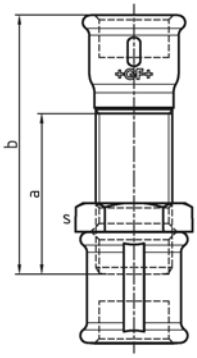




536
Longscrew socket

Hot dip galvanised, thread electroplated.

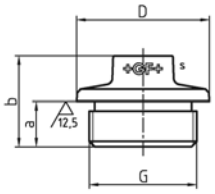
EN		Dim. [inch]	Length [mm]	Code	a [mm]	b [mm]	
-	G	½	80	**770 536 204**	50	80	
-	G	¾	90	**770 536 205**	57	90	
-	G	1	100	**770 536 206**	65	100	
-	G	1 ¼	116	**770 536 207**	75	116	
-	G	1 ½	125	**770 536 208**	84	125	
-	G	2	143	**770 536 209**	98	143	



537
Longscrew socket, complete

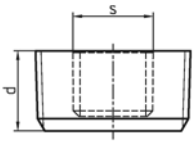
* Large chamfer (gasket chamber)

EN		Dim. [inch]	Code	a [mm]	b [mm]	s [mm]
-	G	½	**770 537 204**	50	80	32
-	G	¾	**770 537 205**	57	90	36
-	G	1	**770 537 206**	65	100	46
-	G	1 ¼	**770 537 207**	75	116	55
-	G	1 ½	**770 537 208**	84	125	60
-	G	2	**770 537 209**	98	143	73



595
Plug with one machined face

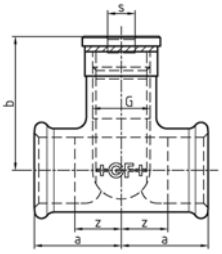
EN		G...B [inch]	Code	a [mm]	b [mm]	D [mm]	s [mm]
-	B	½	**770 595 104**	11	23	28	11
-	G	½	**770 595 204**	11	23	28	11
-	B	¾	**770 595 105**	11	24	35	17
-	G	¾	**770 595 205**	11	24	35	17
-	B	1	**770 595 106**	14	28	41	19
-	G	1	**770 595 206**	14	28	41	19



596
Plug, hexagon/square inside, ISO/EN T11

ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.

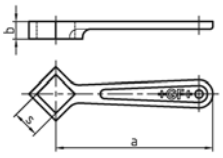
EN		Dim. R [inch]	Code	d [mm]	s [mm]		
ST-	B	⅛	**770 596 101**	8	5	hexagonal	
ST-	G	⅛	**770 596 201**	8	5	hexagonal	
ST-	B	¼	**770 596 102**	10	7	hexagonal	
ST-	G	¼	**770 596 202**	10	7	hexagonal	
ST•	B	⅜	**770 596 103**	10	8	hexagonal	
ST•	G	⅜	**770 596 203**	10	8	hexagonal	
•	B	½	**770 596 104**	15	10	square	
•	G	½	**770 596 204**	15	10	square	
•	B	¾	**770 596 105**	17	12	square	
•	G	¾	**770 596 205**	17	12	square	
•	B	1	**770 596 106**	19	16	square	
•	G	1	**770 596 206**	19	16	square	
-	B	1 ¼	**770 596 107**	22	22	square	
-	G	1 ¼	**770 596 207**	22	22	square	
-	B	1 ½	**770 596 108**	22	22	square	
-	G	1 ½	**770 596 208**	22	22	square	
-	B	2	**770 596 109**	27	27	square	
-	G	2	**770 596 209**	27	27	square	



599a
Regulation socket

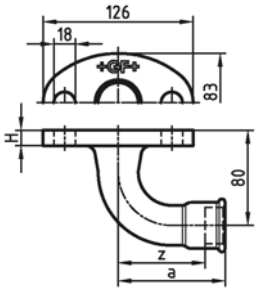
* brass

EN		Dim. Rp [inch]	G...B [inch]	Code	a [mm]	b [mm]	z [mm]	s [mm]
-	B	½	⅜	**770 599 104**	27	45.5	14	8
-	G	½	⅜	**770 599 204**	27	45.5	14	8
-	B	¾	½	**770 599 105**	32	55.5	17	10
-	G	¾	½	**770 599 205**	32	55.5	17	10
-	B	1	¾	**770 599 106**	38	64.5	21	12
-	G	1	¾	**770 599 206**	38	64.5	21	12
-	B	1 ¼	1 ⅛	**770 599 107**	45	81.0	26	17
-	G	1 ¼	1 ⅛	**770 599 207**	45	81.0	26	17
-	B	1 ½	1 ¼	**770 599 108**	47	77.0	28	22
-	B	2	1 ¾	**770 599 109**	57	98.5	33	27



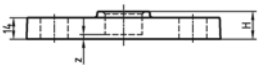
901
Stopcock spanner

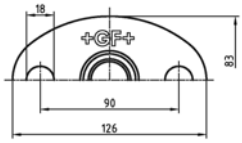
Dim. s [mm]	Code	a [mm]	b [mm]
10	**770 901 215**	88	11
12	**770 901 217**	95	12
14	**770 901 218**	110	13
17	**770 901 219**	130	14



933
Water meter bend

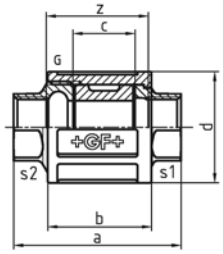
EN		G...B [inch]	Code	a [mm]	z [mm]	H [mm]
-	G	¾	**770 933 205**	115	100	14
-	G	1	**770 933 206**	90	73	13
-	G	1 ¼	**770 933 207**	90	71	13





933a
Counter Flange to fig. 933

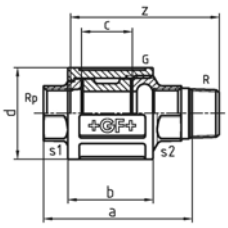
EN		Dim. Rp [inch]	Code	H [mm]	z [mm]
-	G	¾	**770 932 205**	18	3
-	G	1	**770 932 206**	19	2
-	G	1 ¼	**770 932 207**	22	3



1330
"Baumer" union flat seat

* Piece parts: 370 ½ s and 372 ½ s

EN		Dim. Rp [inch]	G...B [inch]	Code	a [mm]	b [mm]	c [mm]	d [mm]	z [mm]	s1 [mm]	s2 [mm]
*-	B	½	1 ⅛	**770 970 174**	71	44	24	46	45	25	26
-	B	¾	1 ¼	**770 970 175**	74	44	24	50	44	31	31
-	B	1	1 ½	**770 970 176**	85	51	28	57	51	38	38



1335
"Baumer" union flat seat

* Piece parts: 372 ½ s and 376 ½ s

EN		Dim. R, Rp [inch]	G...B [inch]	Code	a [mm]	b [mm]	c [mm]	d [mm]	z [mm]	s1 [mm]	s2 [mm]	
*-	B	½	1 ⅛	**770 970 177**	87.5	44	24	46	74.5	25	26	
-	B	¾	1 ¼	**770 970 178**	94.0	44	24	50	79.0	31	32	
-	B	1	1 ½	**770 970 179**	108.0	51	28	57	91.0	38	38	

Technical Product Notes

Fittings sizes

Fitting sizes are designated based on the thread sizes defined in EN 10226-1 and ISO 7-1. Connection sizes of pipes, flanges or plumbing fixtures are designated according to thread sizes or nominal diameters (DN).

The following table shows the relationship between size of fittings and the nominal diameter (DN):

Thread size / fitting size	1/8	1/4	3/8	1/2	3/4	1	11/4	11/2	2	21/2	3	4	5	6
Nominal diameter DN (mm)	6	8	10	15	20	25	32	40	50	65	80	100	125	150

Material - malleable cast iron

Malleable cast iron is an iron-carbon alloy which combines the outstanding properties of cast iron (pourability) and steel (strength and ductility).

The chemical composition of the cast produces excellent castability, which makes malleable cast iron particularly suitable for making complicated shapes and producing thin walled parts.

In its cast state malleable cast iron is hard, brittle and unworkable, it only acquires its final microstructure after subsequent heat treatment known as annealing.

As a result of the annealing process (= malleabelising) very good workability and very good ductility are achieved while sufficiently high material strength is maintained.

There are two distinct types of malleable cast iron which are dependent on the annealing method. Their designation is a result of the appearance of the fracture surfaces:

1. Blackheart malleable cast iron
is annealed in an inert atmosphere (protective gas or vacuum) and has a uniform microstructure with a higher carbon content.

2. Whiteheart malleable cast iron
is annealed in an oxidising atmosphere, and in the process the carbon content of the surface zone is greatly reduced.

Due to the decarburisation of the microstructure whiteheart has a number of advantages when compared to blackheart malleable cast iron:

- **better galvanisability**
  (better alloy formation of the zinc coating)
- **higher strength** with the same elongation
- a limited weldability and solderabilty can be achieved by additional heat treatment
  (see also page 77).

Hot dip galvanising

Galvanising is a very commonly used process for increasing the corrosion resistance of iron based materials. The corrosion proofing effect of zinc is based on its anticorrosive properties.

Zinc is in fact a relatively base metal and corrodes quickly in the presence of oxygen, but in the process it forms a very homogeneous outer layer, which protects from further corrosion.

Hot dip galvanising achieves a zinc coating by repeatedly dipping the prepared workpieces in molten zinc. In the process, several iron zinc alloy layers form on the workpiece surface which guarantee optimal bonding of the zinc coating on the workpiece.

Georg Fischer malleable cast iron fittings are hot dip galvanised to the requirements in EN 10242, using special procedural technique ensuring that uniform coating thicknesses (minimum 500 g/m^2 equivalent to 70 μm) are achieved.

Electroplating

With electroplating zinc is deposited from an electrolyte by applying an electric current to the surface of the workpiece.

The zinc coating achieved in this way is simply an outer layer which is deposited on the base material (no alloy formation takes place with the base material). The zinc coat thickness is a maximum of 25 μm.

Thread

General outline

Threads for pipes, valves, fittings and other pipework components which have a threaded connection are determined by international and national standards.

A basic distinction must be made between

- **Jointing threads**, which are sealing pipe threads, for connections to **EN 10226-1** and/or ISO 7-1 (DIN 2999, BS 21 are replaced by a national version of EN 10226-1 for each European country)
- **Fastening threads** - that are threads for connections to **EN ISO 228-1** not sealing on the thread.

Difference between jointing threads/ fastening threads

The fundamental difference consists of the fact that:

- the pipe thread to **EN 10226-1** achieves a seal on the thread, mainly as a result of metallic compression (taper/parallel) of the interlocking thread surfaces in the jointing area. The sealing effect is improved by using an appropriate jointing medium.
- In contrast, the pipe thread to **EN ISO 228-1** is a purely mechanical fastening thread. Sealing of the components being connected is achieved between sealing faces with flat seat gaskets or by metal sealing surfaces.

Full designation of pipe threads

using the example of thread size 11/2

Jointing thread to EN 10226-1

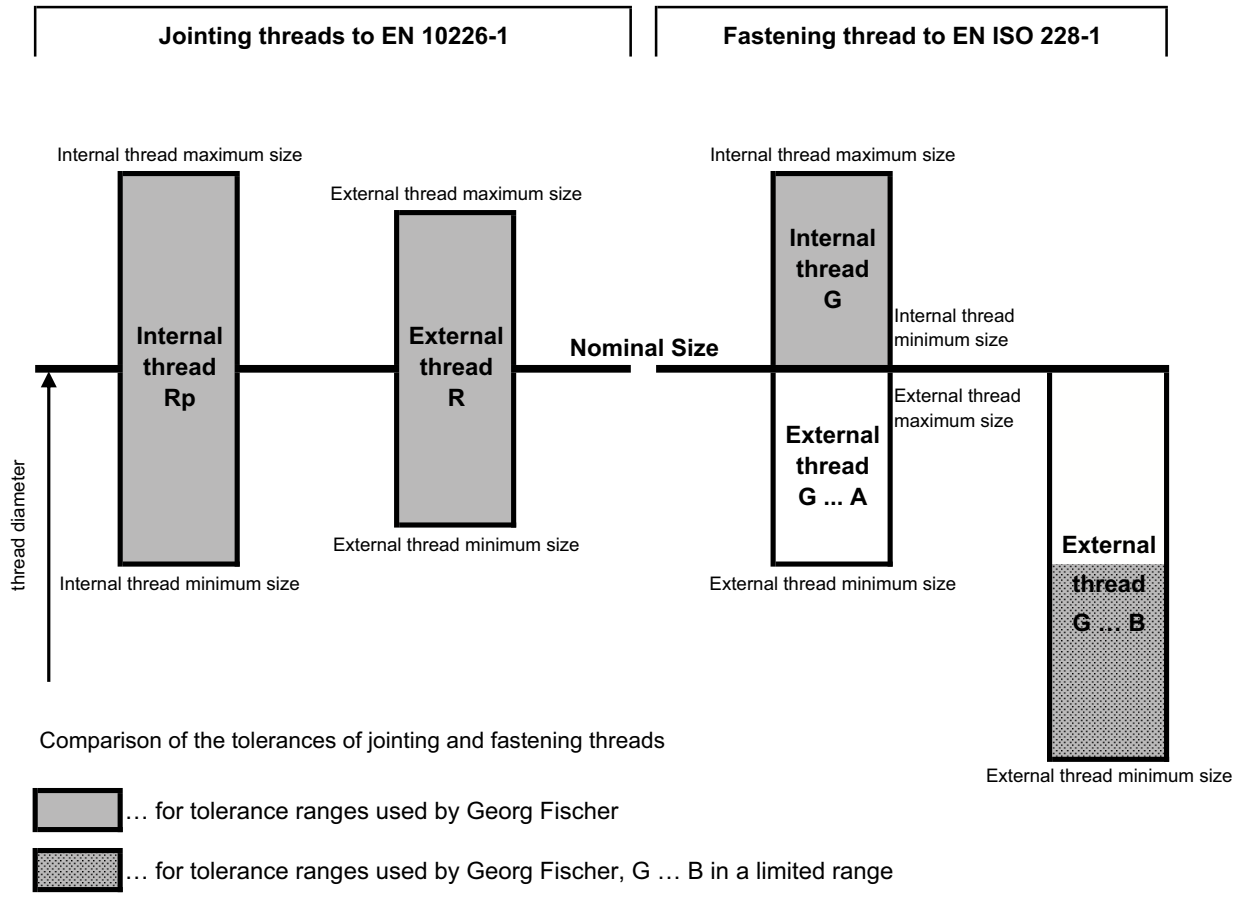
Internal thread (right-hand)	parallel	Rp 11/2
External thread (right-hand)	taper	R 11/2
Comment: the symbol LH is added to designate left-hand thread. Example: Rp 11/2 - LH		

Fastening thread to EN ISO 228-1

Internal thread (right-hand)	parallel	G 11/2
External thread (right-hand) Tolerance class A	parallel	G 11/2 A
External thread (right-hand) Tolerance class B	parallel	G 11/2 B
Comment: the symbol LH is added to designate left-hand thread. Example: G 11/2 - LH		

For external threads to EN ISO 228-1 Georg Fischer uses part of the class B tolerances. (see below).

