

GS-HYDRO

PIPE & TUBES



 **GS-PIPING WITHOUT WELDING™**



General Information

GS-Hydro’s product portfolio covers the wide range needed in high performance piping system applications (e.g. hydraulic lines):

1. Seamless cold-drawn precision steel pipes E235N (St 37.4) and E355N (St 52.4) according to EN 10305-4

- a. E235N (St 37.4) – NBK
 - Normalized, phosphated and oiled inside and outside
- b. E235N (St 37.4) – NBK/ZN
 - Normalized, electric zinc plated with Cr-VI-free passivation
- c. E355N (St 52.4) – NBK
 - Normalized, phosphated and oiled inside and outside
- d. E355N (St 52.4) – NBK/ZN
 - Normalized, electric zinc plated with Cr-VI-free passivation

2. Austenitic stainless steel pipes, seamless, cold-drawn 316L (1.4404) according ASTM-standards

- a. AISI 316L – metric sizes Fully annealed, scale free
- b. TP 316L – schedule sizes Fully annealed, scale free

By using high quality tube & pipe manufacturers GS-Hydro ensures constantly offering of quality tubes and pipes – with properties even exceeding standard requirements (e.g. yield and tensile strength). High tensile strength tube means higher permissible working pressures and reduced wall thickness, leading to reduced overall weight.

GS-Hydro recommends the use only of cold drawn tubes & pipes due to quality (precision in dimension and shape) and cleanliness reasons (no scale) As a comparison hot rolled tubes will always have some scale both inside and out due to the manufacturing process; by cold forming there will not be any scale inside the tube after the manufacturing.

Original GS-Hydro high pressure piping can be recognized from the marking of “GS-PIPING” and trace (heat lot) number due to full traceability. GS-Hydro can deliver the pipes and tubes with either 3.1. (3.1.B) or 3.2. (3.1.C) certificates according EU standard EN 10204. The required type of certificate – if any – has to be specified when ordering.

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Steel type	Old/Other designation	Material specification	Manufacturing specification	Tensile strength Rm	Yield strength ReH	Elongation A5, min. longitudinal
E235N tubes	St 37.4	EN 10305-4 (DIN 1630)	EN 10305-4 (DIN 2391)	340–480 N/mm ²	235 N/mm ² min.	25%
E355N tubes	St 52.4	EN 10305-4 (DIN 1630)	EN 10305-4 (DIN 2391)	490–650 N/mm ²	355 N/mm ² min.	22%
AISI 316L metric size tubes	1.4404 (X2CrNiMo 17-12-2)	ASTM A269/A213	ASTM A269	485 N/mm ² min.	170 N/mm ² min.	35%
TP 316L schedule size pipes	1.4404 (X2CrNiMo 17-12-2)	ASTM A312	ASTM A999	485 N/mm ² min.	170 N/mm ² min.	35%

NOTE! Tensile and yield strength values are standard values. GS-Hydro is using higher requirements when determining the maximum allowable working pressure. See table in page 14.

