

Coiled Tubing

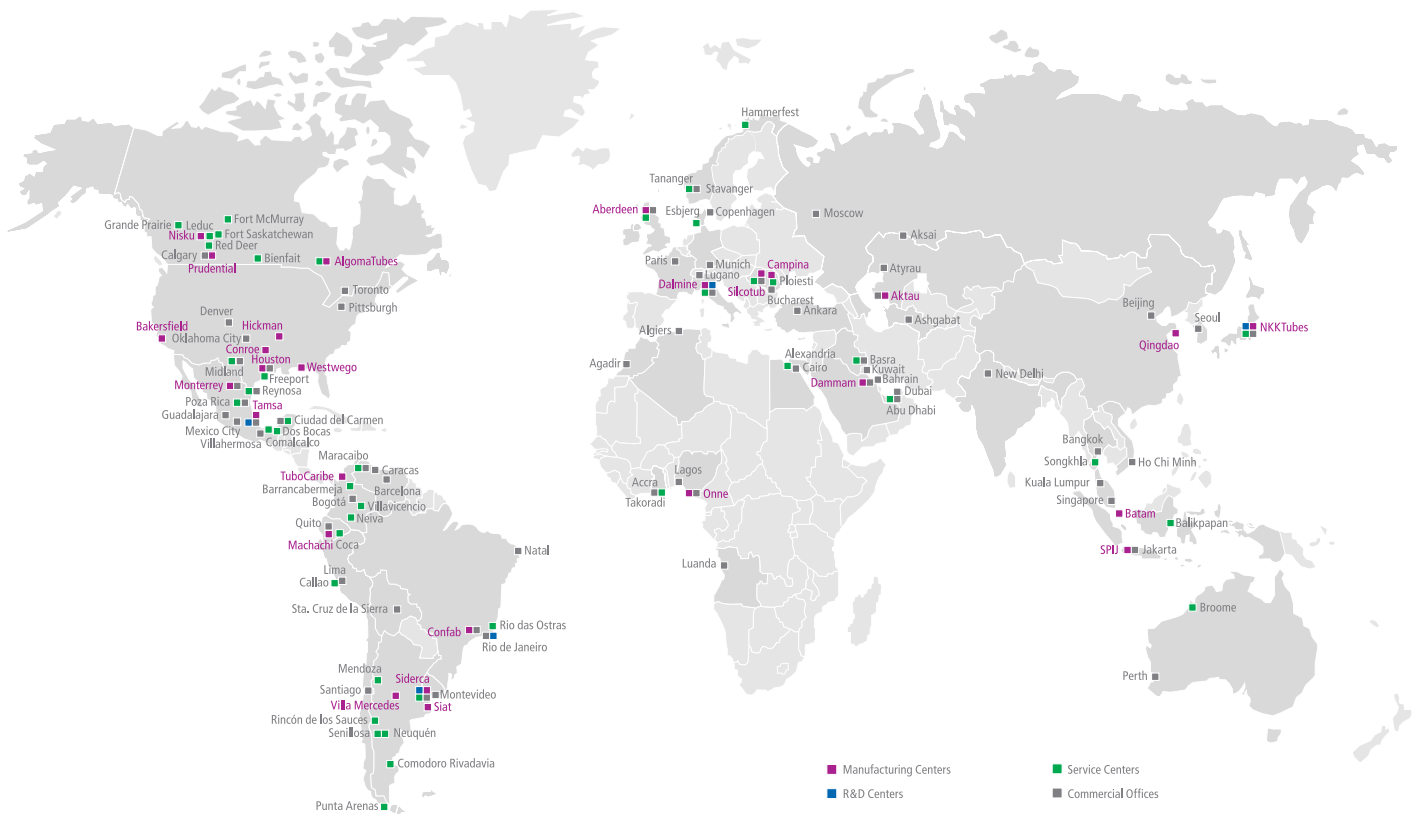
for Downhole Applications



Tenaris

Tenaris is a leading supplier of tubes and related services for the world's energy industry and certain other industrial applications. Our mission is to deliver value to our customers through product development, manufacturing excellence, and supply chain management. We seek to minimize risk for our customers and help them reduce costs, increase flexibility and improve time-to-market. Tenaris employees around the world are committed to continuous improvement by sharing knowledge across a single global organization.

Tenaris offers a range of coiled tubing products tailored to the specific demands of an expanding spectrum of downhole applications. From standard well workover and hang-off strings to logging, drilling and special application strings with factory installed wireline, capillary tubes, or integral tools, Tenaris designs and manufactures the coiled tubing string best suited to each project.



Setting Industry Standards

Tenaris manufactures coiled tubing products that meet the highest industry specifications.

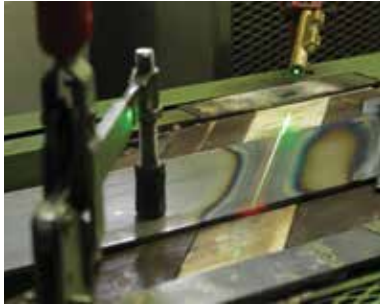
Tenaris is the first API 5ST certified coiled tubing manufacturer in the world, setting a new standard for manufacturing and testing of coiled tubing in the industry.

Today's oil and gas industry requires products that meet stringent specifications to promote reliability in the field. We have a company-wide Quality Management System, which includes ISO-9001, making Tenaris the only coiled tubing producer in the industry to hold this certification. The coiled tubing produced by Tenaris is high frequency induction welded while stainless steel products are laser welded to ensure maximum precision and durability.

Tenaris has a history of industry milestones, including one of the longest coiled tubing workstrings, stretching 36,430 ft, of 2" HS-80 and one of the world's heaviest coiled tubing workstrings, weighing 122,000 lbs, of 2 7/8" HS-80.



Tenaris leads the industry in innovative coiled tubing technologies.



Downhole Applications

The use of coiled tubing for oil and gas well service operations has increased significantly over the past 10 years for applications such as shales, tight gas and tight oil. Tenaris manufactures products for the following applications:

DRILLING

Coiled tubing has achieved great success performing reentry drilling, where a horizontal lateral is drilled in an existing well with a coiled tubing conveyed mud motor and bit. Coiled tubing reentry drilling can be performed through the existing production casing and in an underbalanced condition. Drilling new wells from the surface with larger 3-1/2" and 4-1/2" coiled tubing has been successful in certain markets, especially shallow gas wells in Canada.

LOGGING/PERFORATING

Wireline cables installed inside coiled tubing allows the deployment of logging or perforating tools in highly deviated wells. Coiled tubing offers several advantages over traditional wireline methods, including enduring greater tensile and compressive forces and the ability to work in live wells.

FRACTURING

Coiled tubing has advantages over traditional methods when fracturing relatively shallow wells multiple zone completions. Coiled tubing can convey zonal isolation tools to pinpoint the fracture treatment and then the coiled tubing is used as the conduit for the fracturing fluid. The fracturing process can be repeated multiple times on a single coiled tubing run.

MILLING FRAC PLUGS

The large multistage fracture treatments that are common in horizontal shale gas completions require setting multiple frac plugs for zonal isolation. Coiled tubing, in conjunction with mud motor and bit assembly is then used to mill out the frac plugs and clean the wellbore.

Tenaris's coiled tubing is designed to provide a reliable solution to customers' demanding operations.



