

FIREFIGHTING HOSE AND NOZZLE COMPARISON CHART 3 Inch Hose with 2½ Inch Couplings

3 Inch Fire Hose (Single Line) to Portable Master Stream Device with Smooth Bore or Combination Nozzle

Nozzle Type	Nozzle Size in inches	Nozzle Pressure in P.S.I.	Nozzle Flow in G.P.M.	Nozzle Reaction lbsf	Prsnl. to Advance Nozzle	Cooling Capacity in MW	Adjusted Cooling Capacity	Iowa Formula Cov. cu. ft.	Friction Loss per 100' Hose	Engine Pressure 150' Line	Engine Pressure 200' Line	Engine Pressure 250' Line	Engine Pressure 300' Line
Smooth Bore	1	55	220	86	♣	36.1	<18.1*	0	4(5)	61(63)	63(65)	65(68)	67(70)
		80	266	126	♣	43.6	<21.8*	0	6(7)	89(91)	92(94)	95(98)	98(101)
		100	297	157	♣	48.7	<24.4*	0	7(9)	111(114)	114(118)	118(123)	121(127)
Smooth Bore	1¼	55	344	135	♣	56.4	<28.2*	0	9(12)	69(73)	73(79)	78(85)	82(91)
		80	415	196	♣	68.1	<34.1*	0	14(17)	111(116)	118(124)	125(133)	132(141)
		100	464	245	♣	76.1	<38.1*	0	17(22)	136(143)	144(154)	153(165)	161(176)
Smooth Bore	1½	55	416	163	♣	68.2	<34.1*	0	14(17)	86(91)	93(99)	100(108)	107(116)
		80	502	237	♣	82.4	<41.2*	0	20(25)	120(128)	130(140)	140(153)	150(165)
		100	562	297	♣	92.2	<46.1*	0	25(32)	148(158)	160(174)	173(190)	185(206)
Smooth Bore	1½	55	496	194	♣	81.4	<40.7*	0	20(25)	95(103)	105(115)	115(128)	125(140)
		80	598	283	♣	98.1	<49.1*	0	29(36)	134(144)	148(162)	163(180)	177(198)
		100	668	353	♣	109.6	<54.8*	0	36(45)	164(178)	182(200)	200(223)	218(245)
Combination		55	300	112	♣	49.2	<24.6*	0	7(9)	66(69)	69(73)	73(78)	76(82)
		80	300	136	♣	49.2	<24.6*	0	7(9)	91(94)	94(98)	98(103)	101(107)
		100	300	152	♣	49.2	<24.6*	0	7(9)	111(114)	114(118)	118(123)	121(127)
Combination		55	400	150	♣	65.6	<32.8*	0	13(16)	85(89)	91(97)	98(105)	104(113)
		80	400	181	♣	65.6	<32.8*	0	13(16)	110(114)	116(122)	123(130)	129(138)
		100	400	202	♣	65.6	<32.8*	0	13(16)	130(134)	136(142)	143(150)	149(158)
Combination		55	500	187	♣	82	<41*	0	20(25)	95(103)	105(115)	115(128)	125(140)
		80	500	226	♣	82	<41*	0	20(25)	120(128)	130(140)	140(153)	150(165)
		100	500	253	♣	82	<41*	0	20(25)	140(148)	150(160)	160(173)	170(185)

Note: 10 P.S.I. appliance friction loss is added to Engine Pressures for Master Stream Flows of 400 G.P.M or greater.

* Adjusted Cooling Capacity figures are calculated at efficiencies of 50%, but lower rates are likely when applying water with Master Streams.

Nozzle Reaction lbsf (force) calculations: NR for Solid Stream Nozzles = 1.57 X d² X NP NR for Fog Stream Nozzles = 0.0505 X Q X NP (Q = Flow in Gallons Per Minute)
 Personnel to Advance Nozzle: To 60± lbsf = 1 firefighter; To 75± lbsf = 2 firefighters; To 95± lbsf = 3 firefighters; To 110± lbsf = 2 firefighters in a fixed position only; >110 lbsf = Good Luck
 Cooling Capacity (Theoretical) in MW = Flow in kg/second X 2.6 MJ/kg For reference: A modern living room fire produces a Heat Release Rate of approximately 9 MW to 12 MW
 Adjusted Cooling Capacity in MW = Cooling Capacity in MW X Efficiency Factor (0.5 for straight streams and 0.75 for fog streams) Note: Efficiency may at times be as low as 20% (0.2)
 Iowa Formula Coverage in cubic feet (for knock down of a closed compartment fire in 30 seconds using an Indirect Attack with water fog) = Nozzle Flow in G.P.M. X 100
 Friction Loss in P.S.I. per 100' of Hose = C X (Q/100)² The coefficient "C" is an adjusted figure reflecting field conditions (the theoretical coefficient is used for results in parenthesis)
 Adjusted and Theoretical Friction Loss Coefficients used for hose and engine pressure calculations: 1½" Hose 12 (15.5) 2" Hose 6 (8) 2½" Hose 2 (2) 3" Hose 0.8 (1)
 † Fog stream efficiency diminishes at nozzle pressures <100 P.S.I. as droplet size increases (>1mm) and droplet velocity decreases. ‡Short pulse fog use is limited to flows ≤150 G.P.M.