Hydraulic Pipe E235N (St 37.4) to EN 10305-4, phosphated and oiled

Part No	Size	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
			1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
4X1ST37.4NBK*	4 x 1.0	3201041000	397	459	555	2600	0.07
6X1ST37.4NBK	6 x 1.0	3201061000	252	289	394	1560	0.12
6X1.5ST37.4NBK	6 x 1.5	3201061500	475	552	555	2600	0.17
6X2ST37.4NBK*	6 x 2.0	3201062000	736	867	697	3900	0.19
8X1ST37.4NBK	8 x 1.0	3201081000	184	211	305	1114	0.17
8X1.5ST37.4NBK	8 x 1.5	3201081500	341	393	436	1800	0.24
8X2ST37.4NBK*	8 x 2.0	3201082000	515	600	555	2600	0.30
8X2.5ST37.4NBK*	8 x 2.5	3201082500	712	838	663	3545	0.34
10X1ST37.4NBK	10 x 1.0	3201101000	145	166	249	867	0.22
10X1.5ST37.4NBK	10 x 1.5	3201101500	265	305	359	1376	0.31
10X2ST37.4NBK*	10 x 2.0	3201102000	397	459	461	1950	0.40
10X2.5ST37.4NBK*	10 x 2.5	3201102500	540	630	555	2600	0.46
12X1.5ST37.4NBK	12 x 1.5	3201121500	218	249	305	1114	0.39
12X2ST37.4NBK	12 x 2.0	3201122000	322	371	394	1560	0.49
12X2.5ST37.4NBK*	12 x 2.5	3201122500	435	504	477	2053	0.59
14X1.5ST37.4NBK*	14 x 1.5	3201141500	184	211	266	936	0.46
14X2ST37.4NBK*	14 x 2.0	3201142000	271	312	344	1300	0.59
15X1.5ST37.4NBK*	15 x 1.5	3201151500	171	196	249	867	0.50
15X2ST37.4NBK*	15 x 2.0	3201152000	252	289	324	1200	0.64
16X1.5ST37.4NBK*	16 x 1.5	3201161500	160	183	235	807	0.54
16X2ST37.4NBK*	16 x 2.0	3201162000	234	269	305	1114	0.69
16X2.5ST37.4NBK*	16 x 2.5	3201162500	313	361	372	1444	0.83
16X3ST37.4NBK*	16 x 3.0	3201163000	397	459	436	1800	0.96
18X1.5ST37.4NBK*	18 x 1.5	3201181500	141	161	211	709	0.61
18X2ST37.4NBK*	18 x 2.0	3201182000	206	236	275	975	0.79
20X2ST37.4NBK*	20 x 2.0	3201202000	184	211	249	867	0.89
20X2.5ST37.4NBK*	20 x 2.5	3201202500	245	281	305	1114	1.08
20X3ST37.4NBK*	20 x 3.0	3201203000	308	355	359	1376	1.26
20X4ST37.4NBK*	20 x 4.0	3201204000	443	514	461	1950	1.58
22X1.5ST37.4NBK*	22 x 1.5	3201221500	114	130	175	571	0.76
22X2ST37.4NBK*	22 x 2.0	3201222000	166	190	228	780	0.99
22X2.5ST37.4NBK*	22 x 2.5	3201222500	221	253	280	1000	1.09
25X2ST37.4NBK*	25 x 2.0	3201252000	145	166	203	678	1.13
25X2.5ST37.4NBK*	25 x 2.5	3201252500	192	220	249	867	1.39
25X3ST37.4NBK*	25 x 3.0	3201253000	241	276	294	1064	1.63
25X4ST37.4NBK*	25 x 4.0	3201254000	343	395	380	1486	2.07
28X2ST37.4NBK*	28 x 2.0	3201282000	129	147	182	600	1.28
28X2.5ST37.4NBK*	28 x 2.5	3201282500	170	195	225	765	1.57
28X3ST37.4NBK*	28 x 3.0	3201283000	213	244	266	936	1.85
30X2ST37.4NBK*	30 x 2.0	3201302000	120	137	171	557	1.38
30X3ST37.4NBK*	30 x 3.0	3201303000	197	226	249	867	2.00
30X4ST37.4NBK*	30 x 4.0	3201304000	279	321	324	1200	2.56
35X2ST37.4NBK*	35 x 2.0	3201352000	102	116	148	473	1.63
35X3ST37.4NBK*	35 x 3.0	3201353000	167	191	216	731	2.37
38X2.5ST37.4NBK*	38 x 2.5	3201382500	123	141	169	549	2.19
38X3ST37.4NBK*	38 x 3.0	3201383000	153	175	200	669	2.59
38X4ST37.4NBK*	38 x 4.0	3201384000	216	247	261	918	3.35
38X5ST37.4NBK*	38 x 5.0	3201385000	281	323	320	1182	4.07
38X6ST37.4NBK*	38 x 6.0	3201386000	349	403	376	1463	4.74
42X2ST37.4NBK*	42 x 2.0	3201422000	85	96	124	390	1.97
42X3ST37.4NBK*	42 x 3.0	3201423000	138	158	182	600	2.89
42X4ST37.4NBK*	42 x 4.0	3201424000	194	222	238	821	3.75
50X3ST37.4NBK	50 x 3.0	3201503000	115	131	155	498	3.48
60X3ST37.4NBK	60 x 3.0	3201603000	95	108	130	411	4.22
73X3ST37.4NBK	73 x 3.0	3201733000	78	88	108	334	5.18
75X3ST37.4NBK	75 x 3.0	3201753000	76	86	105	325	5.32
90X3.5ST37.4NBK	90 x 3.5	3201903500	75	85	102	316	7.47

Items with black letters: Recommended sizes. Normally stock items.
 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
 2. Straight pipe including manufacturing and corrosion tolerances.
 3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
 4. Based on Tensile value, wall thickness tolerance not included.

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Hydraulic Pipe E235N (St 37.4) to EN 10305-4, phosphated and oiled

Part No	Size	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
			1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
100X4ST37.4NBK*	100 x 4.0	3201100400	78	89	105	325	9.47
115X4ST37.4NBK	115 x 4.0	3201115400	68	77	92	281	10.95
140X4.5ST37.4NBK	140 x 4.5	3201140450	63	72	85	260	15.00
165X5ST37.4NBK	165 x 5.0	3201165500	60	68	80	244	19.73
220X6ST37.4NBK	220 x 6.0	3201220600	54	62	72	219	31.66
273X6ST37.4NBK	273 x 6.0	3201273600	44	49	59	175	39.51

Items with black letters: Recommended sizes. Normally stock items.
 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
2. Straight pipe including manufacturing and corrosion tolerances.
3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
4. Based on Tensile value, wall thickness tolerance not included.

