

Galvanising is a very commonly used process for increasing the corrosion resistance of iron based materials.
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.

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 significantly above the norm-requirement (500 g/m² equivalent to 70 µm in average) are achieved.
Due to the use of highly pure zinc raw material continuous receiving inspections and liquid zinc inspections Georg Fischer ensures the conformity with drinking water requirements and several other regulations (e.g. RoHS)

Thread

General

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:**
Pipe threads where pressure tight joints are made on the threads according to **EN 10226-1/-2*** respectively ISO 7-1. The respective national issue of EN 10226 replaced DIN 2999, BS 21, ...
- **Fastening threads:**
Thread for joints not sealing on the threads according to **EN ISO 228-1**.

* EN 10226-2 covers the taper internal thread Rc. This type of thread is not used in Continental Europe. As it is not produced by Georg Fischer no further explanations are given.

Full designation of pipe threads

using the example of thread size 1 ½

Jointing thread to EN 10226-1

Internal thread (right-hand)	parallel	Rp 1 ½
External thread (right-hand)	taper	R 1 ½
Comment: the symbol LH is added to designate left-hand thread. Example: Rp 1 ½ - LH		

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 a thin protection 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.
Due to the lower corrosion protection electroplated zinc surfaces are not suitable for drinking water application (see also chapter steel fittings page 74).

Difference between jointing threads/ fastening threads

The fundamental difference consists of the fact that:

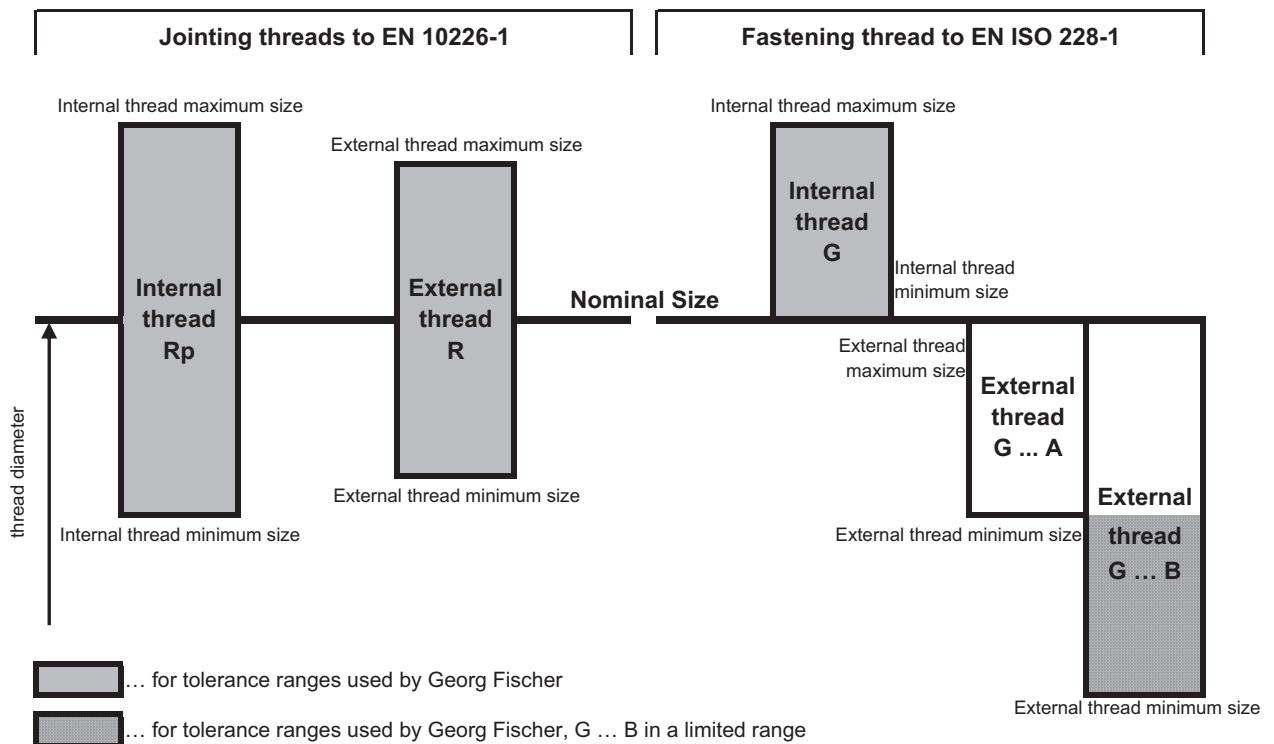
- the pipe thread to **EN 10226-1** achieves a seal on the thread, mainly as a result of metallic compression (taper/parallel) of the interlocking thread surfaces in the jointing area. The sealing effect is improved by using an appropriate jointing medium.
- In contrast, the pipe thread to **EN ISO 228-1** 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.

