

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
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

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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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 (σf2)
Stainless steel ASTM A269/A213 (A.W.) – Grade TP 316 L • dynamic	140
ASTM A312/A999 – Grade TP 316 L • dynamic	
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

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

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

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 = 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:

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

$$t = t_o + c + b \quad [4]$$

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

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)

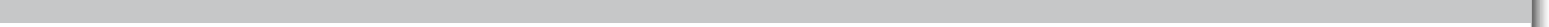
t_o = required wall without tolerances

t = required wall thickness including corrosion and bending

b = bending allowance

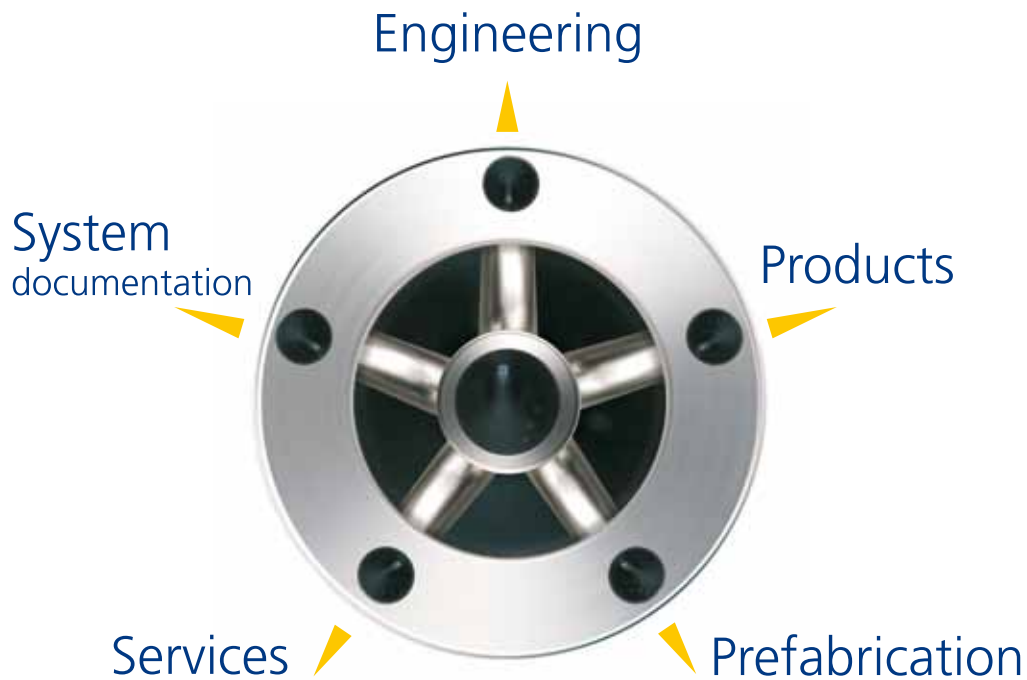
$$b = \frac{1}{2.5} \times \frac{\text{O.D.} \times t_o}{R} = 0.1333t_o \quad (R = 3 \times \text{O.D.})$$

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. The company operates globally in more than twenty-five countries through own companies and partners. GS-Hydro supplies complete piping systems with engineering, products, prefabrication, services and documentation.

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ISO 9001
MED 96/98/EC
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