

WATER TREATMENT & PURIFICATION

Product Catalog



Providing the Clear Choice

WATER TREATMENT & PURIFICATION PRODUCT CATALOG

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Maxim Overview

Maxim Evaporators of America, LLC, dba Maxim Watermakers has been serving the U.S. Military as an OEM for more than 70 years and is dedicated to water treatment and water handling technologies.

Maxim is the subject matter expert for freshwater generation, water treatment, and seawater cooling technologies. Maxim has manufactured more than 5,600 units for use around the world in military, commercial marine, and offshore oil and gas applications. Our proven approach is to partner with clients to understand their needs and match their needs with the right solutions. Maxim has and continues to be able to design systems that meet program requirements while making recommendations aimed at equipment reliability and longevity. As demonstrated, Maxim continues to work with Industry partners and bring solutions to the customer while supporting lifecycle requirements of Maxim equipment, including working closely with Prime Contractors, NAVSEA, NSWC-PHD, associated ISEAs and other organizations like NAVSUP/DLA.

Maxim's engineering design areas of expertise include product design, structural engineering, and piping system design. Maxim has and continues to design and build equipment to meet MIL-STD and related EQT requirements. Equipment cost is competitive, minimizes maintenance requirements and uses modern and readily available components. Maxim can reverse engineer components and systems that can no longer

be sourced from other suppliers, minimizing the impacts of parts obsolescence, and evaluate existing mechanical equipment for fitness of service.

As a fabricator, our capabilities include structural fabrication, piping assembly fabrication, and machining (turning, Computer Numerical Control (CNC) milling/drilling, radial mill, manual/horizontal/vertical milling, sawing, surface grinding). Maxim is well versed in working with a wide array of materials, including 90/10 and 70/30 CuNi, 304/316 Stainless Steel (SS), Super Duplex SS, Carbon and High Strength Low Alloy (HSLA) steels.

Welding methods include GTAW, FCAW, SMAW and GMAW and are supported by Maxim's Tech Pub 278 compliant Welder Workmanship Program. This was developed in accordance with Appendix K; Section VII, NNS, "Procedure Welder Workmanship Training for Subcontractors" as approved by Newport News Shipbuilding and Electric Boat. Tech pubs most commonly applicable to Maxim projects are 278, 271 and 248.

Maxim has an onsite clean room adhering to MIL-STD-767F. Maxim offers NDT using contracted NDT personnel qualified in accordance with SNT-TC-1A. All NDT procedures adhere to Tech Pub 271. With an ISO 9001:2015 certified Quality Management System, Maxim provides products and services that consistently meet or exceed customer specifications and requirements.

Maxim is supplying critical equipment for DDG 51 Flight III and the Constellation Class Frigates. Maxim is also manufacturing equipment for Heritage-Class Cutters, Phase II. Maxim has also supplied equipment for, including but not limited to, CVN 68-77, LA Class SSN, USNS Comfort, USNS Mercy, USCGC Polar Star, USCGC Polar Sea, USCGC Healy, Navajo-class T-ATS ships, Frank Cable & Emory S. Land submarine tenders.

At Maxim, we bring solutions to the Warfighter at-sea, and on land, to support sustained superior combat readiness with the highest possible system operational availability.

Facilities Overview

Manufacturing & Machining Capabilities

Maxim Watermakers has a 50,000 square foot manufacturing facility. Maxim offers structural fabrication, piping assembly fabrication, electrical controls, installation/integration, and machining.

Materials of Construction:

- 90/10 CuNi
- 70/30 CuNi
- Bronze
- Monel
- 304 & 316 Stainless Steels
- Duplex Stainless Steel
- Super Duplex Stainless Steel
- Other materials as needed

Pipe/Tube Sizes:

- Schedule 10S
- Schedule 40
- Schedule 80
- Class 200
- Class 700
- Class 1650
- Class 3300
- Others as needed

Machining Capabilities:

- Horizontal Boring Mill – allows machining on items as large as 122" x 165" and weighing as much as 70,000 lbs.
- Ironworker
- Turning
- CNC milling & drilling
- Radial mill
- Manual/horizontal/vertical milling
- Sawing
- Surface grinding

Maxim is also able to perform Noise Testing to MIL-STD-740-1 and 740-2

Quality

Maxim Watermakers is ISO 9001:2015 certified. The ISO 9001:2015 standard combines the principles of organizational context, leadership commitment, risk-based analysis and continual improvement to create the foundation for internal and external customer satisfaction. The guiding principles for Maxim have always been customer focused, striving to meet and exceed expectations. Being ISO certified further highlights our commitment to quality, continual improvement and our customers. Customer satisfaction, continual improvement, and prevention of nonconformities are addressed through the effective application of this system.

- Ensures material control and segregation
- Clean room adheres to MIL-STD-767F
- Dedicated manufacturing & quality plans created for each individual project
- Customer approval obtained prior to project start
- Ensures adherence to all fabrication processes and provides traceability
- Documentation of all completed quality processes
- Non-Destructive Testing performed according to customer and/or project requirements
- Welder Qualification

FMD – Overview

Stacking the decks with best-in-class marine technologies and service solutions. Fairbanks Morse Defense has mastered that balance over more than a century, configuring the delivery of every customer engagement to meet the needs of the moment. We deliver an advantage to the U.S. Fleet with a growing array of best-in-class marine technologies, OEM parts, and turnkey services – all from a single, trusted source.



Sales & Service Support

Maxim's legacy has and continues to be the development of water treatment technologies that meet the needs of the industry. Maxim continues to work with clients to provide solutions for water-related needs, both offshore & onshore.

We want you to be able to make an informed decision about the technological, operational, and financial investment that comes with the purchase of your water treatment equipment.

The Choice is CLEAR!