Comparison of the tolerances of jointing and fastening threads



Illustr. 1 Comparison of the tolerances of jointing and fastening threads

… for tolerance ranges used by Georg Fischer

… for tolerance ranges used by Georg Fischer, G … B in a limited range

Combination of jointing threads (sealing on the thread) with fastening threads (not sealing on the thread)

The combination of an external parallel thread G, tolerance class A or B in accordance with EN ISO 228-1, with an internal parallel thread Rp in accordance with EN 10226-1 needs special consideration.

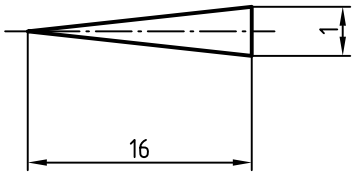
When it is neccessary to have this combination, the positive or negative tolerance of the internal thread to EN 10226-1 shall be considered in the relevant product standards, where external parallel threads G are used. Such a combination of threads **may not necessarily** achieve a leak-tight joint (be EN ISO 228-1, chapter 6).

Construction and function of jointing threads which are sealing on the threads to EN 10226-1 (ISO 7-1)

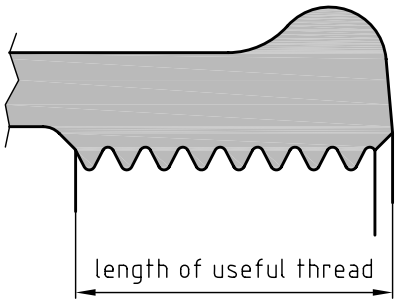
Thread types, dimensions, tolerances and designations per thread size are specified in standard EN 10226-1 (ISO 7-1).

The most important dimensions for these jointing threads (pipe threads) and medium and heavy-duty pipes are given in the table on page 74.

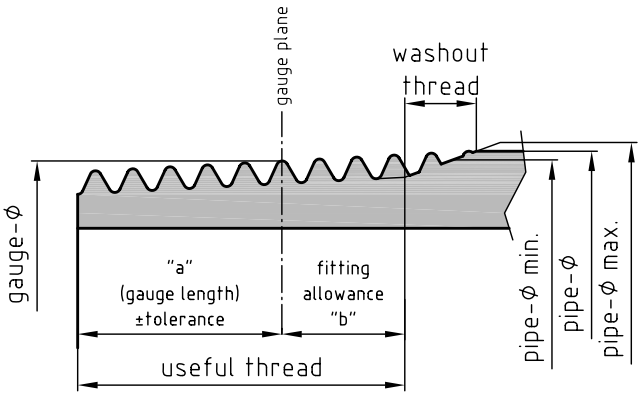
For parallel internal threads
(Illustr. 3) Care must be taken that the useful thread length allows the external thread to be screwed in, to achieve adequate compression and sealing, even when the external thread is at the maximum permitted gauge length.



Illustr. 2 Taper form of the 1:16 external thread diameter. The thread profile is at a right angle to the pipe axis.



Illustr. 3 Parallel internal thread Rp



Illustr. 4 Taper external thread R

For taper external threads
(Illustr. 4) There are some details to be considered. The taper is in the ratio of 1:16 (Illustr. 2).

The total pipe thread length is divided into 3 sections. (Illustr. 4)

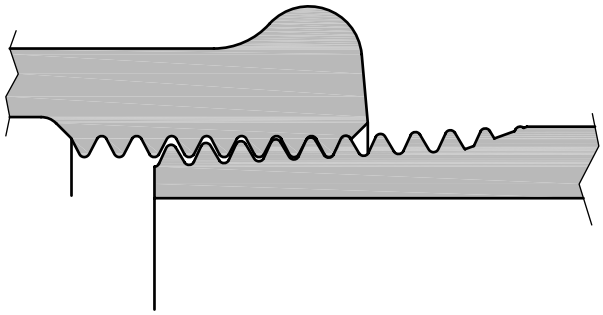
- Gauge length "a" is specified and may vary within the tolerances. The design is such that even with the minimum possible internal thread diameter the external thread can easily be screwed in and the sparingly applied sealing material is drawn perfectly into the joint.

- Distance "b" is the thread zone which is decisive for sealing. The length of the fully formed thread roots behind the gauge plane is dedicated to provide a sufficient tightening length for the tool, even with the maximum permissible internal thread diameter; this produces tight compression between the threads and thus a permanently reliable seal.

- The washout thread is not fully formed at the root, and normally remains visible after a joint is made. If it is screwed in too tightly, (beyond the fitting allowance) there is a risk of leakage.
  The crests of thread over the entire length of the useful thread should be fully formed.

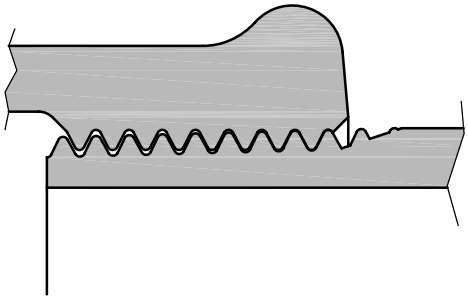
Fittings allowance "b" is the thread zone decisive for sealing. Fully formed profile at thread root and also at most thread crests. Diameter increasingly larger than internal thread diameter; this produces the compression effect. "b", in conjunction with the 1:16 taper, produces sufficient compression, even with the largest permissible female thread diameter.

As an example illustr. 5 shows a 1 inch joint with a fitting screwed on hand tight. There are still 2 3/4 threads available on the external thread for tightening with a wrench (see pipe thread table page 74 fitting allowance "b").



Illustr. 5 Hand tight engagement

Illustr. 6 shows, the thread connection tightened according to the standard. It can be screwed together a little less or a little more to adjust the direction of the fitting's outlet (or the overall length of the pre-assembled pipeline). The connection is nevertheless perfectly pressure tight.



Illustr. 6 Tightened with wrench

The **sealing effect on the thread** is achieved by the fact that the internal and external threads (pitch diameters) touch from the first moment of contact on and then compress when further tightened with a wrench.

Thus in a taper/parallel joint the **sealing material** only has to fill the inevitable deviations from the theoretical thread profile and roughness of the thread surfaces. Therefore only a small amount of suitable sealing material is necessary.

Tensile load, compressive stress or reversed bending stress on the joint are absorbed by the metal to metal contact.

To ensure the sealing effect of the taper/parallel joint actually takes place, the following points must be taken into account:

- The **thread cutting tool** must be adjusted so that the fitting can be screwed by hand thread, leaving enough thread (without sealant) for tightening with a wrench. In this way the necessary compression to achieve a seal is obtained even when the internal thread diameter is the maximum permissible.

- The end of the useful external thread (length a + b, see illustr. 4) should not be screwed in deeper than to the first fully formed thread of the internal thread (see illustr. 6), otherwise the compression required for sealing may be reduced by the incomplete root of the washout on the external threads.

Gauging

The gauging of both the jointing thread and the fastening thread is done with standardised plug and ring gauges.

- The plug thread gauges used for checking **fastening threads** are go and no go plug gauges and / or go and no go ring gauges. These are standardised in EN ISO 228-2. To assess the dimensional conformity to EN ISO 228-1 of thin walled parts the pitch diameter must be taken as an average between two diameter measurements offset by 90°.

- The plug thread gauges used for checking **jointing threads** are limit gauges, plug gauges for internal threads and ring gauges for external threads. These were **standardised** to **EN 10226-3** in 2005, identical to ISO 7-2 of 2000.

It should be noted that thread inspection using gauges is a comparative test.

This has particular implications when checking the **parallel internal thread** (jointing thread) to EN 10226-1 especially if the thread is chamfered.

The plug gauges according to EN 10226-3 and ISO 7-2 imply a chamfer, removing 1/2 pitch of the internal thread. The resulting chamfer diameter on the example of a 90° chamfer is given in the table of Illustr.7!

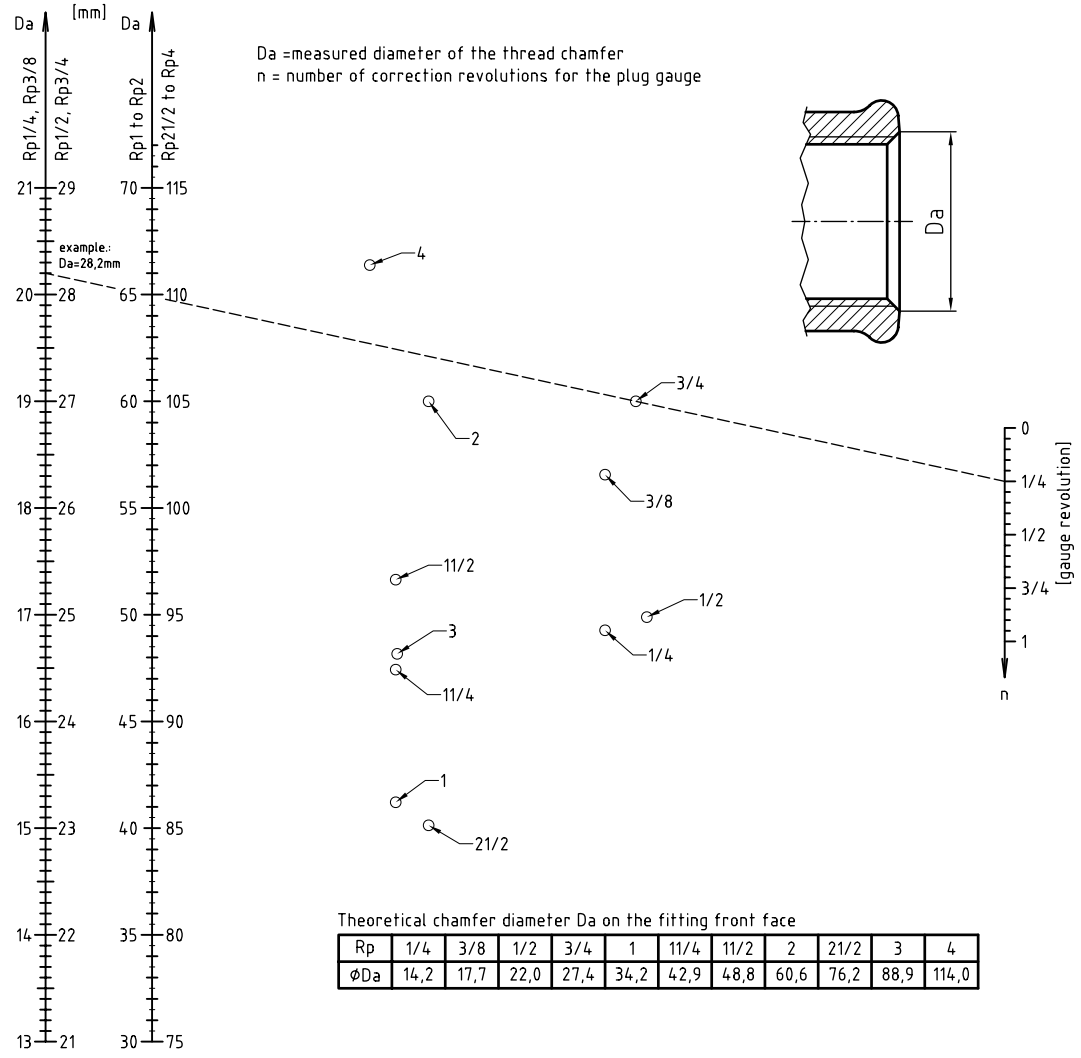
The bigger the chamfer the further the plug gauge can be screwed in; i.e. the thread diameter seems larger than it really is.

This is due to the thread section removed by the chamfer. Georg Fischer has developed the following nomogram to simply correct the effect of the chamfer on the test result. It should be used as follows:

The outer diameter D_a (Illustr. 7) of the thread chamfer is measured first. Then a straight line is drawn on the nomogram to join the points corresponding to the thread size and the measured diameter (D_a). The point of intersection of this straight line with the n axis, indicates the number of necessary correction revolutions n.

Correction is carried out by retracting the plug gauge by n revolutions, back from the hand tight position. The new position of the plug gauge indicates the actual size of the internal thread diameter.

Example:
On the elbow 90-3/4 a chamfer diameter of (D_a=) 28.2 mm was measured. By joining the points D_a= 28.2 and 3/4, and extending the line n = 1/4 is read on the n axis.