Fastening thread to EN ISO 228-1

Internal thread (right-hand)	parallel	G 1 ½
External thread (right-hand) Tolerance class A	parallel	G 1 ½ A
External thread (right-hand) Tolerance class B	parallel	G 1 ½ B
Comment: the symbol LH is added to designate left-hand thread. Example: G 1 ½ - LH		

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

Comparison of the tolerances of jointing and fastening threads



illustr. 1 Tolerances of jointing and fastening threads

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

Connection of a parallel external thread according to EN ISO 228-1 with a parallel internal thread according to EN 10226-1: Due to the overlapping of the tolerance fields of the thread diameter (illustr. 1) of G ... A and G ... B with Rp it is not ensured that both threads can be screwed together. This can be secured by manufacturing the external thread G ... B with limited range (illustr. 1 – lower half of G ... B). Because of the missing metallic contact between the threads a sealing joint is not automatically achieved.

Connection of a taper external thread according to EN 10226-1 with a parallel internal thread according to EN ISO 228-1: Other than in the first case there is no problem in screwing both threads together / with the thread diameter. But EN ISO 228-1 does not require a minimum length of the internal thread or a fully shaped thread profile. Both may lead to sealing problems and thus has to be regulated in the norm of the product foreseeing the G - thread.

Pipe threads (EN 10226/ISO 7) and threaded pipes (EN 10255/ISO 65)

The most important dimensions

Thread size Nominal diameter DN		$\frac{1}{8}$ 6	$\frac{1}{4}$ 8	$\frac{3}{8}$ 10	$\frac{1}{2}$ 15	$\frac{3}{4}$ 20	1 25	1 $\frac{1}{4}$ 32	1 $\frac{1}{2}$ 40	2 50	2 $\frac{1}{2}$ 65	3 80	4 100
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
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
Number of threads per inch		28	19	19	14	14	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
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
Fitting allowance «b»	mm	2,5	3,7	3,7	5,0	5,0	6,4	6,4	6,4	7,5	9,2	9,2	10,4
Number of threads length [ca.=approx.]	pitch ca. mm	2 $\frac{3}{4}$ 7,0	2 $\frac{3}{4}$ 10,0	2 $\frac{3}{4}$ 10,0	2 $\frac{3}{4}$ 13,0	2 $\frac{3}{4}$ 15,0	2 $\frac{3}{4}$ 17,0	2 $\frac{3}{4}$ 19,0	2 $\frac{3}{4}$ 19,0	3 $\frac{1}{4}$ 24,0	4 27,0	4 30,0	4 $\frac{1}{2}$ 36,0
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
Surface area of the pipe	ca. m ² /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
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
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
Clear opening	ca. cm ²	0,30	0,62	1,25	2,04	3,70	5,85	10,18	13,79	22,15	37,28	51,40	87,09
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
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
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
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
Clear opening	ca. cm ²	0,19	0,47	1,02	1,74	3,27	5,19	9,29	12,76	20,66	35,36	48,89	84,13
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
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

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.

Width across flats for malleable iron fittings

The catalogue section gives the sizes of wrenches required.

Steel fittings

Some fittings up to max. $\frac{3}{8}$ inch with straight design are exclusively offered by Georg Fischer in steel material. This option is foreseen by EN 10242, because of (casting-) technological reasons. These 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.