C - Competitive Capital Costs & Low Maintenance Costs

L - Longevity

E - Environmentally Friendly

A - "After the Sale" Service




R - Reliability

Maxim Watermakers

6702 Linwood Ave
Shreveport, LA 71106
Maxim.info@fmdefense.com

Our Locations



-  Service Centers
-  Manufacturing Facilities
-  International Service Partners

Fairbanks Morse Defense

701 White Avenue
Beloit, WI 53511
Phone: 1-800-356-6955

www.FairbanksMorseDefense.com

American Fan

Phone: 1-866-771-6266

Federal Equipment Co.

Phone: 1-877-435-4723

Hunt Valve Company

Phone: 1-800-321-2757

Maxim Watermakers

Phone: 1-318-629-2460

Research Tool & Die Works

Phone: 1-310-639-5722

Ward Leonard

Phone: 1-860-283-5801

Welin Lambie

Phone: +44 1384-78294

MILITARY SOLUTIONS

Custom Engineered Seawater Reverse Osmosis (SWRO) and High Purity Reverse Osmosis (HPRO) Systems for Defense Applications

Maxim specializes in custom engineered water treatment equipment including SWRO and HPRO systems. Maxim's designs are meticulously created to meet the PTS, corresponding Appendices, MIL-SPEC and other requirements as provided by the Prime Contractor and U.S. Military.

Maxim designs these systems to meet the water production capacity and permeate water quality requirements for both seawater and high purity water applications.

Advantages:

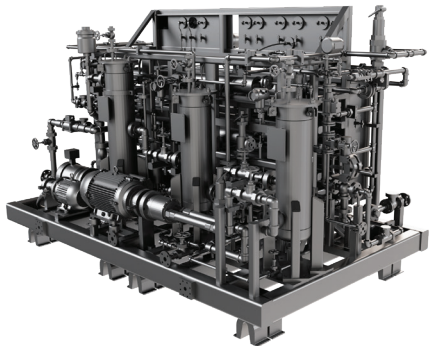
- Maxim offers a single skid design.
 - Smaller footprint
 - Less weight
- Maxim's design employs modern RO technology.
 - Maxim uses a modern radial axial positive displacement pump.
 - o Very efficient operation
 - o Well proven design that is easy to maintain
 - Maxim's SWRO system uses modern membranes.
- Maxim utilizes readily available components instead of proprietary ones.
- Maxim's design utilizes cost effective, seawater-compatible materials.

- Maxim's SWRO system offers lower lifecycle costs and a simpler maintenance program.
- Upfront capital costs for Maxim equipment is extremely competitive.

Equipment designed to meet the requirements of Environmental Qualification Testing.

Maxim areas of expertise:

- Equipment design adhering to PTS & MIL-SPEC requirements
- Fabrication & Assembly - Welder Workmanship Program created in accordance with MIL-STD-278 and MIL-STD-248.
- ISO 9001:2015 certified Quality Management System



Electronics Cooling Systems for Defense Applications

Maxim manufactures custom engineered heat exchange and cooling equipment, using seawater and freshwater as mediums. Our Electronics Cooling Systems (ECS) have a smaller overall footprint and are meticulously designed to meet the PTS, corresponding Appendices, MIL-SPEC and other requirements as provided by the Prime Contractor and U.S. Military.

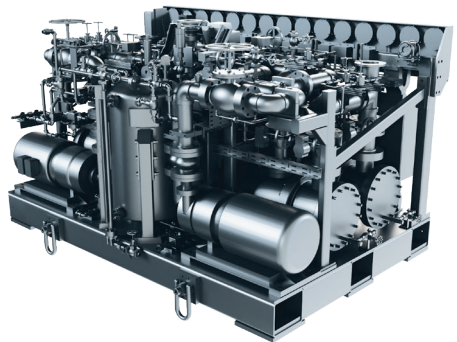
As a major supplier of water treatment, water purification and water handling equipment, this equipment incorporates critical components, common to the majority of Maxim's product portfolio.

Maxim's wide range of technologies incorporates:

- Skidded units, able to meet heavy shock qualifications
- Heat exchangers (shell & tube, plate-type, or basket)
- Pump & Motor assemblies sized to the flow and pressure requirements of the system
- Pre-filtration and post treatment options
- Control panels/gauge boards

Maxim areas of expertise:

- Equipment design adhering to MIL-SPEC and PTS requirements and able to successfully pass Environmental Qualification Testing.
- Fabrication & Assembly - Welder Workmanship Program created in accordance with MIL-STD-278 and MIL-STD-248.
- Materials can include CuNi, Stainless Steels, Carbon Steel, Monel, Titanium, and other materials as required with tubing and piping sizes ranging from ½" to 6".
- ISO 9001:2015 certified Quality Management System

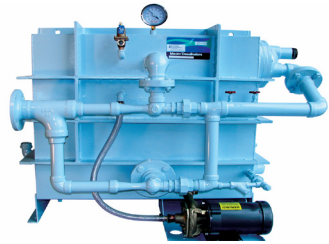


COMMERCIAL SOLUTIONS

HJ SERIES HEAT RECOVERY EVAPORATORS

Standard Features

- Five standard models available.
- Offers water production capacities from 192 gallons per day to 3,000 gallons per day.
- Satisfies a wide range of fresh water needs.
- Uses waste heat, reducing operating costs since little new energy generation is needed.
- Our thermo circulation design minimizes scaling and lowers maintenance costs.
- Environmentally friendly since energy is conserved and there are no membranes or filters to replace or dispose of.