CLEANOUTS

Coiled tubing can be used to remove scale, produced sand, frac sand and debris from the wellbore. Coiled tubing is run into the wellbore, fluid is pumped down the coiled tubing and returns are circulated through the annulus. Coiled tubing can rig up and get to depth quickly without killing the well or pull the production tubing.

NITROGEN INJECTION

Coiled tubing allows the injection of nitrogen at depth into a dead wellbore to displace the wellbore fluid with nitrogen. This lowers the bottom hole pressure and allows the well to resume flowing.

STIMULATION

Coiled tubing matrix stimulation treatments are designed to restore the natural permeability of the near-wellbore formation by injecting treatment fluids into the formation. Coiled tubing

stimulation can be performed on live wells and combined with other operations such as nitrogen injection.

VELOCITY STRINGS

Coiled tubing is run into an existing producing well to reduce the effective flow area to allow the natural reservoir pressure to lift water from the reservoir, allowing natural pressure to sustain production in mature producing wells.

ELECTRICAL SUBMERSIBLE PUMP (ESP) INSTALLATION

An ESP cable can be installed into the coiled tubing prior to deployment, enabling the coiled tubing to support the ESP cable, and facilitate the rapid deployment and retrieval of ESPs.

Tenaris's products are used in a variety of environments around the globe.



PHOTO COURTESY OF XTREME COIL DRILLING



Material Specifications

Chemical Requirements (mass percent)

GRADE	CARBON	MANGANESE	PHOSPHORUS	SULFUR	SILICON
	MAX	MAX	MAX	MAX	MAX
HV-70™ (CT70)	0.16	1.20	0.020	0.005	0.50
HS-70™ (CT70)	0.16	1.20	0.020	0.005	0.50
HS-80™ (CT80)	0.16	1.20	0.020	0.005	0.50
HS-90™ (CT90)	0.16	1.20	0.020	0.005	0.50
HS-100™ (CT100)	0.16	1.65	0.020	0.005	0.50
HS-110™ (CT110)	0.16	1.65	0.020	0.005	0.50
HS-80 CRA™	0.03	6.00	0.040	0.030	1.00

Tensile Requirements

GRADE	YIELD STRENGTH		YIELD STRENGTH		TENSILE STRENGTH		HARDNESS MAXIMUM
	MIN		MAX		MIN		BODY AND WELD
	psi	MPa	psi	MPa	psi	MPa	HRC
HV-70™ (CT70)	70,000	483	80,000	552	80,000	552	22
HS-70™ (CT70)	70,000	483	80,000	552	80,000	552	22
HS-80™ (CT80)	80,000	552	90,000	621	88,000	607	22
HS-90™ (CT90)	90,000	621	100,000	689	97,000	669	22
HS-100™ (CT100)	100,000	689			108,000	758	28
HS-110™ (CT110)	110,000	758			115,000	793	30
HS-80 CRA™	80,000	552			100,000	689	30

HV-70™ (CT70) | 1.000" TO 2.000"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
1.000	0.095	0.090	0.810	0.920	18,900	21,600	9,800	12,300
	0.109	0.104	0.782	1.040	21,400	24,400	11,400	14,200
	0.125	0.117	0.750	1.171	24,100	27,500	12,600	15,800
1.250	0.095	0.090	1.060	1.175	24,100	27,600	7,900	9,900
	0.109	0.104	1.032	1.332	27,400	31,300	9,100	11,400
	0.125	0.117	1.000	1.506	30,900	35,300	10,200	12,800
1.500	0.109	0.104	1.282	1.623	33,300	38,100	7,700	9,600
	0.125	0.117	1.250	1.840	37,800	43,200	8,600	10,800
1.750	0.109	0.104	1.532	1.915	39,300	45,000	6,600	8,200
	0.125	0.117	1.500	2.175	44,700	51,100	7,400	9,300
2.000	0.109	0.104	1.782	2.207	45,300	51,800	5,600	7,200
	0.125	0.117	1.750	2.509	51,500	58,900	6,500	8,100

HS-70™ (CT70) | 1.000" TO 1.750"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
1.000	0.080	0.075	0.840	0.788	16,200	18,500	9,400	10,400
	0.087	0.082	0.826	0.850	17,500	20,000	10,200	11,300
	0.095	0.090	0.810	0.920	18,900	21,600	11,100	12,300
	0.102	0.097	0.796	0.981	20,100	23,000	12,000	13,300
	0.109	0.104	0.782	1.040	21,400	24,400	12,800	14,200
	0.116	0.108	0.768	1.098	22,600	25,800	13,200	14,700
	0.125	0.117	0.750	1.171	24,100	27,500	14,200	15,800
	0.134	0.126	0.732	1.242	25,500	29,200	15,200	16,900
1.250	0.080	0.075	1.090	1.002	20,600	23,500	7,500	8,300
	0.087	0.082	1.076	1.083	22,300	25,400	8,200	9,100
	0.095	0.090	1.060	1.175	24,100	27,600	8,900	9,900
	0.102	0.097	1.046	1.254	25,800	29,400	9,600	10,700
	0.109	0.104	1.032	1.332	27,400	31,300	10,300	11,400
	0.116	0.108	1.018	1.408	28,900	33,100	10,700	11,900
	0.125	0.117	1.000	1.506	30,900	35,300	11,500	12,800
	0.134	0.126	0.982	1.601	32,900	37,600	12,400	13,800
	0.145	0.137	0.960	1.715	35,200	40,300	13,400	14,900
	0.156	0.148	0.938	1.827	37,500	42,900	14,400	16,000
1.500	0.080	0.075	1.340	1.216	25,000	28,600	6,300	7,000
	0.087	0.082	1.326	1.316	27,000	30,900	6,800	7,600
	0.095	0.090	1.310	1.429	29,400	33,500	7,500	8,300
	0.102	0.097	1.296	1.527	31,400	35,800	8,100	9,000
	0.109	0.104	1.282	1.623	33,300	38,100	8,600	9,600
	0.116	0.108	1.268	1.719	35,300	40,300	8,900	9,900
	0.125	0.117	1.250	1.840	37,800	43,200	9,700	10,800
	0.134	0.126	1.232	1.960	40,300	46,000	10,400	11,600
	0.145	0.137	1.210	2.104	43,200	49,400	11,300	12,500
	0.156	0.148	1.188	2.245	46,100	52,700	12,200	13,500
1.750	0.087	0.082	1.576	1.549	31,800	36,400	5,900	6,500
	0.095	0.090	1.560	1.683	34,600	39,500	6,500	7,200
	0.102	0.097	1.546	1.800	37,000	42,200	6,900	7,700
	0.109	0.104	1.532	1.915	39,300	45,000	7,400	8,200
	0.116	0.108	1.518	2.029	41,700	47,600	7,700	8,600
	0.125	0.117	1.500	2.175	44,700	51,100	8,400	9,300
	0.134	0.126	1.482	2.318	47,600	54,400	8,900	9,900
	0.145	0.137	1.460	2.492	51,200	58,500	9,700	10,800
	0.156	0.148	1.438	2.662	54,700	62,500	10,400	11,600
	0.165	0.157	1.420	2.800	57,500	65,700	11,100	12,300
1.750	0.175	0.167	1.400	2.951	60,600	69,300	11,800	13,100
	0.190	0.178	1.370	3.173	65,200	74,500	12,500	13,900
	0.204	0.192	1.342	3.377	69,400	79,300	13,400	14,900
	0.224	0.212	1.302	3.660	75,200	85,900	14,700	16,300
	0.250	0.238	1.250	4.015	82,500	94,200	16,400	18,200