Theoretical chamfer diameter Da on the fitting front face

Rp	1/4	3/8	1/2	3/4	1	11/4	11/2	2	21/2	3	4
⌀Da	14,2	17,7	22,0	27,4	34,2	42,9	48,8	60,6	76,2	88,9	114,0

Illustr. 7 Nomogram (to be reproduced only with the express permission of Georg Fischer)

Pipe threads (EN 10226/ISO 7) and threaded pipes (EN 10255/ISO 65)
The most important dimensions

Thread size Nominal diameter DN		1/8 6	1/4 8	3/8 10	1/2 15	3/4 20	1 25	11/4 32	11/2 40	2 50	21/2 65	3 80	4 100	5 125	6 150
Pipe threads															
Plug gauge diameter (thread external diameter in the measuring plane)	mm	9,728	13,157	16,662	20,955	26,441	33,249	41,910	47,803	59,614	75,184	87,884	113,030	138,430	163,830
Pitch	mm	0,907	1,337	1,337	1,814	1,814	2,309	2,309	2,309	2,309	2,309	2,309	2,309	2,309	2,309
Number of threads per inch		28	19	19	14	14	11	11	11	11	11	11	11	11	11
Gauge length «a» (external thread)	mm	4,0	6,0	6,4	8,2	9,5	10,4	12,7	12,7	15,9	17,5	20,6	25,4	28,6	28,6
Tolerance for «a»	mm	± 0,9	± 1,3	± 1,3	± 1,8	± 1,8	± 2,3	± 2,3	± 2,3	± 2,3	± 3,5	± 3,5	± 3,5	± 3,5	± 3,5
Fitting allowance «b» Number of threads		2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	3 1/4	4	4	4 1/2	5	5
length [ca.=approx.]	ca. mm	7,0	10,0	10,0	13,0	15,0	17,0	19,0	19,0	24,0	27,0	30,0	36,0	40,0	40,0
Threaded pipes															
Outside diameter	mm	10,2	13,5	17,2	21,3	26,9	33,7	42,4	48,3	60,3	76,1	88,9	114,3	139,7	165,1
Surface area of the pipe	ca. m²/m	0,032	0,042	0,054	0,067	0,085	0,106	0,133	0,152	0,189	0,239	0,279	0,359	0,439	0,519
Medium duty															
Wall thickness	ca. mm	2,0	2,3	2,3	2,6	2,6	3,2	3,2	3,2	3,6	3,6	4,0	4,5	5,0	5,0
Inside diameter	ca. mm	6,2	8,9	12,6	16,1	21,7	27,3	36,0	41,9	53,1	68,9	80,9	105,3	129,7	155,1
Clear opening	ca. cm²	0,30	0,62	1,25	2,04	3,70	5,85	10,18	13,79	22,15	37,28	51,40	87,09	132,12	188,94
Capacity	ca. l/m	0,030	0,062	0,125	0,204	0,370	0,585	1,018	1,379	2,215	3,728	5,140	8,709	13,212	18,894
Pipe mass, plain end black pipe	ca. kg/m	0,40	0,64	0,84	1,21	1,56	2,41	3,10	3,56	5,03	6,42	8,36	12,20	16,60	19,80
Heavy duty															
Wall thickness	ca. mm	2,6	2,9	2,9	3,2	3,2	4,0	4,0	4,0	4,5	4,5	5,0	5,4	5,4	5,4
Inside diameter	ca. mm	5,0	7,7	11,4	14,9	20,4	25,7	34,4	40,3	51,3	67,1	78,9	103,5	128,9	154,3
Clear opening	ca. cm²	0,19	0,47	1,02	1,74	3,27	5,19	9,29	12,76	20,66	35,36	48,89	84,13	130,50	186,99
Capacity	ca. l/m	0,020	0,047	0,102	0,174	0,327	0,519	0,929	1,276	2,066	3,536	4,889	8,413	13,050	18,699
Pipe mass, plain end black pipe	ca. kg/m	0,49	0,77	1,02	1,44	1,87	2,93	3,79	4,37	6,19	7,93	10,30	14,50	17,90	21,30

For details see the relevant standards

Length tolerances

The permitted length tolerances for standardised types of fittings are given in the table below.
For straight parts (nipples, sockets, etc) the tolerance refers to the face to face dimension.
For fittings with changes of direction (bends, elbows, tees) the tolerance refers to the face to centre (axis) dimension.

The stated tolerances for **unions** are referring to the individual union parts and not to the complete fitting.

Length tolerance — Dimensions in mm

Dimensions (overall lengths)			tolerance
	to	30	± 1,5
over 30	to	50	± 2,0
over 50	to	75	± 2,5
over 75	to	100	± 3,0
over 100	to	150	± 3,5
over 150	to	200	± 4,0
over 200			± 5,0

Angle tolerance

The axis of the fitting threads may deviate by a maximum of 0.5° from the specified angle.

Widths across flats for malleable iron fittings

The catalogue section gives the sizes of wrenches required.

Steel fittings

Steel fittings are marked with "**ST**" in the catalogue section. For technical reasons the zinc coating of the steel fittings is done by electroplating. Galvanised steel fittings are therefore not suitable for drinking water installations.

Georg Fischer steel fittings (apart from cat. nos. 290, 291, 531, 596) can be recognised by a code groove on the hexagon.

Union fittings

Flat seat unions

Flat seat unions are supplied without sealing gaskets (except 599a, 1330, 1335). The overall lengths and z dimensions refer to the assembled union with a sealing gasket 2 or 3 mm thick (see page 79 for sizes of sealing gaskets). The choice of a suitable sealing ring material depends on the working requirements.

During production pressure tests are only carried out on the piece parts (union ends and union bushes).

Flat seat unions can be dismantled completely and reassembled (see Illustr. 8).

Illustr. 8 Flat seat union Fig. 330

Taper seat unions

Before use of all conical (metallic) seat unions the sealing surfaces are to be cleaned and to be treated with a thin film of lubricant (like oil or in case of drinking water exclusively one that is suitable according to DIN 30660 e.g. thread sealing paste to DIN 30660).

If taper seat unions are reused, Georg Fischer do not take over a warranty for the sealing performance.

Conical/spherical and spherical sealing seat unions

Fig. 342 and 342a offer high sealing efficiency due to specially formed sealing surfaces. Fig. 346 with spherically produced sealing surfaces allows a smooth angular movement from 0 to 6°.
Limits for the use of figures 342, 342a and 346 see page 76. Fig. 342 and 342a are not suitable for use in drinking water installations.

Union piece parts

Most Georg Fischer flat seat union components are available as spare parts.

Georg Fischer taper seat union piece parts must not be interchanged or reused. Therefore we do only offer these for sale in exceptional cases.

Taper seat union ends and bushes are inspected in the works, fitted together and only available at the sales outlets as a complete assembly.

We would like to point out that cast-on flanges and taper dimensions on union piece parts are not standardised on either an international or on a European level. They are subject to a works standard which may be revised for technical reasons. Georg Fischer assumes no liability for pressure tightness if these parts are interchanged with other taper seat unions parts of Georg Fischer or other brands, or if the fitting are reused after dismantling.

Guideline for tightening taper seat unions (Final assembly) valid also for fig. 342, 342a, and 346

Fitting size	1/8	1/4	3/8	1/2	3/4	1	11/4	11/2	2	21/2	3	4
Tightening torque Nm	15	20	30	50 **) 60	65 **) 80	80 **) 100	150	180	240	310	350	470
max. allowable revolutions *)	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2

*) maximal nut-revolutions after hand-tight fastening

**) deviating tightening torques for 342, 342a and 346

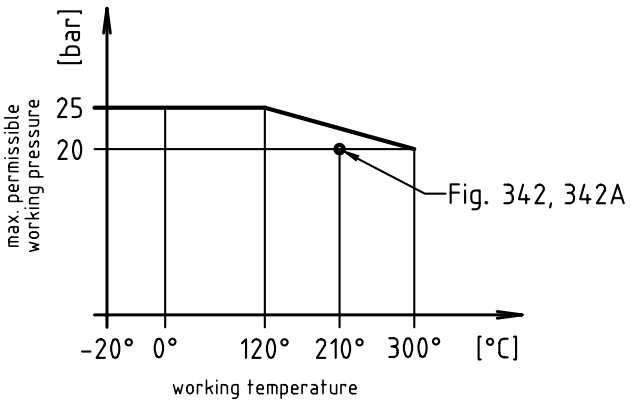
Application notes

Range of application

Malleable cast iron fittings are used for conveying liquids and gases up to the pressure and temperature limits specified in standard ISO 49 and EN 10242. Fittings and union piece parts are tested individually for leak tightness. The test pressures are above the values stipulated in the standard. Unless otherwise specified (see specially pressure tested fittings), the following working pressures and temperatures apply for the parts in the Georg Fischer range of malleable iron fittings.

Working temperature °C	Maximum permissible working pressure bar *)
-20 up to 120	25
between 120 and 300	interpolated values
300	20

*) 1bar = 10^5N/m² = 100kPa



Exceptions:
Figure 342, 342a max. 210°C / max. 20 bar
Figure 346 max. 300°C / max. 20 bar

Installations of malleable iron fittings

The limits of use for specific applications can be found in international, European and national guidelines (e.g. norms, rules, regulations of regional supply companies etc.).

Specially pressure tested fittings

Fittings for higher working pressures than 25 bar are available on request in the dimension range from 3/8 to 3.

They are subjected to a separate individual test (at 100 bar test pressure), they are marked with yellow colour and the letter "P".
A test report is available on request.

Type tested fittings

These fittings are mainly used in gas-high pressure fire extinguishing systems according to the German VdS-Rules. **A type test** is carried out on fitting samples. The fitting body must withstand a pressure of 300 bar without bursting. (These test pressure should not be mixed up with the permissible working pressure.)

Before delivery these parts are subjected to a separate individual pressure test, they are marked with red colour and with the letter "D".
A test report is available on request.

There is only a limited range of Georg Fischer malleable iron fittings available as type tested fittings. The list of type tested fittings is available on request.

Hot dip galvanised malleable iron fittings

Apart from the steel fittings (marked with "**ST**") galvanised items in the George Fischer range of fittings are hot dip galvanised, in accordance with the requirements in ISO 49 and/or EN 10242, and DIN 50930-6.

The protective coat consists of several iron-zinc alloy layers covered by a layer of pure zinc. To avoid damage by corrosion in hot dip galvanised pipework systems the build-up of homogeneous, protective layers is necessary. To achieve this state certain conditions (e.g. as described in EN 12502-3) are necessary.

The effect of the following parameters must be taken into account:

- material property
- water quality
- working conditions
- design and installation of the pipework system

Under normal circumstances the outer layer formation arising from the positive combination of this criteria is accompanied by the physical wearing away of the pure zinc coating.

Reusability of dismantled fittings

When the threaded joint between fittings and threaded pipes is correctly made, no permanent deformation of fittings occurs and the fittings may be reused.

In contrast to that permanent deformation of the external thread at the pipe occurs. Therefore pipes should not be reused after dismantling.

Taper (metalic) seat unions and union piece parts see page 75.

Welding and brazing

The EN-GJMW-400-5 material used for Georg Fischer fittings is not ideal for welding and brazing.
The chemical analysis of this material differs from weldable materials mainly in the silicon, sulphur, manganese and carbon content.

The conditions necessary for welding or brazing are a maximum carbon content of 0.3% which can be achieved with an additional heat treatment. Elongation values are established approximately as required for welding and brazing qualities - measured on a 9 mm test bar.

In summary the Georg Fischer EN-GJMW-400-5 material is only **suitable** for welding or brazing after additional heat treatment. After this **additional** heat treatment we recommend that on welding applications welding tests be carried out on test components to ascertain whether the required standards have been met. This is important for welded connections because compared with soldering, changes in the microstructure are greater because of the higher temperatures during welding.

In either case, apart from material specific instructions further constructive and process engineering conditions are required in case of welding and brazing joints.

Sealing material for thread connections

Sealing material

In a taper/parallel threaded joint, the sealing material has the task of filling in unavoidable deviations from the theoretical thread profile, and roughness at the thread surface. Tensile load, compressive stress or reversed bending stress on the joint is absorbed by the metal to metal contact.

Only permitted sealing materials should be used to seal threads on potable water and gas installations. Testing of sealing agents is carried out according to EN 751 : Part 1 - anaerobic jointing compounds,
Part 2 - non-hardening jointing compounds,
Part 3 - unsintered PTFE tapes.

The alignment of already assembled fittings sometimes requires turning back conical / cylindrical joints up to a maximum of 45°. To assure that the sealing tape meets those requirements, in countries where this procedure is practiced, additional requirements have to be met. These sealing tapes have to be additionally marked with "Rp" according EN 751-2.

Paraliq PM35 sealing paste and paraliq fleece are not hardening and have been tested to DIN 30660 and authorised by DVGW and ÖVGW for gas (up to 4 or 5 bar/80° C), drinking water installations (up to 16 bar/95° C) and water installation systems (6 bar/ 130°C) conforming to standards in domestic installations. Sealing materials must be suitable for the application and working conditions. If no other practical data is available, the table below provides a guide.

Connections on gaslines and pipelines for higher pressure requirements call for special care. For other application fields the relevant regulations on the use of thread connections must be complied with.

sealing material / medium	Georg Fischer products						Foreign manufactured products			
	hemp with Paraliq PM35 sealing compound	Paraliq PM35-Vlies thread sealing tape		hemp and synthesol sealing compound	synthesol-fleece sealing tape		PTFE teflon standard sealing tape	PTFE teflon special sealing tape **)	Polyamid-cord impregnated with sealing compounds	anaerobic sealing compounds
Thread size	1/2-4	1/2-21/2	3-4	1/2-4	1/2-21/2	3-4	1/2-11/4	1/2-2	1/2-4	1/2-4
drinking water up to 60°C	●	●	○	●	●	○	●	●	●	●
waters within a system up to 130°C *)	●	●	○	●	●	○	●	●	●	●
natural gas, town gas and liquid gases	●	●	○	●	●	○	●	●	●	●
compressed air oiled and unoiled	●	●	○	●	●	○	●	●	●	●
steam up to150°C	-	-		-	-		●	●	○	●
up to250°C	-	-		-	-		-	●	-	●
heating and diesel oils, petrol max. 80°C	-	-		●	●	●	●	●	-	●
hydraulic oils up to 200°C	-	-		-	-		●	●	-	○

● suitable ○ conditionally suitable - unsuitable

*) waters within a system: in closed circuit systems inducted drinking water (e.g. water in hot water heating) without chemical additives

**) thick teflon tapes (with large area-related mass)

Other media on request!

