



2" PITOTLESS NOZZLE™

PN2GRV

FLOW CHART

10 - 50 PSI			51 - 70 PSI			Key Flow Test Points		
PSI	GPM	GPM	PSI	GPM	GPM	GPM	PSI	PSI
10	493	529	51	1114	1194	500	10.7	9.1
11	517	555	52	1125	1206	562.5	13.0	11.3
12	540	579	53	1136	1217	750	23.1	20.1
13	562	603	54	1146	1229	1000	41.1	35.8
14	584	626	55	1157	1240	1125	52.0	45.3
15	604	648	56	1167	1251	1500	92.5	80.5
16	624	669	57	1178	1262			
17	643	689	58	1188	1273			
18	662	709	59	1198	1284			
19	680	729	60	1208	1295			
20	698	748	61	1218	1306			
21	715	766	62	1228	1317			
22	732	784	63	1238	1327			
23	748	802	64	1248	1338			
24	764	819	65	1258	1348			
25	780	836	66	1267	1358			
26	795	853	67	1277	1369			
27	811	869	68	1286	1379			
28	825	885	69	1296	1389			
29	840	900	70	1305	1399			
30	854	916						
31	869	931						
32	882	946						
33	896	960						
34	910	975						
35	923	989						
36	936	1003						
37	949	1017						
38	962	1031						
39	974	1044						
40	987	1057						
41	999	1071						
42	1011	1084						
43	1023	1096						
44	1035	1109						
45	1046	1122						
46	1058	1134						
47	1069	1146						
48	1081	1158						
49	1092	1170						
50	1103	1182						

The readings on this chart are based on which device the Pitotless Nozzle is connected to.

It is the user's responsibility to verify that the correct chart and column is being used.

- **Little Hose Monster™ (HML).** Use this column when the Pitotless Nozzle is connected to a Little Hose Monster.

- **Open Atmosphere.** Use this column when the Pitotless Nozzle is connected directly to a test header or hydrant flowing openly to atmosphere.

This chart is FM Approved for flow rate accuracy. Please call us or instruct the Authority Having Jurisdiction to call us if there are any questions. Additional copies of flow charts are available at: www.hosemonster.com



Pitotless Nozzle™ Grooved

INSTRUCTIONS

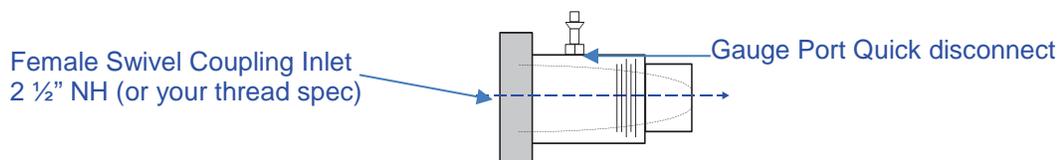
US Patent 6,874,375

The Pitotless Nozzle Grooved (PN#GRV) must be used with the Little Hose Monster (HML) **or** attached directly to a hydrant or test header valve discharging into open atmosphere. The flow chart has columns entitled Little Hose Monster™ and Open Atmosphere. Be sure to use the appropriate column to determine flow rates. *Call us if you are considering a configuration not listed here.*

SETUP

The gauge connection on the Pitotless Nozzle is a factory-installed male end of a quick disconnect coupling. One female counterpart is included and additional ones can be purchased separately. Attach the female end of the quick disconnect coupling directly to the gauge or remote reader adapter and use the quick disconnect feature to attach and remove. Do not remove the male quick disconnect from the Pitotless Nozzle as it will damage the threads on the Pitotless Nozzle.

We recommend a gauge with an accuracy rating of ½% or better and of a suitable range.



Using the Pitotless Nozzle with the Little Hose Monster™

Line up the Pitotless Nozzle outlet at the inlet of the Little Hose Monster with the gauge port rotated to 45° off either side of vertical. Push the Nozzle all the way in until the latch lever arms hook into the groove. Rotate the Nozzle right or left until the latch levers snap parallel to the body and the gauge port is in the desired position. The gauge port can be positioned so that a gauge can be viewed in a vertical position, or horizontal to the left or right side of the Little Hose Monster. Insert the locking pins all the way through the pinhole and latch-lever arm. When the Pitotless Nozzle is installed, securely attach a hose using a spanner wrench. Make sure the hose lays flat and is not twisted.

