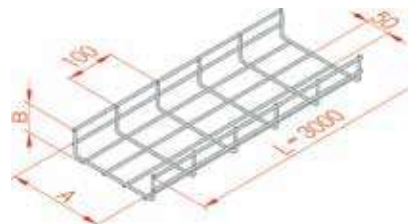
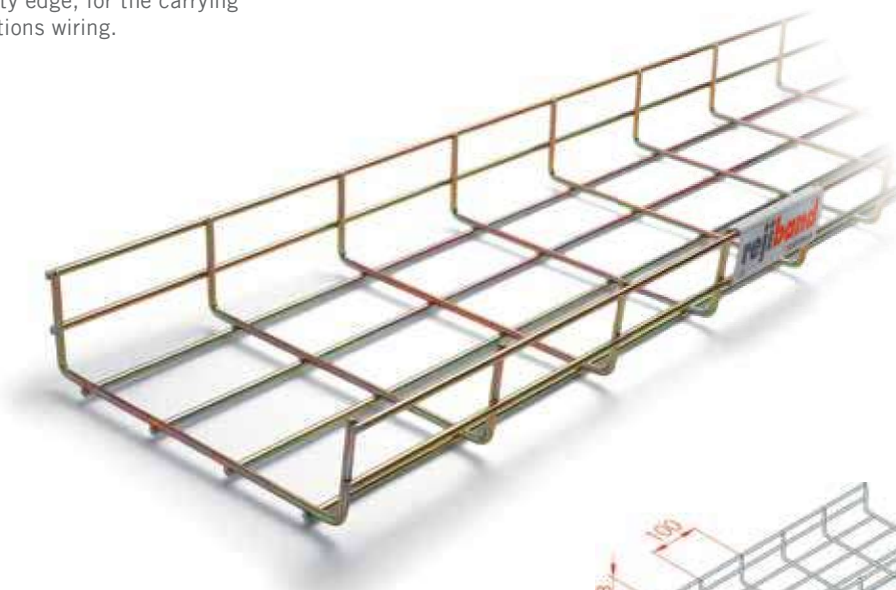


rejibanda®

Welded rod metal tray, with safety edge, for the carrying of electrical and telecommunications wiring.



Patented safety edge. Avoids damage to cables and injury to the installer.
It is lightweight providing maximum ventilation and cleanliness for the cables.
Provides high strength and flexibility.
Savings in material costs and labour.

DIM. AxB	rejiband®						
	Bycro	E.G.	H.D.G.*	Rod diameter (mm)	Loading values* (kg)	 Pack Unit	
	Reference	Reference	Reference				
60x35	60221060	60211060	60231060	4.0	27	24	
100x35	60221100	60211100	60231100	4.0	27	24	
150x35	60221150	60211150	60231150	4.5	27	24	
200x35	60221200	60211200	60231200	4.5	27	18	
300x35	60221300	60211300	60231300	4.5	28	18	
400x35	60221400	60211400	60231400	4.5	34	12	
60x60	60222060	60212060	60232060	4.0	34	24	
100x60	60222100	60212100	60232100	4.0	47	24	
150x60	60222150	60212150	60232150	4.5	48	24	
200x60	60222200	60212200	60232200	4.5	48	18	
300x60	60222300	60212300	60232300	5.0	75	12	
400x60	60222400	60212400	60232400	5.0	78	6	
450x60	60222450			5.0	90	6	
500x60	60222500	60212500	60232500	5.0	96	6	
600x60	60222600	60212600	60232600	5.0	107	6	
100x100	60223100	60213100	60233100	5.0	95	12	
150x100	60223150	60213150	60233150	5.0	95	6	
200x100	60223200	60213200	60233200	5.0	95	6	
300x100	60223300	60213300	60233300	5.0	106	6	
400x100	60223400	60213400	60233400	5.0	106	6	
500x100	60223500	60213500	60233500	5.0	150	6	
600x100	60223600	60213600	60233600	5.0	137	6	



* kg/m at 1.5m support distance.

Applications:

- Management and distribution of electrical and telecommunications wiring for Civil Works Facilities, Tunnels, Public Buildings, Shopping Centres, Hospitals, Major Infrastructures, Airports, Underground Transport, Railways, etc.
- Industrial facilities sectors. Naval applications, Petrochemical, Textile, Chemical and Food.
- Especially suitable for photovoltaic (PV) systems, Wind, Energy Industry, Renewable Energy.

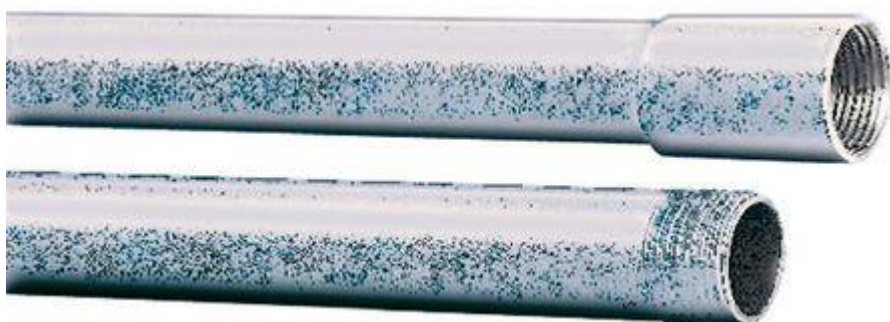


ENGLISH

Datasheet

Stock No: 228-823

RS Pro Galvanised Steel 20mm 3.75m



Product Details

Steel Conduit

Black enamelled or galvanised heavy gauge welded steel conduit. Threaded at both ends and supplied with one coupling per 3-75 m length with the choice of 20 mm or 25 mm sizes. A wide selection of fittings and accessories are available to assist in the most demanding or effortless installations.

Conforms to BS4568

For Conduit Cables see stock no. 381-012 typically

For Cable and Wire pulling lubricants see stock no. 196-3407 typically

Steel To BS4568

BS4568 Part 2 product finish classification.,Class 2 - Black enamelled inside and outside.,Class 3 - Pre-galvanised sheet steel.,Class 4 - Hot dipped galvanised inside and outside.

Specifications:

Nominal Diameter	20mm
Material	Galvanised Steel
Length	3.75m

Technical Catalogue
2008

Malleable cast iron fittings



Quality malleable cast iron pipe fittings from Georg Fischer

Georg Fischer supplies both a comprehensive 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

Table of Contents

General information	4
Product range	7
Product assortment	8
Technical product notes	68
Application notes	76
z dimension method	81
General Terms and Conditions	107

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:

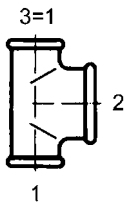
Elbow EN 10242 - A1 - 2 - Zn - A

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

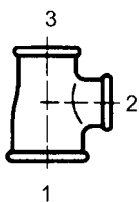
The naming of types of fittings starts from the simplest possible basic types such as bend, elbow, tee, cross etc.; basic features are also indicated.

The following rules apply for the sequence of connection sizes:



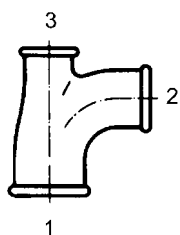
illustr. 1/A

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



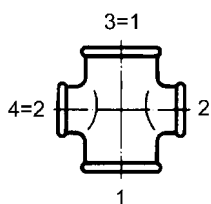
illustr. 1/B

- 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 **fitting 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

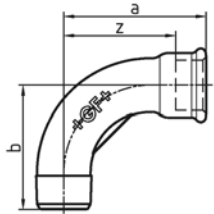
Product Range



Malleable cast iron fittings

1

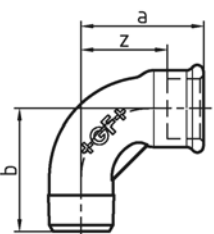
Long sweep bend 90°, ISO/EN G4



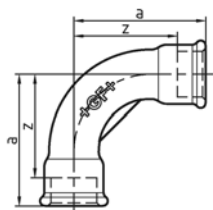
EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
•	B	1/8	770 001 101	35	32	28	
•	G	1/8	770 001 201	35	32	28	
•	B	1/4	770 001 102	40	36	30	
•	G	1/4	770 001 202	40	36	30	
•	B	3/8	770 001 103	48	42	38	
•	G	3/8	770 001 203	48	42	38	
•	B	1/2	770 001 104	55	48	42	
•	G	1/2	770 001 204	55	48	42	
•	B	3/4	770 001 105	69	60	54	
•	G	3/4	770 001 205	69	60	54	
•	B	1	770 001 106	85	75	68	
•	G	1	770 001 206	85	75	68	
•	B	1 1/4	770 001 107	105	95	86	
•	G	1 1/4	770 001 207	105	95	86	
•	B	1 1/2	770 001 108	116	105	97	
•	G	1 1/2	770 001 208	116	105	97	
•	B	2	770 001 109	140	130	116	
•	G	2	770 001 209	140	130	116	
•	B	2 1/2	770 001 110	176	165	149	
•	G	2 1/2	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

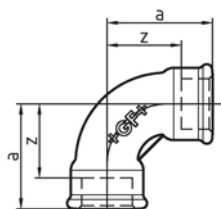


EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
•	B	1/4	770 011 102	30	30	20	
•	G	1/4	770 011 202	30	30	20	
•	B	3/8	770 011 103	36	36	26	
•	G	3/8	770 011 203	36	36	26	
•	B	1/2	770 011 104	45	45	32	
•	G	1/2	770 011 204	45	45	32	
•	B	3/4	770 011 105	50	50	35	
•	G	3/4	770 011 205	50	50	35	
•	B	1	770 011 106	63	63	46	
•	G	1	770 011 206	63	63	46	
•	B	1 1/4	770 011 107	76	76	57	
•	G	1 1/4	770 011 207	76	76	57	
•	B	1 1/2	770 011 108	85	85	66	
•	G	1 1/2	770 011 208	85	85	66	
•	B	2	770 011 109	102	102	78	
•	G	2	770 011 209	102	102	78	
-	B	2 1/2	770 011 110	115	115	88	
-	G	2 1/2	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	



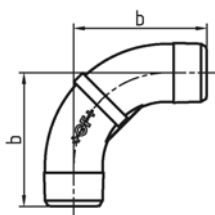
2 Long sweep bend 90°, ISO/EN G1

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



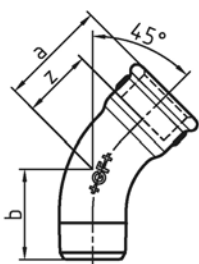
2a Short bend 90°, ISO/EN D1

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	

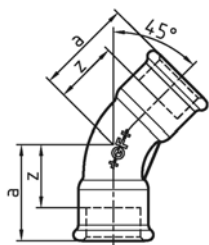


40 Long sweep bend 45°, ISO/EN G4/45°

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

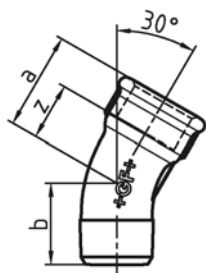
Long sweep bend 45°, ISO/EN G1/45°



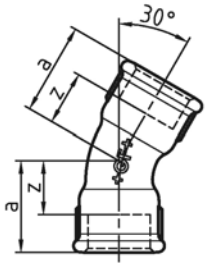
EN		Dim. [inch]	Code	a [mm]	z [mm]	
•	B	3/8	770 041 103	30	20	
•	G	3/8	770 041 203	30	20	
•	B	1/2	770 041 104	36	23	
•	G	1/2	770 041 204	36	23	
•	B	3/4	770 041 105	43	28	
•	G	3/4	770 041 205	43	28	
•	B	1	770 041 106	51	34	
•	G	1	770 041 206	51	34	
•	B	1 1/4	770 041 107	64	45	
•	G	1 1/4	770 041 207	64	45	
•	B	1 1/2	770 041 108	68	49	
•	G	1 1/2	770 041 208	68	49	
•	B	2	770 041 109	81	57	
•	G	2	770 041 209	81	57	
•	B	2 1/2	770 041 110	99	72	
•	G	2 1/2	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°

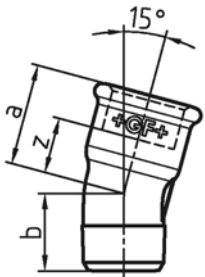


EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
-	G	1/2	770 050 204	30	24	17	
-	G	3/4	770 050 205	36	30	21	
-	G	1	770 050 206	44	36	27	
-	G	1 1/4	770 050 207	52	44	33	
-	G	1 1/2	770 050 208	56	46	37	
-	G	2	770 050 209	66	54	42	
-	G	2 1/2	770 050 210	80	66	53	
-	G	3	770 050 211	92	77	62	
-	G	4	770 050 212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



51 Bend 30°

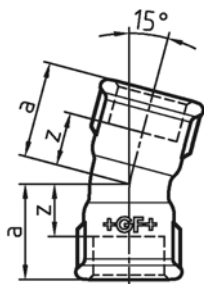
EN		Dim. [inch]	Code	a [mm]	z [mm]	
-	G	½	770 051 204	30	17	
-	G	¾	770 051 205	36	21	
-	G	1	770 051 206	44	27	
-	G	1 ¼	770 051 207	52	33	
-	G	1 ½	770 051 208	56	37	
-	G	2	770 051 209	66	42	



53 Bend 15°

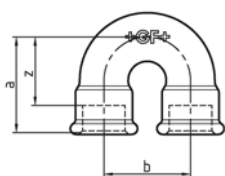
EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
-	G	½	770 053 204	28	21	15	
-	G	¾	770 053 205	33	25	18	
-	G	1	770 053 206	37	29	20	
-	G	1 ¼	770 053 207	43	34	24	
-	G	1 ½	770 053 208	45	35	26	
-	G	2	770 053 209	51	41	27	
-	G	2 ½	770 053 210	62	52	35	

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	

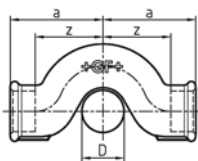
60 Return bend



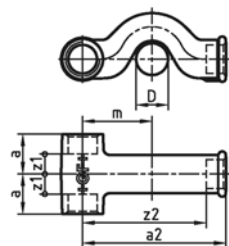
EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
-	B	½	770 060 104	45	38	32	
-	G	½	770 060 204	45	38	32	
-	B	¾	770 060 105	52	50	37	
-	G	¾	770 060 205	52	50	37	
-	B	1	770 060 106	64	64	47	
-	G	1	770 060 206	64	64	47	
-	B	1 ¼	770 060 107	73	76	54	
-	G	1 ¼	770 060 207	73	76	54	
-	B	1 ½	770 060 108	80	89	61	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

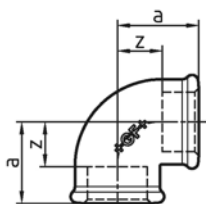


EN		Dim. [inch]	Code	a [mm]	D [inch]	z [mm]	
-	B	¾	770 085 103	38	¾	28	
-	G	¾	770 085 203	38	¾	28	
-	B	½	770 085 104	47	½	34	
-	G	½	770 085 204	47	½	34	
*-	B	½	770 085 115	49	¾	36	
*-	G	½	770 085 215	49	¾	36	
-	B	¾	770 085 105	55	¾	40	
-	G	¾	770 085 205	55	¾	40	
-	B	1	770 085 106	70	1	53	
-	G	1	770 085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



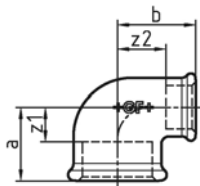
87 Tee with crossover branch

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	



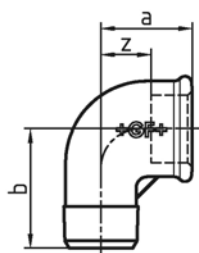
90 Elbow 90°, equal, ISO/EN A1

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	



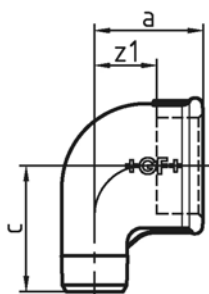
90 Elbow 90°, reducing, ISO/EN A1

EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	z1 [mm]	z2 [mm]	
-	B	¼ - ½	770 090 115	20	20	10	13	
-	G	¼ - ½	770 090 215	20	20	10	13	
•	B	¾ - ¼	770 090 116	23	23	13	13	
•	G	¾ - 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 - ¾	770 090 118	26	26	13	16	
•	G	½ - ¾	770 090 218	26	26	13	16	
•	B	¾ - ¾	770 090 119	28	28	13	18	
•	G	¾ - ¾	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 - ¾	770 090 145	32	34	15	24	
-	G	1 - ¾	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	



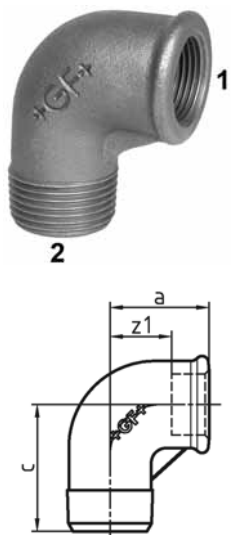
92 Elbow 90°, equal, ISO/EN A4

EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
•	B	$\frac{1}{8}$	770 092 101	19	25	12	
•	G	$\frac{1}{8}$	770 092 201	19	25	12	
•	B	$\frac{1}{4}$	770 092 102	21	28	11	
•	G	$\frac{1}{4}$	770 092 202	21	28	11	
•	B	$\frac{3}{8}$	770 092 103	25	32	15	
•	G	$\frac{3}{8}$	770 092 203	25	32	15	
•	B	$\frac{1}{2}$	770 092 104	28	37	15	
•	G	$\frac{1}{2}$	770 092 204	28	37	15	
•	B	$\frac{3}{4}$	770 092 105	33	43	18	
•	G	$\frac{3}{4}$	770 092 205	33	43	18	
•	B	1	770 092 106	38	52	21	
•	G	1	770 092 206	38	52	21	
•	B	1 $\frac{1}{4}$	770 092 107	45	60	26	
•	G	1 $\frac{1}{4}$	770 092 207	45	60	26	
•	B	1 $\frac{1}{2}$	770 092 108	50	65	31	
•	G	1 $\frac{1}{2}$	770 092 208	50	65	31	
•	B	2	770 092 109	58	74	34	
•	G	2	770 092 209	58	74	34	
•	B	2 $\frac{1}{2}$	770 092 110	69	88	42	
•	G	2 $\frac{1}{2}$	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	



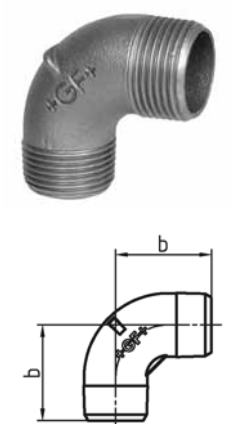
92 Elbow 90°, male thread reduced, ISO/EN A4

EN		Dim. (1-2) [inch]	Code	a [mm]	c [mm]	z1 [mm]	
•	B	$\frac{1}{2} - \frac{3}{8}$	770 092 116	26	33	13	
•	G	$\frac{1}{2} - \frac{3}{8}$	770 092 216	26	33	13	
•	B	$\frac{3}{4} - \frac{1}{2}$	770 092 117	30	40	15	
•	G	$\frac{3}{4} - \frac{1}{2}$	770 092 217	30	40	15	
•	B	1 - $\frac{1}{2}$	770 092 130	32	46	15	
•	G	1 - $\frac{1}{2}$	770 092 230	32	46	15	
•	B	1 - $\frac{3}{4}$	770 092 118	35	46	18	
•	G	1 - $\frac{3}{4}$	770 092 218	35	46	18	
-	G	1 $\frac{1}{4}$ - $\frac{3}{4}$	770 092 219	44	51	17	
•	B	1 $\frac{1}{4}$ - 1	770 092 120	40	56	21	
•	G	1 $\frac{1}{4}$ - 1	770 092 220	40	56	21	
-	B	1 $\frac{1}{2}$ - 1	770 092 121	47	62	28	
-	G	1 $\frac{1}{2}$ - 1	770 092 221	47	62	28	
-	B	1 $\frac{1}{2}$ - 1 $\frac{1}{4}$	770 092 122	52	64	33	
-	G	1 $\frac{1}{2}$ - 1 $\frac{1}{4}$	770 092 222	52	64	33	



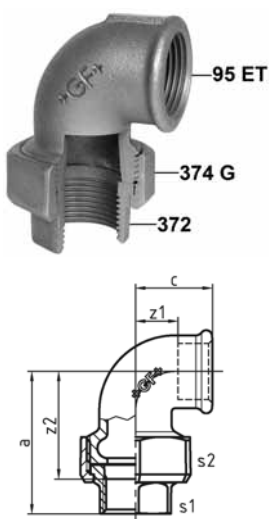
92 Elbow 90°, female thread reduced, ISO/EN A4

EN		Dim. (1-2) [inch]	Code	a [mm]	c [mm]	z1 [mm]	
-	B	3/8 - 1/2	770 092 124	28	37	18	
-	G	3/8 - 1/2	770 092 224	28	37	18	
-	B	1/2 - 3/4	770 092 125	34	42	21	
-	G	1/2 - 3/4	770 092 225	34	42	21	
-	B	3/4 - 1	770 092 126	39	50	24	
-	G	3/4 - 1	770 092 226	39	50	24	
-	B	1 - 1 1/4	770 092 127	44	59	27	
-	G	1 - 1 1/4	770 092 227	44	59	27	



94 Elbow 90°

EN		Dim. [inch]	Code	b [mm]	
-	B	3/8	770 094 103	29	
-	G	3/8	770 094 203	29	
-	B	1/2	770 094 104	37	
-	G	1/2	770 094 204	37	
-	B	3/4	770 094 105	40	
-	G	3/4	770 094 205	40	
-	B	1	770 094 106	47	
-	G	1	770 094 206	47	
-	B	1 1/4	770 094 107	56	
-	G	1 1/4	770 094 207	56	
-	B	1 1/2	770 094 108	59	
-	G	1 1/2	770 094 208	59	
-	B	2	770 094 109	68	
-	G	2	770 094 209	68	



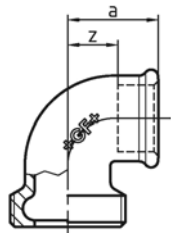
95 Union elbow, flat seat, ISO/EN UA1

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

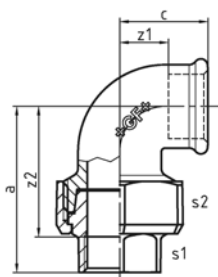
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	c [mm]	z1 [mm]	z2 [mm]	s1 [mm]	s2 [mm]	
•	B	3/8	3/4	770 095 103	52	25	15	42	*12	32	
•	G	3/8	3/4	770 095 203	52	25	15	42	*12	32	
•	B	1/2	1	770 095 104	58	28	15	45	26	41	
•	G	1/2	1	770 095 204	58	28	15	45	26	41	
•	B	3/4	1 1/4	770 095 105	62	33	18	47	31	48	
•	G	3/4	1 1/4	770 095 205	62	33	18	47	31	48	
•	B	1	1 1/2	770 095 106	72	38	21	55	38	55	
•	G	1	1 1/2	770 095 206	72	38	21	55	38	55	
•	B	1 1/4	2	770 095 107	82	45	26	63	48	67	
•	G	1 1/4	2	770 095 207	82	45	26	63	48	67	
•	B	1 1/2	2 1/4	770 095 108	90	50	31	71	54	74	
•	G	1 1/2	2 1/4	770 095 208	90	50	31	71	54	74	
•	B	2	2 3/4	770 095 109	100	58	34	76	67	90	
•	G	2	2 3/4	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	3/8	3/4	-	25	15	
*	G	3/8	3/4	-	25	15	
-	B	1/2	1	770 695 104	28	15	
-	G	1/2	1	770 695 204	28	15	
-	B	3/4	1 1/4	770 695 105	33	18	
-	G	3/4	1 1/4	770 695 205	33	18	
-	B	1	1 1/2	770 695 106	38	21	
-	G	1	1 1/2	770 695 206	38	21	
-	B	1 1/4	2	770 695 107	45	26	
-	G	1 1/4	2	770 695 207	45	26	
-	B	1 1/2	2 1/4	770 695 108	50	31	
-	G	1 1/2	2 1/4	770 695 208	50	31	
-	B	2	2 3/4	770 695 109	58	34	
-	G	2	2 3/4	770 695 209	58	34	



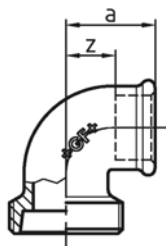
96 Union elbow, taper seat, ISO/EN UA11

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

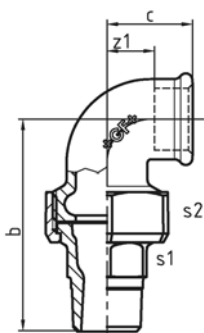
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	c [mm]	z1 [mm]	z2 [mm]	s1 [mm]	s2 [mm]	
•	B	1/4	5/8	770 096 102	48	21	11	38	*10	28	
•	G	1/4	5/8	770 096 202	48	21	11	38	*10	28	
•	B	3/8	3/4	770 096 103	52	25	15	42	*12	32	
•	G	3/8	3/4	770 096 203	52	25	15	42	*12	32	
•	B	1/2	1	770 096 104	58	28	15	45	25	41	
•	G	1/2	1	770 096 204	58	28	15	45	25	41	
•	B	3/4	1 1/4	770 096 105	62	33	18	47	32	48	
•	G	3/4	1 1/4	770 096 205	62	33	18	47	32	48	
•	B	1	1 1/2	770 096 106	72	38	21	55	38	55	
•	G	1	1 1/2	770 096 206	72	38	21	55	38	55	
•	B	1 1/4	2	770 096 107	82	45	26	63	48	67	
•	G	1 1/4	2	770 096 207	82	45	26	63	48	67	
•	B	1 1/2	2 1/4	770 096 108	90	50	31	71	54	74	
•	G	1 1/2	2 1/4	770 096 208	90	50	31	71	54	74	
•	B	2	2 3/4	770 096 109	100	58	34	76	66	90	
•	G	2	2 3/4	770 096 209	100	58	34	76	66	90	
-	B	2 1/2	3 1/2	770 096 110	130	72	45	103	85	111	
-	G	2 1/2	3 1/2	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	

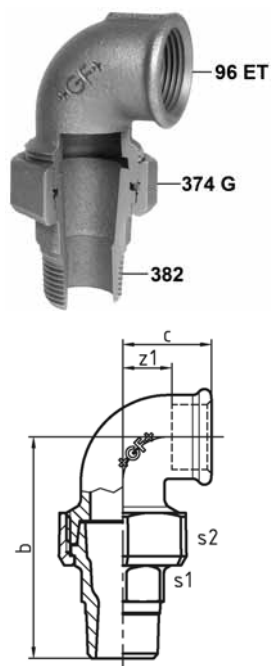


97 Union elbow, flat seat, ISO/EN UA2

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.

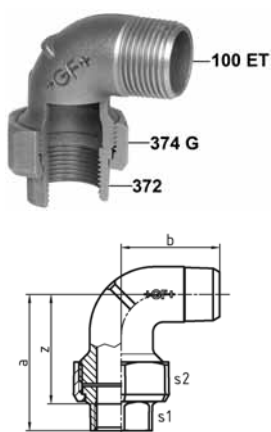
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	c [mm]	z1 [mm]	s1 [mm]	s2 [mm]	
•	B	⅝	¾	770 097 103	65	25	15	19	32	
•	G	⅝	¾	770 097 203	65	25	15	19	32	
•	B	½	1	770 097 104	76	28	15	25	41	
•	G	½	1	770 097 204	76	28	15	25	41	
•	B	¾	1 ¼	770 097 105	82	33	18	32	48	
•	G	¾	1 ¼	770 097 205	82	33	18	32	48	
•	B	1	1 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.