Maxim Model HJ50C

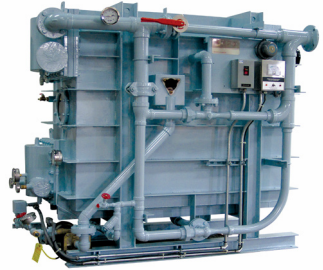
MAXIM Model		HJ3C	HJ10C	HJ20C
Fresh Water Capacity	GPD	192	600	1,200
	MTPD	0.73	2.27	4.50
Engine Load	Dev. BHP	38	125	250
Generator Load	Dev. KW	30	93	186
Jacket Water	Flow - GPM	6.5	20.0	40.0
	Head - FT	15.5	15.0	16.2
Heat Input Requirements	BTU/hr	75,000	250,000	500,000
Sea Water Flow	GPM	6	19	36
Electical Power Required	KW/hr	0.8	2.9	2.9
Net Wt.	lbs	125	250	410
Approximate Dimensions	L x W x H in.	20 x 11 x 23	36 x 20 x 26	43 x 22 x 31

MAXIM Model		HJ30C	HJ50C
Fresh Water Capacity	GPD	2,000	3,000
	MTPD	7.57	11.40
Engine Load	Dev. BHP	416	625
Generator Load	Dev. KW	310	466
Jacket Water	Flow - GPM	78.0	100.0
	Head - FT	25.0	25.0
Heat Input Requirements	BTU/hr	832,000	1,250,000
Sea Water Flow	GPM	80	90
Electical Power Required	KW/hr	6.5	6.5
Net Wt.	lbs	625	970
Approximate Dimensions	L x W x H in.	54 x 24 x 27	52 x 29 x 44

TCF SERIES HEAT RECOVERY EVAPORATORS

Standard Features

- Five standard models available.
- Offers water production capacities from 3,700 gallons per day to 15,000 gallons per day.
- Perfect for larger cruisers, tugs, fishing boats, survey vessels, offshore production platforms, drilling rigs and FPSO's.
- Uses waste heat, reducing operating costs since little new energy generation is needed.
- Our thermo circulation design minimizes scaling and lowers maintenance costs.
- Environmentally friendly since energy is conserved and there are no membranes or filters to replace or dispose of.



Maxim Model TCF 7.5

MAXIM Model		TCF 3.7	TCF 5	TCF 7.5
Fresh Water Capacity	GPD	3,700	5,000	7,500
	MTPD	14.00	18.90	28.40
Engine Load	Dev. BHP	715	950	1425
Generator Load	Dev. KW	533	710	1065
Jacket Water	Flow - GPM	115.0	156.0	290.0
	Head - FT	30.0	30.0	30.0
Heat Input Requirements	BTU/hr	1,430,000	1,950,000	2,900,000
Sea Water Flow	GPM	125	156	245
Electical Power Required	KW/hr	0.6	0.6	1.6
Net Weight	lbs	2,100	2,250	2,900
Approximate Dimensions	L x W x H in.	55 x 39 x 65	55 x 42 x 65	82 x 44 x 68

MAXIM Model		TCF 11	TCF 15
Fresh Water Capacity	GPD	11,000	15,000
	MTPD	41.60	56.80
Engine Load	Dev. BHP	2100	2850
Generator Load	Dev. KW	1565	2125
Jacket Water	Flow - GPM	340.0	464.0
	Head - FT	30.0	30.0
Heat Input Requirements	BTU/hr	4,250,000	5,800,000
Sea Water Flow	GPM	334	460
Electical Power Required	KW/hr	1.6	1.6
Net Weight	lbs	4,800	5,600
Approximate Dimensions	L x W x H in.	92 x 50 x 68	95 x 65 x 76

STERLING SERIES REVERSE OSMOSIS WATERMAKERS

Standard Features

- Stainless steel corrosion resistant frame
- 2205 duplex stainless steel high pressure piping
- Victaulic couplings for easy parts replacement
- 2205 duplex stainless steel ultra-quiet Danfoss pump
- 5-Micron sediment filter
- High rejection seawater membranes
- Low and high pressure switches
- High pressure relief safety valve
- Pressure gauges: Prefilter Outlet, Pump Discharge, Concentrate, Intermediate Concentrate
- Permeate total dissolved solids (TDS) meter
- Automatic flush for maximum membrane life
- Energy efficient design
- 60 Hz electrical service
- Fiberglass pressure vessel(s)
- Vertical & horizontal configurations available



Model	Gallons Per Day	M ³	Membrane Size	No. of Membranes	Weight (lbs) Estimate	Dimensions } (D x W x H)
STR-1	1,000	3.79	4" x 40"	1	285	30" x 34" x 68"
STR-2	2,000	7.57	4" x 40"	2	330	30" x 34" x 68"
STR-3	3,000	11.36	4" x 40"	3	390	30" x 34" x 68"
STR-4	4,000	15.14	4" x 40"	4	440	30" x 34" x 68"
STR-5	5,000	18.93	4" x 40"	5	475	30" x 34" x 68"
STR-6	6,000	22.71	4" x 40"	6	550	30" x 34" x 68"
STR-8	8,000	30.00	8" x 40"	2	750	50" x 42" x 80"
STR-10	10,000	37.85	8" x 40"	3	850	50" x 42" x 80"

**CLEANING SOLUTIONS/
REPLACEMENT PARTS**

HEAT RECOVERY EVAPORATOR CLEANING SOLUTIONS

MAX-GUARD 102

Scale Preventative

- Non-hazardous.
- High performance dispersant used to prevent scale formation and fouling in heat recovery evaporators.
- Designed to be used in the chemical feed system.
- Environmentally compatible.
- Safe for drinking water applications.
- Sold in 5 gallon pails.

MAX-Descaler/ODT

Scale Removal & Corrosion Inhibitor

- Non-hazardous.
- A liquid scale remover & corrosion inhibitor.
- Effective at removing iron & precipitated hardness deposits.
- Designed to prevent corrosion that can occur as a result of acid cleanings.
- Designed for use on mild steel, stainless steel, copper or brass.
- Sold in 5 gallon pails.