Hydraulic Pipe E235N (St 37.4) to EN 10305-4, Cr-VI-free plated

Part No	Size	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
			1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
6X1ST37.4NBK/ZN	6 x 1.0	3202061000	252	289	394	1560	0.12
6X1.5ST37.4NBK/ZN	6 x 1.5	3202061500	475	552	555	2600	0.17
6X2ST37.4NBK/ZN*	6 x 2.0	3202062000	736	867	697	3900	0.19
8X1ST37.4NBK/ZN	8 x 1.0	3202081000	184	211	305	1115	0.17
8X1.5ST37.4NBK/ZN	8 x 1.5	3202081500	341	393	436	1800	0.24
8X2ST37.4NBK/ZN*	8 x 2.0	3202082000	515	600	555	2600	0.30
8X2.5ST37.4NBK/ZN*	8 x 2.5	3202082500	712	838	663	3545	0.34
10X1ST37.4NBK/ZN	10 x 1.0	3202101000	145	166	249	867	0.22
10X1.5ST37.4NBK/ZN	10 x 1.5	3202101500	265	305	359	1376	0.31
10X2ST37.4NBK/ZN*	10 x 2.0	3202102000	397	459	461	1950	0.40
10X2.5ST37.4NBK/ZN*	10 x 2.5	3202102500	540	630	555	2600	0.45
12X1.5ST37.4NBK/ZN	12 x 1.5	3202121500	218	249	305	1114	0.39
12X2ST37.4NBK/ZN	12 x 2.0	3202122000	322	371	394	1560	0.49
12X2.5ST37.4NBK/ZN*	12 x 2.5	3202122500	435	504	477	2053	0.59
15X1.5ST37.4NBK/ZN	15 x 1.5	3202151500	171	196	249	867	0.50
15X2ST37.4NBK/ZN*	15 x 2.0	3202152000	252	289	324	1200	0.64
16X1.5ST37.4NBK/ZN*	16 x 1.5	3202161500	160	183	235	807	0.54
16X2ST37.4NBK/ZN	16 x 2.0	3202162000	234	269	305	1114	0.69
16X2.5ST37.4NBK/ZN*	16 x 2.5	3202162500	313	361	372	1444	0.83
16X3ST37.4NBK/ZN*	16 x 3.0	3202163000	397	459	436	1800	0.96
18X1.5ST37.4NBK/ZN	18 x 1.5	3202181500	141	161	211	709	0.61
18X2ST37.4NBK/ZN*	18 x 2.0	3202182000	206	236	275	975	0.79
20X2ST37.4NBK/ZN	20 x 2.0	3202202000	184	211	249	867	0.89
20X2.5ST37.4NBK/ZN	20 x 2.5	3202202500	245	281	305	1114	1.08
20X3ST37.4NBK/ZN*	20 x 3.0	3202203000	308	355	359	1376	1.25
22X1.5ST37.4NBK/ZN*	22 x 1.5	3202221500	114	130	175	571	0.76
22X2ST37.4NBK/ZN	22 x 2.0	3202222000	166	190	228	780	0.99
22X2.5ST37.4NBK/ZN*	22 x 2.5	3202222500	221	253	280	1000	1.09
25X2ST37.4NBK/ZN*	25 x 2.0	3202252000	145	166	203	678	1.13
25X2.5ST37.4NBK/ZN*	25 x 2.5	3202252500	192	220	249	867	1.39
25X4ST37.4NBK/ZN	25 x 4.0	3202254000	343	395	380	1486	2.07
28X2ST37.4NBK/ZN	28 x 2.0	3202282000	129	147	182	600	1.28
28X2.5ST37.4NBK/ZN*	28 x 2.5	3202282500	170	195	225	765	1.57
28X3ST37.4NBK/ZN*	28 x 3.0	3202283000	213	244	266	936	1.85
30X2ST37.4NBK/ZN*	30 x 2.0	3202302000	120	137	171	557	1.38
30X3ST37.4NBK/ZN	30 x 3.0	3202303000	197	226	249	867	2.00
30X4ST37.4NBK/ZN*	30 x 4.0	3202304000	279	321	324	1200	2.51
35X2ST37.4NBK/ZN	35 x 2.0	3202352000	102	116	148	473	1.63
35X3ST37.4NBK/ZN*	35 x 3.0	3202353000	167	191	216	731	2.37
38X2.5ST37.4NBK/ZN*	38 x 2.5	3202382500	123	141	169	549	2.19
38X3ST37.4NBK/ZN*	38 x 3.0	3202383000	153	175	200	669	2.59
38X4ST37.4NBK/ZN	38 x 4.0	3202384000	216	247	261	918	3.35
38X6ST37.4NBK/ZN*	38 x 6.0	3202386000	349	403	376	1463	4.74
42X2ST37.4NBK/ZN*	42 x 2.0	3202422000	85	96	124	390	1.97
42X3ST37.4NBK/ZN	42 x 3.0	3202423000	138	158	182	600	2.89
42X4ST37.4NBK/ZN*	42 x 4.0	3202424000	194	222	238	821	3.75
50X3ST37.4NBK/ZN	50 x 3.0	3202503000	115	131	155	498	3.48
60X3ST37.4NBK/ZN	60 x 3.0	3202603000	95	108	130	411	4.22
73X3ST37.4NBK/ZN	73 x 3.0	3202733000	78	88	108	334	5.18
75X3ST37.4NBK/ZN	75 x 3.0	3202753000	76	86	105	325	5.32

Items with black letters: Recommended sizes. Normally stock items.
 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
2. Straight pipe including manufacturing and corrosion tolerances.
3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
4. Based on Tensile value, wall thickness tolerance not included.