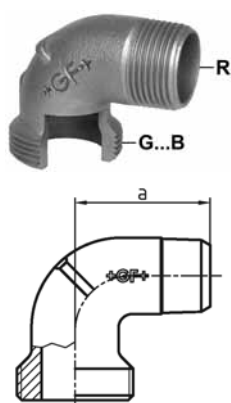
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	c [mm]	z1 [mm]	s1 [mm]	s2 [mm]
•	B	1/4	5/8	770 098 102	61	21	11	15	28
•	G	1/4	5/8	770 098 202	61	21	11	15	28
•	B	3/8	3/4	770 098 103	65	25	15	20	32
•	G	3/8	3/4	770 098 203	65	25	15	20	32
•	B	1/2	1	770 098 104	76	28	15	25	41
•	G	1/2	1	770 098 204	76	28	15	25	41
•	B	3/4	1 1/4	770 098 105	82	33	18	32	48
•	G	3/4	1 1/4	770 098 205	82	33	18	32	48
•	B	1	1 1/2	770 098 106	94	38	21	38	55
•	G	1	1 1/2	770 098 206	94	38	21	38	55
•	B	1 1/4	2	770 098 107	107	45	26	48	67
•	G	1 1/4	2	770 098 207	107	45	26	48	67
•	B	1 1/2	2 1/4	770 098 108	115	50	31	54	74
•	G	1 1/2	2 1/4	770 098 208	115	50	31	54	74
•	B	2	2 3/4	770 098 109	128	58	34	67	90
•	G	2	2 3/4	770 098 209	128	58	34	67	90
-	B	2 1/2	3 1/2	770 098 110	164	72	45	85	111
-	G	2 1/2	3 1/2	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

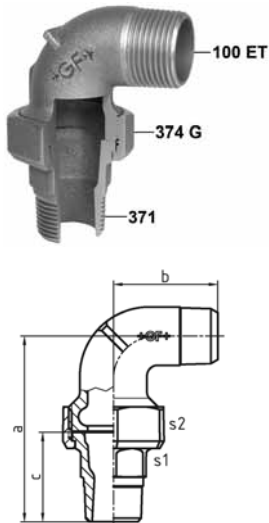
Supplied without sealing gaskets; a and z include the seal thickness as per table
"Sealing Gasket Dimension".
374 G ... refers to the thread size G according to ISO 228 of the union nut 374.

EN		Dim. [inch]	374 G [inch]	Code	a [mm]	b [mm]	z [mm]	s1 [mm]	s2 [mm]
-	B	1/2	1	770 100 104	58	39	45	26	41
-	G	1/2	1	770 100 204	58	39	45	26	41
-	B	3/4	1 1/4	770 100 105	61	43	46	31	48
-	G	3/4	1 1/4	770 100 205	61	43	46	31	48
-	B	1	1 1/2	770 100 106	71	52	55	38	55
-	G	1	1 1/2	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	1/2	1	770 600 104	39
-	G	1/2	1	770 600 204	39
-	B	3/4	1 1/4	770 600 105	43
-	G	3/4	1 1/4	770 600 205	43
-	B	1	1 1/2	770 600 106	52
-	G	1	1 1/2	770 600 206	52

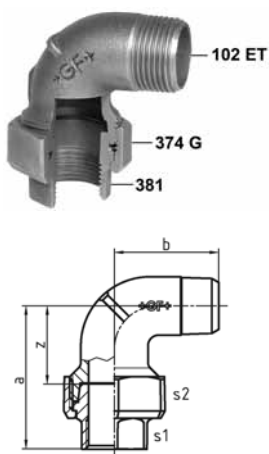


101 Union elbow, flat seat

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	1/2	1	770 101 104	77	39	40	25	41	
-	G	1/2	1	770 101 204	77	39	40	25	41	
-	B	3/4	1 1/4	770 101 105	81	43	42	32	48	
-	G	3/4	1 1/4	770 101 205	81	43	42	32	48	
-	B	1	1 1/2	770 101 106	93	52	47	39	55	
-	G	1	1 1/2	770 101 206	93	52	47	39	55	

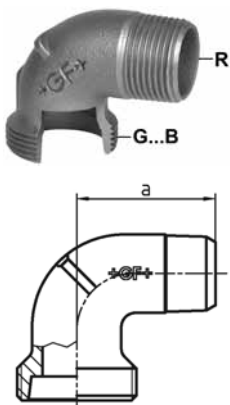


102 Union elbow, taper seat

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.

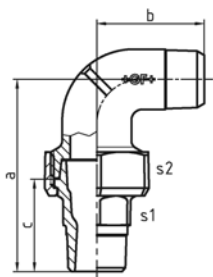
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	b [mm]	z [mm]	s1 [mm]	s2 [mm]	
-	B	1/2	1	770 102 104	59	39	46	25	41	
-	G	1/2	1	770 102 204	59	39	46	25	41	
-	B	3/4	1 1/4	770 102 105	61	43	46	32	48	
-	G	3/4	1 1/4	770 102 205	61	43	46	32	48	
-	B	1	1 1/2	770 102 106	71	52	54	38	55	
-	G	1	1 1/2	770 102 206	71	52	54	38	55	



102 ET Union bush to Fig. 102

Is usually not supplied as a separate piece.

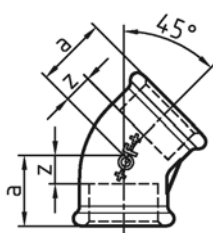
EN		Dim. R [inch]	G...B [inch]	Code	a [mm]	
-	B	1/2	1	-	39	
-	G	1/2	1	-	39	
-	B	3/4	1 1/4	-	43	
-	G	3/4	1 1/4	-	43	
-	B	1	1 1/2	-	52	
-	G	1	1 1/2	-	52	



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	1/2	1	770 103 104	76	39	40.5	25	39	
-	G	1/2	1	770 103 204	76	39	40.5	25	39	
-	B	3/4	1 1/4	770 103 105	81	43	42.5	32	48	
-	G	3/4	1 1/4	770 103 205	81	43	42.5	32	48	
-	B	1	1 1/2	770 103 106	93	52	47.5	38	55	
-	G	1	1 1/2	770 103 206	93	52	47.5	38	55	

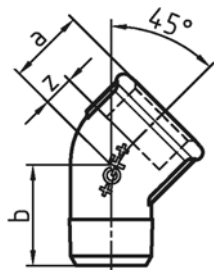


120 Elbow 45°, ISO/EN A1/45°

EN		Dim. [inch]	Code	a [mm]	z [mm]	
•	B	3/8	770 120 103	20	10	
•	G	3/8	770 120 203	20	10	
•	B	1/2	770 120 104	22	9	
•	G	1/2	770 120 204	22	9	
•	B	3/4	770 120 105	25	10	
•	G	3/4	770 120 205	25	10	
•	B	1	770 120 106	28	11	
•	G	1	770 120 206	28	11	
•	B	1 1/4	770 120 107	33	14	
•	G	1 1/4	770 120 207	33	14	
•	B	1 1/2	770 120 108	36	17	
•	G	1 1/2	770 120 208	36	17	
•	B	2	770 120 109	43	19	
•	G	2	770 120 209	43	19	
-	B	2 1/2	770 120 110	48	21	
-	G	2 1/2	770 120 210	48	21	
-	B	3	770 120 111	54	24	
-	G	3	770 120 211	54	24	

121

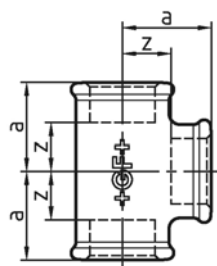
Elbow 45°, ISO/EN A4/45°



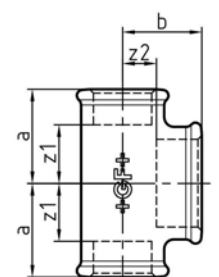
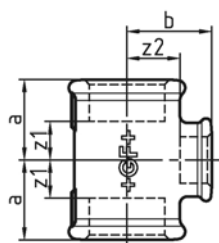
EN		Dim. [inch]	Code	a [mm]	b [mm]	z [mm]	
•	B	3/8	770 121 103	20	25	10	
•	G	3/8	770 121 203	20	25	10	
•	B	1/2	770 121 104	22	28	9	
•	G	1/2	770 121 204	22	28	9	
•	B	3/4	770 121 105	25	32	10	
•	G	3/4	770 121 205	25	32	10	
•	B	1	770 121 106	28	37	11	
•	G	1	770 121 206	28	37	11	
•	B	1 1/4	770 121 107	33	43	14	
•	G	1 1/4	770 121 207	33	43	14	
•	B	1 1/2	770 121 108	36	46	17	
•	G	1 1/2	770 121 208	36	46	17	
•	B	2	770 121 109	43	55	19	
•	G	2	770 121 209	43	55	19	
-	B	2 1/2	770 121 110	46	54	19	
-	G	2 1/2	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



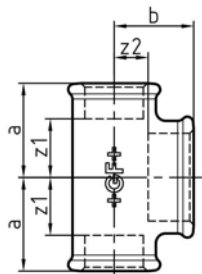
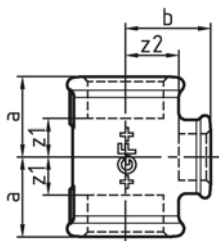
EN		Dim. [inch]	Code	a [mm]	z [mm]	
•	B	1/8	770 130 101	19	12	
•	G	1/8	770 130 201	19	12	
•	B	1/4	770 130 102	21	11	
•	G	1/4	770 130 202	21	11	
•	B	3/8	770 130 103	25	15	
•	G	3/8	770 130 203	25	15	
•	B	1/2	770 130 104	28	15	
•	G	1/2	770 130 204	28	15	
•	B	3/4	770 130 105	33	18	
•	G	3/4	770 130 205	33	18	
•	B	1	770 130 106	38	21	
•	G	1	770 130 206	38	21	
•	B	1 1/4	770 130 107	45	26	
•	G	1 1/4	770 130 207	45	26	
•	B	1 1/2	770 130 108	50	31	
•	G	1 1/2	770 130 208	50	31	
•	B	2	770 130 109	58	34	
•	G	2	770 130 209	58	34	
•	B	2 1/2	770 130 110	69	42	
•	G	2 1/2	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	



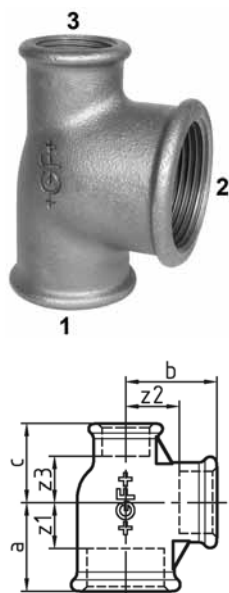
130

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	$\frac{3}{8} - \frac{1}{4}$	770 130 115	23	23	13	13
•	G	$\frac{3}{8} - \frac{1}{4}$	770 130 215	23	23	13	13
•	B	$\frac{3}{8} - \frac{1}{2}$	770 130 116	26	26	16	13
•	G	$\frac{3}{8} - \frac{1}{2}$	770 130 216	26	26	16	13
•	B	$\frac{1}{2} - \frac{1}{4}$	770 130 117	24	24	11	14
•	G	$\frac{1}{2} - \frac{1}{4}$	770 130 217	24	24	11	14
•	B	$\frac{1}{2} - \frac{3}{8}$	770 130 119	26	26	13	16
•	G	$\frac{1}{2} - \frac{3}{8}$	770 130 219	26	26	13	16
•	B	$\frac{1}{2} - \frac{3}{4}$	770 130 121	31	30	18	15
•	G	$\frac{1}{2} - \frac{3}{4}$	770 130 221	31	30	18	15
•	B	$\frac{1}{2} - 1$	770 130 130	34	32	21	15
•	G	$\frac{1}{2} - 1$	770 130 230	34	32	21	15
•	B	$\frac{3}{4} - \frac{1}{4}$	770 130 122	26	27	11	17
•	G	$\frac{3}{4} - \frac{1}{4}$	770 130 222	26	27	11	17
•	B	$\frac{3}{4} - \frac{3}{8}$	770 130 124	28	28	13	18
•	G	$\frac{3}{4} - \frac{3}{8}$	770 130 224	28	28	13	18
•	B	$\frac{3}{4} - \frac{1}{2}$	770 130 127	30	31	15	18
•	G	$\frac{3}{4} - \frac{1}{2}$	770 130 227	30	31	15	18
•	B	$\frac{3}{4} - 1$	770 130 132	36	35	21	18
•	G	$\frac{3}{4} - 1$	770 130 232	36	35	21	18
•	B	$1 - \frac{1}{4}$	770 130 133	28	31	11	21
•	G	$1 - \frac{1}{4}$	770 130 233	28	31	11	21
•	B	$1 - \frac{3}{8}$	770 130 134	30	32	13	22
•	G	$1 - \frac{3}{8}$	770 130 234	30	32	13	22
•	B	$1 - \frac{1}{2}$	770 130 137	32	34	15	21
•	G	$1 - \frac{1}{2}$	770 130 237	32	34	15	21
•	B	$1 - \frac{3}{4}$	770 130 140	35	36	18	21
•	G	$1 - \frac{3}{4}$	770 130 240	35	36	18	21
•	B	$1 - 1 \frac{1}{4}$	770 130 145	42	40	25	21
•	G	$1 - 1 \frac{1}{4}$	770 130 245	42	40	25	21
•	B	$1 - 1 \frac{1}{2}$	770 130 159	46	42	29	23
•	G	$1 - 1 \frac{1}{2}$	770 130 259	46	42	29	23
•	B	$1 \frac{1}{4} - \frac{3}{8}$	770 130 146	32	36	13	26
•	G	$1 \frac{1}{4} - \frac{3}{8}$	770 130 246	32	36	13	26
•	B	$1 \frac{1}{4} - \frac{1}{2}$	770 130 148	34	38	15	25
•	G	$1 \frac{1}{4} - \frac{1}{2}$	770 130 248	34	38	15	25
•	B	$1 \frac{1}{4} - \frac{3}{4}$	770 130 151	36	41	17	26
•	G	$1 \frac{1}{4} - \frac{3}{4}$	770 130 251	36	41	17	26
•	B	$1 \frac{1}{4} - 1$	770 130 155	40	42	21	25
•	G	$1 \frac{1}{4} - 1$	770 130 255	40	42	21	25
•	B	$1 \frac{1}{4} - 1 \frac{1}{2}$	770 130 161	48	46	29	27
•	G	$1 \frac{1}{4} - 1 \frac{1}{2}$	770 130 261	48	46	29	27
•	B	$1 \frac{1}{4} - 2$	770 130 177	54	48	35	24
•	G	$1 \frac{1}{4} - 2$	770 130 277	54	48	35	24
-	B	$1 \frac{1}{2} - \frac{3}{8}$	770 130 162	33	38	14	28
-	G	$1 \frac{1}{2} - \frac{3}{8}$	770 130 262	33	38	14	28
•	B	$1 \frac{1}{2} - \frac{1}{2}$	770 130 164	36	42	17	29
•	G	$1 \frac{1}{2} - \frac{1}{2}$	770 130 264	36	42	17	29
•	B	$1 \frac{1}{2} - \frac{3}{4}$	770 130 166	38	44	19	29
•	G	$1 \frac{1}{2} - \frac{3}{4}$	770 130 266	38	44	19	29
•	B	$1 \frac{1}{2} - 1$	770 130 169	42	46	23	29
•	G	$1 \frac{1}{2} - 1$	770 130 269	42	46	23	29
•	B	$1 \frac{1}{2} - 1 \frac{1}{4}$	770 130 172	46	48	27	29
•	G	$1 \frac{1}{2} - 1 \frac{1}{4}$	770 130 272	46	48	27	29
•	B	$1 \frac{1}{2} - 2$	770 130 179	55	52	36	28
•	G	$1 \frac{1}{2} - 2$	770 130 279	55	52	36	28
•	B	$2 - \frac{1}{2}$	770 130 181	38	48	14	35
•	G	$2 - \frac{1}{2}$	770 130 281	38	48	14	35
•	B	$2 - \frac{3}{4}$	770 130 183	40	50	16	35
•	G	$2 - \frac{3}{4}$	770 130 283	40	50	16	35



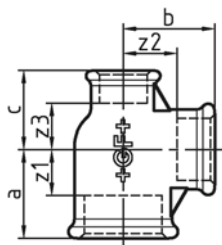
EN		Dim. (1-2) [inch]	Code	a [mm]	b [mm]	z1 [mm]	z2 [mm]	
•	B	2 - 1	770 130 185	44	52	20	35	
•	G	2 - 1	770 130 285	44	52	20	35	
•	B	2 - 1 ¼	770 130 188	48	54	24	35	
•	G	2 - 1 ¼	770 130 288	48	54	24	35	
•	B	2 - 1 ½	770 130 191	52	55	28	36	
•	G	2 - 1 ½	770 130 291	52	55	28	36	
-	B	2 - 2 ½	770 130 197	66	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

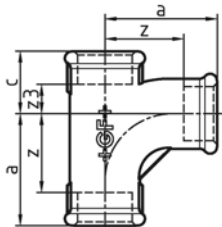
Tee, reducing or increasing on the branch, reducing on the run, ISO/EN B1

EN		Dim. (1-2-3) [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z2 [mm]	z3 [mm]	
•	B	$\frac{1}{2} - \frac{3}{8} - \frac{3}{8}$	770 130 118	26	26	25	13	16	15	
•	G	$\frac{1}{2} - \frac{3}{8} - \frac{3}{8}$	770 130 218	26	26	25	13	16	15	
•	B	$\frac{1}{2} - \frac{1}{2} - \frac{3}{8}$	770 130 120	28	28	26	15	15	16	
•	G	$\frac{1}{2} - \frac{1}{2} - \frac{3}{8}$	770 130 220	28	28	26	15	15	16	
•	B	$\frac{3}{4} - \frac{3}{8} - \frac{1}{2}$	770 130 123	28	28	26	13	18	13	
•	G	$\frac{3}{4} - \frac{3}{8} - \frac{1}{2}$	770 130 223	28	28	26	13	18	13	
•	B	$\frac{3}{4} - \frac{1}{2} - \frac{3}{8}$	770 130 125	30	31	26	15	18	16	
•	G	$\frac{3}{4} - \frac{1}{2} - \frac{3}{8}$	770 130 225	30	31	26	15	18	16	
•	B	$\frac{3}{4} - \frac{1}{2} - \frac{1}{2}$	770 130 126	30	31	28	15	18	15	
•	G	$\frac{3}{4} - \frac{1}{2} - \frac{1}{2}$	770 130 226	30	31	28	15	18	15	
•	B	$\frac{3}{4} - \frac{3}{4} - \frac{3}{8}$	770 130 128	33	33	28	18	18	18	
•	G	$\frac{3}{4} - \frac{3}{4} - \frac{3}{8}$	770 130 228	33	33	28	18	18	18	
•	B	$\frac{3}{4} - \frac{3}{4} - \frac{1}{2}$	770 130 129	33	33	31	18	18	18	
•	G	$\frac{3}{4} - \frac{3}{4} - \frac{1}{2}$	770 130 229	33	33	31	18	18	18	
-	B	$\frac{3}{4} - 1 - \frac{1}{2}$	770 130 131	36	35	34	21	18	21	
-	G	$\frac{3}{4} - 1 - \frac{1}{2}$	770 130 231	36	35	34	21	18	21	
•	B	$1 - \frac{1}{2} - \frac{1}{2}$	770 130 135	32	34	28	15	21	15	
•	G	$1 - \frac{1}{2} - \frac{1}{2}$	770 130 235	32	34	28	15	21	15	
•	B	$1 - \frac{1}{2} - \frac{3}{4}$	770 130 136	32	34	30	15	21	15	
•	G	$1 - \frac{1}{2} - \frac{3}{4}$	770 130 236	32	34	30	15	21	15	
•	B	$1 - \frac{3}{4} - \frac{1}{2}$	770 130 138	35	36	31	18	21	18	
•	G	$1 - \frac{3}{4} - \frac{1}{2}$	770 130 238	35	36	31	18	21	18	
•	B	$1 - \frac{3}{4} - \frac{3}{4}$	770 130 139	35	36	33	18	21	18	
•	G	$1 - \frac{3}{4} - \frac{3}{4}$	770 130 239	35	36	33	18	21	18	
•	B	$1 - 1 - \frac{3}{8}$	770 130 141	38	38	32	21	21	22	
•	G	$1 - 1 - \frac{3}{8}$	770 130 241	38	38	32	21	21	22	
•	B	$1 - 1 - \frac{1}{2}$	770 130 142	38	38	34	21	21	21	
•	G	$1 - 1 - \frac{1}{2}$	770 130 242	38	38	34	21	21	21	
•	B	$1 - 1 - \frac{3}{4}$	770 130 143	38	38	36	21	21	21	
•	G	$1 - 1 - \frac{3}{4}$	770 130 243	38	38	36	21	21	21	
-	B	$1 - 1 \frac{1}{4} - \frac{3}{4}$	770 130 144	42	40	41	25	21	26	
-	G	$1 - 1 \frac{1}{4} - \frac{3}{4}$	770 130 244	42	40	41	25	21	26	
•	B	$1 \frac{1}{4} - \frac{1}{2} - 1$	770 130 147	34	38	32	15	25	15	
•	G	$1 \frac{1}{4} - \frac{1}{2} - 1$	770 130 247	34	38	32	15	25	15	
•	B	$1 \frac{1}{4} - \frac{3}{4} - \frac{3}{4}$	770 130 149	36	41	33	17	26	18	
•	G	$1 \frac{1}{4} - \frac{3}{4} - \frac{3}{4}$	770 130 249	36	41	33	17	26	18	
•	B	$1 \frac{1}{4} - \frac{3}{4} - 1$	770 130 150	36	41	35	17	26	18	
•	G	$1 \frac{1}{4} - \frac{3}{4} - 1$	770 130 250	36	41	35	17	26	18	
•	B	$1 \frac{1}{4} - 1 - \frac{3}{4}$	770 130 153	40	42	36	21	25	21	
•	G	$1 \frac{1}{4} - 1 - \frac{3}{4}$	770 130 253	40	42	36	21	25	21	
•	B	$1 \frac{1}{4} - 1 - 1$	770 130 154	40	42	38	21	25	21	
•	G	$1 \frac{1}{4} - 1 - 1$	770 130 254	40	42	38	21	25	21	
•	B	$1 \frac{1}{4} - 1 \frac{1}{4} - \frac{1}{2}$	770 130 156	45	45	38	26	26	25	
•	G	$1 \frac{1}{4} - 1 \frac{1}{4} - \frac{1}{2}$	770 130 256	45	45	38	26	26	25	
•	B	$1 \frac{1}{4} - 1 \frac{1}{4} - \frac{3}{4}$	770 130 157	45	45	41	26	26	26	
•	G	$1 \frac{1}{4} - 1 \frac{1}{4} - \frac{3}{4}$	770 130 257	45	45	41	26	26	26	
•	B	$1 \frac{1}{4} - 1 \frac{1}{4} - 1$	770 130 158	45	45	42	26	26	25	
•	G	$1 \frac{1}{4} - 1 \frac{1}{4} - 1$	770 130 258	45	45	42	26	26	25	
-	B	$1 \frac{1}{4} - 1 \frac{1}{2} - 1$	770 130 160	48	46	46	29	27	29	
-	G	$1 \frac{1}{4} - 1 \frac{1}{2} - 1$	770 130 260	48	46	46	29	27	29	
•	B	$1 \frac{1}{2} - \frac{1}{2} - 1 \frac{1}{4}$	770 130 163	36	42	34	17	29	15	
•	G	$1 \frac{1}{2} - \frac{1}{2} - 1 \frac{1}{4}$	770 130 263	36	42	34	17	29	15	
•	B	$1 \frac{1}{2} - \frac{3}{4} - 1 \frac{1}{4}$	770 130 165	38	44	36	19	29	17	
•	G	$1 \frac{1}{2} - \frac{3}{4} - 1 \frac{1}{4}$	770 130 265	38	44	36	19	29	17	
•	B	$1 \frac{1}{2} - 1 - 1$	770 130 167	42	46	38	23	29	21	
•	G	$1 \frac{1}{2} - 1 - 1$	770 130 267	42	46	38	23	29	21	
•	B	$1 \frac{1}{2} - 1 - 1 \frac{1}{4}$	770 130 168	42	46	38	23	29	21	
•	G	$1 \frac{1}{2} - 1 - 1 \frac{1}{4}$	770 130 268	42	46	38	23	29	21	
•	B	$1 \frac{1}{2} - 1 \frac{1}{4} - 1$	770 130 170	46	48	42	27	29	25	
•	G	$1 \frac{1}{2} - 1 \frac{1}{4} - 1$	770 130 270	46	48	42	27	29	25	

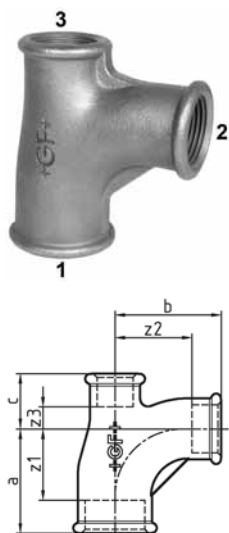


EN		Dim. (1-2-3) [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z2 [mm]	z3 [mm]
•	B	1 ½ - 1 ¼ - 1 ¼	770 130 171	46	48	45	27	29	26
•	G	1 ½ - 1 ¼ - 1 ¼	770 130 271	46	48	45	27	29	26
•	B	1 ½ - 1 ½ - ½	770 130 173	50	50	42	31	31	29
•	G	1 ½ - 1 ½ - ½	770 130 273	50	50	42	31	31	29
•	B	1 ½ - 1 ½ - ¾	770 130 174	50	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

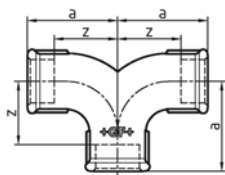


Pitcher tee, reducing on the branch, ISO/EN E1

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	

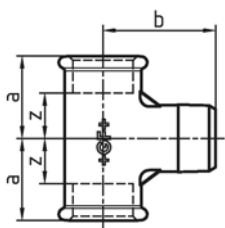
Pitcher tee, equal or reducing on the branch and run, ISO/EN E1

[illegible]



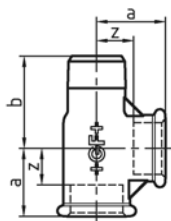
132 Twin elbow, equal, ISO/EN E2

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	



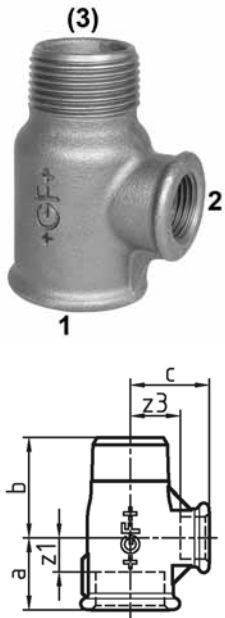
133 Tee, equal

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	



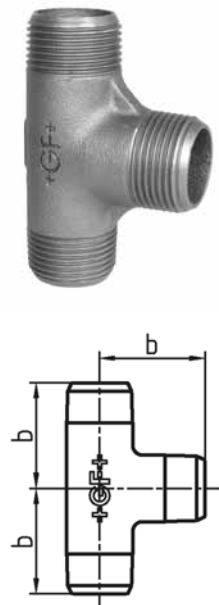
134 Tee, equal

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	



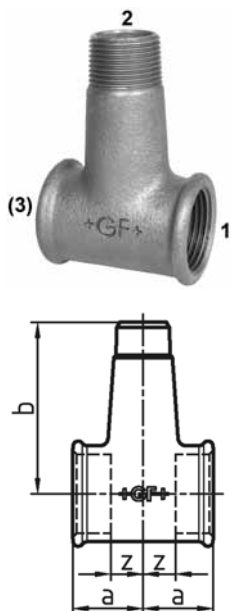
134 Tee, reducing on branch

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	



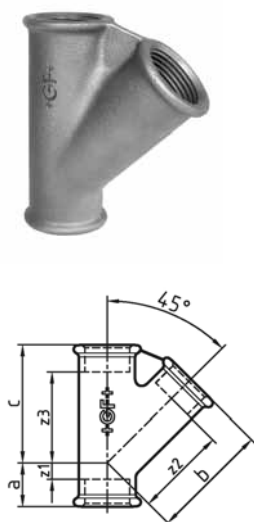
135 Tee, equal

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	



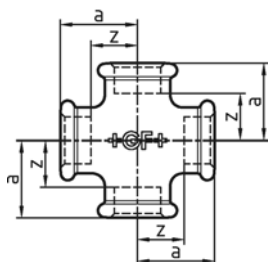
137 Distribution Tee reducing on branch

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

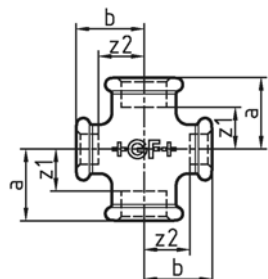
EN		Dim. [inch]	Code	a [mm]	b [mm]	c [mm]	z1 [mm]	z2 [mm]	z3 [mm]	
-	B	¾	770 165 103	16	46	46	6	36	36	
-	B	½	770 165 104	23	54	54	10	41	41	
-	G	½	770 165 204	23	54	54	10	41	41	
-	B	¾	770 165 105	24	64	64	9	49	49	
-	G	¾	770 165 205	24	64	64	9	49	49	
-	B	1	770 165 106	28	77	77	11	60	60	
-	G	1	770 165 206	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