HS-70™ (CT70) | 2.000" TO 4.500"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
2.000	0.102	0.097	1.796	2.073	42,600	48,700	6,000	6,700
	0.109	0.104	1.782	2.207	45,300	51,800	6,500	7,200
	0.116	0.108	1.768	2.340	48,100	54,900	6,800	7,500
	0.125	0.117	1.750	2.509	51,500	58,900	7,300	8,100
	0.134	0.126	1.732	2.677	55,000	62,800	7,800	8,700
	0.145	0.137	1.710	2.880	59,200	67,600	8,600	9,500
	0.156	0.148	1.688	3.080	63,300	72,300	9,200	10,200
	0.165	0.157	1.670	3.242	66,600	76,100	9,700	10,800
	0.175	0.167	1.650	3.419	70,200	80,300	10,400	11,500
	0.190	0.178	1.620	3.682	75,600	86,400	11,000	12,200
	0.204	0.192	1.592	3.923	80,600	92,100	11,800	13,100
	0.224	0.212	1.552	4.259	87,500	100,000	13,000	14,400
	0.250	0.238	1.500	4.684	96,200	110,000	14,500	16,100
	0.280	0.265	1.440	5.156	105,900	121,000	15,900	17,700
2.375	0.125	0.117	2.125	3.011	61,900	70,700	6,200	6,900
	0.134	0.126	2.107	3.215	66,000	75,500	6,700	7,400
	0.145	0.137	2.085	3.462	71,100	81,300	7,200	8,000
	0.156	0.148	2.063	3.706	76,100	87,000	7,700	8,600
	0.165	0.157	2.045	3.904	80,200	91,600	8,300	9,200
	0.175	0.167	2.025	4.122	84,700	96,800	8,700	9,700
	0.190	0.178	1.995	4.445	91,300	104,300	9,300	10,300
	0.204	0.192	1.967	4.742	97,400	111,300	10,000	11,100
	0.224	0.212	1.927	5.159	106,000	121,100	11,000	12,200
	0.250	0.238	1.875	5.688	116,800	133,500	12,300	13,700
	0.280	0.265	1.815	6.280	129,000	147,400	13,600	15,100
0.300	0.285	1.775	6.665	136,900	156,500	14,600	16,200	
2.625	0.134	0.126	2.357	3.574	73,400	83,900	6,000	6,700
	0.145	0.137	2.335	3.850	79,100	90,400	6,600	7,300
	0.156	0.148	2.313	4.124	84,700	96,800	7,000	7,800
	0.165	0.157	2.295	4.346	89,300	102,000	7,500	8,300
	0.175	0.167	2.275	4.590	94,300	107,800	7,900	8,800
	0.190	0.178	2.245	4.953	101,700	116,300	8,500	9,400
	0.204	0.192	2.217	5.288	108,600	124,100	9,100	10,100
	0.224	0.212	2.177	5.758	118,300	135,200	10,000	11,100
	0.250	0.238	2.125	6.357	130,600	149,200	11,200	12,400
	0.280	0.265	2.065	7.030	144,400	165,000	12,400	13,800
0.300	0.285	2.025	7.468	153,400	175,300	13,200	14,700	
2.875	0.145	0.137	2.585	4.238	87,100	99,500	5,900	6,600
	0.156	0.148	2.563	4.541	93,300	106,600	6,500	7,200
	0.165	0.157	2.545	4.787	98,300	112,400	6,800	7,600
	0.175	0.167	2.525	5.059	103,900	118,800	7,300	8,100
	0.190	0.178	2.495	5.462	112,200	128,200	7,700	8,600
	0.204	0.192	2.467	5.834	119,800	136,900	8,300	9,200
	0.224	0.212	2.427	6.358	130,600	149,200	9,200	10,200
	0.250	0.238	2.375	7.026	144,300	164,900	10,300	11,400
	0.280	0.265	2.315	7.779	159,800	182,600	11,300	12,600
	0.300	0.285	2.275	8.271	169,900	194,200	12,200	13,500
3.500	0.175	0.167	3.150	6.230	128,000	146,200	5,900	6,600
	0.190	0.178	3.120	6.733	138,300	158,100	6,400	7,100
	0.204	0.192	3.092	7.199	147,900	169,000	6,800	7,600
	0.224	0.212	3.052	7.857	161,400	184,400	7,600	8,400
	0.250	0.238	3.000	8.699	178,700	204,200	8,500	9,400
	0.280	0.265	2.940	9.653	198,300	226,600	9,400	10,400
	0.300	0.285	2.900	10.278	211,100	241,300	10,100	11,200
4.500	0.224	0.212	4.052	10.255	210,600	240,700	5,900	6,600
	0.250	0.238	4.000	11.376	233,700	267,000	6,700	7,400
	0.280	0.265	3.940	12.651	259,800	297,000	7,400	8,200
	0.300	0.285	3.900	13.490	277,100	316,700	7,900	8,800

HS-80™ (CT80) | 1.000" TO 1.750"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
1.000	0.080	0.075	0.840	0.788	18,500	20,300	10,600	11,800
	0.087	0.082	0.826	0.850	20,000	22,000	11,600	12,900
	0.095	0.090	0.810	0.920	21,600	23,800	12,700	14,100
	0.102	0.097	0.796	0.981	23,000	25,300	13,700	15,200
	0.109	0.104	0.782	1.040	24,400	26,800	14,600	16,200
	0.116	0.108	0.768	1.098	25,800	28,300	15,100	16,800
	0.125	0.117	0.750	1.171	27,500	30,200	16,300	18,100
	0.134	0.126	0.732	1.242	29,200	32,100	17,500	19,400
1.250	0.080	0.075	1.090	1.002	23,500	25,900	8,600	9,500
	0.087	0.082	1.076	1.083	25,400	28,000	9,400	10,400
	0.095	0.090	1.060	1.175	27,600	30,300	10,300	11,400
	0.102	0.097	1.046	1.254	29,400	32,400	11,000	12,200
	0.109	0.104	1.032	1.332	31,300	34,400	11,800	13,100
	0.116	0.108	1.018	1.408	33,100	36,400	12,200	13,600
	0.125	0.117	1.000	1.506	35,300	38,900	13,100	14,600
	0.134	0.126	0.982	1.601	37,600	41,300	14,100	15,700
	0.145	0.137	0.960	1.715	40,300	44,300	15,300	17,000
	0.156	0.148	0.938	1.827	42,900	47,200	16,500	18,300
1.500	0.080	0.075	1.340	1.216	28,600	31,400	7,100	7,900
	0.087	0.082	1.326	1.316	30,900	34,000	7,800	8,700
	0.095	0.090	1.310	1.429	33,500	36,900	8,600	9,500
	0.102	0.097	1.296	1.527	35,800	39,400	9,200	10,200
	0.109	0.104	1.282	1.623	38,100	41,900	9,900	11,000
	0.116	0.108	1.268	1.719	40,300	44,400	10,300	11,400
	0.125	0.117	1.250	1.840	43,200	47,500	11,100	12,300
	0.134	0.126	1.232	1.960	46,000	50,600	11,900	13,200
	0.145	0.137	1.210	2.104	49,400	54,300	12,900	14,300
	0.156	0.148	1.188	2.245	52,700	58,000	13,900	15,400
1.750	0.080	0.075	1.590	1.516	31,600	34,400	6,100	6,900
	0.087	0.082	1.576	1.616	33,900	37,000	6,800	7,700
	0.095	0.090	1.560	1.729	36,500	39,900	7,600	8,500
	0.102	0.097	1.546	1.827	38,800	42,400	8,200	9,200
	0.109	0.104	1.532	1.923	41,100	44,900	8,900	10,000
	0.116	0.108	1.518	2.019	43,300	47,400	9,300	10,500
	0.125	0.117	1.500	2.140	46,200	50,500	10,100	11,400
	0.134	0.126	1.482	2.260	49,000	53,600	10,900	12,300
	0.145	0.137	1.460	2.392	52,400	57,300	11,900	13,400
	0.156	0.148	1.438	2.524	55,700	61,000	12,900	14,500
1.750	0.165	0.157	1.420	2.800	65,700	72,300	12,700	14,100
	0.175	0.167	1.400	2.951	69,300	76,200	13,400	14,900
	0.190	0.178	1.370	3.173	74,500	81,900	14,300	15,900
	0.204	0.192	1.342	3.377	79,300	87,200	15,300	17,000
	0.224	0.212	1.302	3.660	85,900	94,500	16,800	18,700
	0.250	0.238	1.250	4.015	94,200	103,700	17,500	20,800