Hydraulic Pipe E355N (St 52.4) to EN 10305-4, phosphated and oiled

Part No	Size	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
			1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
14X2ST52.4NBK*	14 x 2.0	3101142000	411	473	456	1777	0.59
15X1.5ST52.4NBK	15 x 1.5	3101151500	259	297	330	1184	0.50
15X2ST52.4NBK*	15 x 2.0	3101152000	381	438	429	1640	0.61
16X1.5ST52.4NBK*	16 x 1.5	3101161500	242	277	311	1103	0.54
16X2ST52.4NBK	16 x 2.0	3101162000	355	408	404	1523	0.69
16X2.5ST52.4NBK	16 x 2.5	3101162500	475	547	493	1974	0.83
18X1.5ST52.4NBK	18 x 1.5	3101181500	214	244	279	969	0.61
18X2ST52.4NBK	18 x 2.0	3101182000	313	358	364	1333	0.79
20X2ST52.4NBK	20 x 2.0	3101202000	279	319	330	1184	0.89
20X2.5ST52.4NBK	20 x 2.5	3101202500	371	426	404	1523	1.08
20X3ST52.4NBK	20 x 3.0	3101203000	467	537	476	1881	1.25
22X1.5ST52.4NBK*	22 x 1.5	3101221500	173	197	231	780	0.76
22X2ST52.4NBK	22 x 2.0	3101222000	252	288	303	1066	0.99
25X2ST52.4NBK*	25 x 2.0	3101252000	220	251	269	927	1.13
25X2.5ST52.4NBK	25 x 2.5	3101252500	291	333	330	1184	1.39
25X3ST52.4NBK	25 x 3.0	3101253000	365	418	390	1454	1.63
28X2ST52.4NBK	28 x 2.0	3101282000	195	223	242	820	1.28
28X3ST52.4NBK*	28 x 3.0	3101283000	322	369	352	1279	1.85
30X2ST52.4NBK*	30 x 2.0	3101302000	182	207	226	761	1.38
30X3ST52.4NBK	30 x 3.0	3101303000	299	343	330	1184	2.00
30X4ST52.4NBK	30 x 4.0	3101304000	424	487	429	1640	2.56
35X2ST52.4NBK*	35 x 2.0	3101352000	155	176	196	646	1.63
35X3ST52.4NBK	35 x 3.0	3101353000	254	290	286	999	2.37
38X3ST52.4NBK*	38 x 3.0	3101383000	233	266	265	914	2.59
38X4ST52.4NBK	38 x 4.0	3101384000	327	375	346	1254	3.35
38X5ST52.4NBK	38 x 5.0	3101385000	426	490	424	1615	4.10
39X7.5ST52.4NBK*	39 x 7.5	3101397500	673	781	590	2538	5.86
42X2ST52.4NBK*	42 x 2.0	3101422000	128	146	164	533	1.97
42X3ST52.4NBK	42 x 3.0	3101423000	209	239	242	820	2.89
42X4ST52.4NBK	42 x 4.0	3101424000	293	336	316	1122	3.75
46X8ST52.4NBK	46 x 8.0	3101468000	601	695	541	2244	7.84
50X5ST52.4NBK	50 x 5.0	3101505000	315	361	330	1184	5.55
56X8.5ST52.4NBK	56 x 8.5	3101568500	516	595	481	1908	9.96
60X5ST52.4NBK	60 x 5.0	3101605000	259	297	279	969	6.78
60X6ST52.4NBK	60 x 6.0	3101606000	319	366	330	1184	8.04
60X10ST52.4NBK*	60 x 10.0	3101601000	578	668	522	2132	12.30
66X8.5ST52.4NBK	66 x 8.5	3101668500	429	494	415	1496	12.05
73X5ST52.4NBK	73 x 5.0	3101735000	211	241	274	784	8.38
73X7ST52.4NBK	73 x 7.0	3101737000	308	353	383	1131	11.39
75X5ST52.4NBK	75 x 5.0	3101755000	205	234	226	761	8.63
80X10ST52.4NBK	80 x 10.0	3101801000	418	481	404	1523	17.21
90X5ST52.4NBK	90 x 5.0	3101905000	169	193	190	627	10.48
90X9ST52.4NBK	90 x 9.0	3101909000	326				
97X12ST52.4NBK	97 x 12.0	3101971200	416	478	401	1505	25.15
115X15ST52.4NBK	115 x 15.0	3101115150	444	511	420	1599	36.95
130X15ST52.4NBK	130 x 15.0	3101130150	388	445	376	1390	42.54
150X15ST52.4NBK	150 x 15.0	3101150150	332	380	330	1184	49.94
190X20ST52.4NBK	190 x 20.0	3101190200	353	405	346	1254	83.84
220X20ST52.4NBK**	220 x 20.0	3101220200	301	345	303	1066	98.65
250X25ST52.4NBK	250 x 25.0	3101250250	335	384	330	1184	138.71
273X25ST52.4NBK	273 x 25.0	3101273250	305	349	305	1075	152.90

Items with black letters: Recommended sizes. Normally stock items.
 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
2. Straight pipe including manufacturing and corrosion tolerances.
3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
4. Based on Tensile value, wall thickness tolerance not included.

Hydraulic Pipe E355N (St 52.4) to EN 10305-4, Cr-VI-free plated

Part No	Size	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
			1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
15X1.5ST52.4NBK/ZN	15 x 1.5	3102151500	259	297	330	1184	0.50
15X2ST52.4NBK/ZN*	15 x 2.0	3102152000	381	438	429	1640	0.64
16X1.5ST52.4NBK/ZN*	16 x 1.5	3102161500	242	277	311	1103	0.54
16X2ST52.4NBK/ZN	16 x 2.0	3102162000	355	408	404	1523	0.69
16X2.5ST52.4NBK/ZN	16 x 2.5	3102162500	475	547	493	1974	0.83
18X1.5ST52.4NBK/ZN	18 x 1.5	3102181500	214	244	279	969	0.61
18X2ST52.4NBK/ZN	18 x 2.0	3102182000	313	358	364	1333	0.79
20X2ST52.4NBK/ZN	20 x 2.0	3102202000	279	319	330	1184	0.89
20X2.5ST52.4NBK/ZN	20 x 2.5	3102202500	371	426	404	1523	1.08
20X3ST52.4NBK/ZN	20 x 3.0	3102203000	467	537	476	1881	1.26
22X1.5ST52.4NBK/ZN*	22 x 1.5	3102221500	173	197	231	780	0.76
22X2ST52.4NBK/ZN	22 x 2.0	3102222000	252	288	303	1066	0.99
25X2ST52.4NBK/ZN*	25 x 2.0	3102252000	220	251	269	927	1.13
25X2.5ST52.4NBK/ZN	25 x 2.5	3102252500	291	333	330	1184	1.39
25X3ST52.4NBK/ZN	25 x 3.0	3102253000	365	418	390	1454	1.63
28X2ST52.4NBK/ZN	28 x 2.0	3102282000	195	223	242	820	1.28
28X3ST52.4NBK/ZN*	28 x 3.0	3102283000	322	369	352	1279	1.85
30X2ST52.4NBK/ZN*	30 x 2.0	3102302000	182	207	226	761	1.38
30X3ST52.4NBK/ZN	30 x 3.0	3102303000	299	343	330	1184	2.00
30X4ST52.4NBK/ZN	30 x 4.0	3102304000	424	487	429	1649	2.56
35X2ST52.4NBK/ZN	35 x 2.0	3102352000	155	176	196	646	1.63
35X3ST52.4NBK/ZN	35 x 3.0	3102353000	254	290	286	999	2.37
38X3ST52.4NBK/ZN	38 x 3.0	3102383000	233	266	265	914	2.59
38X4ST52.4NBK/ZN	38 x 4.0	3102384000	327	375	346	1254	3.35
38X5ST52.4NBK/ZN	38 x 5.0	3102385000	426	490	424	1615	4.07
42X3ST52.4NBK/ZN	42 x 3.0	3102423000	209	239	242	820	2.89
42X4ST52.4NBK/ZN	42 x 4.0	3102424000	293	336	316	1122	3.75
50X5ST52.4NBK/ZN	50 x 5.0	3102505000	315	361	330	1184	5.55
50X6ST52.4NBK/ZN	50 x 6.0	3102506000	390	448	390	1454	6.50
56X8.5ST52.4NBK/ZN*	56 x 8.5	3102568500	516	595	481	1908	9.96
60X5ST52.4NBK/ZN	60 x 5.0	3102605000	259	297	279	969	6.18
60X6ST52.4NBK/ZN	60 x 6.0	3102606000	319	366	330	1184	7.97
73X5ST52.4NBK/ZN	73 x 5.0	3102735000	211	241	274	784	8.38
75X5ST52.4NBK/ZN	75 x 5.0	3102755000	205	234	226	761	8.63
90X9ST52.4NBK/ZN	90 X 9.0	3102909000	326				