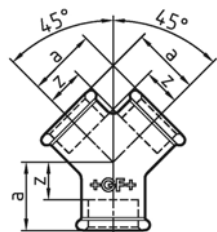
* Available as long as our stock will last

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	



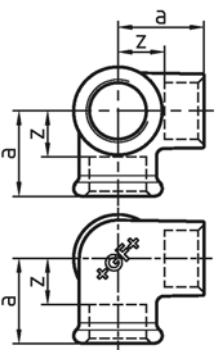
180 Cross, reducing, ISO/EN C1

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	



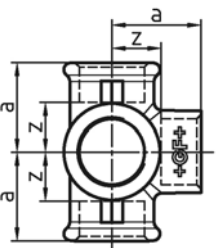
220 Y-piece

EN		Dim. [inch]	Code	a [mm]	z [mm]	
-	B	3/8	770 220 103	24	14	
-	G	3/8	770 220 203	24	14	
-	B	1/2	770 220 104	27	14	
-	G	1/2	770 220 204	27	14	
-	B	3/4	770 220 105	33	18	
-	G	3/4	770 220 205	33	18	
-	B	1	770 220 106	40	23	
-	G	1	770 220 206	40	23	



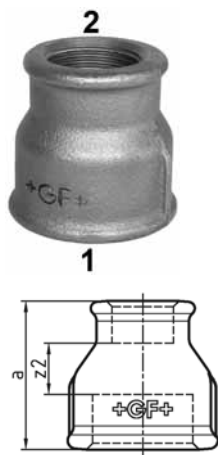
221 Side outlet elbow, ISO/EN Za1

EN		Dim. [inch]	Code	a [mm]	z [mm]	
•	B	3/8	770 221 103	25	15	
•	G	3/8	770 221 203	25	15	
•	B	1/2	770 221 104	28	15	
•	G	1/2	770 221 204	28	15	
•	B	3/4	770 221 105	33	18	
•	G	3/4	770 221 205	33	18	
•	B	1	770 221 106	38	21	
•	G	1	770 221 206	38	21	
-	B	1 1/4	770 221 107	45	26	
-	G	1 1/4	770 221 207	45	26	
-	B	1 1/2	770 221 108	50	31	
-	G	1 1/2	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

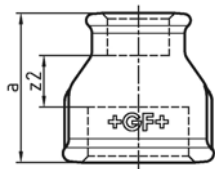
EN		Dim. [inch]	Code	a [mm]	z [mm]	
•	B	1/2	770 223 104	28	15	
•	G	1/2	770 223 204	28	15	
•	B	3/4	770 223 105	33	18	
•	G	3/4	770 223 205	33	18	
•	B	1	770 223 106	38	21	
•	G	1	770 223 206	38	21	



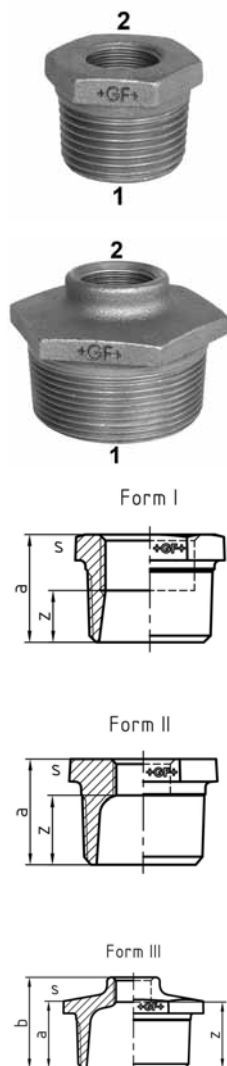
240 Socket, reducing, ISO/EN M2

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	1/4 - 1/8	770 240 115	27	17	10	
ST.	G	1/4 - 1/8	770 240 215	27	17	10	
ST.	B	3/8 - 1/8	770 240 116	30	22	13	
ST.	G	3/8 - 1/8	770 240 216	30	22	13	
ST.	B	3/8 - 1/4	770 240 117	30	22	10	
ST.	G	3/8 - 1/4	770 240 217	30	22	10	
•	B	1/2 - 1/4	770 240 118	36		13	
•	G	1/2 - 1/4	770 240 218	36		13	
•	B	1/2 - 3/8	770 240 119	36		13	
•	G	1/2 - 3/8	770 240 219	36		13	
•	B	3/4 - 1/4	770 240 120	39		14	
•	G	3/4 - 1/4	770 240 220	39		14	
•	B	3/4 - 3/8	770 240 121	39		14	
•	G	3/4 - 3/8	770 240 221	39		14	
•	B	3/4 - 1/2	770 240 122	39		11	
•	G	3/4 - 1/2	770 240 222	39		11	
•	B	1 - 3/8	770 240 123	45		18	
•	G	1 - 3/8	770 240 223	45		18	
•	B	1 - 1/2	770 240 124	45		15	
•	G	1 - 1/2	770 240 224	45		15	
•	B	1 - 3/4	770 240 125	45		13	
•	G	1 - 3/4	770 240 225	45		13	
-	B	1 1/4 - 3/8	770 240 126	50		21	
-	G	1 1/4 - 3/8	770 240 226	50		21	
•	B	1 1/4 - 1/2	770 240 127	50		18	
•	G	1 1/4 - 1/2	770 240 227	50		18	
•	B	1 1/4 - 3/4	770 240 128	50		16	
•	G	1 1/4 - 3/4	770 240 228	50		16	
•	B	1 1/4 - 1	770 240 129	50		14	
•	G	1 1/4 - 1	770 240 229	50		14	
•	B	1 1/2 - 1/2	770 240 130	55		23	
•	G	1 1/2 - 1/2	770 240 230	55		23	
•	B	1 1/2 - 3/4	770 240 131	55		21	
•	G	1 1/2 - 3/4	770 240 231	55		21	
•	B	1 1/2 - 1	770 240 132	55		19	
•	G	1 1/2 - 1	770 240 232	55		19	
•	B	1 1/2 - 1 1/4	770 240 133	55		17	
•	G	1 1/2 - 1 1/4	770 240 233	55		17	
•	B	2 - 1/2	770 240 134	65		28	
•	G	2 - 1/2	770 240 234	65		28	
•	B	2 - 3/4	770 240 135	65		26	
•	G	2 - 3/4	770 240 235	65		26	
•	B	2 - 1	770 240 136	65		24	
•	G	2 - 1	770 240 236	65		24	
•	B	2 - 1 1/4	770 240 137	65		22	
•	G	2 - 1 1/4	770 240 237	65		22	
•	B	2 - 1 1/2	770 240 138	65		22	
•	G	2 - 1 1/2	770 240 238	65		22	
-	B	2 1/2 - 1	770 240 139	74		30	
-	G	2 1/2 - 1	770 240 239	74		30	
•	B	2 1/2 - 1 1/4	770 240 140	74		28	
•	G	2 1/2 - 1 1/4	770 240 240	74		28	
•	B	2 1/2 - 1 1/2	770 240 141	74		28	
•	G	2 1/2 - 1 1/2	770 240 241	74		28	
•	B	2 1/2 - 2	770 240 142	74		23	
•	G	2 1/2 - 2	770 240 242	74		23	
-	B	3 - 1 1/2	770 240 143	80		31	
-	G	3 - 1 1/2	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	

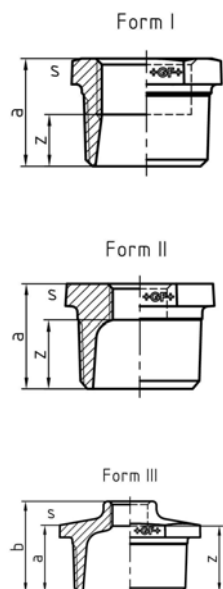


241 Reducing bush, ISO/EN N4

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	1/4 - 1/8	I	770 241 115	20		13	17	
ST•	G	1/4 - 1/8	I	770 241 215	20		13	17	
ST•	B	3/8 - 1/8	I	770 241 116	20		13	19	
ST•	G	3/8 - 1/8	I	770 241 216	20		13	19	
ST•	B	3/8 - 1/4	I	770 241 117	20		10	19	
ST•	G	3/8 - 1/4	I	770 241 217	20		10	19	
•	B	1/2 - 1/8	II	770 241 118	24		17	23	
•	G	1/2 - 1/8	II	770 241 218	24		17	23	
•	B	1/2 - 1/4	I	770 241 119	24		14	23	
•	G	1/2 - 1/4	I	770 241 219	24		14	23	
•	B	1/2 - 3/8	I	770 241 120	24		14	23	
•	G	1/2 - 3/8	I	770 241 220	24		14	23	
•	B	3/4 - 1/4	II	770 241 121	26		16	30	
•	G	3/4 - 1/4	II	770 241 221	26		16	30	
•	B	3/4 - 3/8	II	770 241 122	27		16	30	
•	G	3/4 - 3/8	II	770 241 222	27		16	30	
•	B	3/4 - 1/2	I	770 241 123	26		13	30	
•	G	3/4 - 1/2	I	770 241 223	26		13	30	
•	B	1 - 1/4	II	770 241 124	29		19	36	
•	G	1 - 1/4	II	770 241 224	29		19	36	
•	B	1 - 3/8	II	770 241 125	29		19	36	
•	G	1 - 3/8	II	770 241 225	29		19	36	
•	B	1 - 1/2	II	770 241 126	29		16	36	
•	G	1 - 1/2	II	770 241 226	29		16	36	
•	B	1 - 3/4	II	770 241 127	29		14	36	
•	G	1 - 3/4	II	770 241 227	29		14	36	
•	B	1 1/4 - 3/8	II	770 241 128	31		21	46	
•	G	1 1/4 - 3/8	II	770 241 228	31		21	46	
•	B	1 1/4 - 1/2	II	770 241 129	31		18	46	
•	G	1 1/4 - 1/2	II	770 241 229	31		18	46	
•	B	1 1/4 - 3/4	II	770 241 130	31		16	46	
•	G	1 1/4 - 3/4	II	770 241 230	31		16	46	
•	B	1 1/4 - 1	II	770 241 131	31		14	46	
•	G	1 1/4 - 1	II	770 241 231	31		14	46	
•	B	1 1/2 - 3/8	II	770 241 132	31		21	50	
•	G	1 1/2 - 3/8	II	770 241 232	31		21	50	
•	B	1 1/2 - 1/2	II	770 241 133	31		18	50	
•	G	1 1/2 - 1/2	II	770 241 233	31		18	50	
•	B	1 1/2 - 3/4	II	770 241 134	31		16	50	
•	G	1 1/2 - 3/4	II	770 241 234	31		16	50	
•	B	1 1/2 - 1	II	770 241 135	31		14	50	
•	G	1 1/2 - 1	II	770 241 235	31		14	50	
•	B	1 1/2 - 1 1/4	I	770 241 136	33		12	50	
•	G	1 1/2 - 1 1/4	I	770 241 236	33		12	50	
•	B	2 - 1/2	III	770 241 137	35	48	35	65	
•	G	2 - 1/2	III	770 241 237	35	48	35	65	
•	B	3 - 3/4	III	770 241 138	35	48	33	65	
•	G	2 - 3/4	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 1/4	II	770 241 140	37		18	65	
•	G	2 - 1 1/4	II	770 241 240	37		18	65	
•	B	2 - 1 1/2	II	770 241 141	37		18	65	
•	G	2 - 1 1/2	II	770 241 241	37		18	65	
•	B	2 1/2 - 1	III	770 241 142	40	54	37	80	
•	G	2 1/2 - 1	III	770 241 242	40	54	37	80	
•	B	2 1/2 - 1 1/4	III	770 241 143	40	54	37	80	
•	G	2 1/2 - 1 1/4	III	770 241 243	40	54	37	80	



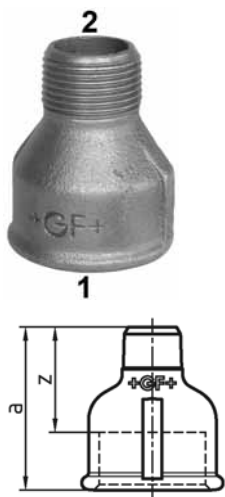
EN		Dim. (1-2) [inch]	Form	Code	a [mm]	b [mm]	z [mm]	s [mm]	
•	B	2 ½ - 1 ½	II	770 241 144	40		21	80	
•	G	2 ½ - 1 ½	II	770 241 244	40		21	80	
•	B	2 ½ - 2	II	770 241 145	40		16	80	
•	G	2 ½ - 2	II	770 241 245	40		16	80	
•	B	3 - 1	III	770 241 146	44	59	42	95	
•	G	3 - 1	III	770 241 246	44	59	42	95	
•	B	3 - 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	

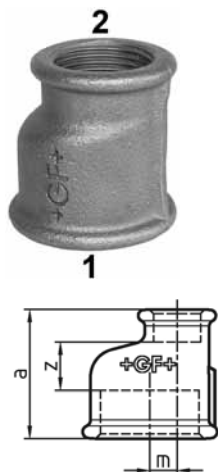


246

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	1/4 - 1/8	770 246 115	32	17	22	
ST_	G	1/4 - 1/8	770 246 215	32	17	22	
ST_	B	3/8 - 1/4	770 246 116	35	22	25	
ST_	G	3/8 - 1/4	770 246 216	35	22	25	
•	B	1/2 - 1/4	770 246 117	43		30	
•	G	1/2 - 1/4	770 246 217	43		30	
•	B	1/2 - 3/8	770 246 118	43		30	
•	G	1/2 - 3/8	770 246 218	43		30	
•	B	3/4 - 3/8	770 246 119	48		33	
•	G	3/4 - 3/8	770 246 219	48		33	
•	B	3/4 - 1/2	770 246 120	48		33	
•	G	3/4 - 1/2	770 246 220	48		33	
•	B	1 - 1/2	770 246 121	55		38	
•	G	1 - 1/2	770 246 221	55		38	
•	B	1 - 3/4	770 246 122	55		38	
•	G	1 - 3/4	770 246 222	55		38	
-	B	1 1/4 - 1/2	770 246 123	60		41	
-	G	1 1/4 - 1/2	770 246 223	60		41	
•	B	1 1/4 - 3/4	770 246 124	60		41	
•	G	1 1/4 - 3/4	770 246 224	60		41	
•	B	1 1/4 - 1	770 246 125	60		41	
•	G	1 1/4 - 1	770 246 225	60		41	
-	B	1 1/2 - 3/4	770 246 126	60		41	
-	G	1 1/2 - 3/4	770 246 226	60		41	
•	B	1 1/2 - 1	770 246 127	63		44	
•	G	1 1/2 - 1	770 246 227	63		44	
•	B	1 1/2 - 1 1/4	770 246 128	63		44	
•	G	1 1/2 - 1 1/4	770 246 228	63		44	
-	B	2 - 1	770 246 129	70		46	
-	G	2 - 1	770 246 229	70		46	
•	B	2 - 1 1/4	770 246 130	70		46	
•	G	2 - 1 1/4	770 246 230	70		46	
•	B	2 - 1 1/2	770 246 131	70		46	
•	G	2 - 1 1/2	770 246 231	70		46	
-	B	2 1/2 - 1 1/2	770 246 132	83		56	
-	G	2 1/2 - 1 1/2	770 246 232	83		56	
-	B	2 1/2 - 2	770 246 133	80		53	
-	G	2 1/2 - 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 1/2	770 246 135	91		61	
-	G	3 - 2 1/2	770 246 235	91		61	



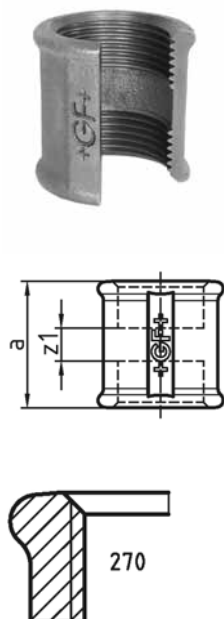
260

Socket eccentric, reducing

EN		Dim. (1-2) [inch]	Code	a [mm]	z [mm]	m [mm]	
-	B	$\frac{3}{4} - \frac{1}{2}$	770 260 122	41	13	3.0	
-	G	$\frac{3}{4} - \frac{1}{2}$	770 260 222	41	13	3.0	
-	B	$1 - \frac{1}{2}$	770 260 115	45	15	6.0	
-	G	$1 - \frac{1}{2}$	770 260 215	45	15	6.0	
-	B	$1 - \frac{3}{4}$	770 260 116	45	13	3.5	
-	G	$1 - \frac{3}{4}$	770 260 216	45	13	3.5	
-	B	$1 \frac{1}{4} - \frac{1}{2}$	770 260 117	50	18	11.0	
-	G	$1 \frac{1}{4} - \frac{1}{2}$	770 260 217	50	18	11.0	
-	B	$1 \frac{1}{4} - \frac{3}{4}$	770 260 118	50	16	8.0	
-	G	$1 \frac{1}{4} - \frac{3}{4}$	770 260 218	50	16	8.0	
-	B	$1 \frac{1}{4} - 1$	770 260 119	50	14	5.0	
-	G	$1 \frac{1}{4} - 1$	770 260 219	50	14	5.0	
-	B	$1 \frac{1}{2} - \frac{1}{2}$	770 260 120	56	24	14.0	
-	G	$1 \frac{1}{2} - \frac{1}{2}$	770 260 220	56	24	14.0	
-	B	$1 \frac{1}{2} - \frac{3}{4}$	770 260 123	56	22	11.0	
-	G	$1 \frac{1}{2} - \frac{3}{4}$	770 260 223	56	22	11.0	
-	B	$1 \frac{1}{2} - 1$	770 260 121	56	20	8.0	
-	G	$1 \frac{1}{2} - 1$	770 260 221	56	20	8.0	
-	B	$1 \frac{1}{2} - 1 \frac{1}{4}$	770 260 124	56	18	3.0	
-	G	$1 \frac{1}{2} - 1 \frac{1}{4}$	770 260 224	56	18	3.0	
-	B	$2 - \frac{1}{2}$	770 260 125	65	28	20.0	
-	G	$2 - \frac{1}{2}$	770 260 225	65	28	20.0	
-	B	$2 - \frac{3}{4}$	770 260 126	65	26	17.0	
-	G	$2 - \frac{3}{4}$	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	$2 - 1 \frac{1}{4}$	770 260 128	65	22	10.0	
-	G	$2 - 1 \frac{1}{4}$	770 260 228	65	22	10.0	
-	B	$2 - 1 \frac{1}{2}$	770 260 129	65	22	7.0	
-	G	$2 - 1 \frac{1}{2}$	770 260 229	65	22	7.0	
-	B	$2 \frac{1}{2} - 2$	770 260 130	74	23	8.0	
-	G	$2 \frac{1}{2} - 2$	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.

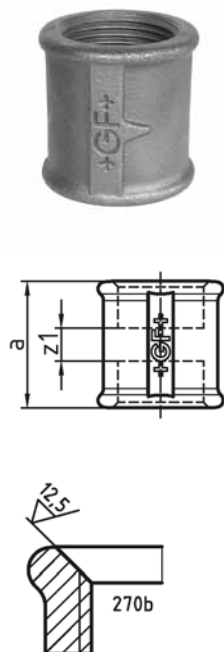


EN		Dim. [inch]	Code	a [mm]	s [mm]	z1 [mm]	
ST.	B	1/8	770 270 101	25	17	11	
ST.	G	1/8	770 270 201	25	17	11	
ST.	B	1/4	770 270 102	27	19	7	
ST.	G	1/4	770 270 202	27	19	7	
•	B	3/8	770 270 103	30		10	
•	G	3/8	770 270 203	30		10	
•	B	1/2	770 270 104	36		10	
•	G	1/2	770 270 204	36		10	
•	B	3/4	770 270 105	39		9	
•	G	3/4	770 270 205	39		9	
•	B	1	770 270 106	45		11	
•	G	1	770 270 206	45		11	
•	B	1 1/4	770 270 107	50		12	
•	G	1 1/4	770 270 207	50		12	
•	B	1 1/2	770 270 108	55		17	
•	G	1 1/2	770 270 208	55		17	
•	B	2	770 270 109	65		17	
•	G	2	770 270 209	65		17	
•	B	2 1/2	770 270 110	74		20	
•	G	2 1/2	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.

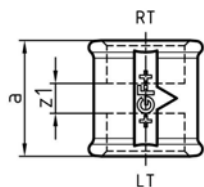


EN		Dim. [inch]	Code	a [mm]	z1 [mm]	
-	G	1/2	-	36	10	
-	G	3/4	-	39	9	
-	G	1	-	45	11	
-	G	1 1/4	-	50	12	
-	G	1 1/2	-	55	17	
-	G	2	-	65	17	

271

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

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

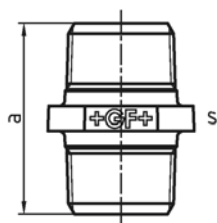


EN		Dim. [inch]	Code	a [mm]	z1 [mm]
•	B	$\frac{3}{8}$	770 271 103	30	10
•	G	$\frac{3}{8}$	770 271 203	30	10
•	B	$\frac{1}{2}$	770 271 104	36	10
•	G	$\frac{1}{2}$	770 271 204	36	10
•	B	$\frac{3}{4}$	770 271 105	39	9
•	G	$\frac{3}{4}$	770 271 205	39	9
•	B	1	770 271 106	45	11
•	G	1	770 271 206	45	11
•	B	1 $\frac{1}{4}$	770 271 107	50	12
•	G	1 $\frac{1}{4}$	770 271 207	50	12
•	B	1 $\frac{1}{2}$	770 271 108	55	17
•	G	1 $\frac{1}{2}$	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.

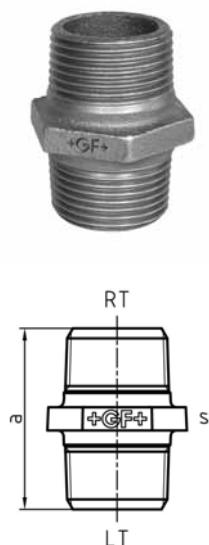


EN		Dim. [inch]	Code	a [mm]	s [mm]
ST•	B	$\frac{1}{8}$	770 280 101	29	17
ST•	G	$\frac{1}{8}$	770 280 201	29	17
ST•	B	$\frac{1}{4}$	770 280 102	36	19
ST•	G	$\frac{1}{4}$	770 280 202	36	19
•	B	$\frac{3}{8}$	770 280 103	38	22
•	G	$\frac{3}{8}$	770 280 203	38	22
•	B	$\frac{1}{2}$	770 280 104	44	28
•	G	$\frac{1}{2}$	770 280 204	44	28
•	B	$\frac{3}{4}$	770 280 105	47	33
•	G	$\frac{3}{4}$	770 280 205	47	33
•	B	1	770 280 106	53	42
•	G	1	770 280 206	53	42
•	B	1 $\frac{1}{4}$	770 280 107	57	50
•	G	1 $\frac{1}{4}$	770 280 207	57	50
•	B	1 $\frac{1}{2}$	770 280 108	59	55
•	G	1 $\frac{1}{2}$	770 280 208	59	55
•	B	2	770 280 109	68	70
•	G	2	770 280 209	68	70
•	B	2 $\frac{1}{2}$	770 280 110	75	85
•	G	2 $\frac{1}{2}$	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



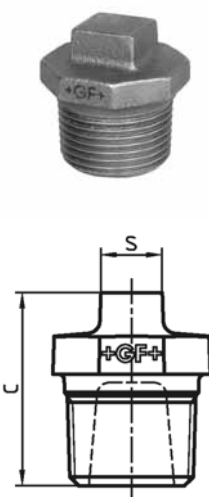
EN		Dim. [inch]	Code	a [mm]	s [mm]	
-	G	3/8	770 281 203	38	22	
•	B	1/2	770 281 104	44	28	
•	G	1/2	770 281 204	44	28	
•	B	3/4	770 281 105	47	33	
•	G	3/4	770 281 205	47	33	
•	B	1	770 281 106	53	42	
•	G	1	770 281 206	53	42	
-	B	1 1/4	770 281 107	57	50	
-	G	1 1/4	770 281 207	57	50	
-	B	1 1/2	770 281 108	59	55	
-	G	1 1/2	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



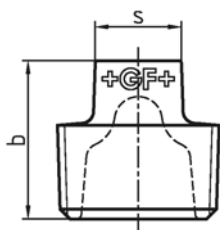
EN		Dim. [inch]	Code	c [mm]	s [mm]	
ST*	B	3/8	770 290 101	20	7	
ST*	G	3/8	770 290 201	20	7	
ST*	B	1/4	770 290 102	24	8	
ST*	G	1/4	770 290 202	24	8	
•	B	3/8	770 290 103	28	10	
•	G	3/8	770 290 203	28	10	
•	B	1/2	770 290 104	32	11	
•	G	1/2	770 290 204	32	11	
•	B	3/4	770 290 105	37	17	
•	G	3/4	770 290 205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

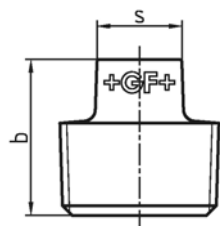
ST ... these types of fittings are made from steel (galvanised finish = electroplated) and not suitable for drinking water installations.

* Solid



EN		Dim. [inch]	Code	b [mm]	s [mm]	
ST*	B	1/8	770 291 101	16.0	7	
ST*	G	1/8	770 291 201	16.0	7	
ST*	B	1/4	770 291 102	18.0	8	
ST*	G	1/4	770 291 202	18.0	8	
ST*	B	3/8	770 291 103	20.0	10	
ST*	G	3/8	770 291 203	20.0	10	
.	B	1/2	770 291 104	24.0	11	
.	G	1/2	770 291 204	24.0	11	
.	B	3/4	770 291 105	25.5	17	
.	G	3/4	770 291 205	25.5	17	
.	B	1	770 291 106	33.0	19	
.	G	1	770 291 206	33.0	19	
.	B	1 1/4	770 291 107	36.0	22	
.	G	1 1/4	770 291 207	36.0	22	
.	B	1 1/2	770 291 108	37.0	22	
.	G	2 1/2	770 291 208	37.0	22	
.	B	2	770 291 109	44.0	27	
.	G	2	770 291 209	44.0	27	
.	B	2 1/2	770 291 110	52.0	32	
.	G	2 1/2	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	

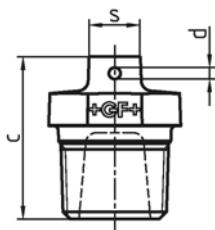
291a Plug, plain, solid



EN		Dim. [inch]	Code	b [mm]	s [mm]	
-	B	3/4	770 292 105	28	17	
-	G	3/4	770 292 205	28	17	
-	B	1	770 292 106	33	19	
-	G	1	770 292 206	33	19	
-	B	1 1/4	770 292 107	36	22	
-	G	1 1/4	770 292 207	36	22	
-	B	1 1/2	770 292 108	38	23	
-	G	1 1/2	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

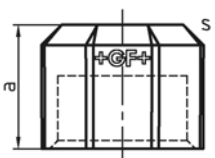


EN		Dim. [inch]	Code	c [mm]	s [mm]	d [mm]	
-	B	½	770 294 104	32	11	4	
-	G	½	770 294 204	32	11	4	
-	B	¾	770 294 105	37	17	4	
-	G	¾	770 294 205	37	17	4	
-	B	1	770 294 106	41	19	5	
-	G	1	770 294 206	41	19	5	
-	B	1 ¼	770 294 107	47	22	5	
-	G	1 ¼	770 294 207	47	22	5	
-	B	1 ½	770 294 108	47	22	5	
-	G	1 ½	770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

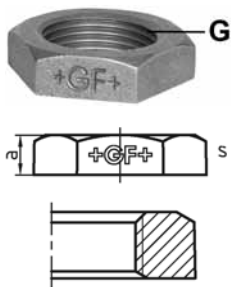
300

Cap, ISO/EN T1

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



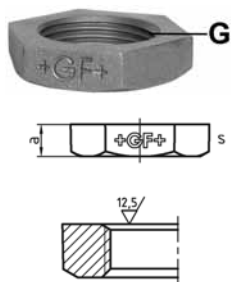
EN		Dim. [inch]	Code	a [mm]	s [mm]		
ST.	B	⅙	770 300 101	14	14	hexagon	
ST.	G	⅙	770 300 201	14	14	hexagon	
ST.	B	¼	770 300 102	17	17	hexagon	
ST.	G	¼	770 300 202	17	17	hexagon	
ST.	B	⅓	770 300 103	18	22	hexagon	
ST.	G	⅓	770 300 203	18	22	hexagon	
•	B	½	770 300 104	24	26	hexagon	
•	G	½	770 300 204	24	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

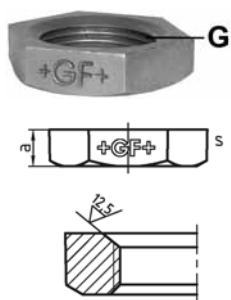
ST ... these types of fittings are made from steel (galvanised finish = electroplated).