If using the Pitotless Nozzle on a Hydrant or Test Header Valve

The Pitotless Nozzle must be attached securely to a pump test header valve or hydrant. Secure the female swivel coupling of the Pitotless Nozzle directly to a hydrant nozzle or test header valve. The Pitotless Nozzle points in the direction the water will flow. Clear water discharge path.

Flow Charts

Pitotless Nozzle flow charts must be used to determine discharge flow rate. The use of flow charts of a different device or size will result in incorrect readings. Within the flow chart is a column for "Little Hose Monster" and for "Open Atmosphere". Use the "Little Hose Monster" flows if the Pitotless Nozzle is attached to a Little Hose Monster. Use the "Open Atmosphere" flows if the Pitotless Nozzle is attached directly on a hydrant or test header valve discharging out into the open. Flow charts are provided with the Pitotless Nozzle and additional copies are available on our website at www.HoseMonster.com/literature.html

WARNING:

- **Do not** attach the Pitotless Nozzle to the end of a hose unless the Hose Monster is attached to it or unless it is permanently secured.
- **Do not** attach a hose to the male outlet end of the Pitotless Nozzle under any circumstance. The resulting backpressure will distort flow rate measurement.
- **Do not** remove the quick disconnect gauge port fitting. The aluminum threads will be damaged. Contact The Hose Monster Company directly for any repairs.



MANUFACTURED BY:
The Hose Monster Company
(888) 202-9987 Toll Free
(847) 434-0073 Fax
Service@FlowTest.com
www.HoseMonster.com

Flow Test Summary Report

Date: _____
 Time: _____

Project: _____
 Street: _____
 City/State/Zip: _____

Witness Name	Representing	Phone	Initials

Notes: _____

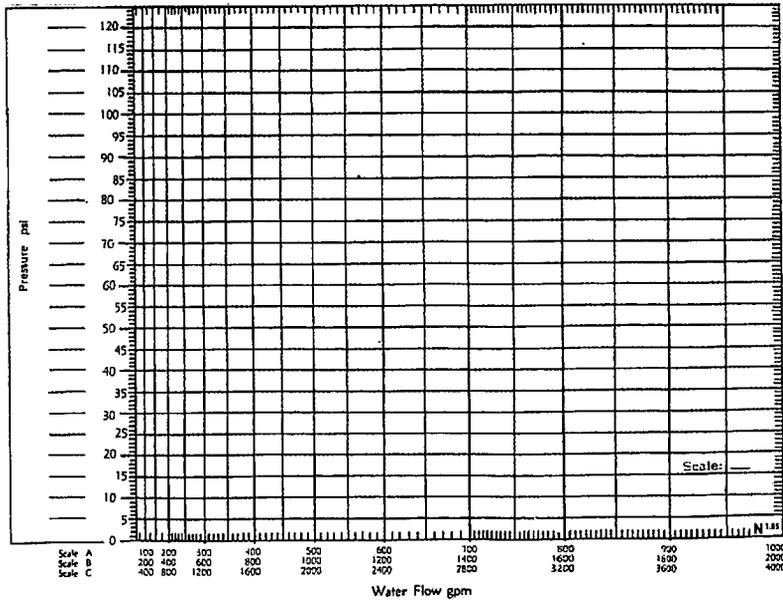
Hydrant "A" Is Test Hydrant – Hydrant "B" Is Flowing Hydrant

Discharge Based On $g = 29.83d^2\sqrt{p}$

Where g=Flow in Gallons Per Minute
 c=Discharge Coefficient (1.00 Used)
 d=Diameter of Orifice
 p=Pitot Pressure in psi