Items with black letters: Recommended sizes. Normally stock items.
 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
2. Straight pipe including manufacturing and corrosion tolerances.
3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
4. Based on Tensile value, wall thickness tolerance not included.

Seamless colddrawn stainless steel pipe ASTM A269/A213 – AISI 316 L

Part No	Size	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
			1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
6X1AISI316L	6 x 1.0	3301061000	525	607	365	2120	0.12
8X1AISI316L	8 x 1.0	3301081000	379	436	283	1514	0.17
8X1.5AISI316L	8 x 1.5	3301081500	602	698	404	2446	0.24
10X1AISI316L	10 x 1.0	3301101000	297	340	231	1178	0.22
10X1.5AISI316L	10 x 1.5	3301101500	465	537	333	1871	0.31
10X2AISI316L*	10 x 2.0	3301102000	650	755	427	2650	0.40
12X1AISI316L	12 x 1.0	3301121000	244	279	195	964	0.27
12X1.5AISI316L	12 x 1.5	3301121500	379	436	283	1514	0.39
12X2AISI316L	12 x 2.0	3301122000	525	607	365	2120	0.49
12X2.5AISI316L*	12 x 2.5	3301122500	682	794	442	2789	0.59
15X1.5AISI316L	15 x 1.5	3301151500	297	340	231	1178	0.50
16X1.5AISI316L*	16 x 1.5	3301161500	277	317	218	1097	0.54
16X2AISI316L	16 x 2.0	3301162000	379	436	283	1514	0.69
16X2.5AISI316L	16 x 2.5	3301162500	487	563	345	1963	0.83
16X3AISI316L*	16 x 3.0	3301163000	602	698	404	2446	0.96
18X1.5AISI316L	18 x 1.5	3301181500	244	279	195	964	0.61
18X2AISI316L	18 x 2.0	3301182000	333	382	255	1325	0.79
20X2AISI316L	20 x 2.0	3301202000	297	340	231	1178	0.89
20X2.5AISI316L	20 x 2.5	3301202500	379	436	283	1514	1.08
20X3AISI316L	20 x 3.0	3301203000	465	537	333	1871	1.26
22X1.5AISI316L*	22 x 1.5	3301221500	197	225	162	776	0.76
22X2AISI316L	22 x 2.0	3301222000	268	307	212	1060	0.99
25X1.5AISI316L*	25 x 1.5	3301251500	172	196	143	677	0.87
25X2AISI316L	25 x 2.0	3301252000	233	267	188	922	1.13
25X2.5AISI316L	25 x 2.5	3301252500	297	340	231	1178	1.39
25X3AISI316L	25 x 3.0	3301253000	362	417	273	1445	1.63
25X4AISI316L	25 x 4.0	3301254000	501	579	352	2019	2.07
28X2AISI316L	28 x 2.0	3301282000	207	236	169	815	1.28
28X2.5AISI316L	28 x 2.5	3301282500	263	301	208	1039	1.57
28X3AISI316L*	28 x 3.0	3301283000	320	367	246	1272	1.85
30X2AISI316L*	30 x 2.0	3301302000	192	220	158	757	1.38
30X2.5AISI316L*	30 x 2.5	3301302500	244	279	195	964	1.70
30X3AISI316L	30 x 3.0	3301303000	297	340	231	1178	2.00
30X4AISI316L	30 x 4.0	3301304000	408	469	300	1631	2.56
35X2AISI316L	35 x 2.0	3301352000	164	187	137	642	1.63
35X2.5AISI316L	35 x 2.5	3301352500	201	236	169	815	2.00
35X3AISI316L	35 x 3.0	3301353000	251	288	201	994	2.37
38X2.5AISI316L*	38 x 2.5	3301382500	190	217	157	746	2.19
38X3AISI316L	38 x 3.0	3301383000	230	263	186	909	2.59
38X4AISI316L	38 x 4.0	3301384000	314	360	242	1247	3.35
38X5AISI316L	38 x 5.0	3301385000	402	462	296	1606	4.07
42X2AISI316L	42 x 2.0	3301422000	135	154	115	530	1.97
42X2.5AISI316L	42 x 2.5	3301422500	171	195	142	671	2.43
42X3AISI316L	42 x 3.0	3301423000	207	236	169	815	2.89
42X4AISI316L	42 x 4.0	3301424000	282	323	221	1116	3.75
50X3AISI316L	50 x 3.0	3301503000	172	196	143	677	3.48
50X5AISI316L	50 x 5.0	3301505000	297	340	231	1178	5.55
50X6AISI316L	50 x 6.0	3301506000	362	417	273	1445	6.51
56X8.5AISI316L	56 x 8.5	3301568500	472	544	337	1897	9.96
60X3AISI316L	60 x 3.0	3301603000	142	162	121	558	4.22
60X5AISI316L	60 x 5.0	3301605000	244	279	195	964	6.78
60X6AISI316L	60 x 6.0	3301606000	297	340	231	1178	7.99
66X8.5AISI316L	66 x 8.5	3301668500	392	451	291	1567	12.05
80X10AISI316L	80 x 10.0	3301801000	379	436	283	1514	17.21
97X12AISI316L	97 x 12.0	3301971200	375	431	281	1496	25.50
115X4AISI316L	115 x 4.0	3301911540	98	111	85	382	10.95
115X15AISI316L	115 x 15.0	3301911515	398	458	294	1590	36.99