HS-80™ (CT80) | 2.000" TO 4.500"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
2.000	0.102	0.097	1.796	2.073	48,700	53,500	6,900	7,700
	0.109	0.104	1.782	2.207	51,800	57,000	7,500	8,300
	0.116	0.108	1.768	2.340	54,900	60,400	7,700	8,600
	0.125	0.117	1.750	2.509	58,900	64,800	8,400	9,300
	0.134	0.126	1.732	2.677	62,800	69,100	9,000	10,000
	0.145	0.137	1.710	2.880	67,600	74,400	9,700	10,800
	0.156	0.148	1.688	3.080	72,300	79,500	10,500	11,700
	0.165	0.157	1.670	3.242	76,100	83,700	11,200	12,400
	0.175	0.167	1.650	3.419	80,300	88,300	11,800	13,100
	0.190	0.178	1.620	3.682	86,400	95,100	12,600	14,000
	0.204	0.192	1.592	3.923	92,100	101,300	13,500	15,000
	0.224	0.212	1.552	4.259	100,000	110,000	14,900	16,500
	0.250	0.238	1.500	4.684	110,000	121,000	16,600	18,400
	0.280	0.265	1.440	5.156	121,000	133,100	17,500	20,300
2.375	0.125	0.117	2.125	3.011	70,700	77,800	7,000	7,800
	0.134	0.126	2.107	3.215	75,500	83,000	7,600	8,400
	0.145	0.137	2.085	3.462	81,300	89,400	8,300	9,200
	0.156	0.148	2.063	3.706	87,000	95,700	8,900	9,900
	0.165	0.157	2.045	3.904	91,600	100,800	9,500	10,500
	0.175	0.167	2.025	4.122	96,800	106,400	10,000	11,100
	0.190	0.178	1.995	4.445	104,300	114,800	10,600	11,800
	0.204	0.192	1.967	4.742	111,300	122,400	11,400	12,700
	0.224	0.212	1.927	5.159	121,100	133,200	12,600	14,000
	0.250	0.238	1.875	5.688	133,500	146,900	14,000	15,600
	0.280	0.265	1.815	6.280	147,400	162,200	15,600	17,300
0.300	0.285	1.775	6.665	156,500	172,100	16,700	18,500	
2.625	0.134	0.126	2.357	3.574	83,900	92,300	6,800	7,600
	0.145	0.137	2.335	3.850	90,400	99,400	7,500	8,300
	0.156	0.148	2.313	4.124	96,800	106,500	8,000	8,900
	0.165	0.157	2.295	4.346	102,000	112,200	8,600	9,500
	0.175	0.167	2.275	4.590	107,800	118,500	9,100	10,100
	0.190	0.178	2.245	4.953	116,300	127,900	9,600	10,700
	0.204	0.192	2.217	5.288	124,100	136,500	10,400	11,500
	0.224	0.212	2.177	5.758	135,200	148,700	11,400	12,700
	0.250	0.238	2.125	6.357	149,200	164,100	12,800	14,200
	0.280	0.265	2.065	7.030	165,000	181,500	14,100	15,700
0.300	0.285	2.025	7.468	175,300	192,800	15,200	16,900	
2.875	0.145	0.137	2.585	4.238	99,500	109,400	6,800	7,600
	0.156	0.148	2.563	4.541	106,600	117,300	7,400	8,200
	0.165	0.157	2.545	4.787	112,400	123,600	7,800	8,700
	0.175	0.167	2.525	5.059	118,800	130,600	8,300	9,200
	0.190	0.178	2.495	5.462	128,200	141,000	8,800	9,800
	0.204	0.192	2.467	5.834	136,900	150,600	9,500	10,600
	0.224	0.212	2.427	6.358	149,200	164,200	10,400	11,600
	0.250	0.238	2.375	7.026	164,900	181,400	11,700	13,000
	0.280	0.265	2.315	7.779	182,600	200,900	13,000	14,400
	0.300	0.285	2.275	8.271	194,200	213,600	14,000	15,500
3.500	0.175	0.167	3.150	6.230	146,200	160,900	6,800	7,600
	0.190	0.178	3.120	6.733	158,100	173,900	7,300	8,100
	0.204	0.192	3.092	7.199	169,000	185,900	7,800	8,700
	0.224	0.212	3.052	7.857	184,400	202,900	8,600	9,600
	0.250	0.238	3.000	8.699	204,200	224,600	9,700	10,800
	0.280	0.265	2.940	9.653	226,600	249,300	10,700	11,900
	0.300	0.285	2.900	10.278	241,300	265,400	11,500	12,800
4.500	0.224	0.212	4.052	10.255	240,700	264,800	6,800	7,500
	0.250	0.238	4.000	11.376	267,000	293,700	7,600	8,400
	0.280	0.265	3.940	12.651	297,000	326,700	8,400	9,300
	0.300	0.285	3.900	13.490	316,700	348,300	9,000	10,000