EN		G...B [inch]	Code	a [mm]	s [mm]	
ST.	B	1/8	770 310 101	7.0	19	
ST.	G	1/8	770 310 201	7.0	19	
ST.	B	1/4	770 310 102	7.5	22	
ST.	G	1/4	770 310 202	7.5	22	
ST.	B	3/8	770 310 103	8.0	27	
ST.	G	3/8	770 310 203	8.0	27	
•	B	1/2	770 310 104	9.0	32	
•	G	1/2	770 310 204	9.0	32	
•	B	3/4	770 310 105	10.0	36	
•	G	3/4	770 310 205	10.0	36	
•	B	1	770 310 106	11.5	46	
•	G	1	770 310 206	11.5	46	
•	B	1 1/4	770 310 107	13.0	56	
•	G	1 1/4	770 310 207	13.0	56	
•	B	1 1/2	770 310 108	14.0	60	
•	G	1 1/2	770 310 208	14.0	60	
•	B	2	770 310 109	16.0	73	
•	G	2	770 310 209	16.0	73	
•	B	2 1/2	770 310 110	19.0	95	
•	G	2 1/2	770 310 210	19.0	95	
•	B	3	770 310 111	22.0	105	
•	G	3	770 310 211	22.0	105	



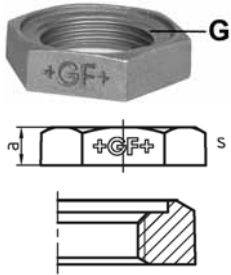
310a Backnut, with one machined face, ISO/EN P4

EN		G...B [inch]	Code	a [mm]	s [mm]	
•	B	1/2	770 309 104	8.5	32	
•	G	1/2	770 309 204	8.5	32	
•	B	3/4	770 309 105	9.5	36	
•	G	3/4	770 309 205	9.5	36	
•	B	1	770 309 106	11.5	46	
•	G	1	770 309 206	11.5	46	
•	B	1 1/4	770 309 107	12.5	56	
•	G	1 1/4	770 309 207	12.5	56	
•	B	1 1/2	770 309 108	13.5	60	
•	G	1 1/2	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

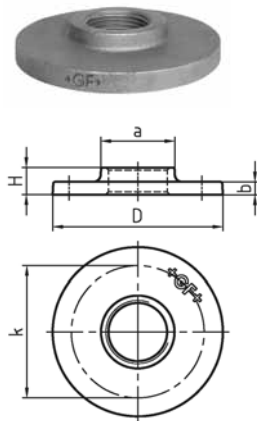
EN		G...B [inch]	Code	a [mm]	s [mm]	
•	G	1/2	770 308 204	9.0	32	
•	G	3/4	770 308 205	10.0	36	
•	G	1	770 308 206	11.5	46	
•	G	1 1/4	770 308 207	13.0	56	
•	G	1 1/2	770 308 208	14.0	60	
•	G	2	770 308 209	16.0	73	



312 Backnut, recessed, ISO/EN P4

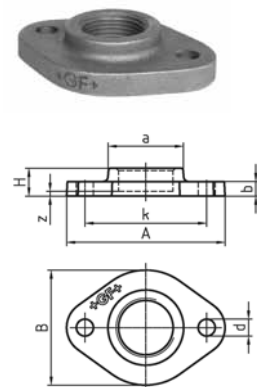
ST ... these types of fittings are made from steel (galvanised finish = electroplated).

EN		G...B [inch]	Code	a [mm]	s [mm]	
ST.	B	1/4	770 312 102	7.5	22	
ST.	G	1/4	770 312 202	7.5	22	
ST.	B	3/8	770 312 103	8.0	27	
ST.	G	3/8	770 312 203	8.0	27	
•	B	1/2	770 312 104	9.0	32	
•	G	1/2	770 312 204	9.0	32	
•	B	3/4	770 312 105	10.0	37	
•	G	3/4	770 312 205	10.0	37	
•	B	1	770 312 106	12.0	46	
•	G	1	770 312 206	12.0	46	
•	B	1 1/4	770 312 107	13.0	55	
•	G	1 1/4	770 312 207	13.0	55	
•	B	1 1/2	770 312 108	14.0	60	
•	G	1 1/2	770 312 208	14.0	60	
•	B	2	770 312 109	16.0	73	
•	G	2	770 312 209	16.0	73	



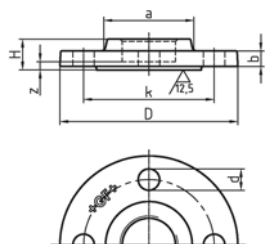
321 Screwed flange, undrilled

EN		Dim. [inch]	PN	Code	a [mm]	b [mm]	k [mm]	H [mm]	D [mm]	
-	B	1/2	PN 1	770 320 104	28	5	55	13	80	
-	G	1/2	PN 1	770 320 204	28	5	55	13	80	
-	B	3/4	PN 1	770 320 105	38	6	65	14	90	
-	G	3/4	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 1/4	PN 1	770 320 107	51	10	90	21	120	
-	G	1 1/4	PN 1	770 320 207	51	10	90	21	120	
-	B	1 1/2	PN 1	770 320 108	56	10	100	21	130	
-	G	1 1/2	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	1/2	PN 10	770 326 104	32	11	11.5	55	4	80	45	17	
-	G	1/2	PN 10	770 326 204	32	11	11.5	55	4	80	45	17	
-	B	3/4	PN 10	770 326 105	38	11	11.5	65	4	90	64	19	
-	G	3/4	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 1/4	PN 10	770 326 107	56	12	14.0	90	3	120	85	22	
-	G	1 1/4	PN 10	770 326 207	56	12	14.0	90	3	120	85	22	
-	B	1 1/2	PN 10	770 326 108	63	13	14.0	100	4	130	95	23	
-	G	1 1/2	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	



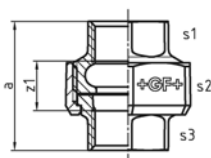
329

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	1/2	PN 16	770 329 104	35	14	14	65	7	20	95	
-	G	1/2	PN 16	770 329 204	35	14	14	65	7	20	95	
-	B	3/4	PN 16	770 329 105	45	16	14	75	9	24	105	
-	G	3/4	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 1/4	PN 16	770 329 107	60	17	18	100	7	26	140	
-	G	1 1/4	PN 16	770 329 207	60	17	18	100	7	26	140	
-	B	1 1/2	PN 16	770 329 108	72	13	18	110	8	26	150	
-	G	1 1/2	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 1/2	PN 16	770 329 110	100	16	18	145	5	32	185	
-	G	2 1/2	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

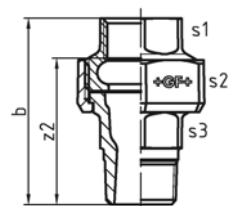
Union flat seat, ISO/EN U1

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	1/4	5/8	770 330 102	42	22	19	28	*10	
•	G	1/4	5/8	770 330 202	42	22	19	28	*10	
•	B	3/8	3/4	770 330 103	47	27	22	32	*12	
•	G	3/8	3/4	770 330 203	47	27	22	32	*12	
•	B	1/2	1	770 330 104	48	22	26	41	26	
•	G	1/2	1	770 330 204	48	22	26	41	26	
•	B	3/4	1 1/4	770 330 105	52	22	31	48	31	
•	G	3/4	1 1/4	770 330 205	52	22	31	48	31	
•	B	1	1 1/2	770 330 106	59	25	38	55	38	
•	G	1	1 1/2	770 330 206	59	25	38	55	38	
•	B	1 1/4	2	770 330 107	65	27	48	67	48	
•	G	1 1/4	2	770 330 207	65	27	48	67	48	
•	B	1 1/2	2 1/4	770 330 108	70	32	54	74	54	
•	G	1 1/2	2 1/4	770 330 208	70	32	54	74	54	
•	B	2	2 3/4	770 330 109	80	32	66	90	67	
•	G	2	2 3/4	770 330 209	80	32	66	90	67	
•	B	2 1/2	3 1/2	770 330 110	85	31	85	111	85	
•	G	2 1/2	3 1/2	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	

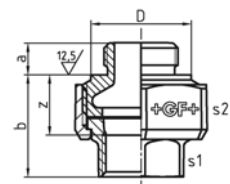


331 Union flat seat, ISO/EN U2

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	1/4	5/8	770 331 102	55	45	19	28	15	
•	G	1/4	5/8	770 331 202	55	45	19	28	15	
•	B	3/8	3/4	770 331 103	58	48	22	32	19	
•	G	3/8	3/4	770 331 203	58	48	22	32	19	
•	B	1/2	1	770 331 104	66	53	26	41	23	
•	G	1/2	1	770 331 204	66	53	26	41	23	
•	B	3/4	1 1/4	770 331 105	72	57	31	48	30	
•	G	3/4	1 1/4	770 331 205	72	57	31	48	30	
•	B	1	1 1/2	770 331 106	80	63	38	55	36	
•	G	1	1 1/2	770 331 206	80	63	38	55	36	
•	B	1 1/4	2	770 331 107	90	71	48	67	48	
•	G	1 1/4	2	770 331 207	90	71	48	67	48	
•	B	1 1/2	2 1/4	770 331 108	95	76	54	74	54	
•	G	1 1/2	2 1/4	770 331 208	95	76	54	74	54	
•	B	2	2 3/4	770 331 109	107	83	66	90	66	
•	G	2	2 3/4	770 331 209	107	83	66	90	66	
-	B	2 1/2	3 1/2	770 331 110	118	91	85	111	85	
-	G	2 1/2	3 1/2	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	

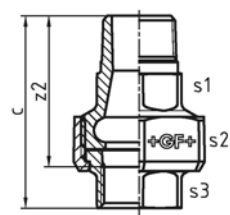


332 Union flat seat

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	3/4	1 1/4	770 332 105	12	39	24	31	48	36	
-	G	3/4	1 1/4	770 332 205	12	39	24	31	48	36	
-	B	1	1 1/2	770 332 106	14	42	25	38	55	43	
-	G	1	1 1/2	770 332 206	14	42	25	38	55	43	
-	B	1 1/4	2	770 332 107	16	50	31	48	67	53	
-	G	1 1/4	2	770 332 207	16	50	31	48	67	53	

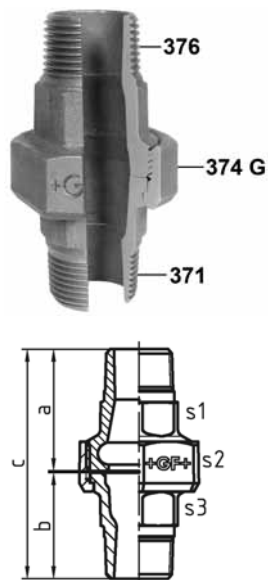


335 Union flat seat

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	1/2	1	770 335 104	66	53	26	41	26	
-	G	1/2	1	770 335 204	66	53	26	41	26	
-	B	3/4	1 1/4	770 335 105	72	57	32	48	31	
-	G	3/4	1 1/4	770 335 205	72	57	32	48	31	
-	B	1	1 1/2	770 335 106	82	65	38	55	38	
-	G	1	1 1/2	770 335 206	82	65	38	55	38	
-	B	1 1/4	2	770 335 107	90	71	48	67	48	
-	G	1 1/4	2	770 335 207	90	71	48	67	48	
-	B	1 1/2	2 1/4	770 335 108	95	76	54	74	54	
-	G	1 1/2	2 1/4	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	1/2	1	770 336 104	43	40	85	26	41	23	
-	G	1/2	1	770 336 204	43	40	85	26	41	23	
-	B	3/4	1 1/4	770 336 105	48	42	92	32	48	30	
-	G	3/4	1 1/4	770 336 205	48	42	92	32	48	30	
-	B	1	1 1/2	770 336 106	54	47	103	38	55	36	
-	G	1	1 1/2	770 336 206	54	47	103	38	55	36	
-	B	1 1/4	2	770 336 107	57	55	114	48	67	48	
-	G	1 1/4	2	770 336 207	57	55	114	48	67	48	
-	B	1 1/2	2 1/4	770 336 108	61	57	120	54	74	54	
-	G	1 1/2	2 1/4	770 336 208	61	57	120	54	74	54	

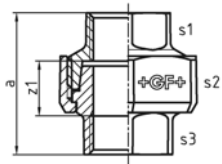


338 Distribution union flat seat

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	3/4	1 1/4	770 338 220	177	74	160	31	48	
-	G	1	1 1/2	770 338 221	174	67	155	38	55	
-	G	1 1/4	2	770 338 222	174	59	153	48	67	



340

Union taper seat, ISO/EN U11

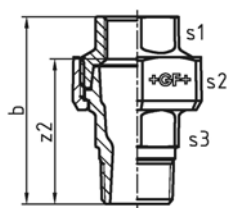
Torque and notes for installation please find in "Technical Product Notes".

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	1/8		1/2	770 340 101	38	24	15	26	15	
•	G	1/8		1/2	770 340 201	38	24	15	26	15	
•	B	1/4		5/8	770 340 102	42	22	19	28	*10	
•	G	1/4		5/8	770 340 202	42	22	19	28	*10	
•	B	3/8		3/4	770 340 103	48	28	22	32	*12	
•	G	3/8		3/4	770 340 203	48	28	22	32	*12	
•	B	1/2		1	770 340 104	48	22	26	41	25	
•	G	1/2		1	770 340 204	48	22	26	41	25	
•	B	1/2	s	1 1/8	770 340 120	48	22	26	44	26	
•	G	1/2	s	1 1/8	770 340 220	48	22	26	44	26	
•	B	3/4		1 1/4	770 340 105	52	22	31	48	32	
•	G	3/4		1 1/4	770 340 205	52	22	31	48	32	
•	B	1		1 1/2	770 340 106	58	24	38	55	38	
•	G	1		1 1/2	770 340 206	58	24	38	55	38	
•	B	1 1/4		2	770 340 107	65	27	48	67	48	
•	G	1 1/4		2	770 340 207	65	27	48	67	48	
•	B	1 1/2		2 1/4	770 340 108	70	32	54	74	54	
•	G	1 1/2		2 1/4	770 340 208	70	32	54	74	54	
•	B	2		2 3/4	770 340 109	78	30	66	90	66	
•	G	2		2 3/4	770 340 209	78	30	66	90	66	
•	B	2 1/2		3 1/2	770 340 110	90	36	85	111	85	
•	G	2 1/2		3 1/2	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	



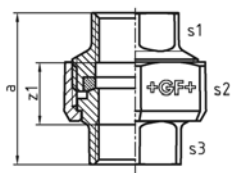
341

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	1/4	5/8	770 341 102	55	45	19	28	15	
•	G	1/4	5/8	770 341 202	55	45	19	28	15	
•	B	3/8	3/4	770 341 103	59	49	22	32	20	
•	G	3/8	3/4	770 341 203	59	49	22	32	20	
•	B	1/2	1	770 341 104	66	53	26	41	23	
•	G	1/2	1	770 341 204	66	53	26	41	23	
•	B	3/4	1 1/4	770 341 105	72	57	31	48	30	
•	G	3/4	1 1/4	770 341 205	72	57	31	48	30	
•	B	1	1 1/2	770 341 106	80	63	38	55	36	
•	G	1	1 1/2	770 341 206	80	63	38	55	36	
•	B	1 1/4	2	770 341 107	90	71	48	67	48	
•	G	1 1/4	2	770 341 207	90	71	48	67	48	
•	B	1 1/2	2 1/4	770 341 108	96	77	54	74	54	
•	G	1 1/2	2 1/4	770 341 208	96	77	54	74	54	
•	B	2	2 3/4	770 341 109	106	82	66	90	66	
•	G	2	2 3/4	770 341 209	106	82	66	90	66	
•	B	2 1/2	3 1/2	770 341 110	122	95	85	111	85	
•	G	2 1/2	3 1/2	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

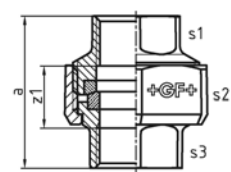
Union, spherical seat/taper seat Bronze to Iron, ISO/EN U11

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	1/2	1 1/8	770 342 104	48	22	26	44	26
•	G	1/2	1 1/8	770 342 204	48	22	26	44	26
•	B	3/4	1 1/4	770 342 105	52	23	31	48	31
•	G	3/4	1 1/4	770 342 205	52	23	31	48	31
•	B	1	1 1/2	770 342 106	58	24	38	55	38
•	G	1	1 1/2	770 342 206	58	24	38	55	38
•	B	1 1/4	2	770 342 107	65	27	48	67	48
•	G	1 1/4	2	770 342 207	65	27	48	67	48
•	B	1 1/2	2 1/4	770 342 108	70	32	54	73	54
•	G	1 1/2	2 1/4	770 342 208	70	32	54	73	54
•	B	2	2 3/4	770 342 109	78	32	66	90	66
•	G	2	2 3/4	770 342 209	78	32	66	90	66



342a

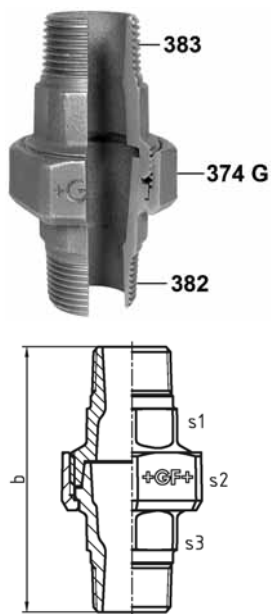
Union, spherical seat/taper seat Bronze to Bronze, ISO/EN U11

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.

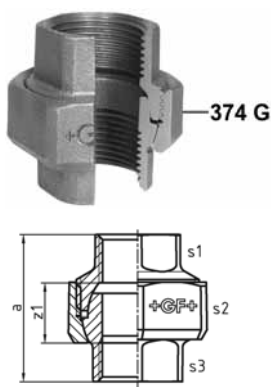
EN		Dim. [inch]	374 G [inch]	Code	a [mm]	z1 [mm]	s1 [mm]	s2 [mm]	s3 [mm]
•	B	1/2	1 1/8	770 345 104	48	22	26	44	26
•	G	1/2	1 1/8	770 345 204	48	22	26	44	26
•	B	3/4	1 1/4	770 345 105	52	23	31	48	31
•	G	3/4	1 1/4	770 345 205	52	23	31	48	31
•	B	1	1 1/2	770 345 106	58	24	38	55	38
•	G	1	1 1/2	770 345 206	58	24	38	55	38
•	B	1 1/4	2	770 345 107	65	27	48	67	48
•	G	1 1/4	2	770 345 207	65	27	48	67	48
•	B	1 1/2	2 1/4	770 345 108	75	32	54	73	54
•	G	1 1/2	2 1/4	770 345 208	75	32	54	73	54
•	B	2	2 3/4	770 345 109	85	32	66	90	66
•	G	2	2 3/4	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.

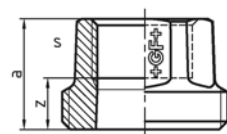
EN		Dim. [inch]	374 G [inch]	Code	b [mm]	s1 [mm]	s2 [mm]	s3 [mm]	
-	B	1/4	5/8	770 344 102	69	18	28	15	
-	G	1/4	5/8	770 344 202	69	18	28	15	
-	B	3/8	3/4	770 344 103	75	22	32	20	
-	G	3/8	3/4	770 344 203	75	22	32	20	
-	B	1/2	1	770 344 104	85	26	39	23	
-	G	1/2	1	770 344 204	85	26	39	23	
-	B	3/4	1 1/4	770 344 105	93	32	48	30	
-	G	3/4	1 1/4	770 344 205	93	32	48	30	
-	B	1	1 1/2	770 344 106	103	38	55	36	
-	G	1	1 1/2	770 344 206	103	38	55	36	
-	B	1 1/4	2	770 344 107	114	48	67	48	
-	G	1 1/4	2	770 344 207	114	48	67	48	
-	B	1 1/2	2 1/4	770 344 108	123	54	74	54	
-	G	1 1/2	2 1/4	770 344 208	123	54	74	54	
-	B	2	2 3/4	770 344 109	136	66	90	67	
-	G	2	2 3/4	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	1/2	1 1/8	770 346 104	48	22	26	44	26	
•	G	1/2	1 1/8	770 346 204	48	22	26	44	26	
•	B	3/4	1 1/4	770 346 105	52	23	31	48	31	
•	G	3/4	1 1/4	770 346 205	52	23	31	48	31	
•	B	1	1 1/2	770 346 106	58	24	38	55	38	
•	G	1	1 1/2	770 346 206	58	24	38	55	38	
•	B	1 1/4	2	770 346 107	65	27	48	67	48	
•	G	1 1/4	2	770 346 207	65	27	48	67	48	
•	B	1 1/2	2 1/4	770 346 108	75	32	54	73	54	
•	G	1 1/2	2 1/4	770 346 208	75	32	54	73	54	
•	B	2	2 3/4	770 346 109	85	32	66	90	66	
•	G	2	2 3/4	770 346 209	85	32	66	90	66	

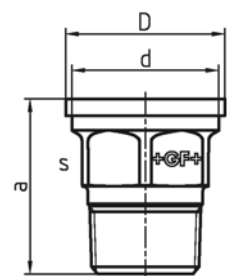


370 Union bush flat seat

* Is usually not supplied as a separate piece.

** Version

EN		Dim. Rp [inch]	**	G...B [inch]	Code	a [mm]	z [mm]	s [mm]	
* -	B	1/4		5/8	-	21	11	19	hexagon
* -	G	1/4		5/8	-	21	11	19	hexagon
* -	B	3/8		3/4	-	23	13	22	hexagon
* -	G	3/8		3/4	-	23	13	22	hexagon
-	B	1/2		1	770 370 119	25	12	26	hexagon
-	G	1/2		1	770 370 219	25	12	26	hexagon
-	B	1/2	s	1 1/8	770 370 120	25	12	26	hexagon
-	G	1/2	s	1 1/8	770 370 220	25	12	26	hexagon
-	B	3/4		1 1/4	770 370 105	28	13	32	hexagon
-	G	3/4		1 1/4	770 370 205	28	13	32	hexagon
-	B	1		1 1/2	770 370 106	31	14	38	hexagon
-	G	1		1 1/2	770 370 206	31	14	38	hexagon
-	B	1 1/4		2	770 370 107	33	14	48	hexagon
-	G	1 1/4		2	770 370 207	33	14	48	hexagon
-	B	1 1/2		2 1/4	770 370 108	36	17	54	hexagon
-	G	1 1/2		2 1/4	770 370 208	36	17	54	hexagon
-	B	2		2 3/4	770 370 109	42	18	66	hexagon
-	G	2		2 3/4	770 370 209	42	18	66	hexagon
-	B	2 1/2		3 1/2	770 370 110	41	14	85	octagon
-	G	2 1/2		3 1/2	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

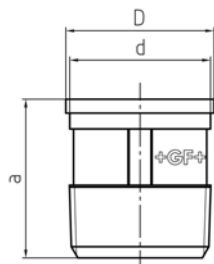


371 Union end flat seat, equal

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	1/4	5/8	-	32	18.1	15	hexagon
* -	G	1/4	5/8	-	32	18.1	15	hexagon
* -	B	3/8	3/4	-	34	21.6	19	octagon
* -	G	3/8	3/4	-	34	21.6	19	octagon
-	B	1/2	1	770 371 104	40	27.0	23	hexagon
-	G	1/2	1	770 371 204	40	27.0	23	hexagon
-	B	3/4	1 1/4	770 371 105	42	35.5	30	hexagon
-	G	3/4	1 1/4	770 371 205	42	35.5	30	hexagon
-	B	1	1 1/2	770 371 106	47	40.9	36	hexagon
-	G	1	1 1/2	770 371 206	47	40.9	36	hexagon
-	B	1 1/4	2	770 371 107	57	52.4	48	hexagon
-	G	1 1/4	2	770 371 207	57	52.4	48	hexagon
-	B	1 1/2	2 1/4	770 371 108	57	58.4	54	hexagon
-	G	1 1/2	2 1/4	770 371 208	57	58.4	54	hexagon
-	B	2	2 3/4	770 371 109	62	73.4	66	hexagon
-	G	2	2 3/4	770 371 209	62	73.4	66	hexagon
-	B	2 1/2	3 1/2	770 371 110	75	91.9	85	octagon
-	G	2 1/2	3 1/2	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

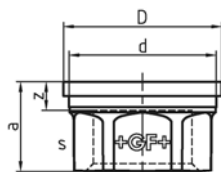
Union end flat seat, equal

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

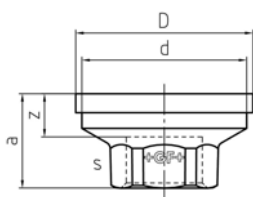
* Is usually not supplied as a separate piece.

** Version

I hex = Internal hexagon



EN		Dim. Rp [inch]	**	G [inch]	Code	a [mm]	d [mm]	z [mm]	s [mm]		
* -	B	¼		5/8	-	20.0	18.1	10.0	10	I hex	
* -	G	¼		5/8	-	20.0	18.1	10.0	10	I hex	
* -	B	3/8		¾	-	22.0	21.6	12.0	12	I hex	
* -	G	3/8		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 1/8	770 372 104	22.0	31.5	9.0	26	hexagon	
-	G	½	s	1 1/8	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	

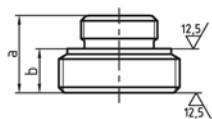
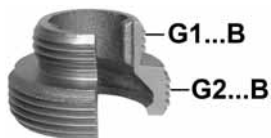


372

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	

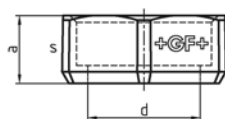


373 Union bush flat seat

Sealing gaskets for sealing surface as per table "Sealing Gasket Dimension" (catalogue no. 332, symbol $\odot$).

* Is usually not supplied as a separate piece.

EN		G1...B [inch]	G2...B [inch]	Code	a [mm]	b [mm]	
* -	G	1/2	1	-	23	13	
-	B	3/4	1 1/4	770 373 105	27	15	
-	G	3/4	1 1/4	770 373 205	27	15	
-	B	1	1 1/2	770 373 106	29	15	
-	G	1	1 1/2	770 373 206	29	15	
-	B	1 1/4	2	770 373 107	33	17	
-	G	1 1/4	2	770 373 207	33	17	



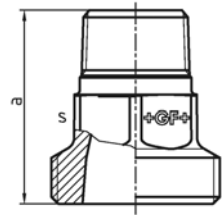
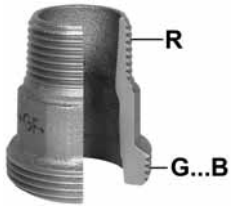
374 Union nut

* Is usually not supplied as a separate piece.