Items with black letters: Recommended sizes. Normally stock items.
 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
 2. Straight pipe including manufacturing and corrosion tolerances.
 3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
 4. Based on Tensile value, wall thickness tolerance not included.

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Seamless colddrawn stainless steel pipe ASTM A269/A213 – AISI 316 L

Part No	Size	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
			1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
130X15AISI316L	130 x 15.0	3301913015	347	399	263	1383	42.54
140X4.5AISI316L	140 x 4.5	3301914045	90	102	79	352	15.04
150X15AISI316L	150 x 15.0	3301915015	297	340	231	1178	49.94
165X5AISI316L	165 x 5.0	3301916550	85	96	98	331	19.73

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 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
2. Straight pipe including manufacturing and corrosion tolerances.
3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
4. Based on Tensile value, wall thickness tolerance not included.

Seamless colddrawn stainless steel pipe ASTM A312 – TP 316 L, schedule

Part No	Nominal Size	SCH	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
				1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
21.34X2.11TP316L*	1/2"	10S	3301000100	241	277	223	1130	1.02
21.34X2.77TP316L*		40S	3301000200	325	374	286	1536	1.29
21.34X3.73TP316L*		80	3301000300	456	527	371	2182	1.65
21.34X4.78TP316L*		160	3301000400	611	712	459	2973	1.98
21.34X7.47TP316L*		XXS	3301000500	1081	1289	657	5547	2.55
26.67X2.11TP316L*	3/4"	10S	3301000600	190	217	181	885	1.30
26.67X2.87TP316L*		40	3301000700	259	297	236	1213	1.71
26.67X3.91TP316L*		80	3301000800	373	430	318	1769	2.33
26.67X5.56TP316L*		160	3301000900	560	651	432	2713	2.94
26.67X7.82TP316L*		XXS	3301001000	854	1008	572	4273	3.64
33.4X2.77TP316L*	1"	10S	3301001100	200	228	189	931	2.13
33.4X3.38TP316L*		40	3301001200	247	284	228	1160	2.54
33.4X4.55TP316L*		80	3301001300	343	395	298	1624	3.29
33.4X6.35TP316L*		160	3301001400	502	583	399	2418	4.30
33.4X9.09TP316L*		XXS	3301001500	777	913	539	3851	5.45
42.16X2.77TP316L*	1 1/4"	10S	3301001600	156	178	152	724	2.73
42.16X3.56TP316L*		40	3301001700	204	233	193	950	3.44
42.16X4.85TP316L*		80	3301001800	285	327	256	1339	4.53
42.16X6.35TP316L*		160	3301001900	384	443	326	1826	5.69
42.16X9.70TP316L*		XXS	3301002000	631	736	469	3078	7.76
48.26X2.77TP316L*	1 1/2"	10S	3301002100	135	154	134	627	3.16
48.26X3.68TP316L*		40	3301002200	183	209	175	850	4.11
48.26X5.08TP316L*		80	3301002300	258	296	236	1212	5.49
48.26X7.14TP316L*		160	3301002400	377	434	321	1788	7.35
48.26X10.16TP316L*		XXS	3301002500	567	659	436	2747	9.55
60.3X2.77TP316L*	2"	10S	3301002600	107	122	108	496	3.99
60.3X3.91TP316L*		40	3301002700	154	176	150	714	5.52
60.3X5.54TP316L*		80	3301002800	223	255	208	1042	7.60
60.3X8.74TP316L*		160	3301002900	368	424	315	1746	11.28
60.3X11.07TP316L*		XXS	3301003000	482	559	388	2316	13.44
73X2.11TP316L*	2 1/2"	5S	3301003100	67	76	69	307	3.76
73X3.05TP316L*		10S	3301003200	97	111	99	449	5.37
73X5.16TP316L*		40	3301003300	169	193	163	783	8.80
73X7.01TP316L*		80	3301003400	234	268	217	1094	11.64
73X9.53TP316L*		160	3301003500	327	377	287	1547	15.15
73X14.02TP316L*	XXS	3301003600	508	590	403	2448	20.50	
88.9X2.11TP316L*	3"	5S	3301003700	55	62	57	250	4.59
88.9X3.05TP316L*		10S	3301003800	79	90	82	366	6.45
88.9X5.49TP316L*		40	3301003900	146	167	144	678	11.46
88.9X7.67TP316L*		80	3301004000	208	238	197	973	15.51
88.9X11.13TP316L*		160	3301004100	312	359	276	1474	21.67
88.9X15.24TP316L*	3"	XXS	3301004200	445	515	365	2131	27.68
114.3X2.11TP316L*	4"	5S	3301004300	42	48	45	194	5.93
114.3X3.05TP316L*		10S	3301004400	61	70	64	282	8.50
114.3X6.07TP316L*		40	3301004500	125	142	124	578	16.32
114.3X8.56TP316L*		80	3301004600	179	205	172	834	22.67
114.3X13.49TP316L*		160	3301004700	293	336	262	1378	34.05
114.3X17.12TP316L*	XXS	3301004800	382	440	324	1815	41.03	
141.3X3.40TP316L*	5"	10S	3301004900	55	63	58	254	11.56
141.3X6.55TP316L*		40	3301005000	108	123	109	501	22.10
141.3X9.53TP316L*		80	3301005100	160	183	156	745	31.40
141.3X15.88TP316L*		160	3301005200	277	318	251	1304	49.11
141.3X19.05TP316L*		XXS	3301005300	339	391	295	1605	57.43