HS-90™ (CT90) | 1.000" TO 1.750"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
1.000	0.087	0.082	0.826	0.850	22,500	24,200	13,100	14,500
	0.095	0.090	0.810	0.920	24,300	26,200	14,300	15,900
	0.102	0.097	0.796	0.981	25,900	27,900	15,300	17,000
	0.109	0.104	0.782	1.040	27,500	29,600	16,400	18,200
	0.116	0.108	0.768	1.098	29,000	31,200	17,000	18,900
	0.125	0.117	0.750	1.171	30,900	33,300	17,500	20,300
	0.134	0.126	0.732	1.242	32,800	35,400	17,500	21,800
1.250	0.087	0.082	1.076	1.083	28,600	30,800	10,500	11,700
	0.095	0.090	1.060	1.175	31,000	33,400	11,500	12,800
	0.102	0.097	1.046	1.254	33,100	35,700	12,400	13,800
	0.109	0.104	1.032	1.332	35,200	37,900	13,200	14,700
	0.116	0.108	1.018	1.408	37,200	40,100	13,800	15,300
	0.125	0.117	1.000	1.506	39,800	42,900	14,900	16,500
	0.134	0.126	0.982	1.601	42,300	45,600	15,900	17,700
	0.145	0.137	0.960	1.715	45,300	48,800	17,200	19,100
	0.156	0.148	0.938	1.827	48,300	52,000	17,500	20,600
	0.165	0.157	0.920	1.917	50,600	54,600	17,500	21,700
0.175	0.167	0.900	2.014	53,200	57,300	17,500	23,000	
1.500	0.087	0.082	1.326	1.316	34,800	37,500	8,800	9,800
	0.095	0.090	1.310	1.429	37,700	40,700	9,600	10,700
	0.102	0.097	1.296	1.527	40,300	43,500	10,400	11,500
	0.109	0.104	1.282	1.623	42,900	46,200	11,100	12,300
	0.116	0.108	1.268	1.719	45,400	48,900	11,500	12,800
	0.125	0.117	1.250	1.840	48,600	52,400	12,400	13,800
	0.134	0.126	1.232	1.960	51,800	55,800	13,400	14,900
	0.145	0.137	1.210	2.104	55,600	59,900	14,500	16,100
	0.156	0.148	1.188	2.245	59,300	63,900	15,600	17,300
	0.165	0.157	1.170	2.358	62,300	67,100	16,500	18,300
	0.175	0.167	1.150	2.483	65,600	70,700	17,500	19,400
	0.190	0.178	1.120	2.665	70,400	75,800	17,500	20,600
0.204	0.192	1.092	2.831	74,800	80,600	17,500	22,100	
1.750	0.087	0.082	1.576	1.549	40,900	44,100	7,600	8,400
	0.095	0.090	1.560	1.683	44,500	47,900	8,300	9,200
	0.102	0.097	1.546	1.800	47,500	51,200	8,900	9,900
	0.109	0.104	1.532	1.915	50,600	54,500	9,500	10,600
	0.116	0.108	1.518	2.029	53,600	57,800	9,900	11,000
	0.125	0.117	1.500	2.175	57,400	61,900	10,700	11,900
	0.134	0.126	1.482	2.318	61,200	66,000	11,500	12,800
	0.145	0.137	1.460	2.492	65,800	70,900	12,500	13,900
	0.156	0.148	1.438	2.662	70,300	75,800	13,400	14,900
	0.165	0.157	1.420	2.800	73,900	79,700	14,200	15,800
	0.175	0.167	1.400	2.951	77,900	84,000	15,100	16,800
	0.190	0.178	1.370	3.173	83,800	90,300	16,000	17,800
	0.204	0.192	1.342	3.377	89,200	96,100	17,300	19,200
	0.224	0.212	1.302	3.660	96,600	104,200	17,500	21,000
	0.250	0.238	1.250	4.015	106,000	114,300	17,500	23,400

HS-90™ (CT90) | 2.000" TO 4.500"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
2.000	0.102	0.097	1.796	2.073	54,700	59,000	7,800	8,700
	0.109	0.104	1.782	2.207	58,300	62,800	8,400	9,300
	0.116	0.108	1.768	2.340	61,800	66,600	8,600	9,600
	0.125	0.117	1.750	2.509	66,300	71,400	9,400	10,400
	0.134	0.126	1.732	2.677	70,700	76,200	10,100	11,200
	0.145	0.137	1.710	2.880	76,100	82,000	11,000	12,200
	0.156	0.148	1.688	3.080	81,300	87,700	11,800	13,100
	0.165	0.157	1.670	3.242	85,600	92,300	12,500	13,900
	0.175	0.167	1.650	3.419	90,300	97,300	13,300	14,800
	0.190	0.178	1.620	3.682	97,200	104,800	14,100	15,700
	0.204	0.192	1.592	3.923	103,600	111,600	15,200	16,900
	0.224	0.212	1.552	4.259	112,500	121,200	16,700	18,500
	0.250	0.238	1.500	4.684	123,700	133,300	17,500	20,700
	0.280	0.265	1.440	5.156	136,200	146,800	17,500	22,800
2.375	0.125	0.117	2.125	3.011	79,500	85,700	7,900	8,800
	0.134	0.126	2.107	3.215	84,900	91,500	8,600	9,500
	0.145	0.137	2.085	3.462	91,400	98,500	9,300	10,300
	0.156	0.148	2.063	3.706	97,900	105,500	10,000	11,100
	0.165	0.157	2.045	3.904	103,100	111,100	10,600	11,800
	0.175	0.167	2.025	4.122	108,900	117,300	11,300	12,500
	0.190	0.178	1.995	4.445	117,400	126,500	12,000	13,300
	0.204	0.192	1.967	4.742	125,200	135,000	12,900	14,300
	0.224	0.212	1.927	5.159	136,200	146,800	14,100	15,700
	0.250	0.238	1.875	5.688	150,200	161,900	15,800	17,600
2.625	0.134	0.126	2.357	3.574	94,400	101,700	7,700	8,600
	0.145	0.137	2.335	3.850	101,700	109,600	8,400	9,300
	0.156	0.148	2.313	4.124	108,900	117,400	9,100	10,100
	0.165	0.157	2.295	4.346	114,800	123,700	9,600	10,700
	0.175	0.167	2.275	4.590	121,200	130,700	10,200	11,300
	0.190	0.178	2.245	4.953	130,800	141,000	10,900	12,100
	0.204	0.192	2.217	5.288	139,600	150,500	11,700	13,000
	0.224	0.212	2.177	5.758	152,100	163,900	12,900	14,300
	0.250	0.238	2.125	6.357	167,900	180,900	14,400	16,000
	0.280	0.265	2.065	7.030	185,600	200,100	15,900	17,700
2.875	0.145	0.137	2.585	4.238	111,900	120,600	7,700	8,500
	0.156	0.148	2.563	4.541	119,900	129,300	8,300	9,200
	0.165	0.157	2.545	4.787	126,400	136,300	8,800	9,800
	0.175	0.167	2.525	5.059	133,600	144,000	9,400	10,400
	0.190	0.178	2.495	5.462	144,200	155,500	9,900	11,000
	0.204	0.192	2.467	5.834	154,100	166,000	10,700	11,900
	0.224	0.212	2.427	6.358	167,900	181,000	11,800	13,100
	0.250	0.238	2.375	7.026	185,600	200,000	13,100	14,600
	0.280	0.265	2.315	7.779	205,400	221,400	14,600	16,200
3.500	0.175	0.167	3.150	6.230	164,500	177,300	7,700	8,500
	0.190	0.178	3.120	6.733	177,800	191,600	8,200	9,100
	0.204	0.192	3.092	7.199	190,100	204,900	8,800	9,800
	0.224	0.212	3.052	7.857	207,500	223,600	9,700	10,800
	0.250	0.238	3.000	8.699	229,700	247,600	10,900	12,100
4.500	0.280	0.265	2.940	9.653	254,900	274,700	12,100	13,400
	0.224	0.212	4.052	10.255	270,800	291,900	7,600	8,400
	0.250	0.238	4.000	11.376	300,400	323,800	8,600	9,500
	0.280	0.265	3.940	12.651	334,100	360,100	9,500	10,500