Sealing Gasket Dimensions (Gaskets should be sourced from specialist suppliers)

Jointing thread Fitting size R/Rp	Fastening thread G	**Gasket** Inside diameter x Outside diameter	Thickness	For **complete unions** (and/or regulation sockets and plugs) **Catalogue number**														Can be used for **Special dimensions of union piece parts, catalogue number**		
				95	**97**	**100**	**101**	**330**	**331**	**332**	**335**	**336**	**338**	**595**	**599a**	**1330**	**1335**	**370**	**372**	**376**
1/4	5/8	13x20	2					●	●											
3/8	3/4	17x24	2	●	●			●	●											
1/2	3/8	17x24	2												■					
1/2	1/2	22x30	2							○				●						
1/2	1	21x30	2	●	●	●	●	●	●	●	●	●								
1/2	11/8	24x34	2													■	■	●	●	●
3/4	1/2	21x28,5	2												■					
3/4	3/4	27x36	2							○				●						
3/4	11/4	27x38	2	●	●	●	●	●	●	●	●	●	●			■	■			
1	3/4	26,5x34,5	2												■					
1	1	34x43	2							○				●						
1	11/2	32x44	2	●	●	●	●	●	●	●	●	●	●			■	■			
11/4	11/4	43x53	2							○										
11/4	11/8	38x48	2												■					
11/4	2	42x55	2	●	●			●	●	●	●	●	●							
11/2	11/4	42x52	2												■					
11/2	11/2	48x60	2							○										
11/2	21/4	46x62	2	●	●			●	●	●	●	●								
2	13/4	54x64	3												■					
2	2	61x73	3							○										
2	23/4	60x78	3	●	●			●	●	●										
21/2	31/2	75x97	3					●	●											
3	4	88x110	3					●	●											
4	5	115x135	3					●												

● recommended gasket ○ recommended gasket for figure no. 373 for the middle plane face

■ gaskets supplied

Jointing thread R/Rp	Nominal diameter, DN	Gasket (inside diameter x Outside diameter) can be used for **flanges, catalogue number**	
		326	**329**
1/2	15	22x 43	24 x 51
3/4	20	28x 53	30 x 61
1	25	35x 63	36 x 71
11/4	32	43x 75	45 x 82
11/2	40	49x 85	49 x 92
2	50	61x 95	61 x 107
21/2	65	77x 115	77 x 127
3	80	90x 123	90 x 142
4	100	115x 152	115 x 162

Except for catalogue nos. 599a, 1330 and 1335 gaskets are not supplied together with the unions because the appropriate sealing material must be selected according to the conditions of use.

Guideline for distance between support brackets on steel pipelines

Jointing thread	Steel pipes	
	Nominal diameter DN	Distance between brackets m
3/8	10	2,25
1/2	15	2,75
3/4	20	3,00
1	25	3,50
11/4	32	3,75
11/2	40	4,25
2	50	4,75
21/2	65	5,50
3	80	6,00
4	100	6,00

Heat expansion in steel pipelines

Any temperature change in a pipeline results in a change in length, which can cause considerable stresses on the joints, fastening elements, the structural parts, appliances and plumbing fixtures. These effects **must** be taken into account when installing steel pipelines. A difference in temperature of 100 K will cause a 1 m steel pipe to expand by 1.2 mm. Changes in length of steel pipelines can be read from the table or can be calculated using the formula below. Usually the critical difference in temperature is the difference between the maximum working temperature and the temperature on installation.

Formula for calculating the change in length:
$\Delta l = 0{,}012 \times l \times \Delta T$

Changes in length of steel pipes due to differences in temperature

Pipe length l (m)	Difference in temperature ΔT (K)									
	10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
	Change in length Δl (mm)									
1	0,12	0,24	0,36	0,48	0,60	0,72	0,84	0,96	1,08	1,20
2	0,24	0,48	0,72	0,96	1,20	1,44	1,68	1,92	2,16	2,40
3	0,36	0,72	1,08	1,44	1,80	2,16	2,52	2,88	3,24	3,60
4	0,48	0,96	1,44	1,92	2,40	2,88	3,36	3,84	4,32	4,80
5	0,60	1,20	1,80	2,40	3,00	3,60	4,20	4,80	5,40	6,00
6	0,72	1,44	2,16	2,88	3,60	4,32	5,04	5,76	6,48	7,20
7	0,84	1,68	2,52	3,36	4,20	5,04	5,88	6,72	7,56	8,40
8	0,96	1,92	2,88	3,84	4,80	5,76	6,72	7,68	8,64	9,60
9	1,08	2,16	3,24	4,32	5,40	6,48	7,56	8,64	9,72	10,80
10	1,20	2,40	3,60	4,80	6,00	7,20	8,40	9,60	10,80	12,00
11	1,32	2,64	3,96	5,28	6,60	7,92	9,24	10,56	11,88	13,20
12	1,44	2,88	4,32	5,76	7,20	8,64	10,08	11,52	12,96	14,40
13	1,56	3,12	4,68	6,24	7,80	9,36	10,92	12,48	14,04	15,60
14	1,68	3,36	5,04	6,72	8,40	10,08	11,76	13,44	15,12	16,80
15	1,80	3,60	5,40	7,20	9,00	10,80	12,60	14,40	16,20	18,00
16	1,92	3,84	5,76	7,68	9,60	11,52	13,44	15,36	17,28	19,20
17	2,04	4,08	6,12	8,16	10,20	12,24	14,28	16,32	18,36	20,40
18	2,16	4,32	6,48	8,64	10,80	12,96	15,12	17,28	19,44	21,60
19	2,28	4,56	6,84	9,12	11,40	13,68	15,96	18,24	20,52	22,80
20	2,40	4,80	7,20	9,60	12,00	14,40	16,80	19,20	21,60	24,00

z dimension method

Introduction

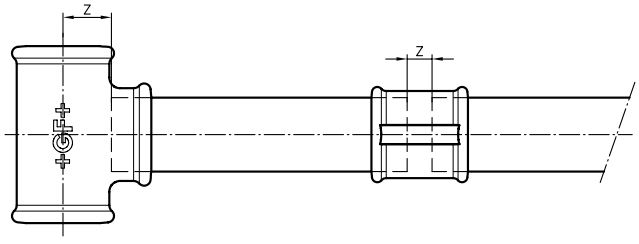
The z dimension installation method, developed by Georg Fischer in conjunction with experienced installers of domestic and industrial piping systems, has been proving its worth for years in practical applications. The method offers a basis for efficient planning, preparation for work and preliminary assembly and can result in savings in time and effort:

- staff use can be reliably planned
- administrative work more easily completed
- calculation and costing simplified
- optimised machine use
- reduced storage requirement of own fittings and pipes
- optimisation of transportation
- the pipeline layout can easily be recognized by the pipeline diagram.

z dimension

The z dimension - also called «laying length» is the middle distance between

- installed pipe end and the axis of the fitting or
- the ends of two installed pipes



The z dimensions are calculated from the overall lengths less the average length of engagement. z dimensions were introduced by Georg Fischer with a view to rational planning and preparation for work.

Requirements

The z dimension method relies on:

- knowledge of the pipeline layout
- knowledge of the space requirements of valves, appliances and their locations.
- co-ordination with architect, planner, works management and the other businesses who work may have an influence on the pipeline layout.
- use of fittings with consistant dimensional accuracy, such as **Georg Fischer's**.
- Pipe threads conforming to standards, implying combined exact adjustment of the threading machine.

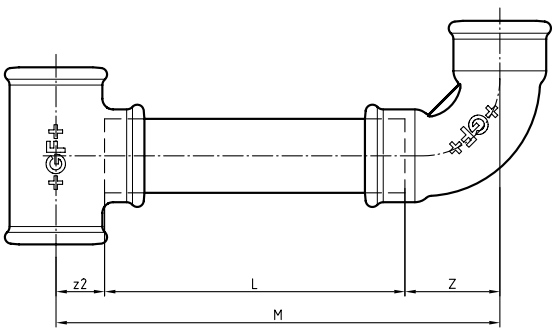
z dimension and measurement procedure

z dimension and uniform measuring procedure are the core of the Georg Fischer installation method.

The z dimension is the pipe installers «design dimension». With its help he can easily calculate the exact pipe length between fittings and/or valves. The principle of

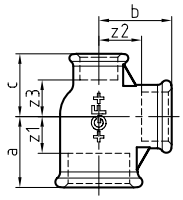
standardised measuring centre - centre = M

forms the basis for determining and using the z dimension



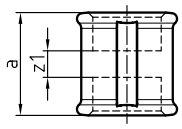
Pipe length L = M - (z2 + z)

The z dimension is calculated as the difference between «dimension face - middle» (a, b or c) and length of engagement of the pipe thread.

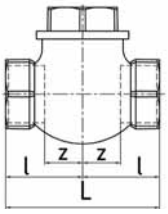


For fittings, e.g. tee no. 130, reduced branch and run:
z1 = a-length of engagement
z2 = b-length of engagement
z3 = c-length of engagement

The fitting‘s bead deliberately put on the Georg Fischer fittings can be used as a measuring aid.



Exception - socket no. 270, 271:
z1 = a-2 length of engagement



For valves:
z = l - length of engagement
If the total overall length is indicated by L,the following applies:

z = L/2 - length of engagement

Pipe threads

(see pages 69pp)

Another pre-condition for using the **Georg Fischer** z dimension method is that the pipes are cut with the correct standardised threads. This assures that all pipes with the connecting pieces can be screwed together equally far and the dimensions M taken as a base are also correct after installation.

The pipe thread must be cut clean and to EN 10226-1 standard (or ISO 7-1 with a taper of 1:16). The taper pipe thread also produces a strengthening of the pipe residual wall in the second half of the thread.
Unequal thread lengths influence the centre-centre dimension M and have a negative effect particularly for straight section with several branches.

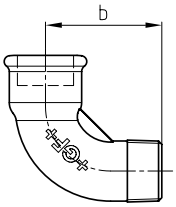
Note:
The centre-centre dimension (M) can show a permitted tolerance of ± 1/2 thread.

Length of engagement

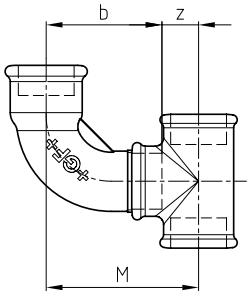
The nominal engagement length of the pipe external thread are (rounded values):

Joint size	Average length of engagement in mm
1/8	**7**
1/4	**10**
3/8	**10**
1/2	**13**
3/4	**15**
1	**17**
11/4	**19**
11/2	**19**
2	**24**
21/2	**27**
3	**30**
4	**36**

Examples of use

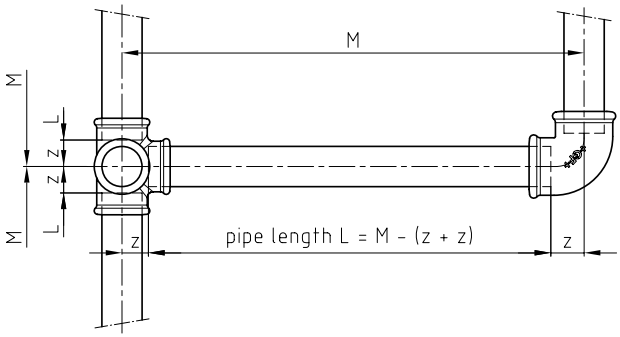


b is the distance of internal thread centre to face of the external thread.

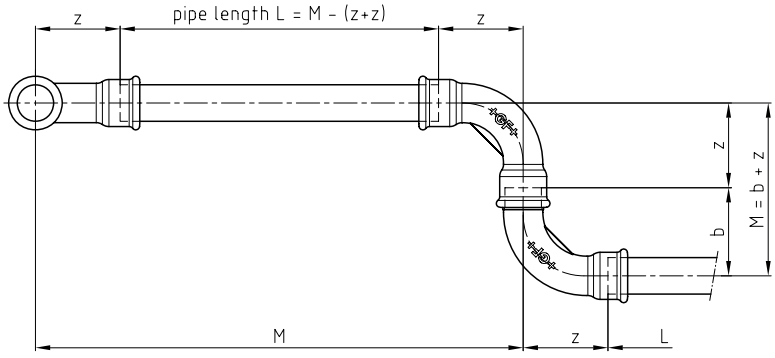


For fittings combinations with internal and external threads the sum of z + b produces the axial distance M:

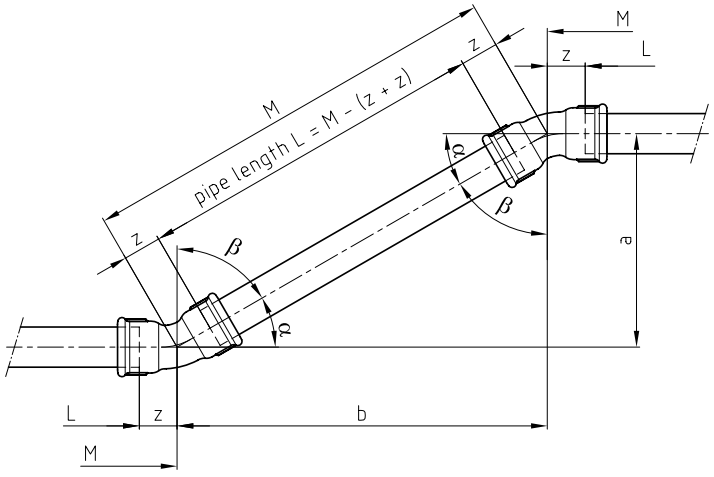
M = z + b



Principle of the z dimension installation method: uniform measuring centre - centre = M



Exact pipe thread lengths produce exact M dimensions.



The M dimension for sloping pipeline parts is easily calculated with the factor or numerical table.

Calculation of the length of sloping pipelines

Parts of a pipeline diverging from the horizontal and verticals can only be accurately marked out in a few cases. Accurate results are obtained by rectangular measuring and determining the remaining (triangle) side lengths.