** Version

*** Union nut for 371 1 - 1 1/4

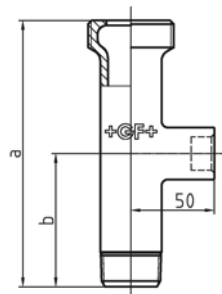
EN		Dim. [inch]	**	Dim. G [inch]	Code	a [mm]	d [mm]	s [mm]	
* -	B	1/8		1/2	-	15	16.6	26	hexagon
* -	G	1/8		1/2	-	15	16.6	26	hexagon
* -	B	1/4	s	5/8	-	15	18.4	28	hexagon
* -	G	1/4	s	5/8	-	15	18.4	28	hexagon
* -	B	1/4		3/4	-	16	21.9	32	hexagon
* -	G	1/4		3/4	-	16	21.9	32	hexagon
-	B	3/8		3/4	770 374 116	16	21.9	32	hexagon
-	G	3/8		3/4	770 374 216	16	21.9	32	hexagon
-	B	3/8	s	7/8	770 374 118	17	24.9	36	hexagon
-	G	3/8	s	7/8	770 374 218	17	24.9	36	hexagon
-	B	1/2		1	770 374 119	18	27.3	41	hexagon
-	G	1/2		1	770 374 219	18	27.3	41	hexagon
-	B	1/2	s	1 1/8	770 374 120	19	31.8	44	hexagon
-	G	1/2	s	1 1/8	770 374 220	19	31.8	44	hexagon
-	B	3/4		1 1/4	770 374 105	20	35.8	48	hexagon
-	G	3/4		1 1/4	770 374 205	20	35.8	48	hexagon
-	B	3/4	34,4	1 1/4	770 374 135	20	34.4	48	hexagon
-	B	1	s	1 1/2	770 374 106	22	41.3	55	hexagon
-	G	1	s	1 1/2	770 374 206	22	41.3	55	hexagon
-	B	1		1 1/2	770 960 180	22	41.3	55	octagon
***	B	1	42,5	1 1/2	770 374 121	22	42.5	55	hexagon
-	B	1 1/4		2	770 374 107	24	52.8	67	hexagon
-	G	1 1/4		2	770 374 207	24	52.8	67	hexagon
-	B	1 1/2		2 1/4	770 374 108	25	58.8	74	hexagon
-	G	1 1/2		2 1/4	770 374 208	25	58.8	74	hexagon
-	B	2		2 3/4	770 374 109	27	73.8	90	hexagon
-	G	2		2 3/4	770 374 209	27	73.8	90	hexagon
-	B	2 1/2		3 1/2	770 374 110	30	92.3	111	octagon
-	G	2 1/2		3 1/2	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

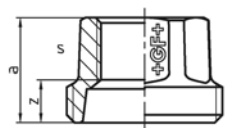
** Version

EN		Dim. R [inch]	**	G...B [inch]	Code	a [mm]	s [mm]		
-	B	1/2		1	770 376 105	43.0	26	hexagon	
-	G	1/2		1	770 376 205	43.0	26	hexagon	
-	B	1/2	s	1 1/8	770 376 125	41.5	26	hexagon	
-	G	1/2	s	1 1/8	770 376 225	41.5	26	hexagon	
-	B	3/4		1 1/4	770 376 106	48.0	32	hexagon	
-	G	3/4		1 1/4	770 376 206	48.0	32	hexagon	
-	B	1		1 1/2	770 376 107	54.0	38	hexagon	
-	G	1		1 1/2	770 376 207	54.0	38	hexagon	
-	B	1 1/4		2	770 376 108	57.0	48	hexagon	
-	G	1 1/4		2	770 376 208	57.0	48	hexagon	
-	B	1 1/2		2 1/4	770 376 109	61.0	54	hexagon	
-	G	1 1/2		2 1/4	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	3/4	1 1/4	770 378 220	153	74	
-	G	1	1 1/2	770 378 221	146	67	
-	G	1 1/4	2	770 378 222	141	59	

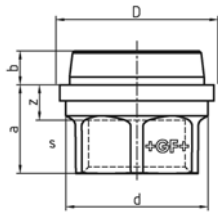


380 Union bush taper seat

** Version

Is usually not supplied as a separate piece.

EN		Dim. Rp [inch]	**	G...B [inch]	Code	a [mm]	z [mm]	s [mm]		
-	B	1/8		1/2	-	19	12	15	hexagon	
-	G	1/8		1/2	-	19	12	15	hexagon	
-	B	1/4		5/8	-	21	11	19	hexagon	
-	G	1/4		5/8	-	21	11	19	hexagon	
-	B	3/8		3/4	-	23	13	22	hexagon	
-	G	3/8		3/4	-	23	13	22	hexagon	
-	B	1/2		1	-	25	11	26	hexagon	
-	G	1/2		1	-	25	11	26	hexagon	
-	B	1/2	s	1 1/8	-	25	11	26	hexagon	
-	G	1/2	s	1 1/8	-	25	11	26	hexagon	
-	B	3/4		1 1/4	-	28	13	32	hexagon	
-	G	3/4		1 1/4	-	28	13	32	hexagon	
-	B	1		1 1/2	-	31	14	38	hexagon	
-	G	1		1 1/2	-	31	14	38	hexagon	
-	B	1 1/4		2	-	33	14	48	hexagon	
-	G	1 1/4		2	-	33	14	48	hexagon	
-	B	1 1/2		2 1/4	-	36	17	54	hexagon	
-	G	1 1/2		2 1/4	-	36	17	54	hexagon	
-	B	2		2 3/4	-	42	18	66	hexagon	
-	G	2		2 3/4	-	42	18	66	hexagon	
-	B	2 1/2		3 1/2	-	41	14	85	octagon	
-	G	2 1/2		3 1/2	-	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

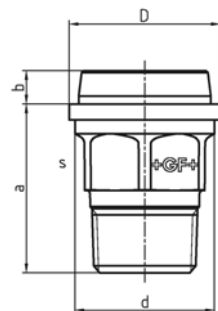
Is usually not supplied as a separate piece.

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	1/8		1/2	-	17.5	6.5	15.8	10.5	15	hexagon	
-	G	1/8		1/2	-	17.5	6.5	15.8	10.5	15	hexagon	
-	B	1/4		5/8	-	20.5	6.0	18.1	10.5	10	I hex	
-	G	1/4		5/8	-	20.5	6.0	18.1	10.5	10	I hex	
-	B	3/8		3/4	-	22.0	6.5	21.6	12.0	12	I hex	
-	G	3/8		3/4	-	22.0	6.5	21.6	12.0	12	I hex	
-	B	1/2		1	-	22.5	7.5	27.0	9.5	25	octagon	
-	G	1/2		1	-	22.5	7.5	27.0	9.5	25	octagon	
-	B	1/2	s	1 1/8	-	21.0	8.0	31.5	8.0	26	hexagon	
-	G	1/2	s	1 1/8	-	21.0	8.0	31.5	8.0	26	hexagon	
-	B	3/4		1 1/4	-	22.5	8.0	35.5	6.5	31	hexagon	
-	G	3/4		1 1/4	-	22.5	8.0	35.5	6.5	31	hexagon	
-	B	1		1 1/2	-	26.5	8.5	40.9	8.5	38	hexagon	
-	G	1		1 1/2	-	26.5	8.5	40.9	8.5	38	hexagon	
-	B	1 1/4		2	-	31.5	9.0	52.4	12.0	48	hexagon	
-	G	1 1/4		2	-	31.5	9.0	52.4	12.0	48	hexagon	
-	B	1 1/2		2 1/4	-	33.0	9.5	58.4	14.0	54	hexagon	
-	G	1 1/2		2 1/4	-	33.0	9.5	58.4	14.0	54	hexagon	
-	B	2		2 3/4	-	35.5	11.5	73.4	10.5	66	hexagon	
-	G	2		2 3/4	-	35.5	11.5	73.4	10.5	66	hexagon	
-	B	2 1/2		3 1/2	-	42.5	13.5	91.9	15.5	85	octagon	
-	G	2 1/2		3 1/2	-	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	

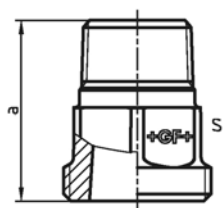


382 Union end taper seat

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.

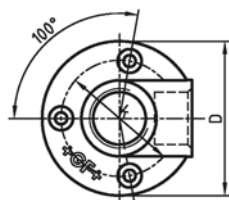
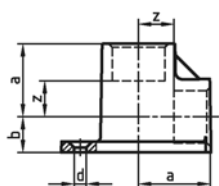
EN		Dim. R [inch]	G [inch]	Code	a [mm]	b [mm]	d [mm]	s [mm]		
-	B	1/4	5/8	-	32.0	6.0	18.1	15	hexagon	
-	G	1/4	5/8	-	32.0	6.0	18.1	15	hexagon	
-	B	3/8	3/4	-	34.0	6.5	21.6	19	octagon	
-	G	3/8	3/4	-	34.0	6.5	21.6	19	octagon	
-	B	1/2	1	-	40.5	7.5	27.0	23	hexagon	
-	G	1/2	1	-	40.5	7.5	27.0	23	hexagon	
-	B	3/4	1 1/4	-	43.8	8.0	35.5	30	hexagon	
-	G	3/4	1 1/4	-	43.8	8.0	35.5	30	hexagon	
-	B	1	1 1/2	-	49.5	8.5	40.9	36	hexagon	
-	G	1	1 1/2	-	49.5	8.5	40.9	36	hexagon	
-	B	1 1/4	2	-	56.0	9.0	52.4	48	hexagon	
-	G	1 1/4	2	-	56.0	9.0	52.4	48	hexagon	
-	B	1 1/2	2 1/4	-	58.0	9.5	58.4	54	hexagon	
-	G	1 1/2	2 1/4	-	58.0	9.5	58.4	54	hexagon	
-	B	2	2 3/4	-	62.5	11.5	73.4	66	hexagon	
-	G	2	2 3/4	-	62.5	11.5	73.4	66	hexagon	
-	B	2 1/2	3 1/2	-	75.5	13.5	91.9	85	octagon	
-	G	2 1/2	3 1/2	-	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	1/4	5/8	-	35	19	hexagon	
-	G	1/4	5/8	-	35	19	hexagon	
-	B	3/8	3/4	-	39	22	hexagon	
-	G	3/8	3/4	-	39	22	hexagon	
-	B	1/2	1	-	44	26	hexagon	
-	G	1/2	1	-	44	26	hexagon	
-	B	3/4	1 1/4	-	48	32	hexagon	
-	G	3/4	1 1/4	-	48	32	hexagon	
-	B	1	1 1/2	-	54	38	hexagon	
-	G	1	1 1/2	-	54	38	hexagon	
-	B	1 1/4	2	-	58	48	hexagon	
-	G	1 1/4	2	-	58	48	hexagon	
-	B	1 1/2	2 1/4	-	61	54	hexagon	
-	G	1 1/2	2 1/4	-	61	54	hexagon	
-	B	2	2 3/4	-	71	66	hexagon	
-	G	2	2 3/4	-	71	66	hexagon	

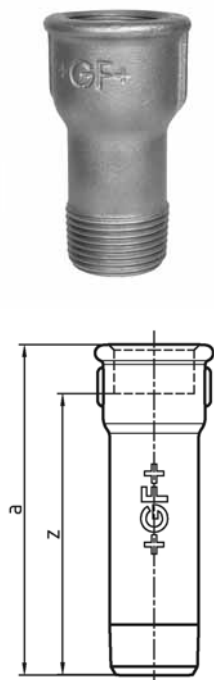


471 Bracket elbow

EN		Dim. [inch]	Code	a [mm]	b [mm]	d [mm]	z [mm]	k [mm]	D [mm]	
-	G	3/8	770 471 203	25	12	4.5	15	41.5	60	
-	G	1/2	770 471 204	28	14	5.5	15	44.5	62	
-	G	3/4	770 471 205	33	17	5.5	18	53.5	70	

526 Extension tube

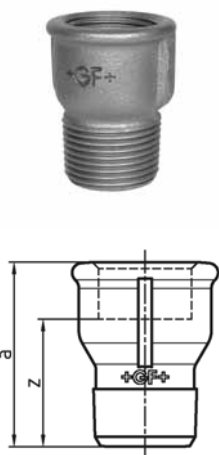
* Due to overall fitting length, the length of the external thread does not comply with the standard.



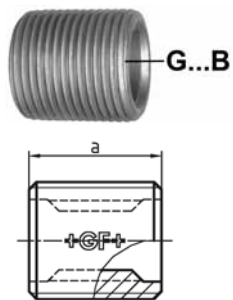
EN		Dim. [inch]	Length [mm]	Code	a [mm]	z [mm]	
-	B	3/8	100	770 526 119	100	90	
-	G	3/8	100	770 526 219	100	90	
* -	B	1/2	30	770 526 120	30	17	
* -	G	1/2	30	770 526 220	30	17	
-	B	1/2	50	770 526 121	50	37	
-	G	1/2	50	770 526 221	50	37	
-	B	1/2	60	770 526 122	60	47	
-	G	1/2	60	770 526 222	60	47	
-	B	1/2	70	770 526 123	70	57	
-	G	1/2	70	770 526 223	70	57	
-	B	1/2	80	770 526 124	80	67	
-	G	1/2	80	770 526 224	80	67	
-	B	1/2	100	770 526 125	100	87	
-	G	1/2	100	770 526 225	100	87	
-	B	1/2	120	770 526 126	120	107	
-	G	1/2	120	770 526 226	120	107	
* -	B	3/4	30	770 526 127	30	15	
* -	G	3/4	30	770 526 227	30	15	
* -	B	3/4	40	770 526 128	40	25	
* -	G	3/4	40	770 526 228	40	25	
-	B	3/4	60	770 526 129	60	45	
-	G	3/4	60	770 526 229	60	45	
-	B	3/4	70	770 526 130	70	55	
-	G	3/4	70	770 526 230	70	55	
-	B	3/4	80	770 526 131	80	65	
-	G	3/4	80	770 526 231	80	65	
-	B	3/4	100	770 526 132	100	85	
-	G	3/4	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.



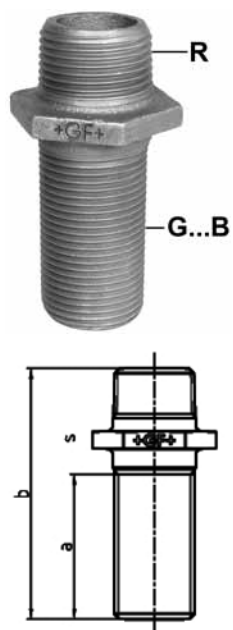
EN		Dim. [inch]	Code	a [mm]	s [mm]	z [mm]	
ST_	B	1/4	770 529 102	28	17	18	
ST_	G	1/4	770 529 202	28	17	18	
ST_	B	3/8	770 529 103	35	22	25	
ST_	G	3/8	770 529 203	35	22	25	
•	B	1/2	770 529 104	43		30	
•	G	1/2	770 529 204	43		30	
•	B	3/4	770 529 105	48		33	
•	G	3/4	770 529 205	48		33	
•	B	1	770 529 106	55		38	
•	G	1	770 529 206	55		38	
-	B	1 1/4	770 529 107	60		41	
-	G	1 1/4	770 529 207	60		41	
-	B	1 1/2	770 529 108	63		44	
-	G	1 1/2	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	3/8	770 970 145	23	
ST_	G	3/8	770 970 245	23	
ST_	B	1/2	770 970 146	25	
ST_	G	1/2	770 970 246	25	
ST_	B	3/4	770 970 147	30	
ST_	G	3/4	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	1/2	770 534 204	46	77	32	
-	G	3/4	770 534 205	49	82	36	
-	G	1	770 534 206	56	92	46	

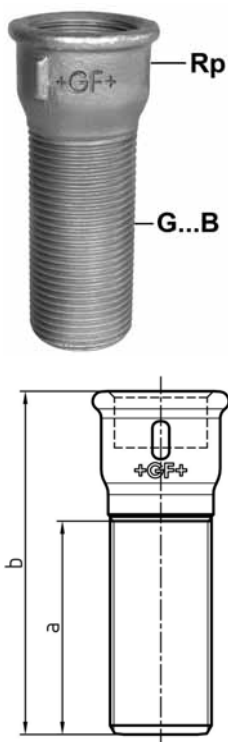


535

Longscrew hexagon nipple, complete

* Large chamfer (gasket chamber)

EN		Dim. [inch]	Code	a [mm]	b [mm]	s [mm]	
-	G	1/2	770 535 204	46	77	32	
-	G	3/4	770 535 205	49	82	36	
-	G	1	770 535 206	56	92	46	

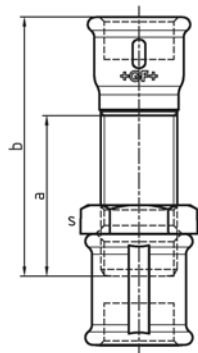


536

Longscrew socket

Hot dip galvanised, thread electroplated.

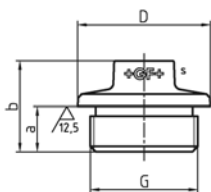
EN		Dim. [inch]	Length [mm]	Code	a [mm]	b [mm]	
-	G	1/2	80	770 536 204	50	80	
-	G	3/4	90	770 536 205	57	90	
-	G	1	100	770 536 206	65	100	
-	G	1 1/4	116	770 536 207	75	116	
-	G	1 1/2	125	770 536 208	84	125	
-	G	2	143	770 536 209	98	143	



537 Longcrew socket, complete

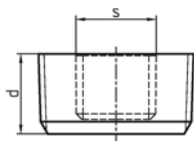
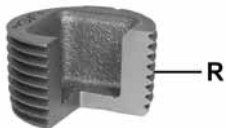
* Large chamfer (gasket chamber)

EN		Dim. [inch]	Code	a [mm]	b [mm]	s [mm]	
-	G	1/2	770 537 204	50	80	32	
-	G	3/4	770 537 205	57	90	36	
-	G	1	770 537 206	65	100	46	
-	G	1 1/4	770 537 207	75	116	55	
-	G	1 1/2	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	1/2	770 595 104	11	23	28	11	
-	G	1/2	770 595 204	11	23	28	11	
-	B	3/4	770 595 105	11	24	35	17	
-	G	3/4	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	

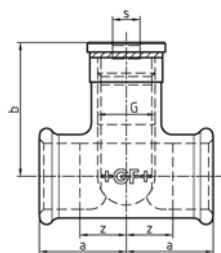


596

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	1/8	770 596 101	8	5	hexagonal	
ST_	G	1/8	770 596 201	8	5	hexagonal	
ST_	B	1/4	770 596 102	10	7	hexagonal	
ST_	G	1/4	770 596 202	10	7	hexagonal	
ST•	B	3/8	770 596 103	10	8	hexagonal	
ST•	G	3/8	770 596 203	10	8	hexagonal	
•	B	1/2	770 596 104	15	10	square	
•	G	1/2	770 596 204	15	10	square	
•	B	3/4	770 596 105	17	12	square	
•	G	3/4	770 596 205	17	12	square	
•	B	1	770 596 106	19	16	square	
•	G	1	770 596 206	19	16	square	
-	B	1 1/4	770 596 107	22	22	square	
-	G	1 1/4	770 596 207	22	22	square	
-	B	1 1/2	770 596 108	22	22	square	
-	G	1 1/2	770 596 208	22	22	square	
-	B	2	770 596 109	27	27	square	
-	G	2	770 596 209	27	27	square	



599a

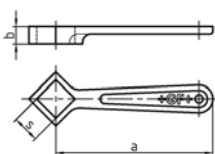
Regulation socket

* brass

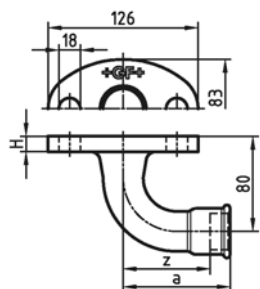
EN		Dim. Rp [inch]	G...B [inch]	Code	a [mm]	b [mm]	z [mm]	s [mm]	
-	B	1/2	3/8	770 599 104	27	45.5	14	8	
-	G	1/2	3/8	770 599 204	27	45.5	14	8	
-	B	3/4	1/2	770 599 105	32	55.5	17	10	
-	G	3/4	1/2	770 599 205	32	55.5	17	10	
-	B	1	3/4	770 599 106	38	64.5	21	12	
-	G	1	3/4	770 599 206	38	64.5	21	12	
-	B	1 1/4	1 1/8	770 599 107	45	81.0	26	17	
-	G	1 1/4	1 1/8	770 599 207	45	81.0	26	17	
-	B	1 1/2	1 1/4	770 599 108	47	77.0	28	22	
-	B	2	1 1/4	770 599 109	57	98.5	33	27	

901

Stopcock spanner

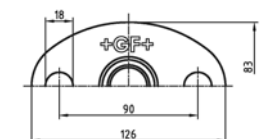
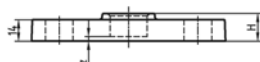


Dim. s [mm]	Code	a [mm]	b [mm]	
10	770 901 215	88	11	
12	770 901 217	95	12	
14	770 901 218	110	13	
17	770 901 219	130	14	



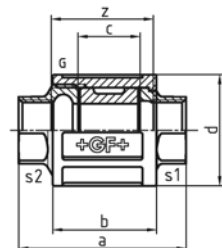
933 Water meter bend

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

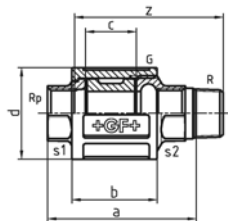
EN		Dim. Rp [inch]	Code	H [mm]	z [mm]	
-	G	¾	770 932 205	18	3	
-	G	1	770 932 206	19	2	
-	G	1 ¼	770 932 207	22	3	



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 ½	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	1 1/4	1 1/2	2	2 1/2	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 (= malleabilising) 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 solderability 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/m² 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

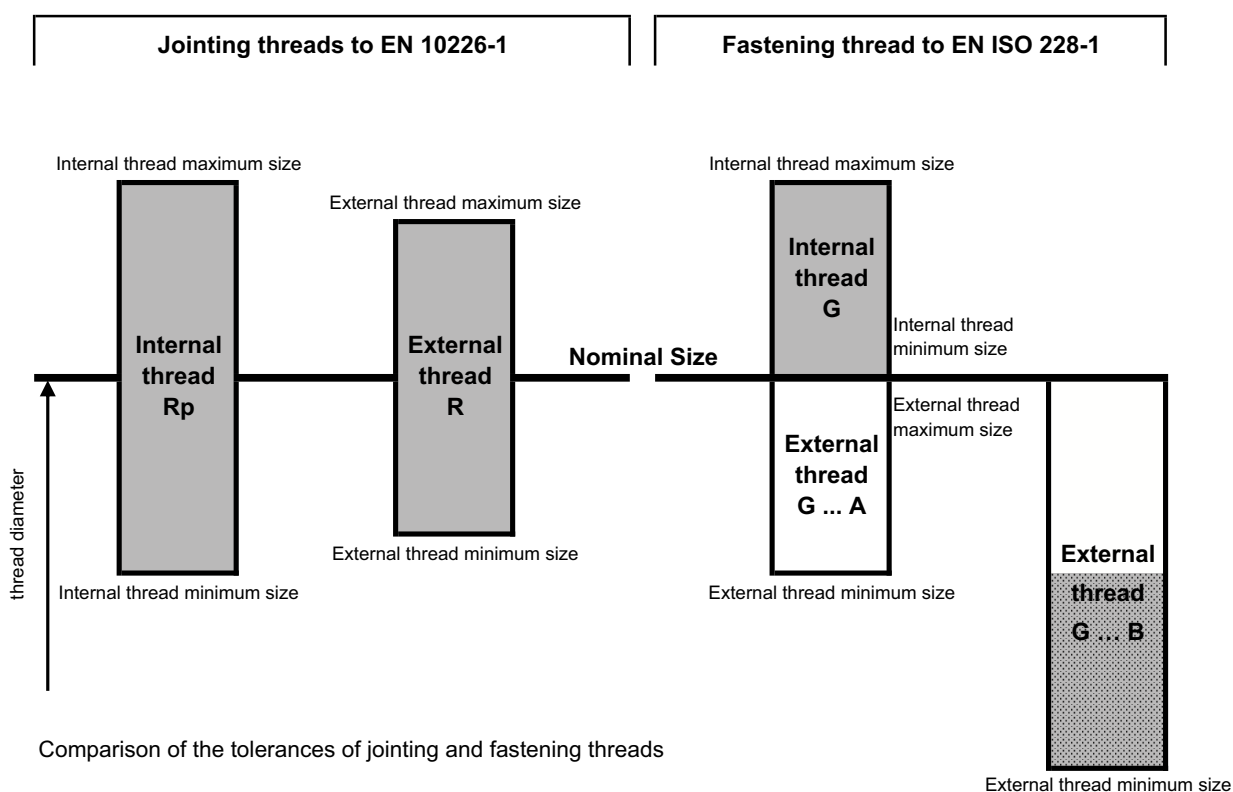
Internal thread (right-hand)	parallel	Rp 11/2
External thread (right-hand)	taper	R 11/2
Comment: the symbol LH is added to designate left-hand thread. Example: Rp 11/2 - LH		

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 necessary 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 (see EN ISO 228-1, chapter 6).

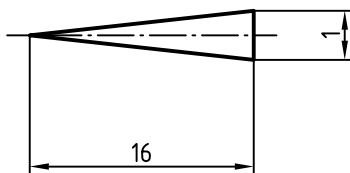
Construction and function of jointing threads which are sealing on the threads to EN 10226-1 (ISO 7-1)

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

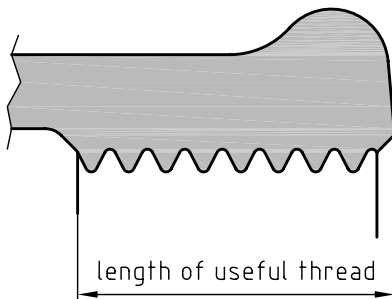
The most important dimensions for these jointing threads (pipe threads) and medium and heavy-duty pipes are given in the table on page 74.

For parallel internal threads

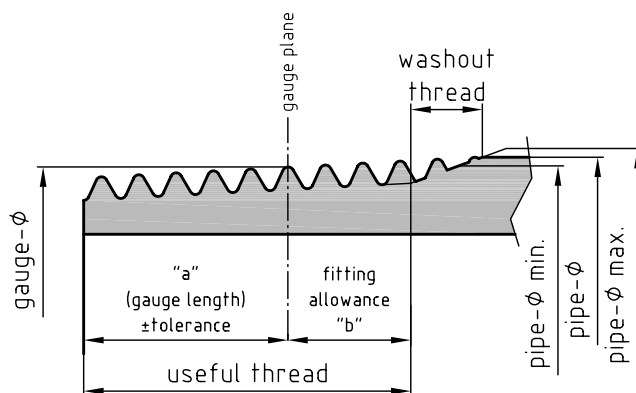
(Illustr. 3) Care must be taken that the useful thread length allows the external thread to be screwed in, to achieve adequate compression and sealing, even when the external thread is at the maximum permitted gauge length.



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

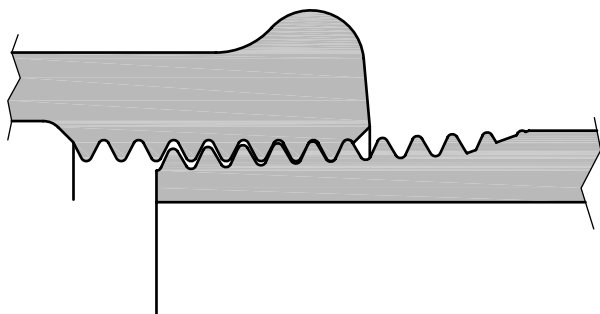
(Illustr. 4) There are some details to be considered. The taper is in the ratio of 1:16 (Illustr. 2).

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.