REVERSE OSMOSIS WATERMAKERS CLEANING SOLUTIONS

MAX-GUARD 100 Antiscalant

- Used in chemical injection system.
- Antiscalant pretreatment that lengthens the life of membrane systems.
- Provides scale control and minimizes iron and manganese build-up.
- ANSI/NSF Standard 60 certified.

MAX-GUARD 200 Low ph Membrane Cleaner

- Designed to remove metal hydroxides, calcium carbonate and other scaling from membrane surfaces.
- Designed to maximize the clean in place (CIP) performance and minimize rinse requirement.

MAX-GUARD 201 High ph Membrane Cleaner

- Designed to remove organics, silt and other particulate deposits from membrane surfaces.
- Designed to maximize the clean in place (CIP) performance and minimize rinse requirement.

MAX-GUARD 202 Inhibited Acid Cleaner

- Blend of acid & a corrosion inhibitor designed to inhibit the acid attack on mild steel, stainless steel, copper & brass metallurgies during the cleaning & maintenance of water systems.
- Particularly effective at removing iron and precipitated hardness deposits.

REVERSE OSMOSIS WATERMAKERS CLEANING SOLUTIONS

MAX-GUARD 300

Preservative & Dechlorination Treatment

- Use for RO system preservation during shutdown.
- Designed to chemically neutralize chlorine.

MAX-GUARD 301

Alkalinity Builder

- Alkalinity builder for pH adjustment application.
- Adjusted to optimize freeze protection while providing the maximum alkalinity adjustment per pound of product available.
- Used in post treatment with chemical injection.

SALINITY MONITORING SYSTEM

Technical Data	
Mounting	Wall-mounted
Display	LC graphic display, light blue backlit, 128x168 pixels resolution
Sensor Monitor	Direct display and verification of measured sensor values
Units of Measure	ppm, $\mu\text{S/cm}$
Range	0.5 $\mu\text{S/cm}$ – 200 $\mu\text{S/cm}$
Capacity	Up to 4 conductivity sensors
Output	2 Digital Outputs
2 Analog Outputs	10,000
Mounting Dimensions	7 1/2" H X 7 1/4" W X 6 3/4" D
Housing Protection Rating	IP65
Housing Material	PA 66
Power Requirements	110 VAC, 1.2 AMP
Weight	5.2 lbs
Memory Card	SD or SDHC (8 MB max)
Expansions*	pH, Flow, Temperature
Ethernet Module*	Modbus TCP, PROFINET Conformance Class B and Ether-Net/IP
Connection Type	G1/4 (Adaptable)
Temperature Range	32° TO 212° F
Maximum Pressure	145 psi
Wetted Parts Materials	316 SS and PTFE, EPDM Seal
Cell Constant	0.1
Measurement Deviation	3% Typical/5% Max
Available BNC Cable Lengths	8 ft or 16 ft

* Optional – must be purchased with new unit



Salinity Monitor/Controller



Salinity Probe

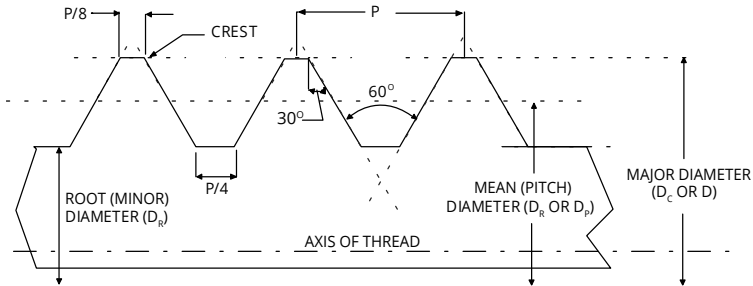


Salinity Probe With Npt Adaptor

RESOURCES

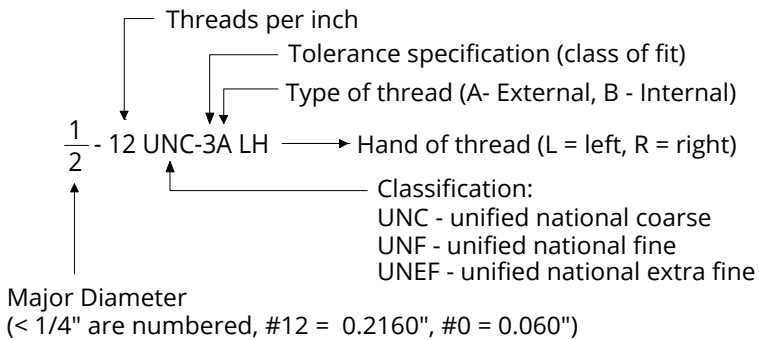
THREAD STANDARDS

UNIFIED AND ISO THREAD GEOMETRY

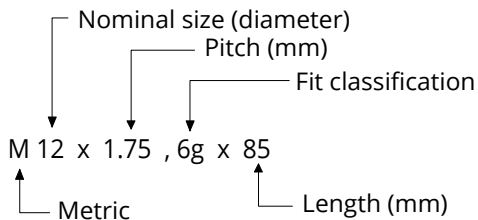


CLASS	UNIFIED		METRIC	
	EXTERNAL THREAD	INTERNAL THREAD	EXTERNAL THREAD	INTERNAL THREAD
LOOSE	1A	1B	8G	7H
STANDARD	2A	2B	6G	6H
CLOSE	3A	3B	4G	5H

UNIFIED NATIONAL:



METRIC:



THREAD DIMENSIONS

AND TAP DRILL SIZES

Size	Threads Per Inch		Outside Diameter Inches	Pitch Diameter Inches	Root Diameter Inches	Tap Drill Approx. 75% Full Thread	Decimal Equiv. Of Tap Drill
	NC UNC	NF UNF					
0	—	80	.0600	.0519	.0438	3/64"	.0469
1	64	—	.0730	.0629	.0527	53	.0595
1	—	72	.0730	.0640	.0550	53	.0595
2	56	—	.0860	.0744	.0628	50	.0700
2	—	64	.0860	.0759	.0657	50	.0700
3	48	—	.0990	.0855	.0719	47	.0785
3	—	56	.0990	.0874	.0758	46	.0810
4	40	—	.1120	.0958	.0795	43	.0890
4	—	48	.1120	.0985	.0849	42	.0935
5	40	—	.1250	.1088	.0925	38	.1015
5	—	44	.1250	.1102	.0955	37	.1040
6	32	—	.1380	.1177	.0974	36	.1065
6	—	40	.1380	.1218	.1055	33	.1130
8	32	—	.1640	.1437	.1234	29	.1360
8	—	36	.1640	.1460	.1279	29	.1360
10	24	—	.1900	.1629	.1359	26	.1470
10	—	32	.1900	.1697	.1494	21	.1590
12	24	—	.2160	.1889	.1619	16	.1770
12	—	28	.2160	.1928	.1696	15	.1800
1/4"	20	—	.2500	.2175	.1850	7	.2010
1/4"	—	28	.2500	.2268	.2036	3	.2130
5/16"	18	—	.3125	.2764	.2403	F	.2570
5/16"	—	24	.3125	.2854	.2584	I	.2720
3/8"	16	—	.3750	.3344	.2938	5/16"	.3125
3/8"	—	24	.3750	.3479	.3209	Q	.3320
7/16"	14	—	.4375	.3911	.3447	U	.3680
7/16"	—	20	.4375	.4050	.3726	25/64"	.3906
1/2"	13	—	.5000	.4500	.4001	27/64"	.4219
1/2"	—	20	.5000	.4675	.4351	29/64"	.4531
9/16"	12	—	.5625	.5084	.4542	31/64"	.4844
9/16"	—	18	.5625	.5264	.4903	33/64"	.5156
5/8"	11	—	.6250	.5660	.5069	17/32"	.5312
5/8"	—	18	.6250	.5889	.5528	37/64"	.5781
3/4"	10	—	.7500	.6850	.6201	21/32"	.6562
3/4"	—	16	.7500	.7094	.6688	11/16"	.6875
7/8"	9	—	.8750	.8028	.7307	49/64"	.7656
7/8"	—	14	.8750	.8286	.7822	13/16"	.8125
1"	8	—	1.0000	.9188	.8376	7/8"	.8750
1"	—	12	1.0000	.9459	.8917	59/64"	.9219
1 1/8"	7	—	1.1250	1.0322	.9394	63/64"	.9844
1 1/8"	—	12	1.1250	1.0709	1.0168	1 3/64"	1.0469
1 1/4"	7	—	1.2500	1.1572	1.0644	1 7/64"	1.1094
1 1/4"	—	12	1.2500	1.1959	1.1418	1 11/64"	1.1719
1 3/8"	6	—	1.3750	1.2667	1.1585	1 7/32"	1.2187
1 3/8"	—	12	1.3750	1.3209	1.2668	1 19/64"	1.2969
1 1/2"	6	—	1.5000	1.3917	1.2835	1 11/32"	1.3437
1 1/2"	—	12	1.5000	1.4459	1.3918	1 27/64"	1.4219
1 3/4"	5	—	1.7500	1.6201	1.4902	1 9/16"	1.5625
2"	4 1/2	—	2.0000	1.8557	1.7113	1 25/32"	1.7812
2 1/4"	4 1/2	—	2.2500	2.1057	1.9613	2 1/32"	2.0313
2 1/2"	4 1/2	—	2.5000	2.3376	2.1752	2 1/4"	2.2500
2 3/4"	4	—	2.7500	2.5876	2.4252	2 1/2"	2.5000
3"	4	—	3.0000	2.8376	2.6752	2 3/4"	2.7500
3 1/4"	4	—	3.2500	3.0876	2.9252	3"	3.0000
3 1/2"	4	—	3.5000	3.3376	3.1752	3 1/4"	3.2500
3 3/4"	4	—	3.7500	3.5876	3.4252	3 1/2"	3.5000
4"	4	—	4.0000	3.3786	3.6752	3 3/4"	3.7500