There are two possibilities for calculating the pipe lengths by means of the z dimensions:

1.Factor table

given:		a		b	
		Factor for		Factor for	
α	β	b	c = M	a	c = M
75°	15°	0,268	1,035	3,732	3,864
60°	30°	0,577	1,155	1,732	2,000
45°	45°	1,000	1,414	1,000	1,414
30°	60°	1,732	2,000	0,577	1,155
15°	75°	3,732	3,864	0,268	1,035

- α = given angle
- β = accompanying angle
- angle-dependent factors multiplied with the given dimension a or b = sought dimensions b and c or a and c.

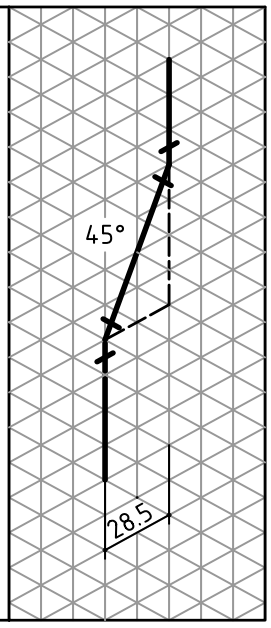
Example:

a = 28,5

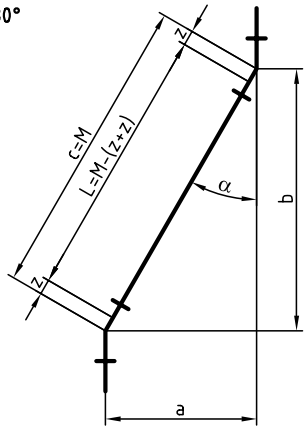
α = 45°

c = M = 28,5 x 1,414

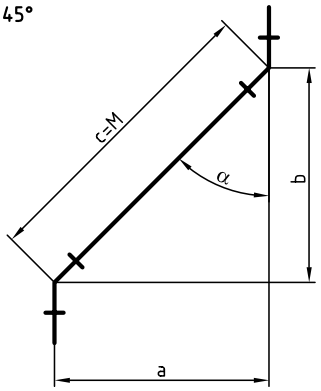
= 40,3



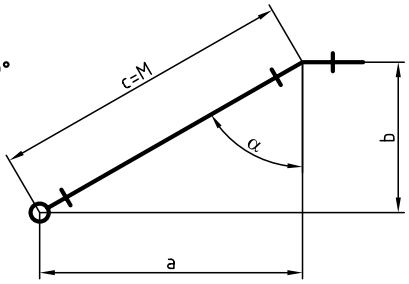
30°



45°



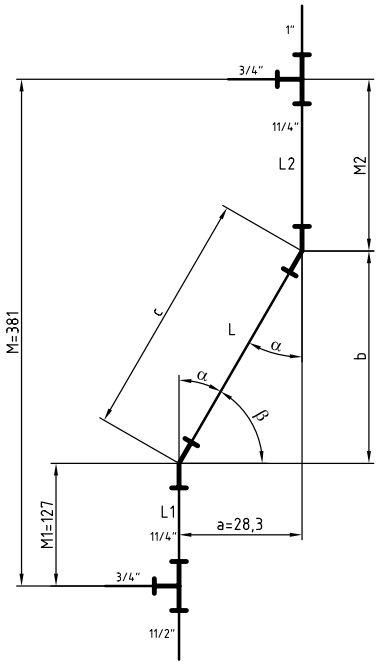
60°



2. Numerical table

see table page 86.

Example:
Tier in a rising train of pipes. The dimensions M, M_1 and a are taken on the site, the remainder are to be determined from the table.



Planned fittings (from bottom to top):
1 tee no. 130 - 11/2 x 3/4 x 11/4
2 bends no. 51 - 11/4
1 tee no. 130 - 11/4 x 3/4 x 1

The projection a is 28.3 cm = 283 mm.
283 consists of 3 + 80 + 200. In columns b and c we find the partial values belonging to 3, 80 and 200 for the perpendiculars b and the slopes c.

In this case lengths b and c result from adding up the partial values α = 30°, β = 60°.

a (known)	b	c
3 mm	5,2 mm	6 mm
80 mm	138,6 mm	160 mm
200 mm	346,4 mm	400 mm
283 mm	**490,2 mm**	**566 mm**
or a=28,3 cm	b=49,0 cm	c= 56,6 cm

Pipe length L = c - (2 x z dimension of bend no. 51 - 11/4)
z dimension bend = 33 mm
L = 56.6 - (2 x 3.3) = 56.6 - 6.6 = 50 cm

Pipe length L_1 = M_1 - (sum of the z dimension of tee piece no. 130 - 11/2 x 3/4 x 11/4 and bend no 51 - 11/4)
z dimension tee no. 130 (on 11/4 exit) = 17 mm
z dimension bend = 33 mm
L_1 = 127 - (1.7 + 3.3) = 127 - 5 = 122 cm

M_2 = M - (M_1 + b), M_1 = 127, b = 49
M_2 = 381 - (127 + 49) = 381 - 176 = 205 cm

Pipe length L_2 = M_2 - (sum of the z dimensions of bend no. 51 - 11/4 and tee piece no. 130 - 11/4 x 3/4 x 1)
z dimension bend = 33 mm
z dimension tee no. 130 (on the 11/4 exit) = 17 mm
L_2 = 205 - (3.3 + 1.7) = 205 - 5 = 200 cm

Table to calculate the lengths of sloping pipes (see text pages 84-85)

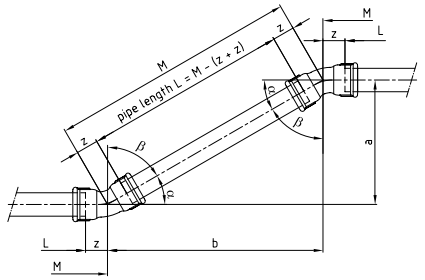
α	88,5°		87°		85°		80°		75°		70°		60°		45°		30°		15°		α
β	1,5°		3°		5°		10°		15°		20°		30°		45°		60°		75°		β
a	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	b	c	a
1	0,0	1,0	0,1	1,0	0,1	1,0	0,2	1,0	0,3	1,0	0,4	1,1	0,6	1,2	1	1,4	1,7	2	3,7	3,9	1
2	0,1	2,0	0,1	2,0	0,2	2,0	0,4	2,0	0,5	2,1	0,7	2,1	1,2	2,3	2	2,8	3,5	4	7,5	7,7	2
3	0,1	3,0	0,2	3,0	0,3	3,0	0,5	3,0	0,8	3,1	1,1	3,2	1,7	3,5	3	4,2	5,2	6	11,2	11,6	3
4	0,1	4,0	0,2	4,0	0,3	4,0	0,7	4,1	1,1	4,1	1,5	4,3	2,3	4,6	4	5,7	6,9	8	14,9	15,5	4
5	0,1	5,0	0,3	5,0	0,4	5,0	0,9	5,1	1,3	5,2	1,8	5,3	2,9	5,8	5	7,1	8,7	10	18,7	19,3	5
6	0,2	6,0	0,3	6,0	0,5	6,0	1,1	6,1	1,6	6,2	2,2	6,4	3,5	6,9	6	8,5	10,4	12	22,4	23,2	6
7	0,2	7,0	0,4	7,0	0,6	7,0	1,2	7,1	1,9	7,2	2,5	7,4	4,0	8,1	7	9,9	12,1	14	26,1	27,0	7
8	0,2	8,0	0,4	8,0	0,7	8,0	1,4	8,1	2,1	8,3	2,9	8,5	4,6	9,2	8	11,3	13,9	16	29,9	30,9	8
9	0,2	9,0	0,5	9,0	0,8	9,0	1,6	9,1	2,4	9,3	3,3	9,6	5,2	10,4	9	12,7	15,6	18	33,6	34,8	9
10	0,3	10,0	0,5	10,0	0,9	10,0	1,8	10,2	2,7	10,4	3,6	10,6	5,8	11,5	10	14,1	17,3	20	37,3	38,6	10
20	0,5	20,0	1,0	20,0	1,7	20,1	3,5	20,3	5,4	20,7	7,3	21,3	11,5	23,1	20	28,3	34,6	40	74,6	77,3	20
30	0,8	30,0	1,6	30,0	2,6	30,1	5,3	30,5	8,0	31,1	10,9	31,9	17,3	34,6	30	42,4	52,0	60	112,0	115,9	30
40	1,0	40,0	2,1	40,1	3,5	40,2	7,1	40,6	10,7	41,4	14,6	42,6	23,1	46,2	40	56,6	69,3	80	149,3	154,5	40
50	1,3	50,0	2,6	50,1	4,4	50,2	8,8	50,8	13,4	51,8	18,2	53,2	28,9	57,7	50	70,7	86,6	100	186,6	193,2	50
60	1,6	60,0	3,1	60,1	5,2	60,2	10,6	60,9	16,1	62,1	21,8	63,9	34,6	69,3	60	84,9	103,9	120	223,9	231,8	60
70	1,8	70,0	3,7	70,1	6,1	70,3	12,3	71,1	18,8	72,5	25,5	74,5	40,4	80,8	70	99,0	121,2	140	261,2	270,5	70
80	2,1	80,0	4,2	80,1	7,0	80,3	14,1	81,2	21,4	83,8	29,1	85,1	46,2	92,4	80	113,1	138,6	160	298,6	309,1	80
90	2,4	90,0	4,7	90,1	7,9	90,3	15,9	91,4	24,1	93,2	32,8	95,8	52,0	103,9	90	127,3	155,9	180	335,9	347,7	90
100	2,6	100,0	5,2	100,1	8,7	100,4	17,6	101,5	26,8	103,5	36,4	106,4	57,7	115,5	100	141,4	173,2	200	373,2	386,4	100
200	5,2	200,1	10,5	200,3	17,5	200,8	35,3	203,1	53,6	207,1	72,8	212,8	115,5	230,9	200	282,8	346,4	400	746,4	772,7	200
300	7,9	300,1	15,7	300,4	26,2	301,1	52,9	304,6	80,4	310,6	109,2	319,3	173,2	346,4	300	424,3	519,6	600	1.119,6	1.159,1	300
400	10,5	400,1	21,0	400,5	35,0	401,5	70,5	406,2	107,2	414,1	145,6	425,7	230,9	461,9	400	565,7	692,8	800	1.492,8	1.545,5	400
500	13,1	500,2	26,2	500,7	43,7	501,9	88,2	507,7	134,0	517,6	182,0	532,1	288,7	577,4	500	707,1	886,0	1.000	1.866,0	1.931,9	500
600	15,7	600,2	31,4	600,8	52,5	602,3	105,8	609,3	160,8	621,2	218,4	638,5	346,4	692,8	600	848,5	1.039,2	1.200	2.239,2	2.318,2	600
700	18,3	700,2	36,7	701,0	61,2	702,7	123,4	710,8	187,6	724,7	254,8	744,9	404,1	808,3	700	989,9	1.212,4	1.400	2.612,4	2.704,6	700
800	21,0	800,3	41,9	801,1	70,0	803,1	141,1	812,3	214,4	828,2	291,2	851,3	461,9	923,8	800	1.131,4	1.385,6	1.600	2.985,6	3.091,0	800
900	23,6	900,3	47,2	901,2	78,7	903,4	158,7	913,9	241,2	931,8	327,6	957,8	519,6	1.039,2	900	1.272,8	1.558,8	1.800	3.358,8	3.477,3	900
1.000	26,2	1.000,3	52,4	1.001,4	87,5	1.003,8	176,3	1.015,4	267,9	1.035,3	364,0	1.064,2	577,4	1.154,7	1.000	1.414,2	1.732,1	2.000	3.732,1	3.863,7	1.000
Example: the b and c belonging to a = 283 are the product of the b and c for 3.80 and 200															b and c for every other three figure number can be calculated in the same way.						
3	0,1	3,0	0,2	3,0	0,3	3,0	0,5	3,0	0,8	3,1	1,1	3,2	1,7	3,5	3	4,2	5,2	6	11,2	11,6	3
80	2,1	80,0	4,2	80,1	7,0	80,3	14,1	81,2	21,4	82,8	29,1	85,1	46,2	92,4	80	113,1	138,6	160,0	298,6	309,1	80
200	5,2	200,1	10,5	200,3	17,5	200,8	35,3	203,1	53,6	207,1	72,8	212,8	115,5	230,9	200	282,8	346,4	400,0	746,4	772,7	200
283	7,4	283,1	14,9	283,4	24,8	284,1	49,9	287,3	75,8	293,0	103,0	301,1	163,4	326,8	283	400,1	490,2	566,0	1.056,2	1.093,4	283

α = given angle

β = accompanying angle

a = given dimension

in the following boxes = the sought values b and c belonging to a, α and β



Clear outlining of the pipework

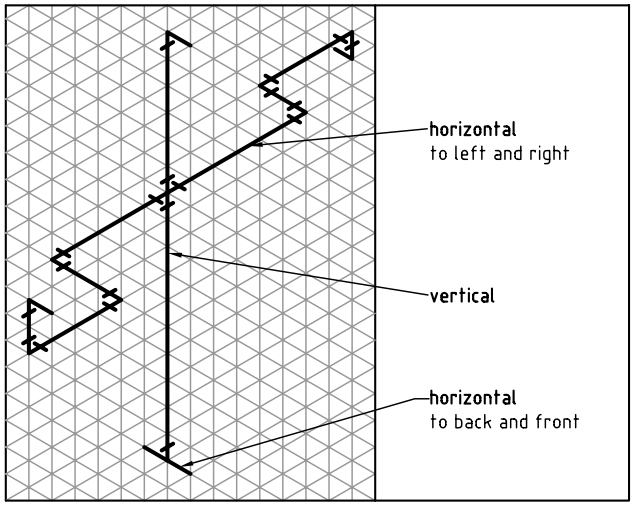
The isometric diagrams of pipes and horizontal projections are ideal for quick preparation when using the Georg Fischer installation method.

The drawing of the pipework should be given in a simple but effective way. The diagrams can be sketched by the installer himself on the spot.