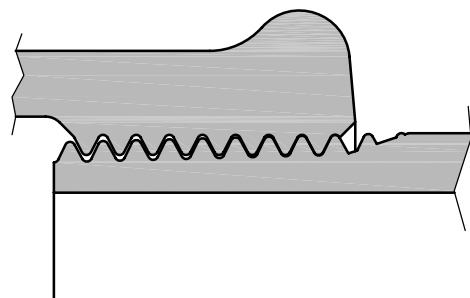
Fittings allowance "b" is the thread zone decisive for sealing. Fully formed profile at thread root and also at most thread crests. Diameter increasingly larger than internal thread diameter; this produces the compression effect. "b", in conjunction with the 1:16 taper, produces sufficient compression,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

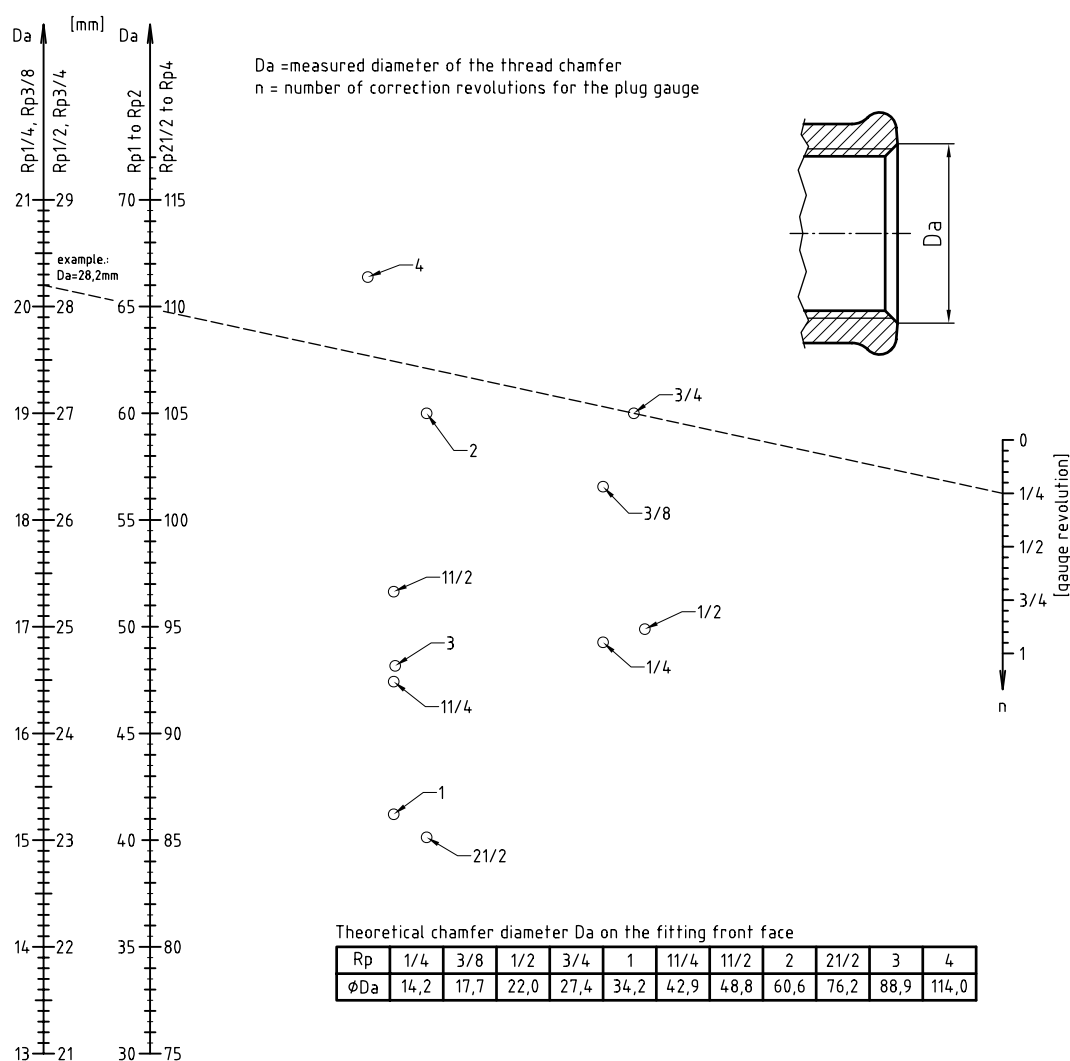
on the test result. It should be used as follows:

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.



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	1 1/4 32	1 1/2 40	2 50	2 1/2 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	1 1/4	1 1/2	2	2 1/2	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

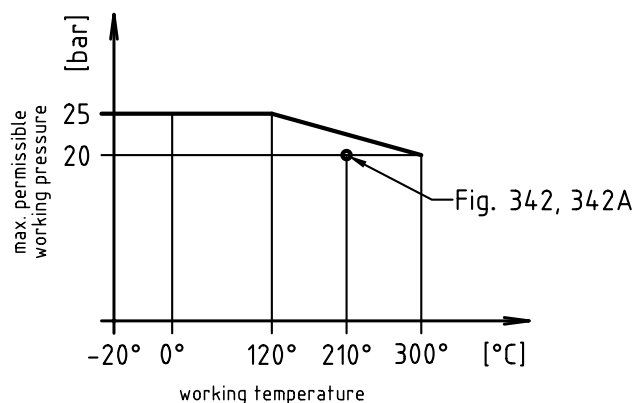
Application notes

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/m^2 = 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 (metallic) 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 to 150°C	-	-		-	-		●	●	○	●
up to 250°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 induced 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)

Joining 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
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	1 1/8	24x34	2												■	■	●	●	●
3/4	1/2	21x28,5	2											■					
3/4	3/4	27x36	2							○			●						
3/4	1 1/4	27x38	2	●	●	●	●	●	●	●	●	●			■	■			
1	3/4	26,5x34,5	2											■					
1	1	34x43	2							○			●						
1	1 1/2	32x44	2	●	●	●	●	●	●	●	●	●			■	■			
1 1/4	1 1/4	43x53	2							○									
1 1/4	1 1/8	38x48	2											■					
1 1/4	2	42x55	2	●	●			●	●	●	●	●	●						
1 1/2	1 1/4	42x52	2											■					
1 1/2	1 1/2	48x60	2							○									
1 1/2	2 1/4	46x62	2	●	●			●	●	●	●	●							
2	1 3/4	54x64	3											■					
2	2	61x73	3							○									
2	2 3/4	60x78	3	●	●			●	●	●									
2 1/2	3 1/2	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

Joining 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
1 1/4	32	43x 75	45 x 82
1 1/2	40	49x 85	49 x 92
2	50	61x 95	61 x 107
2 1/2	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
1 1/4	32	3,75
1 1/2	40	4,25
2	50	4,75
2 1/2	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

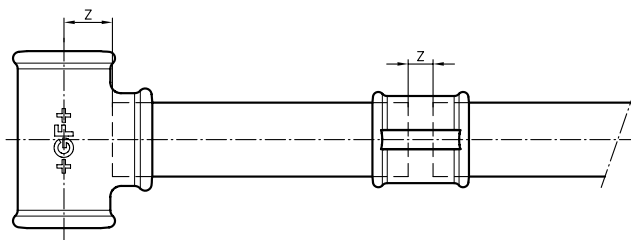
The z dimension installation method, developed by Georg Fischer in conjunction with experienced installers of domestic and industrial piping systems, has been proving its worth for years in practical applications. The method offers a basis for efficient planning, preparation for work and preliminary 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 constant dimensional accuracy, such as **Georg Fischer's**.
- Pipe threads conforming to standards, implying combined exact adjustment of the threading machine.

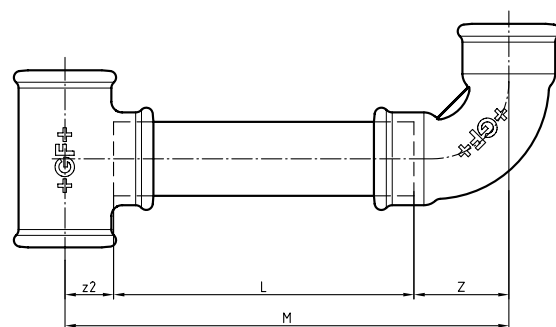
z dimension and measurement procedure

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

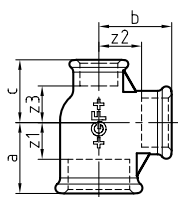
standardised measuring centre - centre = M

forms the basis for determining and using the z dimension



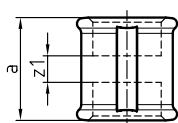
$$\text{Pipe length } L = M - (z2 + z)$$

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

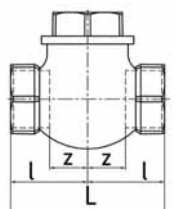


For fittings, e.g. tee no. 130, reduced branch and run:
 $z1 = a$ - length of engagement
 $z2 = b$ - length of engagement
 $z3 = c$ - length of engagement

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:

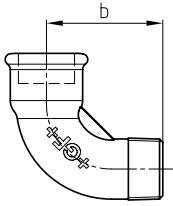
The centre-centre dimension (M) can show a permitted tolerance of $\pm 1/2$ thread.

Length of engagement

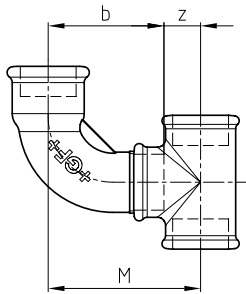
The nominal engagement length of the pipe external thread are (rounded values):

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
1 1/4	19
1 1/2	19
2	24
2 1/2	27
3	30
4	36

Examples of use

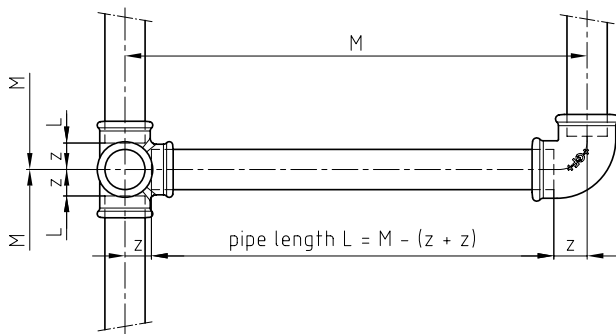


b is the distance of internal thread centre to face of the external thread.

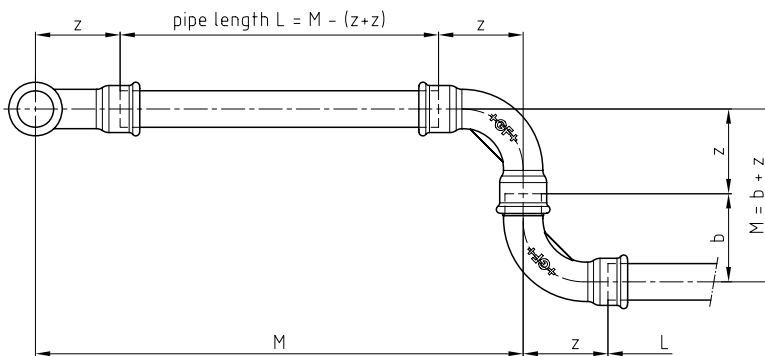


For fittings combinations with internal and external threads the sum of $z + b$ produces the axial distance M :

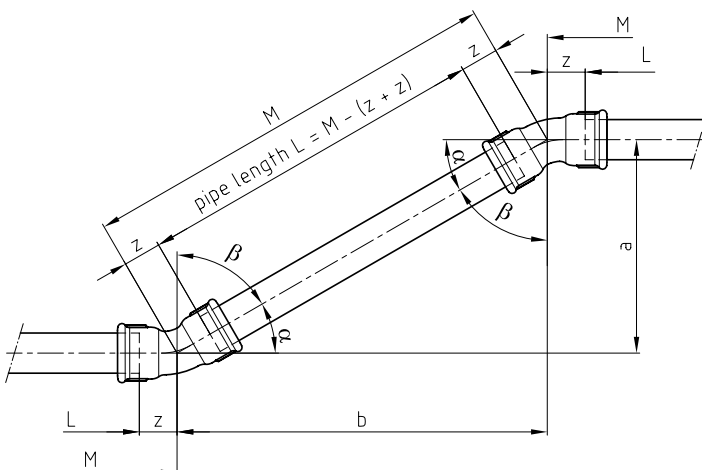
$$M = z + b$$



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	
α	β	Factor for		Factor for	
		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.

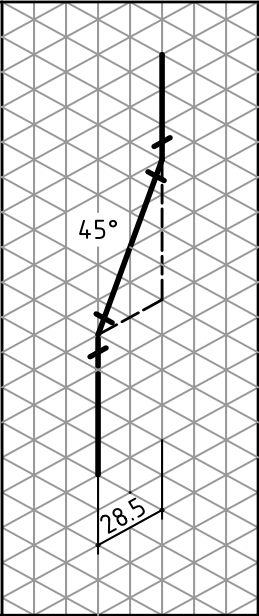
Example:

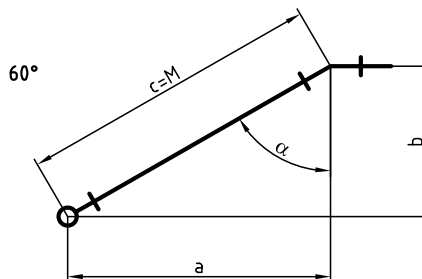
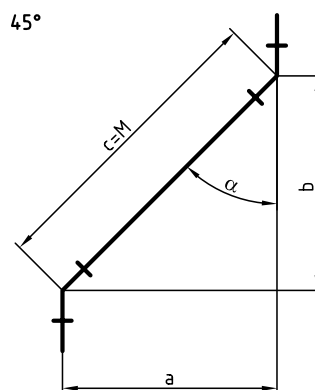
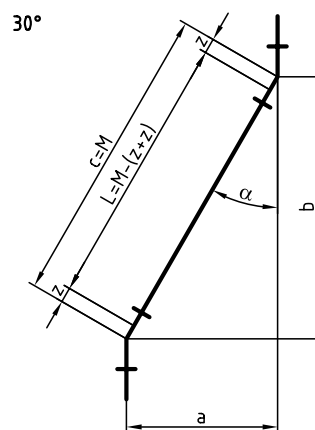
a = 28,5

$\alpha = 45^\circ$

$c = M = 28,5 \times 1,414$

= 40,3



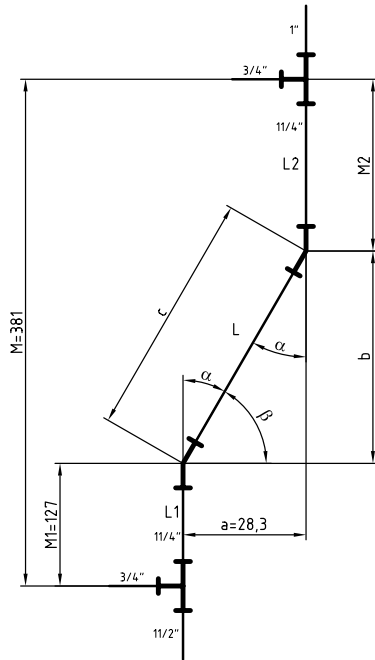


2. Numerical table

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 $\alpha = 30^\circ$, $\beta = 60^\circ$.

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 $L = c - (2 \times z \text{ dimension of bend no. 51 - 11/4})$

$z \text{ dimension bend} = 33 \text{ mm}$

$$L = 56.6 - (2 \times 3.3) = 56.6 - 6.6 = 50 \text{ cm}$$

Pipe length $L_1 = M_1 - (\text{sum of the } z \text{ dimension of tee piece no. 130 - 11/2 x 3/4 x 11/4 and bend no 51 - 11/4})$

$z \text{ dimension tee no. 130 (on 11/4 exit)} = 17 \text{ mm}$

$z \text{ dimension bend} = 33 \text{ mm}$

$$L_1 = 127 - (1.7 + 3.3) = 127 - 5 = 122 \text{ cm}$$

$$M_2 = M - (M_1 + b), M_1 = 127, b = 49$$

$$M_2 = 381 - (127 + 49) = 381 - 176 = 205 \text{ cm}$$

Pipe length $L_2 = M_2 - (\text{sum of the } z \text{ dimensions of bend no. 51 - 11/4 and tee piece no. 130 - 11/4 x 3/4 x 1})$

$z \text{ dimension bend} = 33 \text{ mm}$

$z \text{ dimension tee no. 130 (on the 11/4 exit)} = 17 \text{ mm}$

$$L_2 = 205 - (3.3 + 1.7) = 205 - 5 = 200 \text{ cm}$$

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

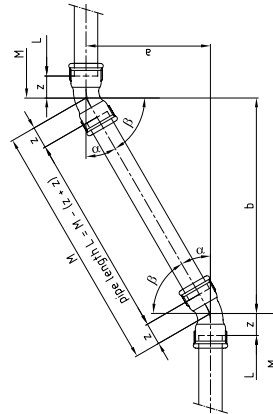
α	88,5°			87°			85°			80°			75°			70°			60°			45°			30°			15°			α
	β			β			β			β			β			β			β			β			β			β			
b and c belonging to a = 283 are the product of the b and c for 3.80 and 200																															
3	0,1	3,0	0,2	3,0	0,3	3,0	0,5	3,0	0,8	3,1	1,1	3,2	1,7	3,5	3	4,2	6	11,2	11,6	3											
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

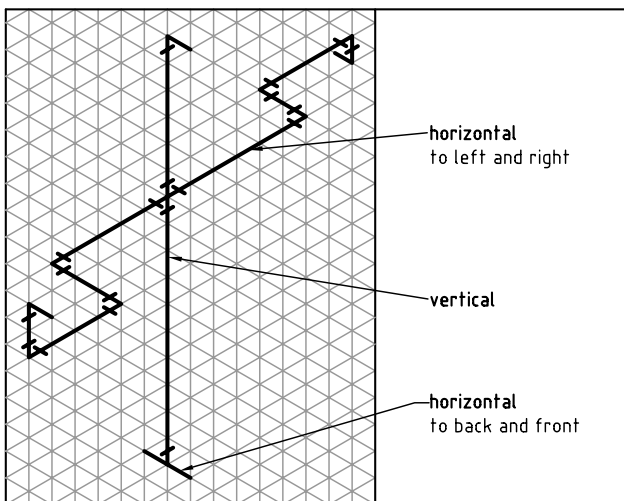
The isometric diagrams of pipes and horizontal projections are ideal for quick preparation when using the Georg Fischer installation method.

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.

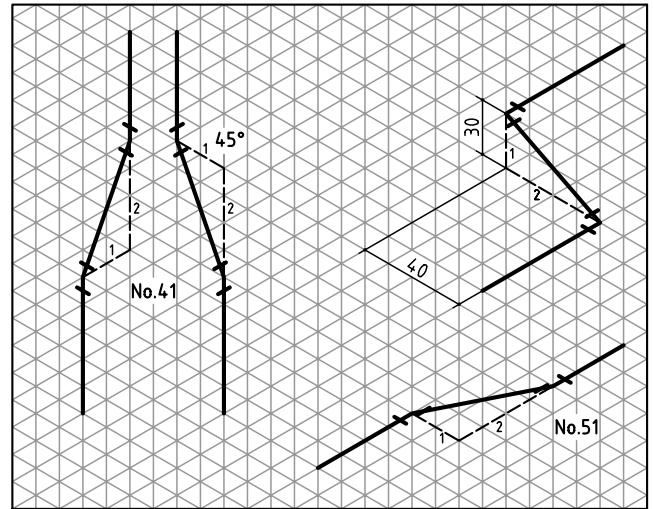
This type of representation enables quick outlining with no aids such as ruler, set square etc. either directly on the site of installation or according to a plan. The pipework system to be installed is always clearly recognisable with all necessary fittings, valves etc.

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:

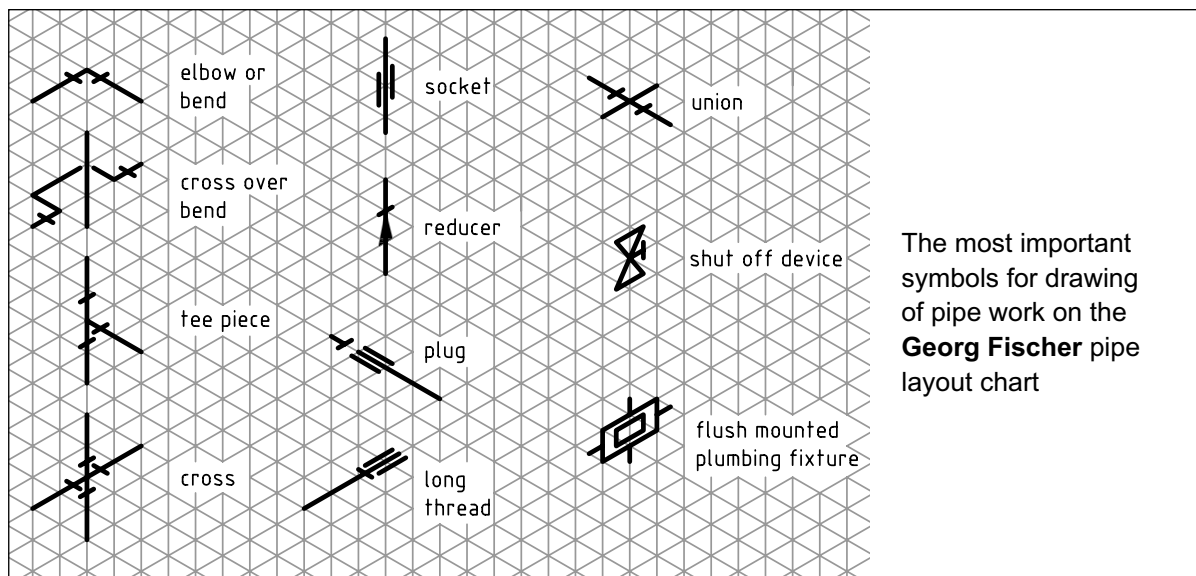


Pipelines sloping in relation to each other are drawn as shown in the example below:



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 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 distributors) to be reproduced.

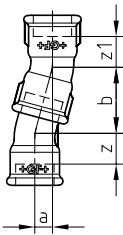
The advantages of the Georg Fischer pipe layout chart are obvious:

- 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.

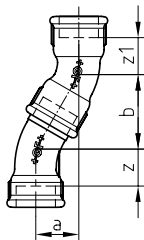
+GF+ GEORG FISCHER PIPING SYSTEMS		Pipe layout chart for z dimension method			item	dimension M-M		z dimensions	pipe length	inch dimension	
Site:		Date	No. of pages	Page No.		in cm	in cm				
KRENN & Co., Traisenriedlung 11, 3160 TRAISEN		16.09.04	4	1	1	26.0	10.2	15.8	1		CW
					2	21.2	6.8	14.4	1		CW
					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	4.5	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		H/W
					16	10.0	4.7	5.3	1/2		H/W
					17	62.0	4.7	57.3	1/2		H/W
					18	48.0	3.0	45.0	1/2		H/W
					19	57.0	3.0	54.0	1/2		H/W
					20	190.0	3.0	187.0	1/2		H/W
					21	49.3	3.0	46.3	1/2		H/W
					22	5.2	-	130/92	1/2		H/W
					23	16.2	3.0	13.2	1/2		H/W

Fittings combinations

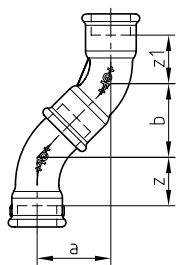
15°
53/54



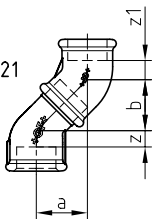
30°
50/51



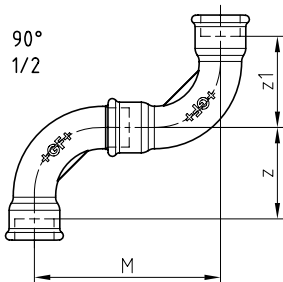
45°
40/41



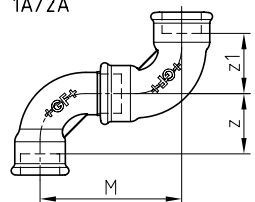
45°
120/121



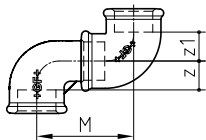
90°
1/2



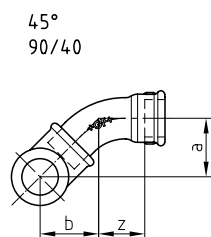
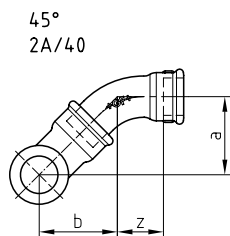
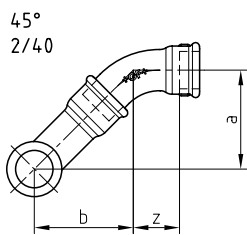
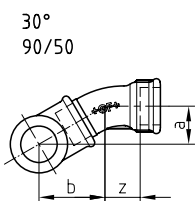
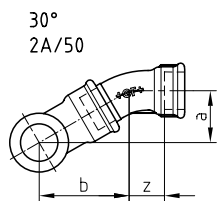
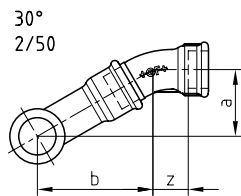
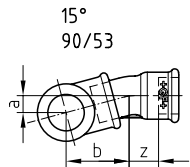
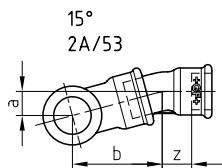
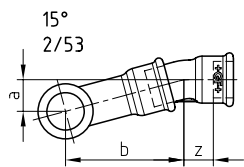
90°
1A/2A



90°
90/92

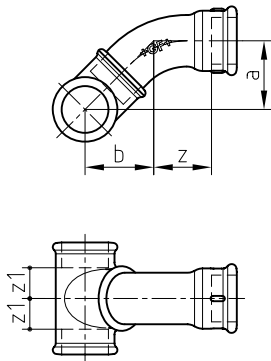


		15° 53/54	30° 50/51	45° 40/41 120/121			90° 1/2 1A/2A 90/92		
3/8	a			31	25	M	80	62	47
	b			31	25	z = z ₁	38	26	15
	z			20	10				
	z ₁			20	10				
1/2	a	9	21	37	26	M	90	77	52
	b	35	36	37	26	z = z ₁	42	32	15
	z	15	17	23	9				
	z ₁	15	17	23	9				
3/4	a	11	26	45	30	M	114	85	61
	b	42	44	45	30	z = z ₁	54	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				
1 1/4	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				
1 1/2	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				
2 1/2	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					



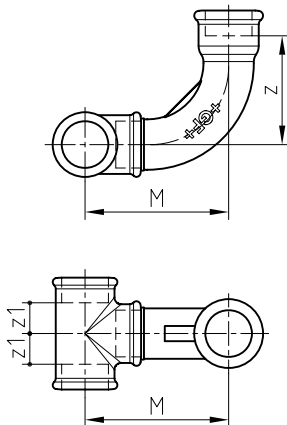
		15°			30°			45°		
		2/53	2a/53	90/53	2/50	2a/50	90/50	2/40	2a/40	90/40
3/8	a							44	35	28
	b							44	35	28
	z							20	20	20
1/2	a	16	14	9	33	28	20	51	44	32
	b	61	51	35	57	48	35	51	44	32
	z	15	15	15	17	17	17	23	23	23
3/4	a	20	15	11	42	33	24	64	50	38
	b	76	58	42	73	56	42	64	50	38
	z	18	18	18	21	21	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
1 1/4	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
1 1/2	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
2 1/2	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



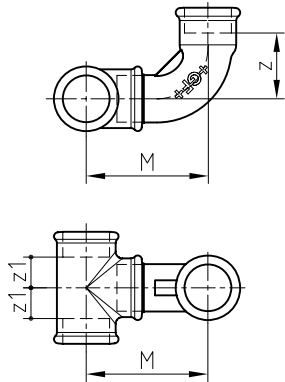
Equal run		Branch									
		3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
3/8	a=b	28									
	z₁	15									
	z	20									
1/2	a=b	28	32								
	z₁	13	15								
	z	20	23								
3/4	a=b	30	34	38							
	z₁	13	15	18							
	z	20	23	28							
1	a=b	33	36	40	45						
	z₁	13	15	18	21						
	z	20	23	28	34						
1 1/4	a=b	35	39	44	47	57					
	z₁	13	15	17	21	26					
	z	20	23	28	34	45					
1 1/2	a=b	37	42	46	50	59	63				
	z₁	14	17	19	23	27	31				
	z	20	23	28	34	45	49				
2	a=b		46	50	54	63	66	74			
	z₁		14	16	20	24	28	34			
	z		23	28	34	45	49	57			
2 1/2	a=b		52	57	60	69	72	79	91		
	z₁		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	
	z₁		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
	z₁				20		28	34	41	48	60
	z				34		49	57	72	93	105