PIPE DIMENSIONS

US AND METRIC

NOMINAL PIPE SIZE	OD	SCHEDULE DESIGNATIONS			WALL THICKNESS		WEIGHT		ID	
		IN. MM	IN. MM	ASME	IN.	MM	LBS/FOOT	KG/METER	IN.	MM
1/8 6	0.405 10.3	10	10S		0.049	1.24	0.19	0.28	0.307	7.82
		STD 40	40S		0.068	1.73	0.24	0.37	0.269	6.84
		XS 80	80S		0.095	2.41	0.31	0.47	0.215	5.84
1/4 8	0.540 13.7	10	10S		0.065	1.65	0.33	0.49	0.410	10.40
		STD 40	40S		0.088	2.24	0.43	0.63	0.364	9.22
		XS 80	80S		0.119	3.02	0.54	0.80	0.302	7.66
3/8 10	0.675 17.1	10	10S		0.065	1.65	0.42	0.63	0.545	13.80
		STD 40	40S		0.091	2.31	0.57	0.84	0.493	12.48
		XS 80	80S		0.126	3.20	0.74	1.10	0.423	10.70
1/2 15	0.840 21.3	5	5S		0.065	1.65	0.54	0.80	0.710	18.00
		10	10S		0.083	2.11	0.67	1.00	0.674	17.08
		STD 40	40S		0.109	2.77	0.85	1.27	0.622	15.76
		XS 80	80S		0.147	3.73	1.09	1.62	0.546	13.84
		160			0.188	4.78	1.31	1.95	0.464	11.74
3/4 20	1.050 26.7	XX			0.294	7.47	1.72	2.55	0.252	6.36
5		5S		0.065	1.65	0.69	1.03	0.920	23.40	
10		10S		0.083	2.11	0.86	1.28	0.884	22.48	
STD 40		40S		0.113	2.87	1.13	1.69	0.824	20.96	
XS 80		80S		0.154	3.91	1.48	2.20	0.742	18.88	
1 25	1.315 33.4	160			0.219	5.56	1.95	2.90	0.612	15.58
		XX			0.308	7.82	2.44	3.64	0.434	11.06
		5	5S		0.065	1.65	0.87	1.29	1.185	30.10
		10	10S		0.109	2.77	1.41	2.09	1.097	27.86
		STD 40	40S		0.133	3.38	1.68	2.50	1.049	26.64
1-1/4 32	1.660 42.2	XS 80	80S		0.179	4.55	2.17	3.24	0.957	24.30
		160			0.250	6.35	2.85	4.24	0.815	20.70
		XX			0.358	9.09	3.66	5.45	0.599	15.22
		5	5S		0.065	1.65	1.11	1.65	1.530	38.90
		10	10S		0.109	2.77	1.81	2.69	1.442	36.66
1-1/2 40	1.900 48.3	STD 40	40S		0.140	3.56	2.27	3.39	1.380	35.08
		XS 80	80S		0.191	4.85	3.00	4.47	1.278	32.50
		160			0.250	6.35	3.77	5.61	1.160	29.50
		XX			0.382	9.70	5.22	7.77	0.896	22.80
		5	5S		0.065	1.65	1.28	1.90	1.770	45.00
2 50	2.375 60.3	10	10S		0.109	2.77	2.09	3.11	1.682	42.76
		STD 40	40S		0.145	3.68	2.72	4.05	1.610	40.94
		XS 80	80S		0.200	5.08	3.63	5.41	1.500	38.14
		160			0.281	7.14	4.86	7.25	1.338	34.02
		XX			0.400	10.15	6.41	9.55	1.100	28.00
2-1/2 65	2.875 73.0	5	5S		0.065	1.65	1.61	2.39	2.245	57.00
		10	10S		0.109	2.77	2.64	3.93	2.157	54.76
		STD 40	40S		0.154	3.91	3.66	5.44	2.067	52.48
		XS 80	80S		0.218	5.54	5.03	7.48	1.939	49.22
		160			0.344	8.74	7.47	11.11	1.687	42.82
3 80	3.500 88.9	XX			0.436	11.07	9.04	13.44	1.503	38.16
		5	5S		0.083	2.11	2.48	3.69	2.709	68.78
		10	10S		0.120	3.05	3.53	5.26	2.635	66.90
		STD 40	40S		0.203	5.16	5.80	8.63	2.469	62.68
		XS 80	80S		0.276	7.01	7.67	11.41	2.323	58.98
3-1/2 90	4.000 101.6	160			0.375	9.53	10.02	14.92	2.125	53.94
		XX			0.552	14.02	13.71	20.39	1.771	44.96
		5	5S		0.083	2.11	3.03	4.52	3.334	84.68
		10	10S		0.120	3.05	4.34	6.46	3.260	82.80
		STD 40	40S		0.216	5.49	7.58	11.29	3.068	77.92
4 100	4.500 114.3	XS 80	80S		0.300	7.62	10.26	15.27	2.900	73.66
		160			0.438	11.13	14.34	21.35	2.624	66.64
		XX			0.600	15.24	18.60	27.68	2.300	58.42
		5	5S		0.083	2.11	3.48	5.18	3.834	97.38
		10	10S		0.120	3.05	4.98	7.41	3.760	95.50
4-1/2 115	5.000 127.0	STD 40	40S		0.226	5.74	9.12	13.57	3.548	90.12
		XS 80	80S		0.318	8.08	12.52	18.64	3.364	85.44
		XX			0.636	16.15	22.87	34.03	2.728	69.30
		5	5S		0.083	2.11	3.92	5.84	4.334	110.08
		10	10S		0.120	3.05	5.62	8.37	4.260	108.20
4-1/2 115	5.000 127.0	156			0.156	3.96	7.24	10.78	4.188	106.38
		188			0.188	4.78	8.67	12.91	4.124	104.74
		STD 40	40S		0.237	6.02	10.80	16.08	4.026	102.26
		XS 80	80S		0.337	8.56	15.00	22.32	3.826	97.18
		120			0.438	11.13	19.02	28.32	3.624	92.04
		160			0.531	13.49	22.53	33.54	3.438	87.32
		XX			0.674	17.12	27.57	41.03	3.152	80.06
4-1/2 115	5.000 127.0	STD 40	40S		0.247	6.27	12.55	18.67	4.506	114.46
XS 80		80S		0.355	9.02	17.63	26.24	4.290	108.96	
XX				0.710	18.03	32.56	48.45	3.580	90.94	