HS-100™ (CT100) | 1.250" TO 2.000"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
1.250	0.087	0.082	1.076	1.083	31,800	34,300	11,700	13,000
	0.095	0.090	1.060	1.175	34,500	37,200	12,800	14,200
	0.102	0.097	1.046	1.254	36,800	39,700	13,800	15,300
	0.109	0.104	1.032	1.332	39,100	42,200	14,700	16,300
	0.116	0.108	1.018	1.408	41,300	44,600	15,300	17,000
	0.125	0.117	1.000	1.506	44,200	47,700	16,500	18,300
	0.134	0.126	0.982	1.601	47,000	50,700	17,500	19,600
	0.145	0.137	0.960	1.715	50,300	54,400	17,500	21,300
	0.156	0.148	0.938	1.827	53,600	57,900	17,500	22,800
	0.165	0.157	0.920	1.917	56,200	60,700	17,500	24,100
0.175	0.167	0.900	2.014	59,100	63,800	17,500	25,500	
1.500	0.087	0.082	1.326	1.316	38,600	41,700	9,800	10,900
	0.095	0.090	1.310	1.429	41,900	45,300	10,700	11,900
	0.102	0.097	1.296	1.527	44,800	48,400	11,500	12,800
	0.109	0.104	1.282	1.623	47,600	51,400	12,300	13,700
	0.116	0.108	1.268	1.719	50,400	54,500	12,800	14,200
	0.125	0.117	1.250	1.840	54,000	58,300	13,900	15,400
	0.134	0.126	1.232	1.960	57,500	62,100	14,900	16,500
	0.145	0.137	1.210	2.104	61,700	66,700	16,100	17,900
	0.156	0.148	1.188	2.245	65,900	71,100	17,300	19,200
	0.165	0.157	1.170	2.358	69,200	74,700	17,500	20,400
0.175	0.167	1.150	2.483	72,800	78,700	17,500	21,600	
0.190	0.178	1.120	2.665	78,200	84,400	17,500	22,900	
0.204	0.192	1.092	2.831	83,100	89,700	17,500	24,600	
1.750	0.087	0.082	1.576	1.549	45,500	49,100	8,400	9,300
	0.095	0.090	1.560	1.683	49,400	53,300	9,200	10,200
	0.102	0.097	1.546	1.800	52,800	57,000	9,900	11,000
	0.109	0.104	1.532	1.915	56,200	60,700	10,600	11,800
	0.116	0.108	1.518	2.029	59,500	64,300	11,000	12,200
	0.125	0.117	1.500	2.175	63,800	68,900	11,900	13,200
	0.134	0.126	1.482	2.318	68,000	73,500	12,800	14,200
	0.145	0.137	1.460	2.492	73,100	79,000	13,900	15,400
	0.156	0.148	1.438	2.662	78,100	84,400	14,900	16,600
	0.165	0.157	1.420	2.800	82,200	88,700	15,800	17,600
0.175	0.167	1.400	2.951	86,600	93,500	16,700	18,600	
0.190	0.178	1.370	3.173	93,100	100,600	17,500	19,800	
0.204	0.192	1.342	3.377	99,100	107,000	17,500	21,300	
0.224	0.212	1.302	3.660	107,400	116,000	17,500	23,300	
0.250	0.238	1.250	4.015	117,800	127,200	17,500	25,900	
2.000	0.102	0.097	1.796	2.073	60,800	65,700	8,600	9,600
	0.109	0.104	1.782	2.207	64,800	69,900	9,300	10,300
	0.116	0.108	1.768	2.340	68,700	74,200	9,600	10,700
	0.125	0.117	1.750	2.509	73,600	79,500	10,400	11,600
	0.134	0.126	1.732	2.677	78,600	84,800	11,300	12,500
	0.145	0.137	1.710	2.880	84,500	91,300	12,200	13,500
	0.156	0.148	1.688	3.080	90,400	97,600	13,100	14,600
	0.165	0.157	1.670	3.242	95,100	102,700	14,000	15,500
	0.175	0.167	1.650	3.419	100,300	108,400	14,800	16,400
	0.190	0.178	1.620	3.682	108,000	116,700	15,700	17,400
0.204	0.192	1.592	3.923	115,100	124,300	16,900	18,800	
0.224	0.212	1.552	4.259	125,000	135,000	17,500	20,600	
0.250	0.238	1.500	4.684	137,400	148,400	17,500	23,000	
0.280	0.265	1.440	5.156	151,300	163,400	17,500	25,300	

HS-100™ (CT100) | 2.375" TO 4.500"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
2.375	0.116	0.108	2.143	2.806	82,300	88,900	8,100	9,000
	0.125	0.117	2.125	3.011	88,400	95,400	8,800	9,800
	0.134	0.126	2.107	3.215	94,300	101,900	9,500	10,500
	0.145	0.137	2.085	3.462	101,600	109,700	10,300	11,400
	0.156	0.148	2.063	3.706	108,800	117,500	11,100	12,300
	0.165	0.157	2.045	3.904	114,600	123,700	11,800	13,100
	0.175	0.167	2.025	4.122	121,000	130,600	12,500	13,900
	0.190	0.178	1.995	4.445	130,400	140,900	13,300	14,800
	0.204	0.192	1.967	4.742	139,100	150,300	14,300	15,900
	0.224	0.212	1.927	5.159	151,400	163,500	15,800	17,500
2.625	0.134	0.126	2.357	3.574	104,900	113,300	8,600	9,500
	0.145	0.137	2.335	3.850	113,000	122,000	9,400	10,400
	0.156	0.148	2.313	4.124	121,000	130,700	10,100	11,200
	0.165	0.157	2.295	4.346	127,500	137,700	10,700	11,900
	0.175	0.167	2.275	4.590	134,700	145,500	11,300	12,600
	0.190	0.178	2.245	4.953	145,300	157,000	12,100	13,400
	0.204	0.192	2.217	5.288	155,200	167,600	13,000	14,400
	0.224	0.212	2.177	5.758	169,000	182,500	14,300	15,900
	0.250	0.238	2.125	6.357	186,500	201,500	16,000	17,800
	0.280	0.265	2.065	7.030	206,300	222,800	17,500	19,700
2.875	0.145	0.137	2.585	4.238	124,400	134,300	8,600	9,500
	0.156	0.148	2.563	4.541	133,300	143,900	9,200	10,200
	0.165	0.157	2.545	4.787	140,500	151,700	9,700	10,800
	0.175	0.167	2.525	5.059	148,400	160,300	10,400	11,500
	0.190	0.178	2.495	5.462	160,300	173,100	11,100	12,300
	0.204	0.192	2.467	5.834	171,200	184,900	11,900	13,200
	0.224	0.212	2.427	6.358	186,600	201,500	13,100	14,500
	0.250	0.238	2.375	7.026	206,200	222,700	14,700	16,300
3.500	0.175	0.167	3.150	6.230	182,800	197,400	8,600	9,500
	0.190	0.178	3.120	6.733	197,600	213,400	9,100	10,100
	0.204	0.192	3.092	7.199	211,200	228,100	9,800	10,900
	0.224	0.212	3.052	7.857	230,500	249,000	10,800	12,000
	0.250	0.238	3.000	8.699	255,300	275,700	12,100	13,400
	0.280	0.265	2.940	9.653	283,200	305,900	13,400	14,900
4.500	0.224	0.212	4.052	10.255	300,900	325,000	8,500	9,400
	0.250	0.238	4.000	11.376	333,800	360,500	9,500	10,500
	0.280	0.265	3.940	12.651	371,200	400,900	10,500	11,700