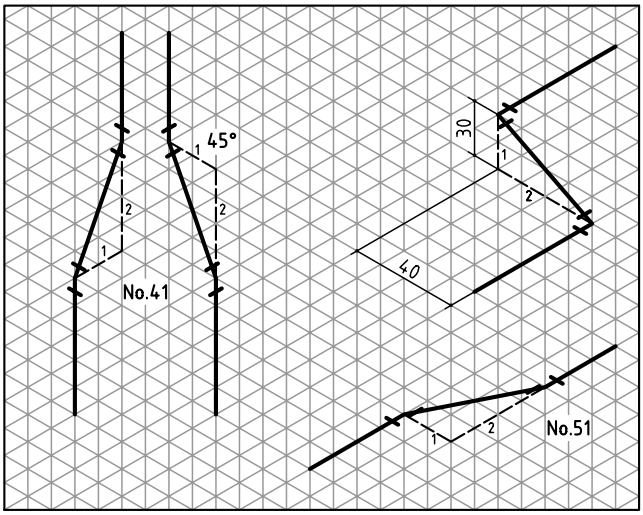
This type of representation enables quick outlining with no aids such as ruler, set square etc. either directly on the site of installation or according to a plan. The pipework system to be installed is always clearly recognisable with all necessary fittings, valves etc.

The 30° pipeline diagram (3D plan) is intentionally not drawn to scale, i.e. long pipe sections are made shorter, short pipe sections are to a large extent made somewhat longer. In this way even extensive pipe systems can be represented on an A4 sheet of paper.

Pipelines running at right angles to each other are drawn as shown below:

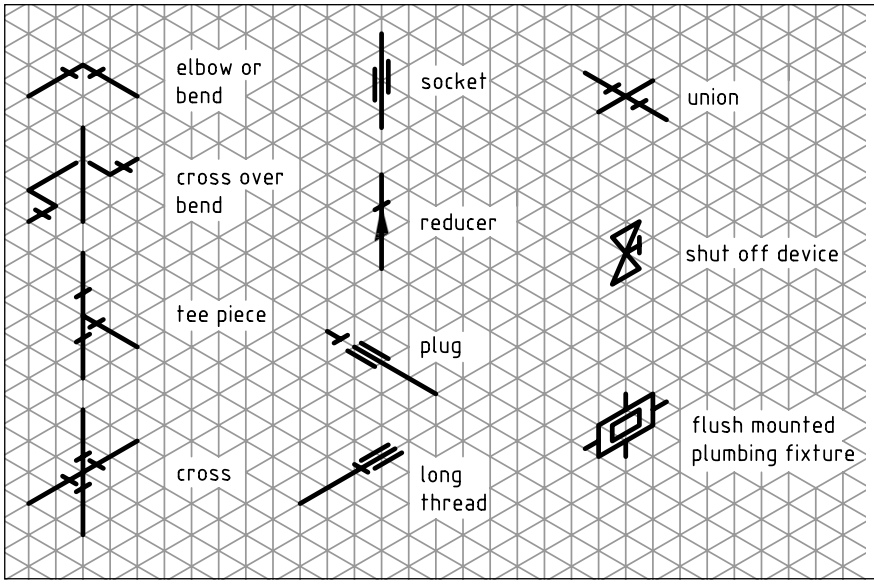


Pipelines sloping in relation to each other are drawn as shown in the example below:



Changes of direction are shown in the ratio of 2:1 or 1:2 irrespective of angles and dimensions. By drawing in the triangle as an aid the change of direction is set accurately. The divergence is established by giving the type of fitting (catalogue no. or angle) or by dimensioning.

Fittings and/or jointing points can be marked with a small dash, valves with the standardized symbols.



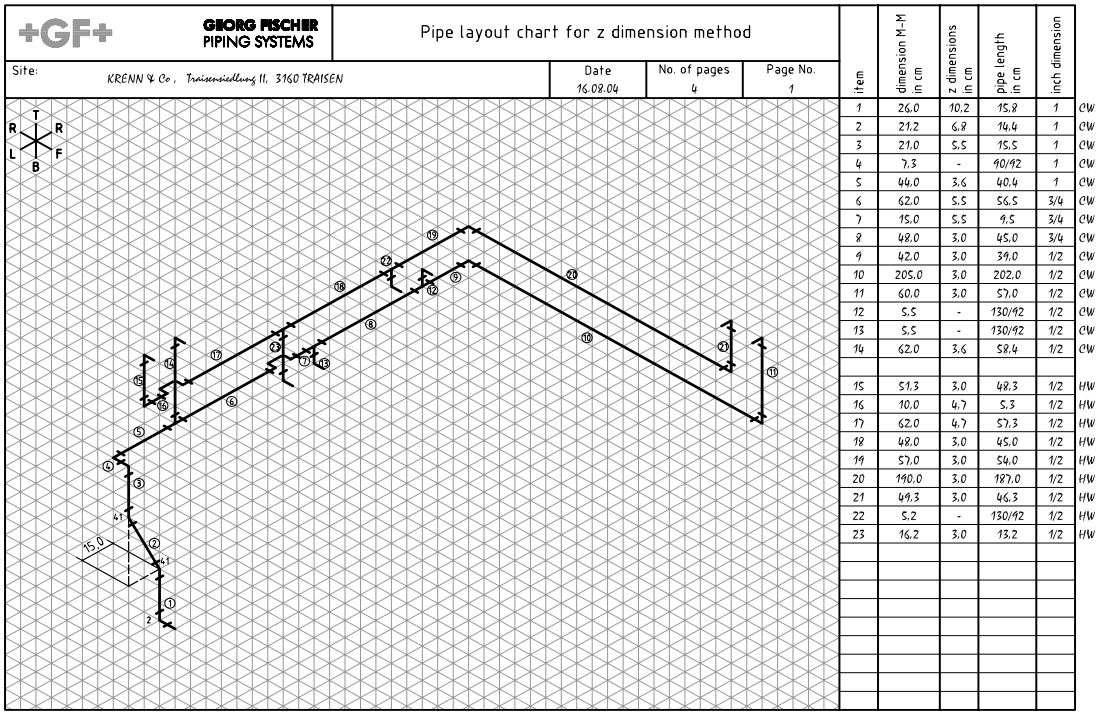
The most important symbols for drawing of pipe work on the **Georg Fischer** pipe layout chart

The Georg Fischer pipe layout chart

The 30° pipeline diagram can be drawn on the Georg Fischer pipe layout chart, for example. The oblong format selected is particularly suitable for use on the site. The area available for sketching, either allows sections of pipelines to be portrayed, or even more extensive part installations (e.g. cellar quantization, floor distributers) to be reproduced.

The advantages of the Georg Fischer pipe layout chart are obvious:

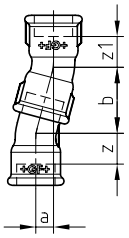
- division of the installation work
- quick drawing of the pipework diagram
- clear record of the centre - centre dimensions
- very simple pipe length calculation
- basis for a summary of pipe components
- costing document
- thus offering real rationalisation: measure, mark, cut into lengths and cut the thread for all pipes of the same diameter one after the other.
- If the project documents are saved, the pipe layout chart makes it possible to determine the pipeline layout exactly even years later. Extensions or repairs can be carried out considerably more easily.



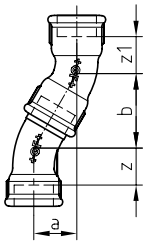
item	dimension M-M in cm	z dimensions in cm	pipe length in cm	inch dimension	
1	26,0	10,2	15,8	1	CW
2	21,2	6,8	14,4	1	CW
3	21,0	5,5	15,5	1	CW
4	7,3	-	90/92	1	CW
5	44,0	3,6	40,4	1	CW
6	62,0	5,5	56,5	3/4	CW
7	15,0	5,5	9,5	3/4	CW
8	48,0	3,0	45,0	3/4	CW
9	42,0	3,0	39,0	1/2	CW
10	205,0	3,0	202,0	1/2	CW
11	60,0	3,0	57,0	1/2	CW
12	5,5	-	130/92	1/2	CW
13	5,5	-	130/92	1/2	CW
14	62,0	3,6	58,4	1/2	CW
15	51,3	3,0	48,3	1/2	HW
16	10,0	4,7	5,3	1/2	HW
17	62,0	4,7	57,3	1/2	HW
18	48,0	3,0	45,0	1/2	HW
19	57,0	3,0	54,0	1/2	HW
20	190,0	3,0	187,0	1/2	HW
21	49,3	3,0	46,3	1/2	HW
22	5,2	-	130/92	1/2	HW
23	16,2	3,0	13,2	1/2	HW

Fittings combinations

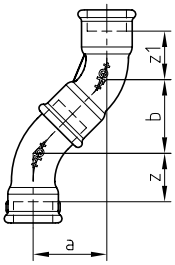
15°
53/54



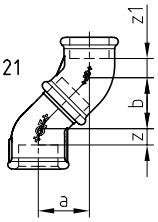
30°
50/51



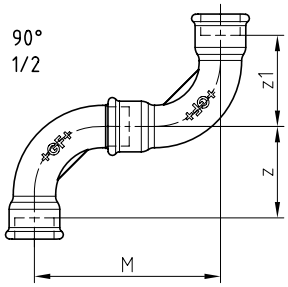
45°
40/41



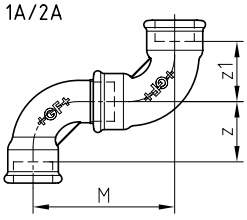
45°
120/121



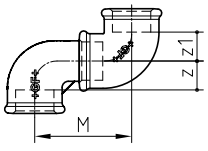
90°
1/2



90°
1A/2A

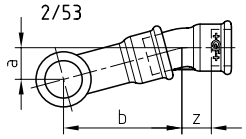


90°
90/92

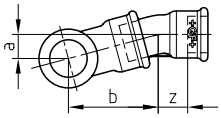


		15°	30°	45°			90°		
		53/54	50/51	40/41	120/121		1/2	1a/2a	90/92
3/8	**a**			**31**	**25**	**M**	**80**	**62**	**47**
	b			**31**	**25**	$z = z_1$	38	26	15
	z			20	10				
	z_1			20	10				
1/2	**a**	**9**	**21**	**37**	**26**	**M**	**90**	**77**	**52**
	b	**35**	**36**	**37**	**26**	$z = z_1$	42	32	15
	z	15	17	23	9				
	z_1	15	17	23	9				
3/4	**a**	**11**	**26**	**45**	**30**	**M**	**114**	**85**	**61**
	b	**42**	**44**	**45**	**30**	$z = z_1$	54	35	18
	z	18	21	28	10				
	z_1	18	21	28	10				
1	**a**	**13**	**32**	**54**	**34**	**M**	**143**	**109**	**73**
	b	**47**	**55**	**54**	**34**	$z = z_1$	68	46	21
	z	20	27	34	11				
	z_1	20	27	34	11				
11/4	**a**	**16**	**39**	**70**	**40**	**M**	**181**	**133**	**86**
	b	**58**	**67**	**70**	**40**	$z = z_1$	86	57	26
	z	24	33	45	14				
	z_1	26	33	45	14				
11/2	**a**	**16**	**42**	**76**	**45**	**M**	**202**	**151**	**96**
	b	**61**	**72**	**76**	**45**	$z = z_1$	97	66	31
	z	26	37	49	17				
	z_1	28	37	49	17				
2	**a**	**18**	**48**	**90**	**52**	**M**	**246**	**180**	**108**
	b	**66**	**83**	**90**	**52**	$z = z_1$	116	78	34
	z	27	42	57	19				
	z_1	27	42	57	19				
21/2	**a**			**112**	**53**	**M**	**314**	**203**	**130**
	b			**112**	**53**	$z = z_1$	149	88	42
	z			72	19				
	z_1			72	21				
3	**a**			**129**	**60**	**M**	**365**	**224**	**146**
	b			**129**	**60**	$z = z_1$	175	97	48
	z			83	22				
	z_1			83	24				
4	**a**			**166**		**M**	**469**	**294**	**178**
	b			**166**		$z = z_1$	224	129	60
	z			105					
	z_1			105					

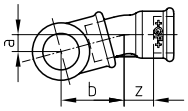
15°
2/53



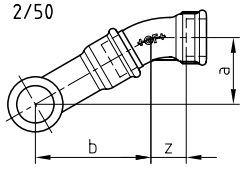
15°
2A/53



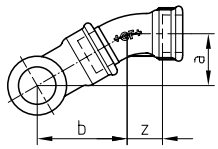
15°
90/53



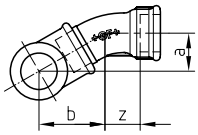
30°
2/50



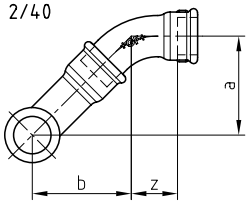
30°
2A/50



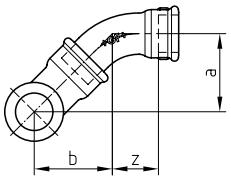
30°
90/50



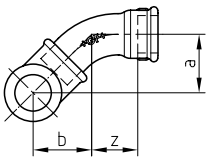
45°
2/40



45°
2A/40

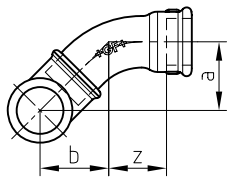


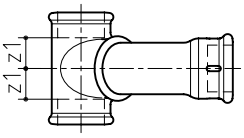
45°
90/40



		15°			30°			45°		
		2/53	**2a/53**	**90/53**	**2/50**	**2a/50**	**90/50**	**2/40**	**2a/40**	**90/40**
3/8	**a**							**44**	**35**	**28**
	b							**44**	**35**	**28**
	z							20	20	20
1/2	**a**	**16**	**14**	**9**	**33**	**28**	**20**	**51**	**44**	**32**
	b	**61**	**51**	**35**	**57**	**48**	**35**	**51**	**44**	**32**
	z	15	15	15	17	17	17	23	23	23
3/4	**a**	**20**	**15**	**11**	**42**	**33**	**24**	**64**	**50**	**38**
	b	**76**	**58**	**42**	**73**	**56**	**42**	**64**	**50**	**38**
	z	18	18	18	21	21	21	28	28	28
1	**a**	**25**	**19**	**13**	**52**	**41**	**29**	**78**	**62**	**45**
	b	**94**	**72**	**48**	**90**	**71**	**49**	**78**	**62**	**45**
	z	20	20	20	27	27	27	34	34	34
11/4	**a**	**31**	**24**	**16**	**65**	**51**	**35**	**99**	**78**	**57**
	b	**116**	**88**	**58**	**113**	**87**	**61**	**99**	**78**	**57**
	z	24	24	24	33	33	33	45	45	45
11/2	**a**	**34**	**26**	**17**	**72**	**56**	**39**	**110**	**88**	**63**
	b	**128**	**98**	**64**	**124**	**97**	**67**	**110**	**88**	**63**
	z	26	26	26	37	37	37	49	49	49
2	**a**	**41**	**31**	**19**	**85**	**66**	**44**	**132**	**105**	**74**
	b	**152**	**115**	**72**	**147**	**114**	**76**	**132**	**105**	**74**
	z	27	27	27	42	42	42	57	57	57
21/2	**a**	**52**	**36**	**24**	**108**	**77**	**54**	**166**	**123**	**91**
	b	**194**	**135**	**91**	**186**	**133**	**94**	**166**	**123**	**91**
	z	35	35	35	53	53	53	72	72	72
3	**a**				**126**	**87**	**63**	**194**	**139**	**105**
	b				**218**	**151**	**108**	**194**	**139**	**105**
	z				62	62	62	83	83	83
4	**a**				**162**	**115**	**80**	**250**	**183**	**134**
	b				**281**	**198**	**139**	**250**	**183**	**134**
	z				78	78	78	105	105	105