AMERICAN WIRE GAUGE

CONDUCTOR SIZE TABLE

AWG	Diameter [inches]	Diameter [mm]	Area [mm ²]	Resistance [Ohms/1000 ft]	Resistance [Ohms / km]	Max Current [Amperes]	Max Frequency
0000 (4/0)	0.46	11.684	107	0.049	0.16072	302	125 Hz
000 (3/0)	0.4096	10.40384	85	0.0618	0.202704	239	160 Hz
00 (2/0)	0.3648	9.26592	67.4	0.0779	0.255512	190	200 Hz
0 (1/0)	0.3249	8.25246	53.5	0.0983	0.322424	150	250 Hz
1	0.2893	7.34822	42.4	0.1239	0.406392	119	325 Hz
2	0.2576	6.54304	33.6	0.1563	0.512664	94	410 Hz
3	0.2294	5.82676	26.7	0.197	0.64616	75	500 Hz
4	0.2043	5.18922	21.2	0.2485	0.81508	60	650 Hz
5	0.1819	4.62026	16.8	0.3133	1.027624	47	810 Hz
6	0.162	4.1148	13.3	0.3951	1.295928	37	1100 Hz
7	0.1443	3.66522	10.5	0.4982	1.634096	30	1300 Hz
8	0.1285	3.2639	8.37	0.6282	2.060496	24	1650 Hz
9	0.1144	2.90576	6.63	0.7921	2.598088	19	2050 Hz
10	0.1019	2.58826	5.26	0.9989	3.276392	15	2600 Hz
11	0.0907	2.30378	4.17	1.26	4.1328	12	3200 Hz
12	0.0808	2.05232	3.31	1.588	5.20864	9.3	4150 Hz
13	0.072	1.8288	2.62	2.003	6.56984	7.4	5300 Hz
14	0.0641	1.62814	2.08	2.525	8.282	5.9	6700 Hz
15	0.0571	1.45034	1.65	3.184	10.44352	4.7	8250 Hz
16	0.0508	1.29032	1.31	4.016	13.17248	3.7	11 k Hz
17	0.0453	1.15062	1.04	5.064	16.60992	2.9	13 k Hz
18	0.0403	1.02362	0.823	6.385	20.9428	2.3	17 kHz
19	0.0359	0.91186	0.653	8.051	26.40728	1.8	21 kHz
20	0.032	0.8128	0.518	10.15	33.292	1.5	27 kHz
21	0.0285	0.7239	0.41	12.8	41.984	1.2	33 kHz
22	0.0254	0.64516	0.326	16.14	52.9392	0.92	42 kHz
23	0.0226	0.57404	0.258	20.36	66.7808	0.729	53 kHz
24	0.0201	0.51054	0.205	25.67	84.1976	0.577	68 kHz
25	0.0179	0.45466	0.162	32.37	106.1736	0.457	85 kHz
26	0.0159	0.40386	0.129	40.81	133.8568	0.361	107 kHz
27	0.0142	0.36068	0.102	51.47	168.8216	0.288	130 kHz
28	0.0126	0.32004	0.081	64.9	212.872	0.226	170 kHz
29	0.0113	0.28702	0.0642	81.83	268.4024	0.182	210 kHz
30	0.01	0.254	0.0509	103.2	338.496	0.142	270 kHz
31	0.0089	0.22606	0.0404	130.1	426.728	0.113	340 kHz
32	0.008	0.2032	0.032	164.1	538.248	0.091	430 kHz
33	0.0071	0.18034	0.0254	206.9	678.632	0.072	540 kHz
34	0.0063	0.16002	0.0201	260.9	855.752	0.056	690 kHz
35	0.0056	0.14224	0.016	329	1079.12	0.044	870 kHz
36	0.005	0.127	0.0127	414.8	1360	0.035	1100 kHz
37	0.0045	0.1143	0.01	523.1	1715	0.0289	1350 kHz
38	0.004	0.1016	0.00797	659.6	2163	0.0228	1750 kHz
39	0.0035	0.0889	0.00632	831.8	2728	0.0175	2250 kHz
40	0.0031	0.07874	0.00501	1049	3440	0.0137	2900 kHz

Current (ampacity) Notes: The current ratings shown in the table are for power transmission and have been determined using the rule of 1 amp per 700 circular mils, which is a very conservative rating

FRACTION - DECIMAL

CONVERSION CHART

	IN	MM
	$\frac{1}{64}$	.015625 .3969
$\frac{1}{32}$	$\frac{2}{64}$	.03125 .7938
	$\frac{3}{64}$	.046875 1.1906
$\frac{1}{16}$	$\frac{5}{64}$	.0625 1.5875
	$\frac{7}{64}$	.078125 1.9844
$\frac{3}{32}$	$\frac{9}{64}$	.09375 2.3813
	$\frac{11}{64}$	.109375 2.7781
$\frac{1}{8}$	$\frac{13}{64}$	.125 3.1750
	$\frac{15}{64}$	.140625 3.5719
$\frac{5}{32}$	$\frac{17}{64}$	.15625 3.9688
	$\frac{19}{64}$	.171875 4.3656
$\frac{3}{16}$	$\frac{21}{64}$	.1875 4.7625
	$\frac{23}{64}$	.203125 5.1594
$\frac{7}{32}$	$\frac{25}{64}$	.21875 5.5563
	$\frac{27}{64}$	.234375 5.9531
$\frac{1}{4}$	$\frac{29}{64}$	.250 6.3500
	$\frac{31}{64}$	.265625 6.7469
$\frac{9}{32}$		.28125 7.1438
		.296875 7.5406
$\frac{5}{16}$		.3125 7.9375
		.328125 8.3344
$\frac{11}{32}$		.34375 8.7313
		.359375 9.1282
$\frac{3}{8}$		.375 9.5250
		.390625 9.9219
$\frac{13}{32}$		.40625 10.3188
		.421875 10.7157
$\frac{7}{16}$		.4375 11.1125
		.453125 11.5094
$\frac{15}{32}$		.46875 11.9063
		.484375 12.3032
$\frac{1}{2}$		.500 12.7001