90°
130/1



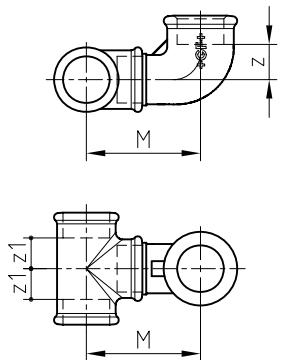
Equal run		Branch									
		3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
3/8	M	57									
	z₁	15									
	z	38									
1/2	M	58	63								
	z₁	13	15								
	z	38	42								
3/4	M	60	66	78							
	z₁	13	15	18							
	z	38	42	54							
1	M	64	69	81	96						
	z₁	13	15	18	21						
	z	38	42	54	68						
1 1/4	M	68	73	86	100	121					
	z₁	13	15	17	21	26					
	z	38	42	54	68	86					
1 1/2	M	70	77	89	104	124	136				
	z₁	14	17	19	23	27	31				
	z	38	42	54	68	86	97				
2	M		83	95	110	130	141	164			
	z₁		14	16	20	24	28	34			
	z		42	54	68	86	97	116			
2 1/2	M		91	104	118	138	149	172	207		
	z₁		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	
	z₁		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
	z₁				20		28	34	41	48	60
	z				68		97	116	149	175	224

90°
130/1A



Equal run		Branch									
		3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	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						
1 1/4	M	62	70	76	88	102					
	Z ₁	13	15	17	21	26					
	Z	26	32	35	46	57					
1 1/2	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			
2 1/2	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									
		3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
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						
1 1/4	M	58	62	69	77	86					
	Z ₁	13	15	17	21	26					
	Z	15	15	18	21	26					
1 1/2	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			
2 1/2	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 prerequisite 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

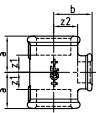
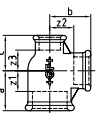
The above text refers primarily to the installation of threaded pipes with malleable cast iron pipe fittings. The transportational stability of assembled sections of pipework and the later possibilities of correcting their running directions on the site of installation make this materials system suitable 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		1 1/4		1 1/2		2		2 1/2		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	-
	 40	20	24	23	30	28	36	34	42	45	54	49	58	57	70	72	86	83	100	105	130
	 41	20	-	23	-	28	-	34	-	45	-	49	-	57	-	72	-	83	-	105	-
	 50	-	-	17	24	21	30	27	36	33	44	37	46	42	54	53	66	62	77	78	100
	 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
	 120	10	-	9	-	10	-	11	-	14	-	17	-	19	-	21	-	24	-	-	-
	 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	130, Branch and run reduced	Dimension	Z ₁	Z ₂	Z ₃	Dimension	Z ₁	Z ₂	Z ₃
	1/2 x 3/4	18	15		3/4 x 1/2 x 1/2	15	18	15	1 1/4 x 1 1/4 x 1	26	26	25
	3/4 x 1/2	15	18		3/4 x 3/4 x 1/2	18	18	18	1 1/2 x 3/4 x 1 1/4	19	29	17
	1 x 1/2	15	21		1 x 1/2 x 3/4	15	21	18	1 1/2 x 1 x 1 1/4	23	29	21
	1 x 3/4	18	21		1 x 3/4 x 3/4	18	21	15	1 1/2 x 1 1/4 x 1	27	29	25
	1 1/4 x 1/2	15	25		1 x 3/4 x 1/2	18	21	18	1 1/2 x 1 1/4 x 1 1/4	27	29	26
	1 1/4 x 3/4	17	26		1 x 1 x 3/4	21	21	21	1 1/2 x 1 1/2 x 1 1/4	31	31	29
	1 1/4 x 1	21	25		1 1/4 x 1/2 x 1	15	25	15	a ... dimension face - face (overall length) b ... dimension fitting axis - face external thread z, z ₁ , z ₂ , z ₃ ... z dimension			
	1 1/2 x 1/2	17	29		1 1/4 x 3/4 x 1	17	26	18				
	1 1/2 x 3/4	19	29		1 1/4 x 1 x 3/4	21	25	21				
	1 1/2 x 1	23	29		1 1/4 x 1 x 1	21	25	21				
	1 1/2 x 1 1/4	27	29		1 1/4 x 1 1/4 x 3/4	26	26	26				

+GF+ GEORG FISCHER PIPING SYSTEMS	Pipe layout chart for z dimension method			item	dimension M-M in cm	z dimensions in cm	pipe length in cm	inch dimension
	Site:	Date	No. of pages	Page No.	T R F B L R			

Code-Index

Code	Page	Code	Page	Code	Page
770 001 101	8	770 011 106	8	770 041 108	11
770 001 102	8	770 011 107	8	770 041 109	11
770 001 103	8	770 011 108	8	770 041 110	11
770 001 104	8	770 011 109	8	770 041 111	11
770 001 105	8	770 011 110	8	770 041 203	11
770 001 106	8	770 011 111	8	770 041 204	11
770 001 107	8	770 011 112	8	770 041 205	11
770 001 108	8	770 011 202	8	770 041 206	11
770 001 109	8	770 011 203	8	770 041 207	11
770 001 110	8	770 011 204	8	770 041 208	11
770 001 111	8	770 011 205	8	770 041 209	11
770 001 112	8	770 011 206	8	770 041 210	11
770 001 201	8	770 011 207	8	770 041 211	11
770 001 202	8	770 011 208	8	770 041 212	11
770 001 203	8	770 011 209	8	770 050 204	11
770 001 204	8	770 011 210	8	770 050 205	11
770 001 205	8	770 011 211	8	770 050 206	11
770 001 206	8	770 011 212	8	770 050 207	11
770 001 207	8	770 012 102	9	770 050 208	11
770 001 208	8	770 012 103	9	770 050 209	11
770 001 209	8	770 012 104	9	770 050 210	11
770 001 210	8	770 012 105	9	770 050 211	11
770 001 211	8	770 012 106	9	770 050 212	11
770 001 212	8	770 012 107	9	770 051 204	12
770 002 102	9	770 012 108	9	770 051 205	12
770 002 103	9	770 012 109	9	770 051 206	12
770 002 104	9	770 012 110	9	770 051 207	12
770 002 105	9	770 012 111	9	770 051 208	12
770 002 106	9	770 012 112	9	770 051 209	12
770 002 107	9	770 012 202	9	770 053 204	12
770 002 108	9	770 012 203	9	770 053 205	12
770 002 109	9	770 012 204	9	770 053 206	12
770 002 110	9	770 012 205	9	770 053 207	12
770 002 111	9	770 012 206	9	770 053 208	12
770 002 112	9	770 012 207	9	770 053 209	12
770 002 202	9	770 012 208	9	770 053 210	12
770 002 203	9	770 012 209	9	770 054 204	13
770 002 204	9	770 012 210	9	770 054 205	13
770 002 205	9	770 012 211	9	770 054 206	13
770 002 206	9	770 012 212	9	770 054 207	13
770 002 207	9	770 040 102	10	770 054 208	13
770 002 208	9	770 040 103	10	770 054 209	13
770 002 209	9	770 040 104	10	770 060 104	13
770 002 210	9	770 040 105	10	770 060 105	13
770 002 211	9	770 040 106	10	770 060 106	13
770 002 212	9	770 040 107	10	770 060 107	13
770 003 102	10	770 040 108	10	770 060 108	13
770 003 103	10	770 040 109	10	770 060 109	13
770 003 104	10	770 040 110	10	770 060 204	13
770 003 105	10	770 040 111	10	770 060 205	13
770 003 106	10	770 040 112	10	770 060 206	13
770 003 107	10	770 040 202	10	770 060 207	13
770 003 108	10	770 040 203	10	770 060 208	13
770 003 109	10	770 040 204	10	770 060 209	13
770 003 202	10	770 040 205	10	770 085 103	13
770 003 203	10	770 040 206	10	770 085 104	13
770 003 204	10	770 040 207	10	770 085 105	13
770 003 205	10	770 040 208	10	770 085 106	13
770 003 206	10	770 040 209	10	770 085 107	13
770 003 207	10	770 040 210	10	770 085 115	13
770 003 208	10	770 040 211	10	770 085 203	13
770 003 209	10	770 040 212	10	770 085 204	13
770 003 210	10	770 041 103	11	770 085 205	13
770 011 102	8	770 041 104	11	770 085 206	13
770 011 103	8	770 041 105	11	770 085 207	13
770 011 104	8	770 041 106	11	770 085 215	13
770 011 105	8	770 041 107	11	770 087 204	14

Code-Index

Code	Page
770 090 101	14
770 090 102	14
770 090 103	14
770 090 104	14
770 090 105	14
770 090 106	14
770 090 107	14
770 090 108	14
770 090 109	14
770 090 110	14
770 090 111	14
770 090 112	14
770 090 115	15
770 090 116	15
770 090 117	15
770 090 118	15
770 090 119	15
770 090 120	15
770 090 121	15
770 090 122	15
770 090 123	15
770 090 124	15
770 090 125	15
770 090 126	15
770 090 127	15
770 090 128	15
770 090 129	15
770 090 130	15
770 090 132	15
770 090 145	15
770 090 201	14
770 090 202	14
770 090 203	14
770 090 204	14
770 090 205	14
770 090 206	14
770 090 207	14
770 090 208	14
770 090 209	14
770 090 210	14
770 090 211	14
770 090 212	14
770 090 215	15
770 090 216	15
770 090 217	15
770 090 218	15
770 090 219	15
770 090 220	15
770 090 221	15
770 090 222	15
770 090 223	15
770 090 224	15
770 090 225	15
770 090 226	15
770 090 227	15
770 090 228	15
770 090 229	15
770 090 230	15
770 090 231	15
770 090 232	15
770 090 245	15
770 092 101	16
770 092 102	16
770 092 103	16
770 092 104	16
770 092 105	16
770 092 106	16

Code	Page
770 092 107	16
770 092 108	16
770 092 109	16
770 092 110	16
770 092 111	16
770 092 112	16
770 092 116	16
770 092 117	16
770 092 118	16
770 092 120	16
770 092 121	16
770 092 122	16
770 092 124	17
770 092 125	17
770 092 126	17
770 092 127	17
770 092 130	16
770 092 201	16
770 092 202	16
770 092 203	16
770 092 204	16
770 092 205	16
770 092 206	16
770 092 207	16
770 092 208	16
770 092 209	16
770 092 210	16
770 092 211	16
770 092 212	16
770 092 216	16
770 092 217	16
770 092 218	16
770 092 219	16
770 092 220	16
770 092 221	16
770 092 222	16
770 092 224	17
770 092 225	17
770 092 226	17
770 092 227	17
770 092 230	16
770 094 103	17
770 094 104	17
770 094 105	17
770 094 106	17
770 094 107	17
770 094 108	17
770 094 109	17
770 094 203	17
770 094 204	17
770 094 205	17
770 094 206	17
770 094 207	17
770 094 208	17
770 094 209	17
770 095 103	17
770 095 104	17
770 095 105	17
770 095 106	17
770 095 107	17
770 095 108	17
770 095 109	17
770 095 203	17
770 095 204	17
770 095 205	17
770 095 206	17
770 095 207	17

Code	Page
770 095 208	17
770 095 209	17
770 096 102	18
770 096 103	18
770 096 104	18
770 096 105	18
770 096 106	18
770 096 107	18
770 096 108	18
770 096 109	18
770 096 110	18
770 096 111	18
770 096 202	18
770 096 203	18
770 096 204	18
770 096 205	18
770 096 206	18
770 096 207	18
770 096 208	18
770 096 209	18
770 096 210	18
770 096 211	18
770 097 103	19
770 097 104	19
770 097 105	19
770 097 106	19
770 097 107	19
770 097 108	19
770 097 109	19
770 097 203	19
770 097 204	19
770 097 205	19
770 097 206	19
770 097 207	19
770 097 208	19
770 097 209	19
770 098 102	20
770 098 103	20
770 098 104	20
770 098 105	20
770 098 106	20
770 098 107	20
770 098 108	20
770 098 109	20
770 098 110	20
770 098 111	20
770 098 202	20
770 098 203	20
770 098 204	20
770 098 205	20
770 098 206	20
770 098 207	20
770 098 208	20
770 098 209	20
770 098 210	20
770 098 211	20
770 100 104	20
770 100 105	20
770 100 106	20
770 100 204	20
770 100 205	20
770 100 206	20
770 101 104	21
770 101 105	21
770 101 106	21
770 101 204	21
770 101 205	21

Code-Index

Code	Page
770 101 206	21
770 102 104	21
770 102 105	21
770 102 106	21
770 102 204	21
770 102 205	21
770 102 206	21
770 103 104	22
770 103 105	22
770 103 106	22
770 103 204	22
770 103 205	22
770 103 206	22
770 120 103	22
770 120 104	22
770 120 105	22
770 120 106	22
770 120 107	22
770 120 108	22
770 120 109	22
770 120 110	22
770 120 111	22
770 120 203	22
770 120 204	22
770 120 205	22
770 120 206	22
770 120 207	22
770 120 208	22
770 120 209	22
770 120 210	22
770 120 211	22
770 121 103	23
770 121 104	23
770 121 105	23
770 121 106	23
770 121 107	23
770 121 108	23
770 121 109	23
770 121 110	23
770 121 111	23
770 121 203	23
770 121 204	23
770 121 205	23
770 121 206	23
770 121 207	23
770 121 208	23
770 121 209	23
770 121 210	23
770 121 211	23
770 129 115	25
770 129 116	25
770 129 118	25
770 129 119	27
770 129 120	25
770 129 131	25
770 129 215	25
770 129 216	25
770 129 218	25
770 129 219	27
770 129 220	25
770 129 221	27
770 129 222	27
770 129 223	27
770 129 224	25
770 129 225	25
770 129 226	25
770 129 227	25

Code	Page
770 129 228	25
770 129 229	27
770 129 230	25
770 129 231	25
770 129 232	27
770 129 233	25
770 129 235	25
770 129 236	25
770 129 237	25
770 129 238	25
770 130 101	23
770 130 102	23
770 130 103	23
770 130 104	23
770 130 105	23
770 130 106	23
770 130 107	23
770 130 108	23
770 130 109	23
770 130 110	23
770 130 111	23
770 130 112	23
770 130 115	24
770 130 116	24
770 130 117	24
770 130 118	26
770 130 119	24
770 130 120	26
770 130 121	24
770 130 122	24
770 130 123	26
770 130 124	24
770 130 125	26
770 130 126	26
770 130 127	24
770 130 128	26
770 130 129	26
770 130 130	24
770 130 131	26
770 130 132	24
770 130 133	24
770 130 134	24
770 130 135	26
770 130 136	26
770 130 137	24
770 130 138	26
770 130 139	26
770 130 140	24
770 130 141	26
770 130 142	26
770 130 143	26
770 130 144	26
770 130 145	24
770 130 146	24
770 130 147	26
770 130 148	24
770 130 149	26
770 130 150	26
770 130 151	24
770 130 153	26
770 130 154	26
770 130 155	24
770 130 156	26
770 130 157	26
770 130 158	26
770 130 159	24
770 130 160	26

Code	Page
770 130 161	24
770 130 162	24
770 130 163	26
770 130 164	24
770 130 165	26
770 130 166	24
770 130 167	26
770 130 168	26
770 130 169	24
770 130 170	26
770 130 171	27
770 130 172	24
770 130 173	27
770 130 174	27
770 130 175	27
770 130 176	27
770 130 177	24
770 130 178	27
770 130 179	24
770 130 180	27
770 130 181	24
770 130 182	27
770 130 183	24
770 130 184	27
770 130 185	25
770 130 186	27
770 130 187	27
770 130 188	25
770 130 190	27
770 130 191	25
770 130 192	27
770 130 193	27
770 130 194	27
770 130 195	27
770 130 196	27
770 130 197	25
770 130 198	25
770 130 199	25
770 130 201	23
770 130 202	23
770 130 203	23
770 130 204	23
770 130 205	23
770 130 206	23
770 130 207	23
770 130 208	23
770 130 209	23
770 130 210	23
770 130 211	23
770 130 212	23
770 130 215	24
770 130 216	24
770 130 217	24
770 130 218	26
770 130 219	24
770 130 220	26
770 130 221	24
770 130 222	24
770 130 223	26
770 130 224	24
770 130 225	26
770 130 226	26
770 130 227	24
770 130 228	26
770 130 229	26
770 130 230	24
770 130 231	26

Code-Index

Code	Page	Code	Page	Code	Page
770 130 232	24	770 131 105	27	770 132 209	29
770 130 233	24	770 131 106	27	770 133 103	29
770 130 234	24	770 131 107	27	770 133 104	29
770 130 235	26	770 131 108	27	770 133 105	29
770 130 236	26	770 131 109	27	770 133 106	29
770 130 237	24	770 131 110	27	770 133 203	29
770 130 238	26	770 131 111	27	770 133 204	29
770 130 239	26	770 131 112	27	770 133 205	29
770 130 240	24	770 131 115	28	770 133 206	29
770 130 241	26	770 131 116	28	770 134 102	29
770 130 242	26	770 131 117	28	770 134 103	29
770 130 243	26	770 131 118	28	770 134 104	29
770 130 244	26	770 131 119	28	770 134 105	29
770 130 245	24	770 131 120	28	770 134 106	29
770 130 246	24	770 131 121	28	770 134 107	29
770 130 247	26	770 131 122	28	770 134 108	29
770 130 248	24	770 131 123	28	770 134 109	29
770 130 249	26	770 131 125	28	770 134 116	30
770 130 250	26	770 131 126	28	770 134 118	30
770 130 251	24	770 131 127	28	770 134 119	30
770 130 253	26	770 131 128	28	770 134 202	29
770 130 254	26	770 131 129	28	770 134 203	29
770 130 255	24	770 131 130	28	770 134 204	29
770 130 256	26	770 131 131	28	770 134 205	29
770 130 257	26	770 131 132	28	770 134 206	29
770 130 258	26	770 131 135	28	770 134 207	29
770 130 259	24	770 131 140	28	770 134 208	29
770 130 260	26	770 131 204	27	770 134 209	29
770 130 261	24	770 131 205	27	770 134 216	30
770 130 262	24	770 131 206	27	770 134 218	30
770 130 263	26	770 131 207	27	770 134 219	30
770 130 264	24	770 131 208	27	770 135 104	30
770 130 265	26	770 131 209	27	770 135 105	30
770 130 266	24	770 131 210	27	770 135 106	30
770 130 267	26	770 131 211	27	770 135 204	30
770 130 268	26	770 131 212	27	770 135 205	30
770 130 269	24	770 131 215	28	770 135 206	30
770 130 270	26	770 131 216	28	770 137 216	30
770 130 271	27	770 131 217	28	770 137 217	30
770 130 272	24	770 131 218	28	770 137 219	30
770 130 273	27	770 131 219	28	770 165 103	31
770 130 274	27	770 131 220	28	770 165 104	31
770 130 275	27	770 131 221	28	770 165 105	31
770 130 276	27	770 131 222	28	770 165 106	31
770 130 277	24	770 131 223	28	770 165 107	31
770 130 278	27	770 131 225	28	770 165 108	31
770 130 279	24	770 131 226	28	770 165 109	31
770 130 280	27	770 131 227	28	770 165 204	31
770 130 281	24	770 131 228	28	770 165 205	31
770 130 282	27	770 131 229	28	770 165 206	31
770 130 283	24	770 131 230	28	770 165 207	31
770 130 284	27	770 131 231	28	770 165 208	31
770 130 285	25	770 131 232	28	770 165 209	31
770 130 286	27	770 131 233	28	770 180 102	32
770 130 287	27	770 131 235	28	770 180 103	32
770 130 288	25	770 131 240	28	770 180 104	32
770 130 290	27	770 132 104	29	770 180 105	32
770 130 291	25	770 132 105	29	770 180 106	32
770 130 292	27	770 132 106	29	770 180 107	32
770 130 293	27	770 132 107	29	770 180 108	32
770 130 294	27	770 132 108	29	770 180 109	32
770 130 295	27	770 132 109	29	770 180 110	32
770 130 296	27	770 132 204	29	770 180 111	32
770 130 297	25	770 132 205	29	770 180 112	32
770 130 298	25	770 132 206	29	770 180 115	32
770 130 299	25	770 132 207	29	770 180 116	32
770 131 104	27	770 132 208	29	770 180 117	32

Code-Index

Code	Page
770 180 118	32
770 180 120	32
770 180 121	32
770 180 202	32
770 180 203	32
770 180 204	32
770 180 205	32
770 180 206	32
770 180 207	32
770 180 208	32
770 180 209	32
770 180 210	32
770 180 211	32
770 180 212	32
770 180 215	32
770 180 216	32
770 180 217	32
770 180 218	32
770 180 220	32
770 180 221	32
770 220 103	33
770 220 104	33
770 220 105	33
770 220 106	33
770 220 203	33
770 220 204	33
770 220 205	33
770 220 206	33
770 221 103	33
770 221 104	33
770 221 105	33
770 221 106	33
770 221 107	33
770 221 108	33
770 221 109	33
770 221 203	33
770 221 204	33
770 221 205	33
770 221 206	33
770 221 207	33
770 221 208	33
770 221 209	33
770 223 104	33
770 223 105	33
770 223 106	33
770 223 204	33
770 223 205	33
770 223 206	33
770 240 115	34
770 240 116	34
770 240 117	34
770 240 118	34
770 240 119	34
770 240 120	34
770 240 121	34
770 240 122	34
770 240 123	34
770 240 124	34
770 240 125	34
770 240 126	34
770 240 127	34
770 240 128	34
770 240 129	34
770 240 130	34
770 240 131	34
770 240 132	34
770 240 133	34

Code	Page
770 240 134	34
770 240 135	34
770 240 136	34
770 240 137	34
770 240 138	34
770 240 139	34
770 240 140	34
770 240 141	34
770 240 142	34
770 240 143	34
770 240 144	34
770 240 145	35
770 240 146	35
770 240 147	35
770 240 148	35
770 240 215	34
770 240 216	34
770 240 217	34
770 240 218	34
770 240 219	34
770 240 220	34
770 240 221	34
770 240 222	34
770 240 223	34
770 240 224	34
770 240 225	34
770 240 226	34
770 240 227	34
770 240 228	34
770 240 229	34
770 240 230	34
770 240 231	34
770 240 232	34
770 240 233	34
770 240 234	34
770 240 235	34
770 240 236	34
770 240 237	34
770 240 238	34
770 240 239	34
770 240 240	34
770 240 241	34
770 240 242	34
770 240 243	34
770 240 244	35
770 240 245	35
770 240 246	35
770 240 247	35
770 240 248	35
770 241 115	36
770 241 116	36
770 241 117	36
770 241 118	36
770 241 119	36
770 241 120	36
770 241 121	36
770 241 122	36
770 241 123	36
770 241 124	36
770 241 125	36
770 241 126	36
770 241 127	36
770 241 128	36
770 241 129	36
770 241 130	36
770 241 131	36
770 241 132	36

Code	Page
770 241 133	36
770 241 134	36
770 241 135	36
770 241 136	36
770 241 137	36
770 241 138	36
770 241 139	36
770 241 140	36
770 241 141	36
770 241 142	36
770 241 143	36
770 241 144	37
770 241 145	37
770 241 146	37
770 241 147	37
770 241 148	37
770 241 149	37
770 241 150	37
770 241 151	37
770 241 152	37
770 241 153	37
770 241 215	36
770 241 216	36
770 241 217	36
770 241 218	36
770 241 219	36
770 241 220	36
770 241 221	36
770 241 222	36
770 241 223	36
770 241 224	36
770 241 225	36
770 241 226	36
770 241 227	36
770 241 228	36
770 241 229	36
770 241 230	36
770 241 231	36
770 241 232	36
770 241 233	36
770 241 234	36
770 241 235	36
770 241 236	36
770 241 237	36
770 241 238	36
770 241 239	36
770 241 240	36
770 241 241	36
770 241 242	36
770 241 243	36
770 241 244	37
770 241 245	37
770 241 246	37
770 241 247	37
770 241 248	37
770 241 249	37
770 241 250	37
770 241 251	37
770 241 252	37
770 241 253	37
770 245 115	38
770 245 116	38
770 245 117	38
770 245 118	38
770 245 119	38
770 245 120	38
770 245 121	38

Code-Index

Code	Page	Code	Page	Code	Page
770 245 122	38	770 246 220	39	770 270 208	41
770 245 123	38	770 246 221	39	770 270 209	41
770 245 124	38	770 246 222	39	770 270 210	41
770 245 125	38	770 246 223	39	770 270 211	41
770 245 126	38	770 246 224	39	770 270 212	41
770 245 127	38	770 246 225	39	770 271 103	42
770 245 128	38	770 246 226	39	770 271 104	42
770 245 129	38	770 246 227	39	770 271 105	42
770 245 130	38	770 246 228	39	770 271 106	42
770 245 131	38	770 246 229	39	770 271 107	42
770 245 132	38	770 246 230	39	770 271 108	42
770 245 133	38	770 246 231	39	770 271 109	42
770 245 134	38	770 246 232	39	770 271 203	42
770 245 135	38	770 246 233	39	770 271 204	42
770 245 136	38	770 246 234	39	770 271 205	42
770 245 137	38	770 246 235	39	770 271 206	42
770 245 138	38	770 260 115	40	770 271 207	42
770 245 215	38	770 260 116	40	770 271 208	42
770 245 216	38	770 260 117	40	770 271 209	42
770 245 217	38	770 260 118	40	770 280 101	42
770 245 218	38	770 260 119	40	770 280 102	42
770 245 219	38	770 260 120	40	770 280 103	42
770 245 220	38	770 260 121	40	770 280 104	42
770 245 221	38	770 260 122	40	770 280 105	42
770 245 222	38	770 260 123	40	770 280 106	42
770 245 223	38	770 260 124	40	770 280 107	42
770 245 224	38	770 260 125	40	770 280 108	42
770 245 225	38	770 260 126	40	770 280 109	42
770 245 226	38	770 260 127	40	770 280 110	42
770 245 227	38	770 260 128	40	770 280 111	42
770 245 228	38	770 260 129	40	770 280 112	42
770 245 229	38	770 260 130	40	770 280 201	42
770 245 230	38	770 260 215	40	770 280 202	42
770 245 231	38	770 260 216	40	770 280 203	42
770 245 232	38	770 260 217	40	770 280 204	42
770 245 233	38	770 260 218	40	770 280 205	42
770 245 234	38	770 260 219	40	770 280 206	42
770 245 235	38	770 260 220	40	770 280 207	42
770 245 236	38	770 260 221	40	770 280 208	42
770 245 237	38	770 260 222	40	770 280 209	42
770 245 238	38	770 260 223	40	770 280 210	42
770 246 115	39	770 260 224	40	770 280 211	42
770 246 116	39	770 260 225	40	770 280 212	42
770 246 117	39	770 260 226	40	770 281 104	43
770 246 118	39	770 260 227	40	770 281 105	43
770 246 119	39	770 260 228	40	770 281 106	43
770 246 120	39	770 260 229	40	770 281 107	43
770 246 121	39	770 260 230	40	770 281 108	43
770 246 122	39	770 270 101	41	770 281 109	43
770 246 123	39	770 270 102	41	770 281 203	43
770 246 124	39	770 270 103	41	770 281 204	43
770 246 125	39	770 270 104	41	770 281 205	43
770 246 126	39	770 270 105	41	770 281 206	43
770 246 127	39	770 270 106	41	770 281 207	43
770 246 128	39	770 270 107	41	770 281 208	43
770 246 129	39	770 270 108	41	770 281 209	43
770 246 130	39	770 270 109	41	770 290 101	43
770 246 131	39	770 270 110	41	770 290 102	43
770 246 132	39	770 270 111	41	770 290 103	43
770 246 133	39	770 270 112	41	770 290 104	43
770 246 134	39	770 270 201	41	770 290 105	43
770 246 135	39	770 270 202	41	770 290 106	43
770 246 215	39	770 270 203	41	770 290 107	43
770 246 216	39	770 270 204	41	770 290 108	43
770 246 217	39	770 270 205	41	770 290 109	43
770 246 218	39	770 270 206	41	770 290 110	43
770 246 219	39	770 270 207	41	770 290 111	43