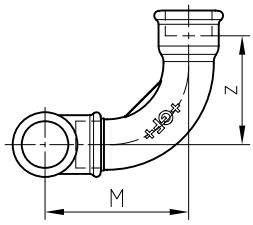
45°
130/40

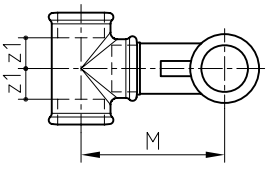




Equal run		Branch									
		3/8	1/2	3/4	1	11/4	11/2	2	21/2	3	4
3/8	**a=b**	**28**									
	z_1	15									
	z	20									
1/2	**a=b**	**28**	**32**								
	z_1	13	15								
	z	20	23								
3/4	**a=b**	**30**	**34**	**38**							
	z_1	13	15	18							
	z	20	23	28							
1	**a=b**	**33**	**36**	**40**	**45**						
	z_1	13	15	18	21						
	z	20	23	28	34						
11/4	**a=b**	**35**	**39**	**44**	**47**	**57**					
	z_1	13	15	17	21	26					
	z	20	23	28	34	45					
11/2	**a=b**	**37**	**42**	**46**	**50**	**59**	**63**				
	z_1	14	17	19	23	27	31				
	z	20	23	28	34	45	49				
2	**a=b**		**46**	**50**	**54**	**63**	**66**	**74**			
	z_1		14	16	20	24	28	34			
	z		23	28	34	45	49	57			
21/2	**a=b**		**52**	**57**	**60**	**69**	**72**	**79**	**91**		
	z_1		14	18	20	25	28	34	42		
	z		23	28	34	45	49	57	72		
3	**a=b**		**57**	**62**	**65**	**74**	**78**	**84**	**95**	**105**	
	z_1		15	18	21	25	28	34	42	48	
	z		23	28	34	45	49	57	72	93	
4	**a=b**				**74**		**87**	**93**	**105**	**115**	**134**
	z_1				20		28	34	41	48	60
	z				34		49	57	72	93	105

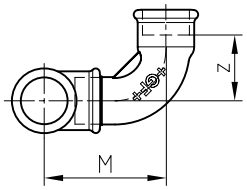
90°
130/1

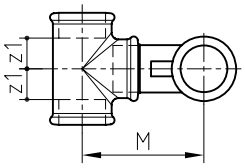




Equal run		Branch									
		3/8	1/2	3/4	1	11/4	11/2	2	21/2	3	4
3/8	**M**	**57**									
	z_1	15									
	z	38									
1/2	**M**	**58**	**63**								
	z_1	13	15								
	z	38	42								
3/4	**M**	**60**	**66**	**78**							
	z_1	13	15	18							
	z	38	42	54							
1	**M**	**64**	**69**	**81**	**96**						
	z_1	13	15	18	21						
	z	38	42	54	68						
11/4	**M**	**68**	**73**	**86**	**100**	**121**					
	z_1	13	15	17	21	26					
	z	38	42	54	68	86					
11/2	**M**	**70**	**77**	**89**	**104**	**124**	**136**				
	z_1	14	17	19	23	27	31				
	z	38	42	54	68	86	97				
2	**M**		**83**	**95**	**110**	**130**	**141**	**164**			
	z_1		14	16	20	24	28	34			
	z		42	54	68	86	97	116			
21/2	**M**		**91**	**104**	**118**	**138**	**149**	**172**	**207**		
	z_1		14	18	20	25	28	34	42		
	z		42	54	68	86	97	116	149		
3	**M**		**98**	**111**	**125**	**146**	**157**	**179**	**214**	**238**	
	z_1		15	18	21	25	28	34	42	48	
	z		42	54	68	86	97	116	149	175	
4	**M**				**138**		**170**	**192**	**227**	**252**	**305**
	z_1				20		28	34	41	48	60
	z				68		97	116	149	175	224

90°
130/1A





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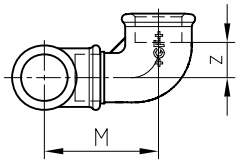
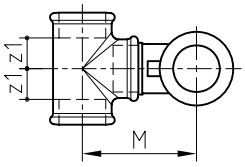
		3/8	1/2	3/4	1	11/4	11/2	2	21/2	3	4
3/8	**M**	**51**									
	z_1	15									
	z	26									
1/2	**M**	**52**	**60**								
	z_1	13	15								
	z	26	32								
3/4	**M**	**54**	**63**	**68**							
	z_1	13	15	18							
	z	26	32	35							
1	**M**	**58**	**66**	**71**	**84**						
	z_1	13	15	18	21						
	z	26	32	35	46						
11/4	**M**	**62**	**70**	**76**	**88**	**102**					
	z_1	13	15	17	21	26					
	z	26	32	35	46	57					
11/2	**M**	**64**	**74**	**79**	**92**	**105**	**116**				
	z_1	14	17	19	23	27	31				
	z	26	32	35	46	57	49				
2	**M**		**80**	**85**	**98**	**111**	**121**	**136**			
	z_1		14	16	20	24	28	34			
	z		32	35	46	57	49	78			
21/2	**M**		**88**	**94**	**106**	**119**	**129**	**144**	**157**		
	z_1		14	18	20	25	28	34	42		
	z		32	35	46	57	49	78	88		
3	**M**		**95**	**101**	**113**	**127**	**137**	**151**	**164**	**175**	
	z_1		15	18	21	25	28	34	42	48	
	z		32	35	46	57	49	78	88	97	
4	**M**				**126**		**150**	**164**	**177**	**189**	**225**
	z_1				20		28	34	41	48	60
	z				46		49	78	88	97	129

90°
130/92





Equal run		Branch									
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3/8	**M**	**47**									
	z_1	15									
	z	15									
1/2	**M**	**48**	**52**								
	z_1	13	15								
	z	15	15								
3/4	**M**	**50**	**55**	**61**							
	z_1	13	15	18							
	z	15	15	18							
1	**M**	**54**	**58**	**64**	**73**						
	z_1	13	15	18	21						
	z	15	15	18	21						
11/4	**M**	**58**	**62**	**69**	**77**	**86**					
	z_1	13	15	17	21	26					
	z	15	15	18	21	26					
11/2	**M**	**60**	**66**	**72**	**81**	**89**	**96**				
	z_1	14	17	19	23	27	31				
	z	15	15	18	21	26	31				
2	**M**		**72**	**78**	**87**	**95**	**101**	**108**			
	z_1		14	16	20	24	28	34			
	z		15	18	21	26	31	34			
21/2	**M**		**80**	**87**	**95**	**103**	**109**	**116**	**130**		
	z_1		14	18	20	25	28	34	42		
	z		15	18	21	26	31	34	42		
3	**M**		**87**	**94**	**102**	**111**	**117**	**123**	**137**	**146**	
	z_1		15	18	21	25	28	34	42	48	
	z		15	18	21	26	31	34	42	48	
4	**M**				**115**		**130**	**136**	**150**	**160**	**178**
	z_1				20		28	34	41	48	60
	z				21		31	34	42	48	60

Practical conclusions

The Georg Fischer z dimension installation method is the tried and tested basis for the skilled worker and industrial prefabrication of pipework installations.

Its objective is to bring together the same repetitive production sequences to achieve a trouble-free flow of materials and work, to avoid idle time, minimise setting up time and doing the same work twice and provide the optimal solutions.

This calls for:
- division of the pipework systems in installation sections.
- division of production in pre-assembly (in the workshop or on site) and installation. It is advantageous to prepare as large a number of the installations as possible in the workshop.
- summarised record of all important site dimensions, to be able to carry out in series prefabrication.

A main rule for this:
Gather as many pipework sections as possible from the planning documents.

However, where sections must be decided on the spot (offsetting of variations in the dimensions of the solidium) the following applies:

Always measure where pipelines are to be laid.

The Georg Fischer z dimension method enables:

- in series prefabrication
- rational use of material, skilled labour and machines
- reduction of installation times
- adaptability to building progress
- very large independence from building deadlines
- better preliminary conditions for carrying out non-local items
- better preliminary conditions for carrying out refurbishment work
- more accurate work with lower expenditure
- consistent quality

As a result of these advantages, installation planning, starting with the preliminary draft, should be included in the building plan. A prerequisiste of the rational running of building work is completed, co-ordinated planning of the implementation of work at its outset in its basic details.

Caution: pre-assembled pipework combinations must never be so unwieldy that they can not be transported or used on the installation site without problems.

Note: using the z dimension method is not synonymous with prefabrication; it is in principle suitable for use anywhere that pipes are installed with fittings.

z dimension method for different materials

The above text refers primarily to the installation of threaded pipes with malleable cast iron pipe fittings. The transportational stability of assembled sections of pipework and the later possibilities of correcting their running directions on the site of installation make this materials system suitable for prefabrication.

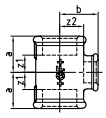
Bearing the features of other materials systems (e.g. copper pipes with soldered fittings, plastic pipes with clamped, welded or bonded fittings) the Georg Fischer z dimension method can be used in the same way.

Installation aids

z dimensions and face-centre dimensions of the most common Georg Fischer malleable cast iron fittings

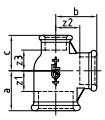
	Dimension	3/8		1/2		3/4		1		11/4		11/2		2		21/2		3		4	
	Nominal thread length	10		13		15		17		19		19		24		27		30		36	
	Catalogue No.	z	b	z	b	z	b	z	b	z	b	z	b	z	b	z	b	z	b	z	b
Equal Fittings	**1**	38	42	42	48	54	60	68	75	86	95	97	105	116	130	149	165	175	190	224	245
	2	38	-	42	-	54	-	68	-	86	-	97	-	116	-	149	-	175	-	224	-
	1a	26	36	32	45	35	50	46	63	57	76	66	85	78	102	88	115	97	127	129	165
	2a	26	-	32	-	35	-	46	-	57	-	66	-	78	-	88	-	97	-	129	-
	45° **40**	20	24	23	30	28	36	34	42	45	54	49	58	57	70	72	86	83	100	105	130
	45° **41**	20	-	23	-	28	-	34	-	45	-	49	-	57	-	72	-	83	-	105	-
	30° **50**	-	-	17	24	21	30	27	36	33	44	37	46	42	54	53	66	62	77	78	100
	30° **51**	-	-	17	-	21	-	27	-	33	-	37	-	42	-	-	-	-	-	-	-
	85	28	-	34	-	40	-	53	-	66	-	-	-	-	-	-	-	-	-	-	-
	90	15	-	15	-	18	-	21	-	26	-	31	-	34	-	42	-	48	-	60	-
	92	15	32	15	37	18	43	21	52	26	60	31	65	34	74	42	88	48	98	60	118
	45° **120**	10	-	9	-	10	-	11	-	14	-	17	-	19	-	21	-	24	-	-	-
	45° **121**	10	25	9	28	10	32	11	37	14	43	17	46	19	55	19	54	22	61	-	-
	130	15	-	15	-	18	-	21	-	26	-	31	-	34	-	42	-	48	-	60	-
	180	15	-	15	-	18	-	21	-	26	-	31	-	34	-	42	-	48	-	60	-
	270	10	-	10	-	9	-	11	-	12	-	17	-	17	-	20	-	20	-	22	-
	471	15	-	15	-	18	-	-	-	-	-		-	-	-	-	-	-	-	-	-
		a		a		a		a		a		a		a		a		a		a	
	280	38		44		47		53		57		59		68		75		83		95	

130, Branch reduced



Dimension	z_1	z_2
1/2 x 3/4	18	15
3/4 x 1/2	15	18
1 x 1/2	15	21
1 x 3/4	18	21
11/4 x 1/2	15	25
11/4 x 3/4	17	26
11/4 x 1	21	25
11/2 x 1/2	17	29
11/2 x 3/4	19	29
11/2 x 1	23	29
11/2 x 11/4	27	29

130, Branch and run reduced



Dimension	z_1	z_2	z_3
3/4 x 1/2 x 1/2	15	18	15
3/4 x 3/4 x 1/2	18	18	18
1 x 1/2 x 3/4	15	21	18
1 x 3/4 x 3/4	18	21	15
1 x 3/4 x 1/2	18	21	18
1 x 1 x 3/4	21	21	21
11/4 x 1/2 x 1	15	25	15
11/4 x 3/4 x 1	17	26	18
11/4 x 1 x 3/4	21	25	21
11/4 x 1 x 1	21	25	21
11/4 x 11/4 x 3/4	26	26	26

Dimension	z_1	z_2	z_3
11/4 x 11/4 x 1	26	26	25
11/2 x 3/4 x 11/4	19	29	17
11/2 x 1 x 11/4	23	29	21
11/2 x 11/4 x 1	27	29	25
11/2 x 11/4 x 11/4	27	29	26
11/2 x 11/2 x 11/4	31	31	29

a … dimension face - face (overall length)

b … dimension fitting axis - face external thread

z, z1, z2, z3 … z dimension

+GF+ GEORG FISCHER PIPING SYSTEMS

Pipe layout chart for z dimension method

Site:

Date

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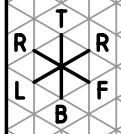

item	dimension M-M in cm	z dimensions in cm	pipe length in cm	inch dimension

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General terms and conditions of Georg Fischer Fittings GmbH, Traisen

according to 01/2008

1 Scope

1.1 These general conditions of sale apply to all deliveries of Georg Fischer Fittings-GmbH, A-3160 Traisen ("Georg Fischer") to the Buyer.
They shall also apply to all future transactions even if reference is not made explicitly to these general conditions of sale.

