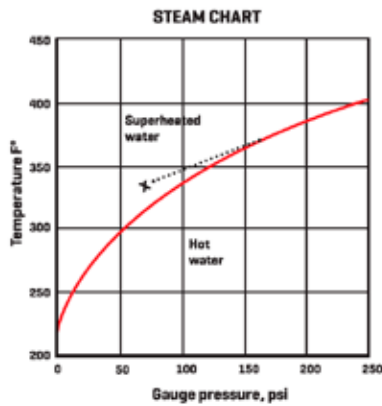




Steam and Its Effects on Hose

Water can exist in three different basic states – solid, liquid or gas – and there are three different conditions of the gas (steam). The pressure and temperature present dictates the particular condition of the water. These conditions are wet saturated steam or “wet steam”, dry saturated steam, and superheated steam or “dry steam”.



By way of explanation, refer to the steam chart. The heavy red line is the boiling point of water at various gauge pressures. Any point on this line represents saturated steam. Saturated steam may be completely free of unvaporized water particles, or it may carry such particles. In other words, saturated steam may be “dry” or “wet”. Any point below the line represents hot water – any point above the line represents superheated steam.

The dotted line shows the process of saturated steam being transformed into superheated steam. If a steam line is at a pressure of 150 psi and a temperature of 366°F, it contains saturated steam. If the pressure is substantially reduced by the expansion of the steam (such as the sudden opening of a valve or the steam passing into a larger pipe or hose), the condition of the steam follows the dotted line to some point X in the superheated steam area. This condition may not last very long, but the superheated steam tends to deteriorate the tube stock in ordinary steam hose intended for use with saturated steam. This usually results in hose failure.

Steam Hose

Maintenance

Steam hose failure can cause **SERIOUS** injury. Therefore, it is extremely important to properly select and maintain steam hose.

Rules to Remember

Rule	Reason
Steam hose should be used to transfer ONLY steam! Never use it to transport other materials.	The hose is specially designed to handle steam. Materials other than steam could damage the tube.
Couple steam hose to a length of pipe to separate the hose from the steam source.	Constant high heat can shorten the life of a steam hose.
Always have an accurate pressure gauge and positive shutoff valve installed between the steam source and the hose.	A surge in the hose could cause a failure and injury.
Operators should always wear protective clothing, which includes face or eye protection, heavy-duty clothing, gloves and boots.	This provides protection from flying particles and liquids.
Operators should NEVER open a steam valve when the hose is lying free.	The sudden surge in pressure can cause the hose to whip, which could cause injury or damage.
ALWAYS drain steam hose when not in use.	Water remaining in the hose may be absorbed by the tube. When the hose is then reheated and still under low pressure, the absorbed water may change to steam and “popcorn” or expand and explode the tube. Popcorn can weaken and destroy a hose.

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How to Select the Correct Steam Hose Assembly

Determine required hose size

The hose size required is usually fixed by size of fittings or pipe to which the hose is to be connected. It is important that you do not select a hose with an inside diameter larger than the diameter of the preceding pipe.

Find actual rated working pressure and temperature

Take pressure and temperature readings just ahead of the hose connections.

Determine length required

Length require is almost always dictated by the application.

Determine condition of steam (saturated or superheated)

Locate the actual rated working pressure and temperature on the steam chart. Any point on the heavy line is saturated steam.

Select the correct hose

From the table below, select the hose that fulfills the requirements of both the condition of the steam and the rated working pressure.

Maintenance and inspection

For proper maintenance and inspection of interlocking and permanently crimped steam hose assemblies, refer to ARPM IP-11-1.

Select couplings required

Gates recommends interlocking* and permanently crimped types of couplings for steam hose applications. These are identified as:

Interlocking, ground joint

Interlocking, washer joint

Permanently crimped

*Remember to retighten bolts on a regular basis.



CAUTION!

When electrical continuity is required, ground the wire braid in the hose to couplings with aluminum, copper or stainless-steel staples.