Pitot 1/4"	1/2"	3/4"	1"	1 1/4"	1 1/2"	Pitot 1/4"	1/2"	3/4"	1"	1 1/4"	1 1/2"
5	104	204	417	1067	1351	41	298	585	1194	3056	3868
6	114	224	457	1169	1480	42	302	592	1208	3093	3915
7	123	242	493	1263	1598	43	306	599	1223	3130	3961
8	132	258	527	1350	1709	44	309	606	1237	3166	4007
9	140	274	559	1432	1812	45	313	613	1251	3202	4052
10	147	289	590	1509	1910	46	316	620	1264	3237	4097
11	155	303	618	1583	2003	47	320	626	1278	3272	4141
12	161	316	646	1653	2093	48	323	633	1292	3307	4185
13	168	329	672	1721	2178	49	326	639	1305	3341	4228
14	174	342	698	1786	2260	50	330	646	1318	3375	4271
15	181	354	722	1848	2340	51	333	652	1331	3408	4314
16	186	365	746	1909	2416	52	336	659	1344	3442	4356
17	192	377	769	1968	2491	53	339	665	1357	3475	4398
18	198	388	791	2025	2563	54	343	671	1370	3507	4439
19	203	398	813	2080	2633	55	346	678	1383	3540	4480
20	208	409	834	2134	2701	56	349	684	1395	3572	4520
21	214	419	854	2187	2768	57	352	690	1408	3603	4561
22	219	428	874	2239	2833	58	355	696	1420	3635	4600
23	224	438	894	2289	2897	59	358	702	1432	3666	4640
24	228	448	913	2338	2959	60	361	708	1444	3697	4679
25	233	457	932	2386	3020	61	364	714	1456	3728	4718
26	238	466	951	2434	3080	62	367	719	1468	3758	4756
27	242	475	969	2480	3139	63	370	725	1480	3788	4795
28	247	483	987	2526	3196	64	373	731	1492	3818	4832
29	251	492	1004	2570	3253	65	376	737	1503	3848	4870
30	255	500	1021	2614	3309	66	379	742	1515	3877	4907
31	260	509	1038	2657	3363	67	382	748	1526	3907	4944
32	264	517	1055	2700	3417	68	384	753	1537	3936	4981
33	268	525	1071	2742	3470	69	387	759	1549	3965	5018
34	272	533	1087	2783	3522	70	390	764	1560	3993	5054
35	276	540	1103	2824	3574	72	395	775	1582	4050	5126
36	280	548	1119	2864	3624	74	401	786	1604	4106	5196
37	284	556	1134	2903	3674	76	406	796	1625	4161	5266
38	287	563	1149	2942	3724	78	412	807	1647	4215	5335
39	291	571	1164	2981	3772	80	417	817	1668	4269	5403
40	295	578	1179	3019	3820	82	422	827	1688	4322	5470

Hydrant "A" Elev:	Static Pressure "A":
Hydrant "B" Elev:	Residual Pressure "A":
Project Finish Fl. Elev:	Pitot Pressure "B":
Type Flowing Outlet:	Theoretical Flow "B":
Size Flowing Outlet:	Calculated Flow "B":
Discharge Coefficient	Calibrated Gauges:



Graphic Sketch/Notes:

NOTE: The Hydrant in the circle is the test Hydrant. Residual and Static flows are measured here.