HS-110™ (CT110) | 1.250" TO 2.000"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
1.250	0.087	0.082	1.076	1.083	35,000	36,600	12,900	14,300
	0.095	0.090	1.060	1.175	37,900	39,600	14,000	15,600
	0.102	0.097	1.046	1.254	40,500	42,300	15,100	16,800
	0.109	0.104	1.032	1.332	43,000	44,900	16,200	18,000
	0.116	0.108	1.018	1.408	45,500	47,500	16,700	18,600
	0.125	0.117	1.000	1.506	48,600	50,800	17,500	20,100
	0.134	0.126	0.982	1.601	51,700	54,000	17,500	21,600
	0.145	0.137	0.960	1.715	55,400	57,900	17,500	23,400
	0.156	0.148	0.938	1.827	59,000	61,700	17,500	25,100
	0.165	0.157	0.920	1.917	61,900	64,700	17,500	26,500
0.175	0.167	0.900	2.014	65,000	68,000	17,500	28,100	
1.500	0.087	0.082	1.326	1.316	42,500	44,400	10,700	11,900
	0.095	0.090	1.310	1.429	46,100	48,200	11,800	13,100
	0.102	0.097	1.296	1.527	49,300	51,500	12,700	14,100
	0.109	0.104	1.282	1.623	52,400	54,800	13,600	15,100
	0.116	0.108	1.268	1.719	55,500	58,000	14,000	15,600
	0.125	0.117	1.250	1.840	59,400	62,100	15,200	16,900
	0.134	0.126	1.232	1.960	63,300	66,100	16,400	18,200
	0.145	0.137	1.210	2.104	67,900	71,000	17,500	19,700
	0.156	0.148	1.188	2.245	72,500	75,700	17,500	21,200
	0.165	0.157	1.170	2.358	76,100	79,600	17,500	22,400
0.175	0.167	1.150	2.483	80,100	83,800	17,500	23,700	
0.190	0.178	1.120	2.665	86,000	89,900	17,500	25,200	
0.204	0.192	1.092	2.831	91,400	95,500	17,500	27,000	
1.750	0.087	0.082	1.576	1.549	50,000	52,300	9,300	10,300
	0.095	0.090	1.560	1.683	54,300	56,800	10,100	11,200
	0.102	0.097	1.546	1.800	58,100	60,700	10,900	12,100
	0.109	0.104	1.532	1.915	61,800	64,600	11,700	13,000
	0.116	0.108	1.518	2.029	65,500	68,500	12,100	13,400
	0.125	0.117	1.500	2.175	70,200	73,400	13,100	14,500
	0.134	0.126	1.482	2.318	74,800	78,200	14,000	15,600
	0.145	0.137	1.460	2.492	80,400	84,100	15,300	17,000
	0.156	0.148	1.438	2.662	85,900	89,800	16,500	18,300
	0.165	0.157	1.420	2.800	90,400	94,500	17,400	19,300
0.175	0.167	1.400	2.951	95,200	99,600	17,500	20,500	
0.190	0.178	1.370	3.173	102,400	107,100	17,500	21,800	
0.204	0.192	1.342	3.377	109,000	113,900	17,500	23,400	
0.224	0.212	1.302	3.660	118,100	123,500	17,500	25,700	
0.250	0.238	1.250	4.015	129,600	135,500	17,500	28,500	
2.000	0.102	0.097	1.796	2.073	66,900	69,900	9,500	10,600
	0.109	0.104	1.782	2.207	71,200	74,500	10,300	11,400
	0.116	0.108	1.768	2.340	75,500	79,000	10,600	11,800
	0.125	0.117	1.750	2.509	81,000	84,700	11,500	12,800
	0.134	0.126	1.732	2.677	86,400	90,300	12,300	13,700
	0.145	0.137	1.710	2.880	93,000	97,200	13,400	14,900
	0.156	0.148	1.688	3.080	99,400	103,900	14,500	16,100
	0.165	0.157	1.670	3.242	104,600	109,400	15,300	17,000
	0.175	0.167	1.650	3.419	110,400	115,400	16,200	18,000
	0.190	0.178	1.620	3.682	118,800	124,200	17,300	19,200
0.204	0.192	1.592	3.923	126,600	132,400	17,500	20,600	
0.224	0.212	1.552	4.259	137,500	143,700	17,500	22,700	
0.250	0.238	1.500	4.684	151,200	158,100	17,500	25,300	
0.280	0.265	1.440	5.156	166,400	174,000	17,500	27,900	

HS-110™ (CT110) | 2.375" TO 4.500"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
2.375	0.116	0.108	2.143	2.806	90,600	94,700	9,000	10,000
	0.125	0.117	2.125	3.011	97,200	101,600	9,700	10,800
	0.134	0.126	2.107	3.215	103,800	108,500	10,400	11,600
	0.145	0.137	2.085	3.462	111,700	116,800	11,300	12,600
	0.156	0.148	2.063	3.706	119,600	125,100	12,200	13,600
	0.165	0.157	2.045	3.904	126,000	131,700	13,000	14,400
	0.175	0.167	2.025	4.122	133,000	139,100	13,800	15,300
	0.190	0.178	1.995	4.445	143,500	150,000	14,700	16,300
	0.204	0.192	1.967	4.742	153,000	160,000	15,800	17,500
	0.224	0.212	1.927	5.159	166,500	174,100	17,300	19,200
	0.250	0.238	1.875	5.688	183,600	191,900	17,500	21,500
	0.280	0.265	1.815	6.280	202,700	211,900	17,500	23,800
2.625	0.134	0.126	2.357	3.574	115,400	120,600	9,500	10,500
	0.145	0.137	2.335	3.850	124,300	129,900	10,300	11,400
	0.156	0.148	2.313	4.124	133,100	139,200	11,100	12,300
	0.165	0.157	2.295	4.346	140,300	146,600	11,700	13,000
	0.175	0.167	2.275	4.590	148,200	154,900	12,500	13,900
	0.190	0.178	2.245	4.953	159,900	167,100	13,200	14,700
	0.204	0.192	2.217	5.288	170,700	178,400	14,300	15,900
	0.224	0.212	2.177	5.758	185,900	194,300	15,800	17,500
	0.250	0.238	2.125	6.357	205,200	214,500	17,500	19,500
	0.280	0.265	2.065	7.030	226,900	237,200	17,500	21,600
2.875	0.145	0.137	2.585	4.238	136,800	143,000	9,400	10,400
	0.156	0.148	2.563	4.541	146,600	153,200	10,100	11,200
	0.165	0.157	2.545	4.787	154,500	161,500	10,700	11,900
	0.175	0.167	2.525	5.059	163,300	170,700	11,400	12,700
	0.190	0.178	2.495	5.462	176,300	184,300	12,200	13,500
	0.204	0.192	2.467	5.834	188,300	196,900	13,100	14,500
	0.224	0.212	2.427	6.358	205,200	214,500	14,400	16,000
	0.250	0.238	2.375	7.026	226,800	237,100	16,100	17,900
	0.280	0.265	2.315	7.779	251,100	262,500	17,500	19,800
	3.500	0.175	0.167	3.150	6.230	201,100	210,200	9,400
0.190		0.178	3.120	6.733	217,300	227,200	10,000	11,100
0.204		0.192	3.092	7.199	232,400	242,900	10,800	12,000
0.224		0.212	3.052	7.857	253,600	265,100	11,900	13,200
0.250		0.238	3.000	8.699	280,800	293,500	13,300	14,800
0.280		0.265	2.940	9.653	311,600	325,700	14,800	16,400
4.500	0.224	0.212	4.052	10.255	331,000	346,000	9,300	10,300
	0.250	0.238	4.000	11.376	367,200	383,900	10,400	11,600
	0.280	0.265	3.940	12.651	408,300	426,900	11,500	12,800