Steam can be dangerous material. Play it safe – stay within the limits of published recommendations.

Do not alternate between steam and water.

Steam Hose Table

Hose Type	Recommended Service		
	Rated Working Pressure (psi)	Working Temperature (°F)	Type of Steam
Plant Master™ Steam Plus	250	450	Saturated or superheated
Plant Master™ Steam	250	450	Saturated or superheated

Properties of Saturated Steam

(Abridged from Handbook of Chemistry and Physics – 39th Edition)

Gauge Pressure (psi) -vs- Temperature of Saturated Steam (°F) *

(psi)	(°F)	(psi)	(°F)	(psi)	(°F)	(psi)	(°F)
10	239	85	328	150	366	215	394
25	267	90	331	155	368	220	395
30	274	95	335	160	371	225	397
35	281	100	338	165	373	230	399
40	287	105	341	170	375	235	401
45	292	110	344	175	377	240	403
50	298	115	347	180	380	245	404
55	303	120	350	185	382	250	406
60	307	125	353	190	384	255	408
65	312	130	356	195	386	260	409
70	316	135	358	200	388	265	411
75	320	140	361	205	390	270	413
80	324	145	363	210	392	275	414

*Based on an atmosphere pressure of 14.7 psi.

Due to continual product improvements, Gates reserves the right to alter specs without prior notice.



STEAM HOSE

Plant Master™ Steam 250
Formerly - 205MB Steam King™



Wrapped Cover

Color	Hose I.D.		Hose O.D.		Max. W.P.		Vac.	MBR	Wt. Per ft	Length	Std. Pack	Pkg Code	Gates Item No.
	(in)	(mm)	(in)	(mm)	(psi)	(Bar)	(In. Hg)	(in)	(Lbs.)	(ft)			
Black	1/2	12.7	1.02	25.9	250	17.2	20.0	7.0	.44	500	REEL	T	3605-5008
Black	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	.57	50	BULK	100	3605-0901
Black	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	.53	50	BULK	1000	3605-5014
Black	1	25.4	1.52	38.6	250	17.2	20.0	11.0	.70	50	BULK	200	3605-0665
Black	1	25.4	1.52	38.6	250	17.2	20.0	11.0	.70	50	BULK	600	3605-0669
Black	1	25.4	1.52	38.6	250	17.2	20.0	11.0	.71	100	CTN	T	3605-5013
Black	1	25.4	1.52	38.6	250	17.2	20.0	11.0	.71	500	REEL	T	3605-5009
Black	1 1/4	31.8	1.81	46.0	250	17.2	20.0	16.0	.90	50	CTN	T	3605-0671
Black	1 1/2	38.1	2.14	54.4	250	17.2	10.0	20.0	1.36	25	CTN	T	3605-0675
Black	1 1/2	38.1	2.14	54.4	250	17.2	10.0	20.0	1.21	50	CTN	T	3605-0676
Black	2	50.8	2.66	67.6	250	17.2	10.0	25.0	1.57	50	CTN	T	3605-0681

Assemblies - Wrapped Cover

Color	Hose I.D.		Hose O.D.		Max. W.P.		Vac.	MBR	Wt. Per ea	Length	Std. Pack	Pkg Code	Gates Item No.
	(in)	(mm)	(in)	(mm)	(psi)	(Bar)	(In. Hg)	(in)	(Lbs.)	(ea)			
Black	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	31.90	50 ft. F/F	ASSY	T	3605-0736
Black	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	30.90	50 ft. F/M	ASSY	T	3605-0737
Black	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	29.90	50 ft. M/M	ASSY	T	3605-0738

RECOMMENDED FOR: All types of steam – saturated and superheated – up to 250 PSI and +450°F (+232°C).

CAUTION: Do not alternate use between steam and water. When electrical continuity is required, ground the wire braid in the hose to couplings with aluminum, copper or stainless steel staples.

TEMPERATURE: -40°F to +450°F (-40°C to +232°C) continuous service.