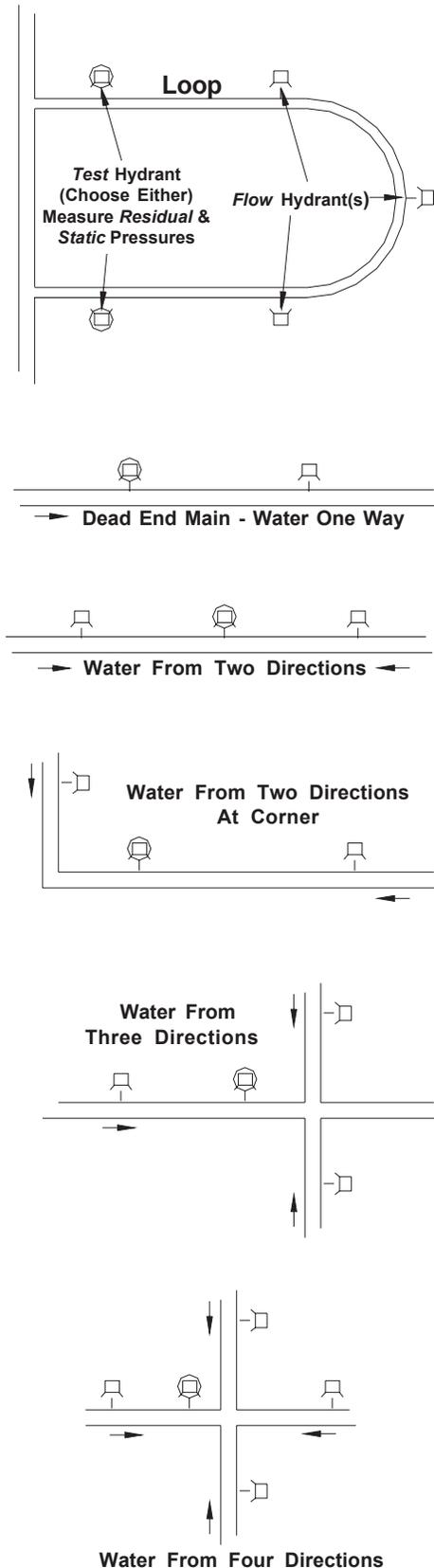


Figure 1

FLOW TEST PROCEDURES

When testing the available water supply, the number of hydrants to be opened will depend upon an estimate of the flow that may be available in the area; a very strong probable flow requires several hydrants to be opened for a more accurate test. Enough hydrants should be opened to drop the **Static** pressure by at least 10 psi (70 kPa); however, if more accurate results are required, the pressure drop should be the **Residual** pressure as close as possible to 20 psi (138 kPa). The flow available at 20 psi (138 kPa) can be determined by dropping the **Residual** pressure to exactly 20 psi (138 kPa) or can be determined at any **Residual** pressure by graphical analysis, or by formula calculations.

Another problem that might be encountered is that water mains may contain such low pressures that no flow pressure will register on the pitot gauge. If this is the case, straight stream nozzles with smaller than 2-1/2" (65 mm) orifices must be placed on the hydrant outlet to increase the flow velocity to a point where the velocity pressure is measurable. It must be noted that these straight stream nozzles will require an adjustment in the water flow calculation that must include the smaller diameter of the nozzle tip and its respective coefficient of friction.

Flow tests are sometimes conducted in areas very close to the base of an elevated water storage tank or stand pipe and the result in flows that are quite large in gallons per minute (L/min). It should be realized that such water large can only be sustained as long as there is sufficient water in the elevated tank or stand pipe. It is advisable to make an additional flow test with the tank or stand pipe shut off. The flow obtained from this second test is the quantity available when the tank or stand pipe has been depleted.

The **Residual** pressure and the **Static** pressure during a flow test should be taken from a fire hydrant that is located as close as possible to the location requiring the test results. This hydrant is commonly called the "**Test**" hydrant. The "**Flow**" hydrants are those where pitot readings are taken to find their individual flows, then added together to find the total flow during the test.

Six arrangements by which fire hydrants in an area can be selected for a flow test are shown on the left side of this page. The illustration (Figure 1) shows the location of the **Test** hydrants relative to the **Flow** hydrants with different hydrant and water main configurations. In general, when flowing a single hydrant, the test hydrant should be between the **Flow** hydrant and the water supply source. That is, the **Flow** hydrant should be down stream from the **Test** hydrant. When flowing multiple hydrants, the **Test** hydrant should be centrally located relative to the **Flow** hydrant.

HYDRANT FLUSHING

Flushing a hydrant removes any accumulated sediment in the barrel and the valve. It is recommended that each hydrant in the system be flushed annually along with the regular inspection and maintenance. In all cases, the annual inspection and maintenance must be done before flushing.

- 1- Contact the appropriate Water Department personal and inform them that a test is about to take place.
- 2- Prepare to flush hydrant. Decide if you will need a diffuser to prevent washout around the hydrant or to protect landscaping or other areas.
 - a- Akron Brass HKD-25, 2-1/2" diffuser for attaching directly to hydrant nozzle.
 - b- Akron Brass ST-25, 2-1/2" Street-T diffuser or the Akron Brass ST-45, 4-1/2" Street-T diffuser
 Attach diffuser to hydrant or length of hose for the T-Bone diffuser.
- 3- Open the hydrant very slowly until it's fully open.
- 4- Let water flow for a minimum of 3 minutes or until water is clear. Flush only one hydrant at a time.
- 5- Shut the hydrant down, again very slowly.
- 6- Prepare to flow test, before replacing cap(s).