	IN	MM
	$\frac{33}{64}$	.515625 13.096
$\frac{17}{32}$	$\frac{35}{64}$	.53125 13.493
	$\frac{37}{64}$	.546875 13.890
$\frac{9}{16}$	$\frac{39}{64}$	.5625 14.287
	$\frac{41}{64}$	.578125 14.684
$\frac{19}{32}$	$\frac{43}{64}$	.59375 15.081
	$\frac{45}{64}$	.609375 15.478
$\frac{5}{8}$	$\frac{47}{64}$	.625 15.875
	$\frac{49}{64}$	.640625 16.271
$\frac{21}{32}$	$\frac{51}{64}$	.65625 16.668
	$\frac{53}{64}$	.671875 17.065
$\frac{11}{16}$	$\frac{55}{64}$	.6875 17.462
	$\frac{57}{64}$	.703125 17.859
$\frac{23}{32}$	$\frac{59}{64}$	.71875 18.256
	$\frac{61}{64}$	.734375 18.653
$\frac{3}{4}$		.750 19.050
		.765625 19.447
$\frac{25}{32}$		.78125 19.843
		.796875 20.240
$\frac{13}{16}$		.8125 20.6375
		.828125 21.0345
$\frac{27}{32}$		.84375 21.431
		.859375 21.8282
$\frac{7}{8}$		.875 22.2251
		.890625 22.6220
$\frac{29}{32}$		.90625 23.0188
		.921875 23.4157
$\frac{15}{16}$		.9375 23.8126
		.953125 24.2095
$\frac{31}{32}$		.96875 24.6063
		.984375 25.0032
1		1.000 25.4001

SHEET METAL GAUGE CHART

Gauge	Steel	Galvanized Steel	Stainless Steel	Aluminium	Electrical Steel
	in (mm)	in (mm)	in (mm)	in (mm)	in (mm)
3	0.2391 (6.07)	—	—	—	—
4	0.2242 (5.69)	—	—	—	—
5	0.2092 (5.31)	—	—	—	—
6	0.1943 (4.94)	—	—	0.162 (4.1)	—
7	0.1793 (4.55)	—	0.1875 (4.76)	0.1443 (3.67)	—
8	0.1644 (4.18)	0.1681 (4.27)	0.1719 (4.37)	0.1285 (3.26)	—
9	0.1495 (3.80)	0.1532 (3.89)	0.1563 (3.97)	0.1144 (2.91)	—
10	0.1345 (3.42)	0.1382 (3.51)	0.1406 (3.57)	0.1019 (2.59)	—
11	0.1196 (3.04)	0.1233 (3.13)	0.1250 (3.18)	0.0907 (2.30)	—
12	0.1046 (2.66)	0.1084 (2.75)	0.1094 (2.78)	0.0808 (2.05)	—
13	0.0897 (2.28)	0.0934 (2.37)	0.094 (2.4)	0.072 (1.8)	—
14	0.0747 (1.90)	0.0785 (1.99)	0.0781 (1.98)	0.0641 (1.63)	—
15	0.0673 (1.71)	0.0710 (1.80)	0.07 (1.8)	0.057 (1.4)	—
16	0.0598 (1.52)	0.0635 (1.61)	0.0625 (1.59)	0.0508 (1.29)	0.0625 (1.59)
17	0.0538 (1.37)	0.0575 (1.46)	0.056 (1.4)	0.045 (1.1)	0.0560 (1.42)
18	0.0478 (1.21)	0.0516 (1.31)	0.0500 (1.27)	0.0403 (1.02)	0.0500 (1.27)
19	0.0418 (1.06)	0.0456 (1.16)	0.044 (1.1)	0.036 (0.91)	0.0453 (1.15)
20	0.0359 (0.91)	0.0396 (1.01)	0.0375 (0.95)	0.0320 (0.81)	0.0375 (0.952)
21	0.0329 (0.84)	0.0366 (0.93)	0.034 (0.86)	0.028 (0.71)	0.0340 (0.860)
22	0.0299 (0.76)	0.0336 (0.85)	0.031 (0.79)	0.025 (0.64)	0.0310 (0.787)
23	0.0269 (0.68)	0.0306 (0.78)	0.028 (0.71)	0.023 (0.58)	0.0280 (0.711)
24	0.0239 (0.61)	0.0276 (0.70)	0.025 (0.64)	0.02 (0.51)	0.0250 (0.635)
25	0.0209 (0.53)	0.0247 (0.63)	0.022 (0.56)	0.018 (0.46)	0.0220 (0.559)
26	0.0179 (0.45)	0.0217 (0.55)	0.019 (0.48)	0.017 (0.43)	0.0185 (0.470)
27	0.0164 (0.42)	0.0202 (0.51)	0.017 (0.43)	0.014 (0.36)	0.0170 (0.432)
28	0.0149 (0.38)	0.0187 (0.47)	0.016 (0.41)	0.0126 (0.32)	0.0155 (0.394)
29	0.0135 (0.34)	0.0172 (0.44)	0.014 (0.36)	0.0113 (0.29)	0.0140 (0.356)
30	0.0120 (0.30)	0.0157 (0.40)	0.013 (0.33)	0.0100 (0.25)	0.0125 (0.318)
31	0.0105 (0.27)	0.0142 (0.36)	0.011 (0.28)	0.0089 (0.23)	0.0100 (0.254)
32	0.0097 (0.25)	—	—	—	—
33	0.0090 (0.23)	—	—	—	—
34	0.0082 (0.21)	—	—	—	—
35	0.0075 (0.19)	—	—	—	—
36	0.0067 (0.17)	—	—	—	—
37	0.0064 (0.16)	—	—	—	—
38	0.0060 (0.15)	—	—	—	—
33	0.0071	0.18034	0.0254	206.9	678.632
34	0.0063	0.16002	0.0201	260.9	855.752
35	0.0056	0.14224	0.016	329	1079.12
36	0.005	0.127	0.0127	414.8	1360
37	0.0045	0.1143	0.01	523.1	1715
38	0.004	0.1016	0.00797	659.6	2163
39	0.0035	0.0889	0.00632	831.8	2728
40	0.0031	0.07874	0.00501	1049	3440



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DEFENSE

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