CONSTRUCTION: **Tube:** [Type P2 \(EPDM\), Black.](#)
Reinforcement: Braided, steel wire.
Cover: [Type P2 \(EPDM\), Black with red stripe. All sizes are perforated.](#)
Design Factor: 10:1

COUPLINGS: [14](#), [15](#) or [76](#) only. Reference the Hose Coupling Section.

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STEAM HOSE



Plant Master™ Steam Plus 250

Formerly - 232MB Steam Queen™



Wrapped Cover

Color	Hose I.D.		Hose O.D.		Max. W.P.		Vac.	MBR	Wt. Per ft	Length	Std. Pack	Pkg Code	Gates Item No.
	(in)	(mm)	(in)	(mm)	(psi)	(Bar)	(In. Hg)	(in)	(Lbs.)	(ft)			
Red	3/8	9.5	.80	20.3	250	17.2	30.0	4.0	.32	50	CTN	T	3602-1051
Red	3/8	9.5	.80	20.3	250	17.2	30.0	4.0	.30	250	REEL	LL	3602-1061
Red	1/2	12.7	1.02	25.9	250	17.2	25.0	7.0	.45	50	CTN	T	3602-1052
Red	1/2	12.7	1.02	25.9	250	17.2	25.0	7.0	.45	250	REEL	LL	3602-1062
Red	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	.60	50	CTN	T	3602-1055
Red	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	.64	100	CTN	T	3602-1162
Red	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	.60	250	REEL	LL	3602-1065
Red	1	25.4	1.52	38.6	250	17.2	20.0	11.0	.73	50	CTN	T	3602-1057
Red	1 1/4	31.8	1.81	46.0	250	17.2	20.0	16.0	1.04	50	CTN	T	3602-1058
Red	1 1/2	38.1	2.18	55.4	250	17.2	10.0	20.0	1.24	50	CTN	T	3602-1059
Red	2	50.8	2.66	67.6	250	17.2	10.0	25.0	.16	25-29	CTN	T	3602-2127
Red	2	50.8	2.66	67.6	250	17.2	10.0	25.0	.16	30-34	CTN	T	3602-2128
Red	2	50.8	2.66	67.6	250	17.2	10.0	25.0	.16	35-39	CTN	T	3602-2129
Red	2	50.8	2.66	67.6	250	17.2	10.0	25.0	.16	40-44	CTN	T	3602-2130
Red	2	50.8	2.66	67.6	250	17.2	10.0	25.0	.16	45-49	CTN	T	3602-2131
Red	2	50.8	2.66	67.6	250	17.2	10.0	25.0	1.80	50	CTN	T	3602-1060

Assemblies - Wrapped Cover

Color	Hose I.D.		Hose O.D.		Max. W.P.		Vac.	MBR	Wt. Per ea	Length	Std. Pack	Pkg Code	Gates Item No.
	(in)	(mm)	(in)	(mm)	(psi)	(Bar)	(In. Hg)	(in)	(Lbs.)	(ea)			
Red	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	33.40	50 ft. F/F	ASSY	T	3602-0002
Red	3/4	19.1	1.27	32.3	250	17.2	20.0	9.0	31.40	50 ft. M/M	ASSY	T	3602-0004

RECOMMENDED FOR: All types of steam – saturated and superheated – up to 250 PSI and +450°F (+232°C). Special compound cover for use in refineries and processing plants.

CAUTION: Do not alternate use between steam and water. When electrical continuity is required, ground the wire braid in the hose to couplings with aluminum, copper or stainless steel staples.

TEMPERATURE: -40°F to +450°F (-40°C to +232°C) continuous service.

CONSTRUCTION: **Tube:** [Type P2 \(EPDM\), Black.](#)
Reinforcement: Braided, steel wire.
Cover: [Type B1 \(Special compound designed to withstand heat and oil\). Wrapped red cover with black and yellow stripe. All sizes are perforated.](#)

Design Factor: 10:1

COUPLINGS: [14](#), [15](#) or [76](#) only. Reference the Hose Coupling Section.

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