Shown are three types of hydrant discharges or outlets and their respective discharge coefficients.

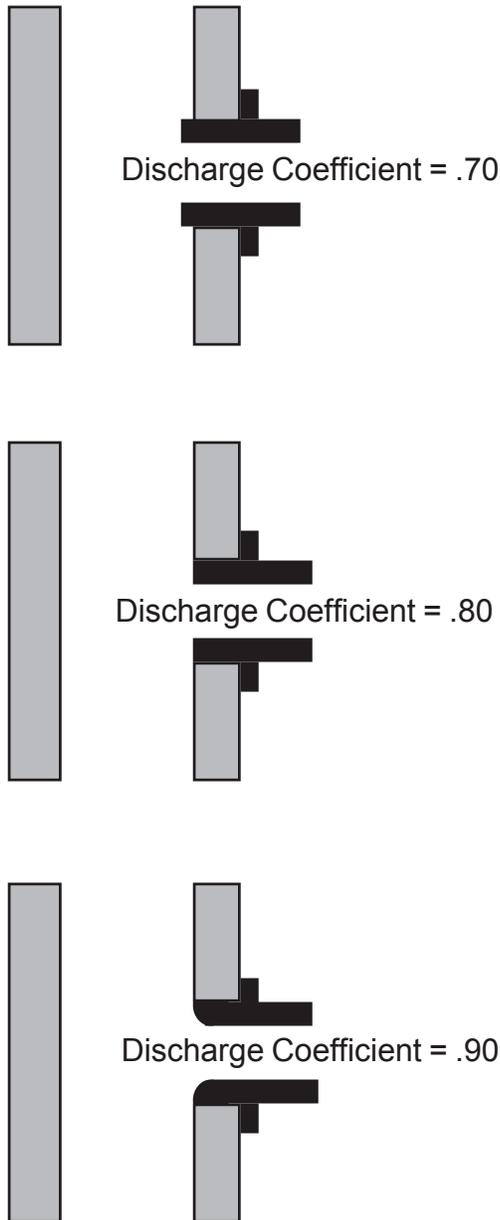


Figure 2

Nozzles have discharge coefficients.

Some common ones are listed:

Akron Brass HK-25	0.84
Short Playpipe	0.96
Smooth Bore Nozzle, General	0.96-0.98
Underwriter Playpipe	0.97
Deluge or Monitor Nozzle	0.99
Short Shut-Off Nozzle	0.90
Standard 1/2" Sprinkler Head	0.75

SETUP & FLOW

- 1- Decide which hydrant will be the **Test** hydrant and which will be your **Flow** hydrant. The **Test** hydrant will be used to measure both **Static** and **Residual** pressures. It should be closer to a feed main than the **Flow** hydrant.
- 2- Decide how many **Flow** hydrants to use. As a general rule of thumb, you should flow enough hydrants at the same time so that the **Residual** pressure drops at least 10% from the **Static** pressure but never allow the **Test** hydrant to go below 20 psi (138 kPa).
- 3- Contact the appropriate Water Department personnel and inform them that a test is about to take place.
- 4- Locate and perform the following on the **Test** hydrant:
 - a- Flush hydrant. (See FLUSHING HYDRANTS section)
 - b- Install Akron Brass cap gauge with petcock open to allow air to escape.
 - c- Open hydrant slowly and fully and after you have a steady stream of water from the petcock close it.
 - d- Read and record the **Static** pressure.
- 5- Locate and perform the following on the **Flow** hydrant.
- 6- Record the inside diameter of the nozzle which will be flowed; generally one of the 2-1/2" nozzles. Insert your hand into the nozzle opening and feel the entrance shoulder to determine the nozzle coefficient. (See Figure 2)
- 7- Flush hydrant. (See FLUSHING HYDRANTS section)
- 8- Install Akron Brass Hydrant Flow Test Kit on the nozzle and or have your Akron Brass Hand Held Pitot ready to get your pitot reading. You will only have this hydrant open long enough to get your Pitot read and Residual reading for the Test hydrant. Record all reading.