Items with black letters: Recommended sizes. Normally stock items.
 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
2. Straight pipe including manufacturing and corrosion tolerances.
3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
4. Based on Tensile value, wall thickness tolerance not included.

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Seamless colddrawn stainless steel pipe ASTM A269/A213 – AISI 316 L

Part No	Nominal Size	SCH	ID Code	Working Pressure			Burst Pressure	Weight [kg/m]
				1. DNV [bar]	2. DNV [bar]	3. DIN [bar]	4. DNV [bar]	
168.3X2.77TP316L*	6"	5S	3301005400	38	43	40	172	11.47
168.3X3.4TP316L*		10S	3301005500	46	53	49	212	14.04
168.3X7.11TP316L*		40	3301005600	98	112	100	454	28.69
168.3X10.97TP316L*		80	3301005700	155	177	151	718	43.21
168.3X14.27TP316L*		120	3301005800	205	234	193	954	54.10
168.3X18.26TP316L*		160	3301005900	267	306	243	1254	67.56
168.3X21.95TP316L*		XXS	3301006000	327	376	287	1545	79.22
219.1X3.76TP316L*	8"	10S	3301006100	39	45	41	180	19.97
219.1X8.18TP316L*		40	3301006200	87	99	89	399	43.20
219.1X12.70TP316L*		80	3301006300	137	156	135	634	66.02
219.1X18.26TP316L*		120	3301006400	201	230	190	936	90.30
219.1X23.01TP316L*		160	3301006500	258	295	236	1209	111.30
219.1X22.00TP316L*		XXS	3301006600	245	281	226	1150	107.00
273X9.27TP316L*	10"	40	3301006700	79	89	81	362	60.40
273X15.06TP316L*		80	3301006800	130	148	129	601	95.90
273X28.58TP316L*		160	3301006900	257	294	235	1204	171.90
273X25.40TP316L*		XXS	3301007000	226	259	211	1057	155.10
323.9X9.53TP316L*	12"	40S	3301007100	68	77	70	312	73.90
323.9X10.31TP316L*		40	3301007200	74	84	76	339	79.70
323.9X17.45TP316L*		80	3301007300	127	144	126	587	131.90
323.9X33.32TP316L*		160	3301007400	252	289	231	1181	238.80
355.6X9.53TP316L*	14"	40S	3301007500	62	70	64	284	81.30
355.6X11.13TP316L*		40	3301007600	72	82	75	333	94.50
355.6X19.05TP316L*		80	3301007700	126	144	125	583	158.10
355.6X35.71TP316L*		160	3301007800	245	281	226	1150	281.70
406.4X9.53TP316L*	16"	40S	3301007900	54	61	56	247	93.30
406.4X12.70TP316L*		40	3301008000	72	82	75	332	123.30
406.4X21.41TP316L*		80	3301008100	124	141	123	573	203.30
406.4X40.46TP316L*		160	3301008200	243	279	224	1139	365.10
457.4X9.53TP316L*	18"	40S	3301008300	48	54	50	219	105.20
457.4X14.27TP316L*		40	3301008400	72	82	74	332	155.80
457.4X23.80TP316L*		80	3301008500	122	139	122	565	254.20
457.4X45.24TP316L*		160	3301008600	241	277	223	1131	459.40
508X9.53TP316L*	20"	40S	3301008700	43	49	45	197	117.10
508X15.06TP316L*		40	3301008800	68	78	71	315	183.10
508X26.19TP316L*		80	3301008900	121	138	121	560	311.20
508X49.99TP316L*		160	3301009000	240	275	222	1124	564.10
609X9.53TP316L*	24"	40S	3301009100	36	41	38	164	140.90
609X17.45TP316L*		40	3301009200	66	75	68	304	254.60
609X30.94TP316L*		80	3301009300	119	136	119	551	441.00
609X59.51TP316L*		160	3301009400	238	273	221	1115	806.50

Items with black letters: Recommended sizes. Normally stock items.
 *) Items with grey letters: Non-standard sizes. Limited availability.

1. Bended pipe including manufacturing and corrosion tolerances.
2. Straight pipe including manufacturing and corrosion tolerances.
3. DIN 2413 III: Dynamic straight pipe including manufacturing tolerance.
4. Based on Tensile value, wall thickness tolerance not included.

DIN 2413/III

All working pressures are based on DIN 2413/III for straight tubes and pipes.

The yield and tensile stress values utilised to determine the maximum allowable working pressure/required wall thickness are based on GS-Hydro's expertise, when using GS-Hydro's qualified pipe manufacturers. Where classification is required the actual yield and tensile stress values must always be verified from the material certificates.