1.2 Provisions which deviate from or supplement these conditions of sale, in particular the Buyer's general conditions of purchase or verbal agreements, shall only apply if and to the extent this has been confirmed in writing by Georg Fischer.

1.3 All forms of dispatch which enable proof of transmission in the form of a text, such as e.g. telefax, e-mail, etc. shall be deemed to be on a par with communications in written form.

2 Offers

Offers shall only be binding if they state a period for acceptance.

3 Scope of Delivery

3.1 Georg Fischer reserves the right to introduce modifications to its range of pro-ducts.

3.2 The order confirmation shall be decisive with regard to scope and execution of delivery.

4 Data and Documentation

4.1 Technical documentation such as drawings, descriptions, illustrations, any indications of measurements, properties or weight and reference to norms shall serve the purpose of providing information and do not contain any guarantees with respect to properties.
If and when it appears timely in view of technical progress Georg Fischer reserves the right to make appropriate modifications.

4.2 All technical documentation remains the intellectual property of Georg Fischer and may only be used for the purposes agreed upon or for the purposes stipulated by Georg Fischer.

5 Confidentiality, Data Protection

5.1 The contracting parties will treat as confidential all non-public business or technical information pertaining to the other contracting party of which it gains knowledge by way of its business relationship and will not disclose such information to third parties or use it for their own purposes.

5.2 Within the context of the contractual relationship with the Buyer the processing of personal data may be required. The Buyer hereby grants his approval in this respect and accepts that Georg Fischer may also disclose such data to third parties (e.g. sub-contractors) in Austria and abroad for the purpose of handling and maintaining business relations.

6 Regulations at the Place of Destination, Export Restrictions

6.1 The Buyer must draw the attention of Georg Fischer to local provisions of law or other regulations which refer to the execution of delivery and compliance with safety provisions and registration rules.

6.2 The responsibility for compliance with regulations concerning export restrictions in the event of the goods being re-exported or exported on to a further country shall be incumbent on the Buyer.

7 Price

7.1 Prices are quoted, unless otherwise agreed, ex works in accordance with the Incoterms of the International Chamber of Commerce (current edition), incl. standard packaging. All additional charges such as e.g. costs for freight, insurance, export, transit or import permits or other permits and legalisations shall be for the account of the Buyer. Likewise the Buyer must pay all types of taxes, levies, charges and customs duties.

7.2 If the costs for packaging, freight, insurance, duties and other additional charges are included in their quoted price or delivery price or are listed separately in the offer or order confirmation, Georg Fischer reserves the right to adjust the rates accordingly if there is a change in the tariffs.

8 Terms of Payment

8.1 Payments are to be made by the Buyer at the place in which the Georg Fischer company that issues the invoice is located without any deductions such as cash discount, expenses, taxes and fees, in accordance with the terms of payment agreed upon.

8.2 The Buyer shall only have a right of set-off and a right of retention with respect to claims which are either undisputed or have been established as being binding in law. In particular payments are also to be made if insignificant parts of the delivery are missing which do not render the use of the delivery impossible.

9 Retention of Title

9.1 The products delivered shall remain the property of Georg Fischer until the Buyer has met all the claims against the Buyer which accrue to Georg Fischer at the time of the delivery.

9.2 If the Buyer sells on any goods subject to the afore-mentioned retention of title according to the terms of the contract, the Buyer already now assigns to Georg Fischer in the internal relationship between them - until payment has been made in full of all Georg Fischer's claims arising out of the sale - those rights which accrue to said Buyer against his customers including all subsidiary rights, securities and reservations of title. The Buyer will be authorised to collect these claims even after such assignment until this authorisation is revoked.

9.3 If - combined with the securities provided to Georg Fischer - the value of the goods subject to the afore-mentioned retention of title exceeds Georg Fischer's claims against the Buyer by over 20%, then Georg Fischer will be obliged to grant release insofar as the Buyer requests it to do so.

10 Delivery

10.1 The term of delivery begins as soon as the contract has been entered into, all official formalities such as permits for import and payment have been obtained and the key technical questions have been sorted out.
The term of delivery or as the case may be the delivery date shall be deemed to have been met if the delivery is ready for dispatch upon expiry of the term of delivery or on the delivery date.

10.2 The obligation to deliver is subject to the following reservations, i.e. the term of delivery will be extended or the delivery date will be postponed for a commensurate period of time:
a) if Georg Fischer does not receive particulars which are necessary for the execution of the order in good time or if the Buyer subsequently modifies these particulars and thus causes a delay in the delivery;
b) if Georg Fischer is prevented from making the delivery by an occurrence of force majeure. Force majeure is deemed to consist of unforeseeable circumstances for which Georg Fischer is not to be held responsible which make it unreasonably difficult or impossible for Georg Fischer to make the delivery such as delays in deliveries or defective deliveries from the designated suppliers, industrial action, official measures, a shortage of raw materials or energy, significant disruptions of operations, for example by destruction of the plant as a whole or of important departments or as a result of the breakdown of indispensable manufacturing systems, serious transport hold-ups, e.g. as a result of road blockades. If these circumstances prevail for over six months, both parties shall have the right to withdraw from the contract. The Buyer shall not be entitled to claim compensation for damages;
c) if the Buyer is in default in performance of its contractual obligations, in particular if it does not comply with the terms of payment or does not provide the securities agreed upon in good time.

10.3 If Georg Fischer is to be held responsible for exceeding the agreed upon term of delivery (including a reasonable extension thereof), Georg Fischer shall only be deemed to be in default if the Buyer grants Georg Fischer a reasonable additional period of time in writing, which must amount to at least one month, and if this additional period of time also expires unused. Thereafter the Buyer shall have the rights provided by law. Subject to Section 16 any claim the Buyer may have to compensation for damages shall, however, be limited to a maximum of 10% of the value of the order in question.

10.4 Partial deliveries shall be permissible. Georg Fischer may issue partial invoices for partial deliveries.

10.5 If the Buyer does not take delivery in good time of goods which have been notified as been ready for dispatch, Georg Fischer shall be entitled to store the goods at the expense and at the risk of the Buyer and to invoice the goods as having been delivered. If the Buyer does not pay for the goods, Georg Fischer shall in particular be entitled to dispose otherwise of the goods.

10.6 In the event that the Buyer cancels an order and Georg Fischer does not insist on performance of the contract, Georg Fischer shall have a claim to a penalty amounting to 10% of the value of the order in question well as to damages in excess of this amount for which proof is submitted. Buyer shall be entitled to provide evidence that Georg Fischer actually has suffered no damage or that its damage is considerably lower than the penalty forfeited.

11 Packaging

If the products are packaged in a way which is above and beyond the standard packaging, the extra packaging in question will be invoiced separately.

12 Passing of Risk

12.1 The risk passes to the Buyer ex factory in accordance with the Incoterms of the ICC (current version), even if the delivery is made free ("franco"), under similar clauses or including assembly or if transport is organised and managed by Georg Fischer.

12.2 If dispatch is delayed for reasons for which Georg Fischer is not to be held responsible, then risk shall pass to the Buyer upon notification that the goods are ready for dispatch.

13 Transport and Insurance

13.1 Goods shall be forwarded at the Buyer's expense, unless otherwise agreed upon.

13.2 Insurance against damages of any kind whatsoever shall be the Buyer's responsibility. Even if insurance is to be arranged by Georg Fischer, it shall be deemed to have been taken out by order and for the account of the Buyer.

13.3 Any special requests regarding forwarding and insurance are to be communicated to Georg Fischer in good time. Otherwise goods will be forwarded at Georg Fischer's discretion – without, however, assuming responsibility – by the fastest and most cost-efficient method possible.
In the case of free deliveries the handling of forwarding is left up to Georg Fischer. If the Buyer issues special instructions in this connection, any additional costs will be charged to the Buyer.

13.4 In the event of damage to or loss of products during transport the Buyer must make a reservation to this effect on the delivery documents and arrange for the facts of the matter to be recorded by the forwarder.
If there are damages which incurred during transport that are not immediately apparent, they must be reported to the forwarder at the latest within six days of receipt of the products.

14 Inspection, Notice of Defects, Reports concerning Damage

14.1 The products are tested by Georg Fischer during manufacture to the usual extent. If the Buyer wishes more extensive testing, such tests must be agreed upon in writing and are to be paid by the Buyer.

14.2 Defects in respect of weight, number of items or the external appearance and workmanship of the products must be reported by the latest 30 days after receipt thereof. The Buyer must give written notice of other defects immediately, by the latest, however, within 7 working days of their discovery, in any case, however, within the period of warranty.

14.3 Defective parts must in any case be kept until claims under warranty or claims to compensation for damage have been finally clarified and must be made available to Georg Fischer upon request.

14.4 If so requested, Georg Fischer is to be given the opportunity to appraise the defect or the damage – by itself or it may arrange for third parties to carry out the appraisal - prior to commencement of repair work.

15 Liability for Defects

15.1 Upon receipt of a written request from the Buyer Georg Fischer undertakes (at its own choice) to repair or replace as soon as possible and free of charge all parts of its delivery which it can be proven have become defective or unusable as a result of poor materials, faulty design, an inadequate finish or due to defects in the operating or assembly instructions.
In order to protect employees from toxic or radioactive substances which may have been transported through defective parts returned to Georg Fischer's sales organisation, said parts must be accompanied by a Material Safety Disclosure Form. The form may be obtained from Georg Fischer's local sales company or via www.piping.georgfischer.com.
Parts which are replaced become the property of Georg Fischer, unless Georg Fischer waives such claim.

15.2 Georg Fischer's warranty for products which are manufactured according to the Buyer's specifications, drawings or models is limited to a warranty in respect of the properties of the materials and the processing.

15.3 The Buyer is entitled to request the annulment of the contract (rescission) or a reduction of the contract price, if
- it is impossible to carry out a repair or make a subsequent delivery;
- Georg Fischer does not succeed in carrying out the repair or making a subsequent delivery within a reasonable period of time or
- Georg Fischer refuses to carry out the repair or make a subsequent delivery or is negligent in causing a delay in this respect.

15.4 As regards significant deliveries from third party contractors, Georg Fischer shall only assume a warranty within the limits of such sub-contractors' obligations under warranty.

15.5 The warranty shall not apply to damage resulting from natural wear and tear, inadequate storage or maintenance, non-compliance with operating and assembly instructions, overloading, unsuitable operational supplements, defective construction work, unsuitable building ground, inappropriate interference by the Buyer or third parties, use of non-original spare parts as well as a result of other grounds for which Georg Fischer is not to be held responsible.

15.6 Claims based on warranty or liability shall be barred under the statute of limitations twelve months after receipt of the delivery by the end user, at the latest, however, 18 months after dispatch of the delivery by Georg Fischer.

15.7 With regard to products which are used in building technology or utility supply systems
- Georg Fischer also assumes the costs of mounting and dismantling for restoring the original condition of the property in question as well as - if Georg Fischer is negligent - the other direct consequential damages (damages to property and personal damages) up to a maximum sum per occurrence of loss of € 730.000; this amount shall, moreover, be limited to a maximum of € 2.000.000 in the case of serial losses.
- Claims based on warranty or liability shall be barred under the statute of limitations, in contradiction to Section 15.6, five years after the date of mounting.

16 Limitation of Liability

All cases of breach of contract and their legal consequences as well as any claims on the part of the Buyer, regardless of whatever legal foundation they are based on, are governed in a final and conclusive manner in these conditions. In particular all claims to compensation for damages, abatement, annulment of the contract or a withdrawal from the contract which are not specifically mentioned shall be excluded. In no case shall the Buyer have any claim to compensation for damages which did not arise in respect of the object of the delivery itself, especially such as production downtime, loss of use, loss of orders, lost profit and other direct or indirect damages. This exclusion of liability shall not apply to illegal intent or gross negligence on the part of Georg Fischer or in those cases of statutory liability in accordance with the applicable product liability laws; however, it shall also apply to illegal intent or gross negligence on the part of auxiliary personnel.

17 Severability

Should certain provisions in these general conditions of sale be or become invalid or null and void, the contracting parties undertake to replace the invalid or null and void provision with a valid provision which comes as close as possible to fulfilling the meaning and purpose of the invalid or null and void provision.

18 Place of Performance, Place of Jurisdiction and Applicable Law

18.1 The Georg Fischer company which dispatches the products shall be deemed to be the place of performance.

18.2 **If any disputes arise out of the contractual relationship, the lawsuit is to be filed exclusively with the competent court in St. Pölten, Austria. Georg Fischer is, however, also entitled to bring an action before any other competent court.**

18.3 **The contractual relationship is subject to Austrian law in accordance with the Austrian Code of Civil Law (ABGB) and the Austrian Code of Commercial Law (HGB).**

GF Piping Systems → worldwide at home

Our sales companies and represantatives ensure local customer support in the following countries.

www.piping.georgfischer.com
www.fittings.at

The technical data are not binding and not expressly warranted characteristics of the goods. They are subject to change. Our General Conditions of Sale apply

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