HS-80 CRA™ | 0.375" TO 0.875"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
0.375	0.035	0.030	0.305	0.125	3,000	4,100	11,300	12,600
	0.050	0.045	0.275	0.171	4,100	5,600	16,700	18,500
	0.065	0.060	0.245	0.212	5,100	7,000	17,500	24,000
	0.075	0.070	0.225	0.237	5,700	7,800	17,500	27,400
0.500	0.035	0.030	0.430	0.171	4,100	5,600	8,600	9,500
	0.050	0.045	0.400	0.237	5,700	7,800	12,700	14,100
	0.065	0.060	0.370	0.297	7,100	9,800	16,700	18,500
	0.075	0.070	0.350	0.335	8,000	11,000	17,500	21,300
	0.090	0.085	0.320	0.388	9,300	12,800	17,500	25,300
0.625	0.035	0.030	0.555	0.217	5,200	7,100	6,800	7,600
	0.050	0.045	0.525	0.302	7,200	9,900	10,300	11,400
	0.065	0.060	0.495	0.383	9,100	12,600	13,500	15,000
	0.075	0.070	0.475	0.434	10,400	14,300	15,700	17,400
	0.090	0.085	0.445	0.506	12,100	16,600	17,500	20,800
	0.100	0.095	0.425	0.552	13,200	18,100	17,500	22,900
	0.109	0.104	0.407	0.592	14,100	19,400	17,500	24,800
	0.125	0.117	0.375	0.657	15,700	21,600	17,500	27,400
0.750	0.035	0.030	0.680	0.263	6,300	8,600	5,800	6,400
	0.050	0.045	0.650	0.368	8,800	12,100	8,600	9,500
	0.065	0.060	0.620	0.468	11,200	15,400	11,300	12,600
	0.075	0.070	0.600	0.532	12,700	17,500	13,100	14,600
	0.090	0.085	0.570	0.625	14,900	20,500	15,800	17,500
	0.100	0.095	0.550	0.684	16,300	22,500	17,500	19,500
	0.109	0.104	0.532	0.735	17,600	24,100	17,500	21,100
	0.125	0.117	0.500	0.822	19,600	27,000	17,500	23,500
	0.134	0.126	0.482	0.868	20,700	28,500	17,500	25,000
0.875	0.050	0.045	0.775	0.434	10,400	14,300	7,400	8,200
	0.065	0.060	0.745	0.554	13,200	18,200	9,700	10,800
	0.075	0.070	0.725	0.631	15,100	20,700	11,300	12,600
	0.090	0.085	0.695	0.743	17,800	24,400	13,700	15,200
	0.100	0.095	0.675	0.815	19,500	26,800	15,200	16,900
	0.109	0.104	0.657	0.878	21,000	28,900	16,500	18,300
	0.125	0.117	0.625	0.986	23,600	32,400	17,500	20,400
	0.134	0.126	0.607	1.044	25,000	34,300	17,500	21,900
	0.153	0.145	0.569	1.162	27,800	38,200	17,500	24,700

HS-80 CRA™ | 1.000" TO 2.000"

DIMENSIONS				NOMINAL WEIGHT	TUBE LOAD BODY		INTERNAL PRESSURE	
Specified OD	Specified Wall	Wall Minimum	ID Calculated		Yield Minimum	Tensile Minimum	Hydro Test Pressure	Internal Yield Minimum
in	in	in	in	lb/ft	lb	lb	psi	psi
1.000	0.050	0.045	0.900	0.500	11,900	16,400	6,500	7,200
	0.065	0.060	0.870	0.639	15,300	21,000	8,600	9,500
	0.075	0.070	0.850	0.730	17,400	24,000	10,000	11,100
	0.090	0.085	0.820	0.861	20,600	28,300	12,100	13,400
	0.100	0.095	0.800	0.947	22,600	31,100	13,400	14,900
	0.109	0.104	0.782	1.022	24,400	33,600	14,600	16,200
	0.125	0.117	0.750	1.150	27,500	37,800	16,300	18,100
	0.134	0.126	0.732	1.221	29,200	40,100	17,500	19,400
	0.153	0.145	0.694	1.363	32,600	44,800	17,500	22,000
1.250	0.050	0.045	1.150	0.631	15,100	20,700	5,100	5,700
	0.065	0.060	1.120	0.810	19,400	26,600	6,800	7,600
	0.075	0.070	1.100	0.927	22,100	30,500	8,000	8,900
	0.090	0.085	1.070	1.098	26,200	36,100	9,700	10,800
	0.100	0.095	1.050	1.210	28,900	39,700	10,800	12,000
	0.109	0.104	1.032	1.308	31,300	43,000	11,800	13,100
	0.125	0.117	1.000	1.479	35,300	48,600	13,100	14,600
	0.134	0.126	0.982	1.573	37,600	51,700	14,100	15,700
	0.153	0.145	0.944	1.765	42,200	58,000	16,100	17,900
1.500	0.065	0.060	1.370	0.981	23,400	32,200	5,800	6,400
	0.075	0.070	1.350	1.124	26,900	36,900	6,700	7,400
	0.090	0.085	1.320	1.335	31,900	43,900	8,100	9,000
	0.100	0.095	1.300	1.473	35,200	48,400	9,000	10,000
	0.109	0.104	1.282	1.595	38,100	52,400	9,900	11,000
	0.125	0.117	1.250	1.808	43,200	59,400	11,100	12,300
	0.134	0.126	1.232	1.925	46,000	63,300	11,900	13,200
	0.153	0.145	1.194	2.168	51,800	71,200	13,600	15,100
1.750	0.075	0.070	1.600	1.321	31,600	43,400	5,800	6,400
	0.090	0.085	1.570	1.571	37,500	51,600	6,900	7,700
	0.100	0.095	1.550	1.735	41,500	57,000	7,700	8,600
	0.109	0.104	1.532	1.881	45,000	61,800	8,500	9,400
	0.125	0.117	1.500	2.136	51,100	70,200	9,500	10,600
	0.134	0.126	1.482	2.278	54,400	74,800	10,300	11,400
	0.153	0.145	1.444	2.570	61,400	84,400	11,700	13,000
2.000	0.090	0.085	1.820	1.808	43,200	59,400	6,100	6,800
	0.100	0.095	1.800	1.998	47,800	65,700	6,800	7,600
	0.109	0.104	1.782	2.168	51,800	71,200	7,500	8,300
	0.125	0.117	1.750	2.465	58,900	81,000	8,400	9,300
	0.134	0.126	1.732	2.630	62,800	86,400	9,000	10,000
	0.153	0.145	1.694	2.972	71,000	97,700	10,300	11,400



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