Material	Allowable (σ_{f2})
Stainless steel ASTM A269/A213 (A.W.) – Grade TP 316 L • dynamic ASTM A312/A999 – Grade TP 316 L • dynamic	140
Carbon steel DIN 2391C(EN 10305-4) ST52.4(E 355N) • dynamic	200
DIN 2391C(EN 10305-4) ST37.4(E 235N) • dynamic	151

The required wall thickness is calculated as follows:

DIN 2413/III

$$t_n \square \frac{t_o}{1 - \frac{a}{100}} \quad [1]$$

$$t_o \square \frac{O.D.}{\frac{2 \times \sigma_{f2}}{p} - 1} \quad [2]$$

p = pressure [N/mm²]

O.D. = outside diameter of pipe [mm]

e = strength ratio (seamless pipe) = 1

R = bending radius [mm]

a = manufacturing tolerance [%] = ±10%

t_n = nominal wall thickness (= W.T. in tables)

t_o = required wall without tolerances

t = required wall thickness with manufacturing tolerance

σ_{f2} = max. permissible stress under fatigue load considering safety factor. The value is based on experience of GS-Hydro.

Det Norske Veritas

All working pressures are based on Det Norske Veritas rules for classification of ships, newbuilding part 4, Chapter 6, Section 6 and mobile offshore units drilling plant (drill) Part 6, chapter 5, Section 6 for bent tubes and pipes.

The yield and tensile stress values utilised to determine the maximum allowable working pressure/required wall thickness are based on GS-Hydro's expertise, when using GS-Hydro's qualified pipe manufacturers. Where classification is required the actual yield and tensile stress values must always be verified from the material certificates.

Material	Yield (σ_t)	Tensile (σ_b)	Allowable (σ_l)
Stainless steel			
ASTM A269/A213 (A.W.) – Grade TP316L	276	530	172
ASTM A312/A999 – Grade TP316L	234	515	146
Carbon steel			
DIN 2391C(EN 10305-4) ST52.4(E 355N)	355	533	197
DIN 2391C(EN 10305-4) ST37.4(E 235N)	235	390	130

The allowable stress (σ_l) is based on the lower value of the following:

$$\text{stainless steel } \sigma_l = \frac{\sigma_b}{2.7} \quad \text{or} \quad \frac{\sigma_t}{1.6}$$

$$\text{carbon steel } \sigma_l = \frac{\sigma_b}{2.7} \quad \text{or} \quad \frac{\sigma_t}{1.8}$$

σ_b = tensile strength at 20°C [N/mm²]

σ_t = yield stress or 0.2 proof stress of the material at design temperature

The required wall thickness is calculated as follows:

$$t_n \square \frac{t}{1 - \frac{a}{100}} \quad [3]$$

$$t \square t_o \square c \square b \quad [4]$$

$$t_o \square \frac{p \times \text{O.D.}}{20 \times \sigma_l \times e \square p} \quad [5]$$

c = corrosion tolerance for hydraulic piping = 0.3

p = pressure [bar]

O.D. = outside diameter of pipe [mm]

e = strength ratio (seamless pipe) = 1

R = bending radius [mm]

a = manufacturing tolerance [%] = ±10%

t_n = nominal wall thickness (= W.T. in tables)

t_o = required wall without tolerances

t = required wall thickness including corrosion and bending

b = bending allowance

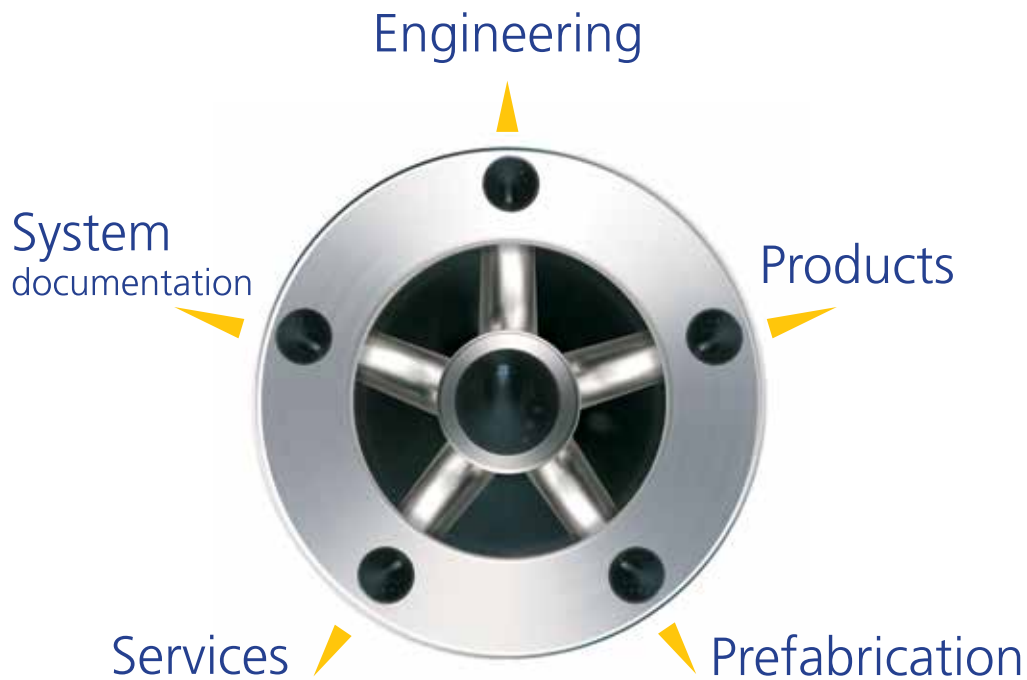
$$b = \frac{1}{2.5} \times \frac{\text{O.D.} \times t_o}{R} = 0.1333t_o \quad (R = 3 \times \text{O.D.})$$

The burst pressure presented is for a straight pipe and based on the tensile stress value. When determining the burst pressure a manufacturing tolerance is excluded.



GS-Hydro is the original provider of non-welded piping solutions with numerous benefits for a wide variety of demanding applications. We create value together with our customers by providing innovative fluid transfer solutions which enable safe operation, reduced environmental impact and lower total cost of ownership. We deliver our piping and hose solutions globally in more than twenty-five countries through own companies and partners.

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