Code-Index

Code	Page	Code	Page	Code	Page
770 290 112	43	770 300 109	45	770 312 205	47
770 290 201	43	770 300 110	45	770 312 206	47
770 290 202	43	770 300 111	45	770 312 207	47
770 290 203	43	770 300 112	45	770 312 208	47
770 290 204	43	770 300 201	45	770 312 209	47
770 290 205	43	770 300 202	45	770 320 104	47
770 290 206	43	770 300 203	45	770 320 105	47
770 290 207	43	770 300 204	45	770 320 106	47
770 290 208	43	770 300 205	45	770 320 107	47
770 290 209	43	770 300 206	45	770 320 108	47
770 290 210	43	770 300 207	45	770 320 109	47
770 290 211	43	770 300 208	45	770 320 204	47
770 290 212	43	770 300 209	45	770 320 205	47
770 291 101	44	770 300 210	45	770 320 206	47
770 291 102	44	770 300 211	45	770 320 207	47
770 291 103	44	770 300 212	45	770 320 208	47
770 291 104	44	770 308 204	46	770 320 209	47
770 291 105	44	770 308 205	46	770 326 104	47
770 291 106	44	770 308 206	46	770 326 105	47
770 291 107	44	770 308 207	46	770 326 106	47
770 291 108	44	770 308 208	46	770 326 107	47
770 291 109	44	770 308 209	46	770 326 108	47
770 291 110	44	770 309 104	46	770 326 109	47
770 291 111	44	770 309 105	46	770 326 204	47
770 291 112	44	770 309 106	46	770 326 205	47
770 291 201	44	770 309 107	46	770 326 206	47
770 291 202	44	770 309 108	46	770 326 207	47
770 291 203	44	770 309 109	46	770 326 208	47
770 291 204	44	770 309 204	46	770 326 209	47
770 291 205	44	770 309 205	46	770 329 104	48
770 291 206	44	770 309 206	46	770 329 105	48
770 291 207	44	770 309 207	46	770 329 106	48
770 291 208	44	770 309 208	46	770 329 107	48
770 291 209	44	770 309 209	46	770 329 108	48
770 291 210	44	770 310 101	46	770 329 109	48
770 291 211	44	770 310 102	46	770 329 110	48
770 291 212	44	770 310 103	46	770 329 111	48
770 292 105	44	770 310 104	46	770 329 112	48
770 292 106	44	770 310 105	46	770 329 115	48
770 292 107	44	770 310 106	46	770 329 204	48
770 292 108	44	770 310 107	46	770 329 205	48
770 292 109	44	770 310 108	46	770 329 206	48
770 292 205	44	770 310 109	46	770 329 207	48
770 292 206	44	770 310 110	46	770 329 208	48
770 292 207	44	770 310 111	46	770 329 209	48
770 292 208	44	770 310 201	46	770 329 210	48
770 292 209	44	770 310 202	46	770 329 211	48
770 294 104	45	770 310 203	46	770 329 212	48
770 294 105	45	770 310 204	46	770 329 215	48
770 294 106	45	770 310 205	46	770 330 102	48
770 294 107	45	770 310 206	46	770 330 103	48
770 294 108	45	770 310 207	46	770 330 104	48
770 294 109	45	770 310 208	46	770 330 105	48
770 294 204	45	770 310 209	46	770 330 106	48
770 294 205	45	770 310 210	46	770 330 107	48
770 294 206	45	770 310 211	46	770 330 108	48
770 294 207	45	770 312 102	47	770 330 109	48
770 294 208	45	770 312 103	47	770 330 110	48
770 294 209	45	770 312 104	47	770 330 111	48
770 300 101	45	770 312 105	47	770 330 112	48
770 300 102	45	770 312 106	47	770 330 202	48
770 300 103	45	770 312 107	47	770 330 203	48
770 300 104	45	770 312 108	47	770 330 204	48
770 300 105	45	770 312 109	47	770 330 205	48
770 300 106	45	770 312 202	47	770 330 206	48
770 300 107	45	770 312 203	47	770 330 207	48
770 300 108	45	770 312 204	47	770 330 208	48

Code-Index

Code	Page	Code	Page	Code	Page
770 330 209	48	770 340 202	51	770 345 109	52
770 330 210	48	770 340 203	51	770 345 204	52
770 330 211	48	770 340 204	51	770 345 205	52
770 330 212	48	770 340 205	51	770 345 206	52
770 331 102	49	770 340 206	51	770 345 207	52
770 331 103	49	770 340 207	51	770 345 208	52
770 331 104	49	770 340 208	51	770 345 209	52
770 331 105	49	770 340 209	51	770 346 104	53
770 331 106	49	770 340 210	51	770 346 105	53
770 331 107	49	770 340 211	51	770 346 106	53
770 331 108	49	770 340 212	51	770 346 107	53
770 331 109	49	770 340 220	51	770 346 108	53
770 331 110	49	770 341 102	51	770 346 109	53
770 331 111	49	770 341 103	51	770 346 204	53
770 331 202	49	770 341 104	51	770 346 205	53
770 331 203	49	770 341 105	51	770 346 206	53
770 331 204	49	770 341 106	51	770 346 207	53
770 331 205	49	770 341 107	51	770 346 208	53
770 331 206	49	770 341 108	51	770 346 209	53
770 331 207	49	770 341 109	51	770 370 105	54
770 331 208	49	770 341 110	51	770 370 106	54
770 331 209	49	770 341 111	51	770 370 107	54
770 331 210	49	770 341 112	51	770 370 108	54
770 331 211	49	770 341 202	51	770 370 109	54
770 332 105	49	770 341 203	51	770 370 110	54
770 332 106	49	770 341 204	51	770 370 111	54
770 332 107	49	770 341 205	51	770 370 119	54
770 332 205	49	770 341 206	51	770 370 120	54
770 332 206	49	770 341 207	51	770 370 205	54
770 332 207	49	770 341 208	51	770 370 206	54
770 335 104	49	770 341 209	51	770 370 207	54
770 335 105	49	770 341 210	51	770 370 208	54
770 335 106	49	770 341 211	51	770 370 209	54
770 335 107	49	770 341 212	51	770 370 210	54
770 335 108	49	770 342 104	52	770 370 211	54
770 335 204	49	770 342 105	52	770 370 219	54
770 335 205	49	770 342 106	52	770 370 220	54
770 335 206	49	770 342 107	52	770 371 104	54
770 335 207	49	770 342 108	52	770 371 105	54
770 335 208	49	770 342 109	52	770 371 106	54
770 336 104	50	770 342 204	52	770 371 107	54
770 336 105	50	770 342 205	52	770 371 108	54
770 336 106	50	770 342 206	52	770 371 109	54
770 336 107	50	770 342 207	52	770 371 110	54
770 336 108	50	770 342 208	52	770 371 111	54
770 336 204	50	770 342 209	52	770 371 115	55
770 336 205	50	770 344 102	53	770 371 204	54
770 336 206	50	770 344 103	53	770 371 205	54
770 336 207	50	770 344 104	53	770 371 206	54
770 336 208	50	770 344 105	53	770 371 207	54
770 338 220	50	770 344 106	53	770 371 208	54
770 338 221	50	770 344 107	53	770 371 209	54
770 338 222	50	770 344 108	53	770 371 210	54
770 340 101	51	770 344 109	53	770 371 211	54
770 340 102	51	770 344 202	53	770 372 104	55
770 340 103	51	770 344 203	53	770 372 105	55
770 340 104	51	770 344 204	53	770 372 106	55
770 340 105	51	770 344 205	53	770 372 107	55
770 340 106	51	770 344 206	53	770 372 108	55
770 340 107	51	770 344 207	53	770 372 109	55
770 340 108	51	770 344 208	53	770 372 110	55
770 340 109	51	770 344 209	53	770 372 111	55
770 340 110	51	770 345 104	52	770 372 115	55
770 340 111	51	770 345 105	52	770 372 116	55
770 340 112	51	770 345 106	52	770 372 119	55
770 340 120	51	770 345 107	52	770 372 133	55
770 340 201	51	770 345 108	52	770 372 204	55

Code-Index

Code	Page
770 372 205	55
770 372 206	55
770 372 207	55
770 372 208	55
770 372 209	55
770 372 210	55
770 372 211	55
770 372 215	55
770 372 216	55
770 372 219	55
770 372 233	55
770 373 105	56
770 373 106	56
770 373 107	56
770 373 205	56
770 373 206	56
770 373 207	56
770 374 105	56
770 374 106	56
770 374 107	56
770 374 108	56
770 374 109	56
770 374 110	56
770 374 111	56
770 374 116	56
770 374 118	56
770 374 119	56
770 374 120	56
770 374 121	56
770 374 135	56
770 374 205	56
770 374 206	56
770 374 207	56
770 374 208	56
770 374 209	56
770 374 210	56
770 374 211	56
770 374 216	56
770 374 218	56
770 374 219	56
770 374 220	56
770 376 105	57
770 376 106	57
770 376 107	57
770 376 108	57
770 376 109	57
770 376 125	57
770 376 205	57
770 376 206	57
770 376 207	57
770 376 208	57
770 376 209	57
770 376 225	57
770 378 220	57
770 378 221	57
770 378 222	57
770 471 203	60
770 471 204	60
770 471 205	60
770 526 119	61
770 526 120	61
770 526 121	61
770 526 122	61
770 526 123	61
770 526 124	61
770 526 125	61
770 526 126	61

Code	Page
770 526 127	61
770 526 128	61
770 526 129	61
770 526 130	61
770 526 131	61
770 526 132	61
770 526 133	61
770 526 134	61
770 526 135	61
770 526 219	61
770 526 220	61
770 526 221	61
770 526 222	61
770 526 223	61
770 526 224	61
770 526 225	61
770 526 226	61
770 526 227	61
770 526 228	61
770 526 229	61
770 526 230	61
770 526 231	61
770 526 232	61
770 526 233	61
770 526 234	61
770 526 235	61
770 529 102	61
770 529 103	61
770 529 104	61
770 529 105	61
770 529 106	61
770 529 107	61
770 529 108	61
770 529 109	61
770 529 202	61
770 529 203	61
770 529 204	61
770 529 205	61
770 529 206	61
770 529 207	61
770 529 208	61
770 529 209	61
770 534 204	62
770 534 205	62
770 534 206	62
770 535 204	63
770 535 205	63
770 535 206	63
770 536 204	63
770 536 205	63
770 536 206	63
770 536 207	63
770 536 208	63
770 536 209	63
770 537 204	64
770 537 205	64
770 537 206	64
770 537 207	64
770 537 208	64
770 537 209	64
770 595 104	64
770 595 105	64
770 595 106	64
770 595 204	64
770 595 205	64
770 595 206	64
770 596 101	65

Code	Page
770 596 102	65
770 596 103	65
770 596 104	65
770 596 105	65
770 596 106	65
770 596 107	65
770 596 108	65
770 596 109	65
770 596 201	65
770 596 202	65
770 596 203	65
770 596 204	65
770 596 205	65
770 596 206	65
770 596 207	65
770 596 208	65
770 596 209	65
770 599 104	65
770 599 105	65
770 599 106	65
770 599 107	65
770 599 108	65
770 599 109	65
770 599 204	65
770 599 205	65
770 599 206	65
770 599 207	65
770 600 104	20
770 600 105	20
770 600 106	20
770 600 204	20
770 600 205	20
770 600 206	20
770 695 104	18
770 695 105	18
770 695 106	18
770 695 107	18
770 695 108	18
770 695 109	18
770 695 204	18
770 695 205	18
770 695 206	18
770 695 207	18
770 695 208	18
770 901 215	65
770 901 217	65
770 901 218	65
770 901 219	65
770 932 205	66
770 932 206	66
770 932 207	66
770 933 205	66
770 933 206	66
770 933 207	66
770 960 180	56
770 970 145	62
770 970 146	62
770 970 147	62
770 970 148	62
770 970 174	66
770 970 175	66
770 970 176	66
770 970 177	67
770 970 178	67
770 970 179	67
770 970 245	62

Code-Index

Code	Page
770 970 246	62
770 970 247	62
770 970 248	62

General terms and conditions of Georg Fischer Fittings GmbH, Traisen

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 legislations 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

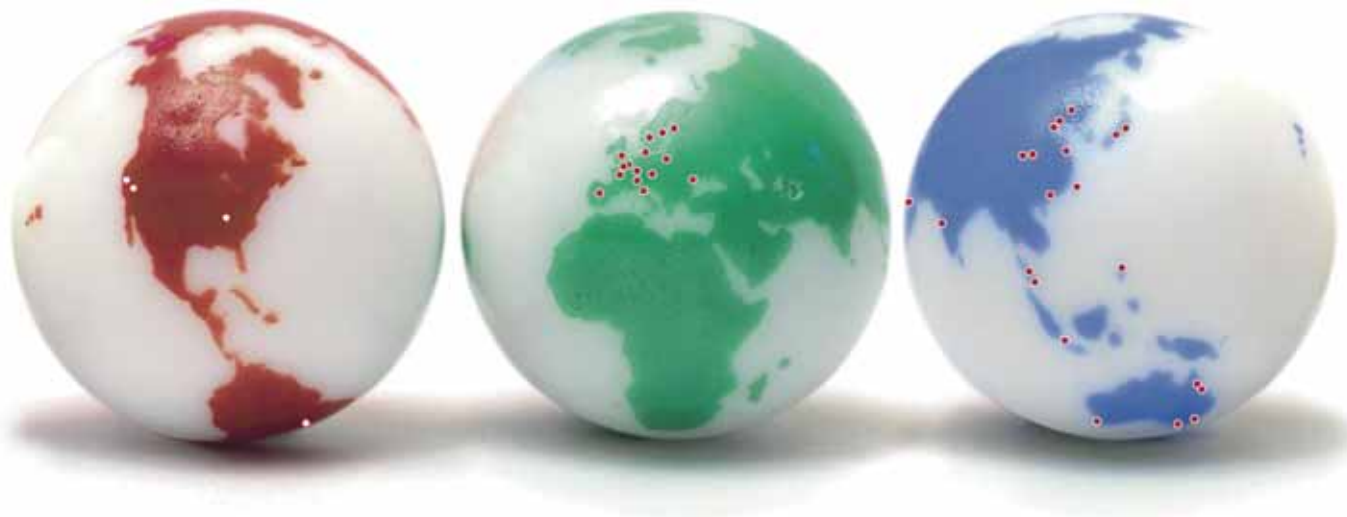
- 18.1 The Georg Fischer company which dispatches the products shall be deemed to be the place of performance.
- 18.2 **If any disputes arise out of the contractual relationship, the lawsuit is to be filed exclusively with the competent court in St. Pölten, Austria. Georg Fischer is, however, also entitled 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 representatives 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

Adding Quality to People's Lives

Production / Sales in Austria

Georg Fischer Fittings GmbH
Mariazeller Strasse 75
A-3160 Traisen
Tel. +43(0)2762/90300-371
Fax +43(0)2762/90300-432
fittings.ps@georgfischer.com
www.fittings.at

Belgium/Luxembourg

Georg Fischer NV/SA
Vaartdijk 109-111 Digue du Canal
B-1070 Bruxelles/Brüssel
Tel. +32(0)2/556 40 20
Fax +32(0)2/524 34 26
be.ps@georgfischer.com
www.georgfischer.be

Denmark

Georg Fischer A/S
Rugvænget 30
DK-2630 Taastrup
Tel. +45(0)70 22 19-75
Fax +45(0)70 22 19-76
info.dk.ps@georgfischer.com
www.georgfischer.dk

France

Georg Fischer SAS
Bâtiment Le Rabelais
Paris Nord 2
22 Avenue des Nations
BP 88026 Villepinte
F-95932 Roissy Charles
de Gaulle Cedex
Tel. +33(0)1/41 84 68 84
Fax +33(0)1/41 84 68 85
fr.ps@georgfischer.com
www.georgfischer.fr

Germany

Georg Fischer GmbH
Daimlerstrasse 6
D-73095 Albershausen
Tel. +49(0)7161/302-0
Fax +49(0)7161/302-259
info.de.ps@georgfischer.com
www.vgd.georgfischer.de

Italy

Georg Fischer S.p.A.
Via Sondrio 1
I-20063 Cernusco S/N (MI)
Tel. +39(0)2/921 861
Fax +39(0)2/921 862 47
it.ps@georgfischer.com
www.georgfischer.it

Netherlands

Georg Fischer N.V.
Lange Veenteweg 19
NL-8161 PA Epe
Tel. +31(0)578/678 222
Fax +31(0)578/621 768
nl.ps@georgfischer.com
www.georgfischer.nl

Norway

Georg Fischer AS
Rudsletta 97
N-1351 Rud
Tel. +47(0)67 18 29 00
Fax +47(0)67 13 92 92
no.ps@georgfischer.com
www.georgfischer.no

Spain

Georg Fischer S.A.
Paseo de la Castellana 184
7ª Planta
E-280046 Madrid
Tel. +34(0)91/781 98 90
Fax +34(0)91/426 08 23
es.ps@georgfischer.com
www.georgfischer.es

Sweden

Georg Fischer AB
Box 113
S-12523 Älvsjö-Stockholm
Tel. +46(0)8 506 775 00
Fax +46(0)8 749 237 0
info.se.ps@georgfischer.com
www.georgfischer.se

Switzerland

Georg Fischer
Rohrleitungssysteme (Schweiz) AG
Ebnatstrasse 101
CH-8201 Schaffhausen
Tel. +41(0)52 631 30 26
Fax +41(0)52 631 28 96
ch.ps@georgfischer.com
www.piping.georgfischer.ch

United Kingdom

George Fischer Sales Limited
Coventry, CV2 2ST
Tel. +44(0)2476 535 535
Fax +44(0)2476 530 450
uk.ps@georgfischer.com
www.georgfischer.co.uk

770.971.129 (04.08)

Made with MediaCockpit
© Georg Fischer Fittings GmbH
A-3160 Traisen/Austria, 2008
Printed in Austria

+GF+

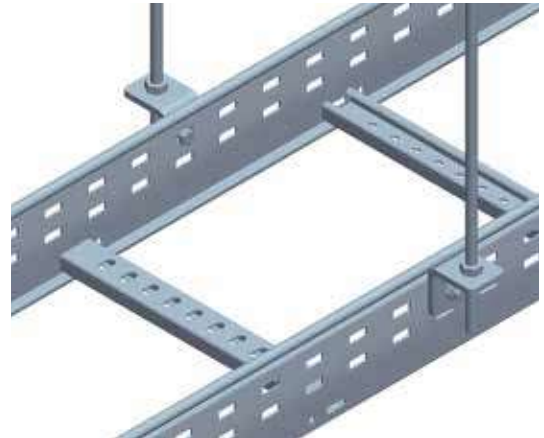
GEORG FISCHER
PIPING SYSTEMS

2 Hole Angle Bracket

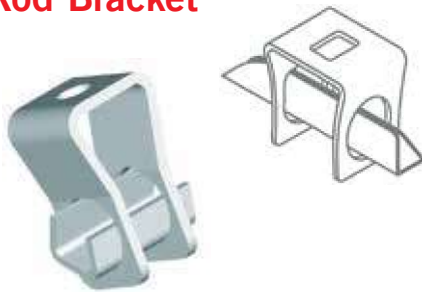


2 Hole Angle Bracket	
H.D.G.*	
Reference	Pack Unit
67030201	Each

- Allows connection of **megaband®** to the ceiling by the use of threaded rods.



Variable Ceiling Rod Bracket



Variable Ceiling Rod Bracket	
H.D.G.*	
Reference	Pack Unit
67030061	Each

NEW

- Allows connection of **megaband®** to the ceiling by the use of M8 or M10 threaded rods.
- This piece allows you to install rod holders on ceilings or inclines.

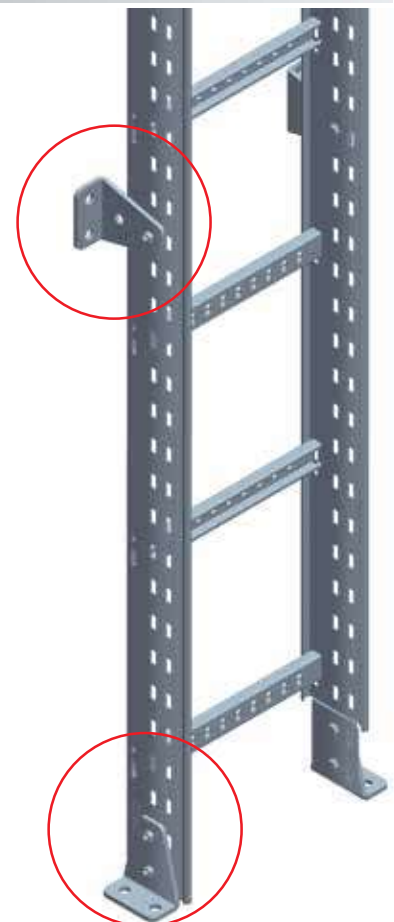
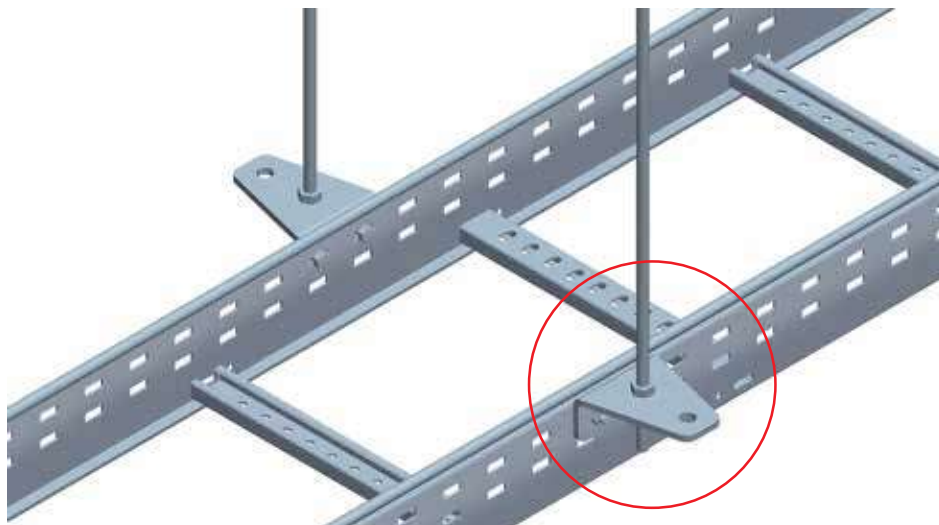


90° Tee Joint



90° Tee Joint	
H.D.G.*	
Reference	Pack Unit
67030204	Each

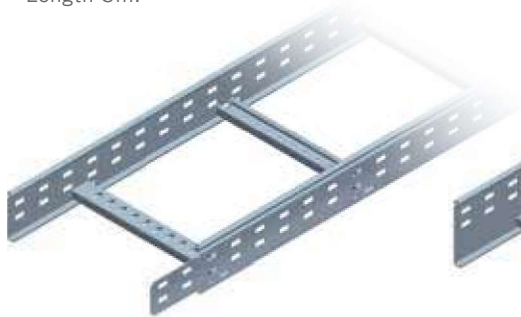
- Support for connecting straight lengths of **megaband®** to the floor in a vertical installation.
- Suitable also, in a vertical installation, for lateral connection to the wall.



(*) The hot dip galvanized finish is NOT AN ACCURATE AESTHETIC FINISH. It is a very effective corrosion protection. COLOUR DIFFERENCES CAN OCCUR (shades of grey), brightness and surface finish (roughness, smoothness), created during the process employed. This is normal and does NOT AFFECT THE QUALITY AND DURATION OF THE ANTI-CORROSION PROTECTION.

megaband® Cable Ladder

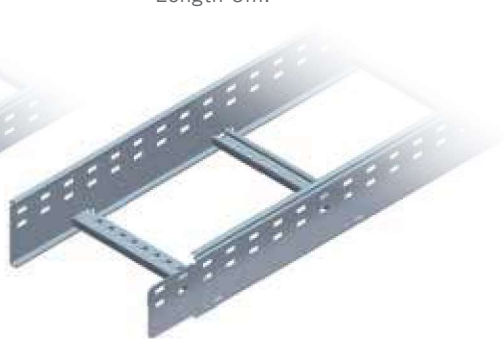
Length 3m.



Integrated Coupler System for depths 60, 85, 100 and 120.
Length of ladder sections 3m.

megaband® Cable Ladder

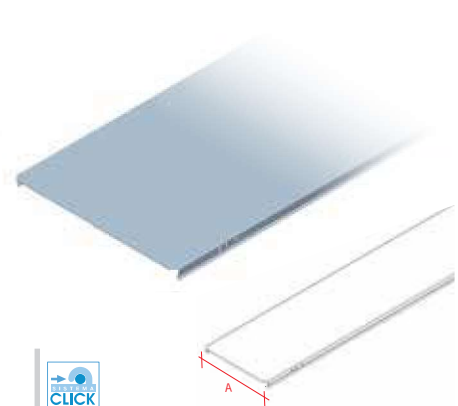
Length 6m.



Integrated Coupler System for depths 60, 85, 100 and 120.
Length of ladder sections 6m.

Cover

Straight Cover for
megaband® Cable Ladder



Click Fit (no screws or fasteners).
The cover remains fixed even in a vertical position.

RANGE	DIM. AxB	megaband® Cable Ladder			megaband® Cable Ladder			Cover megaband®	
		H.D.G.*		Reference	H.D.G.*		Reference	H.D.G.*	
Standard Light Duty	60x100	92032100	3	92032100	6	73031100	24		
	60x150	92032150	3	92132100	6	73031150	12		
	60x200	92032200	3	92132200	6	73031200	12		
	60x300	92032300	3	92132300	6	73031300	6		
	60x400	92032400	3	92132400	6	73031400	6		
	60x450	92032450	3	92132400	6	73031450	6		
	60x500	92032500	3	92132500	6	73031500	6		
	60x600	92032600	3	92132600	6	73031600	6		
	60x700	92032700	3(*)	92132700	6(*)	73031700	6(*)		
	60x800	92032800	3(*)	92132800	6(*)	73031800	4(*)		
	60x900	92032900	3(*)	92132900	6(*)	73031900	4(*)		
	60x1000	92032990	3(*)	92132990	6(*)	73031990	4(*)		
	85x100	92033100	3	92133100	6	73031100	24		
	85x200	92033200	3	92133200	6	73031200	12		
	85x300	92033300	3	92133300	6	73031300	6		
	85x400	92033400	3	92133400	6	73031400	6		
	85x500	92033500	3	92133500	6	73031500	6		
	85x600	92033600	3	92133600	6	73031600	6		
	85x700	92033700	3(*)	92133700	6(*)	73031700	6(*)		
	85x800	92033800	3(*)	92133800	6(*)	73031800	4(*)		
	85x900	92033900	3(*)	92133900	6(*)	73031900	4(*)		
	85x1000	92033990	3(*)	92133990	6(*)	73031990	4(*)		
Medium Duty	100x100	92034100	3	92134100	6	73031100	24		
	100x150	92034150	3	92134100	6	73031150	12		
	100x200	92034200	3	92134200	6	73031200	12		
	100x300	92034300	3	92134300	6	73031300	6		
	100x400	92034400	3	92134400	6	73031400	6		
	100x450	92034450	3	92134400	6	73031450	6		
	100x500	92034500	3	92134500	6	73031500	6		
	100x600	92034600	3	92134600	6	73031600	6		
	100x700	92034700	3(*)	92134700	6(*)	73031700	6(*)		
	100x750	92034750	3(*)	92134700	6(*)	73031750	4(*)		
	100x800	92034800	3(*)	92134800	6(*)	73031800	4(*)		
	100x900	92034900	3(*)	92134900	6(*)	73031900	4(*)		
Heavy Duty	100x1000	92034990	3(*)	92134990	6(*)	73031990	4(*)		
	120x100	92035100	3	92135100	6	73031100	24		
	120x150	92035150	3	92135150	6	73031150	12		
	120x200	92035200	3	92135200	6	73031200	12		
	120x300	92035300	3	92135300	6	73031300	6		
	120x400	92035400	3	92135400	6	73031400	6		
	120x450	92035450	3	92135450	6	73031450	6		
	120x500	92035500	3	92135500	6	73031500	6		
	120x600	92035600	3	92135600	6	73031600	6		
	120x700	92035700	3(*)	92135700	6(*)	73031700	6(*)		
	120x750	92035750	3(*)	92135750	6(*)	73031750	4(*)		
	120x800	92035800	3(*)	92135800	6(*)	73031800	4(*)		
	120x900	92035900	3(*)	92135900	6(*)	73031900	4(*)		
	120x1000	92035990	3(*)	92135990	6(*)	73031990	4(*)		

Also available, to order, in other widths and depths.
Bycro finish, Electrogalvanised, stainless steel 304 and 316L available on request.

(*) Consult for minimum quantities and pack units.

(*) The hot dip galvanized finish is NOT AN ACCURATE AESTHETIC FINISH. It is a very effective corrosion protection. COLOUR DIFFERENCES CAN OCCUR (shades of grey), brightness and surface finish (roughness, smoothness), created during the process employed. This is normal and does NOT AFFECT THE QUALITY AND DURATION OF THE ANTI-CORROSION PROTECTION.