COMPUTING HYDRANT FLOW:

The easiest way to determine how much water is flowing from the hydrant outlet(s) is to refer to prepared tables for nozzle discharge. These tables have been computed by using a formula for gallons per minute (L/min) flow, when the flow pressure is known.

THE FORMULA MAY BE STATED AS FOLLOWS:

Flow rate is equal to a constant, multiplied by the coefficient of discharge, multiplied by the diameter of the orifice-squared, by the square root of the pressure.

THE FORMULA IS WRITTEN AS FOLLOWS:

$$\begin{aligned} \text{GPM} \quad Q_r &= 29.83 \times C_d \times D^2 \times \sqrt{P_p} \\ \text{L/min} \quad Q_r &= 0.0667766 \times C_d \times D^2 \times \sqrt{P_p} \end{aligned}$$

$$Q_f = Q_r \left[\frac{P_s - 20}{P_s - P_r} \right]^{0.54}$$

WHERE:

- 29.83 or (0.0667766) are constants.
- "C_d" is the friction loss coefficient (**usually 0.90 for a smooth 2-1/2" opening**)
- "D" is the actual diameter (measured) of the hydrant or nozzle in inches (mm)
- "P_p" is the **Pitot** pressure reading in PSI (kPa)
- "Q_f" is the **Fire Flow** in GPM (L/min)
- "P_s" is the **Static** pressure in PSI (kPa)
- "P_r" is the **Residual** pressure in PSI (kPa)

DISCHARGE TABLE FOR CIRCULAR OUTLETS* (US)

Outlet Pressure Measured by Pitot Gauge

<i>HK-25</i> Outlet Pressure in psi	OUTLET DIAMETER IN INCHES											
	2-3/8"	2-1/2"	2-5/8"	2-3/4"	2-7/8"	3"	3-1/8"	3-7/8"	4"(*)	4-3/8"(*)	4-1/2"(*)	4-5/8"(*)
	U.S. Gallons per Minute											
1	150	160	180	200	220	240	260	400	430	510	540	580
2	210	220	260	290	310	340	370	570	610	720	770	810
3	260	280	320	350	380	420	450	700	740	890	940	990
4	300	320	370	410	440	480	530	810	860	1030	1090	1150
5	340	350	410	450	500	540	590	900	960	1150	1220	1290
6	370	390	450	500	540	590	640	990	1050	1260	1340	1410
7	400	420	490	540	590	640	690	1070	1140	1360	1440	1520
8	430	450	520	570	630	680	740	1140	1220	1450	1540	1620
9	450	480	550	610	670	730	790	1210	1290	1540	1640	1720
10	480	500	580	640	700	760	830	1280	1360	1630	1730	1820
11	500	520	610	670	730	800	870	1340	1430	1710	1810	1910
12	520	550	640	700	770	840	910	1400	1490	1780	1890	1990
13	550	570	670	730	800	870	950	1450	1550	1850	1960	2070
14	570	590	690	760	830	900	980	1510	1610	1920	2040	2150
15	590	610	720	790	860	940	1020	1560	1660	1990	2110	2220
16	610	630	740	810	890	970	1050	1620	1720	2060	2180	2300
17	620	650	760	840	910	1000	1080	1660	1770	2120	2240	2370
18	640	670	780	860	940	1030	1110	1710	1820	2180	2310	2440
19	660	690	810	890	960	1050	1140	1760	1870	2240	2370	2510
20	680	700	830	910	990	1080	1170	1800	1920	2290	2430	2570
22	710	740	870	950	1040	1130	1230	1890	2020	2400	2550	2700
24	740	770	910	1000	1090	1180	1290	1970	2110	2510	2660	2810
26	770	800	940	1040	1130	1230	1340	2050	2190	2620	2770	2930
28	800	830	980	1070	1170	1280	1390	2130	2280	2720	2880	3040
30	830	860	1010	1110	1210	1320	1430	2210	2350	2820	2980	3150
32	860	890	1050	1150	1260	1370	1480	2280	2430	2910	3080	3250
34	880	920	1080	1180	1290	1410	1530	2350	2510	3000	3170	3350
36	910	950	1110	1220	1330	1450	1580	2420	2580	3080	3260	3440
38	930	970	1140	1250	1370	1490	1620	2480	2650	3170	3350	3540
40	960	1000	1170	1290	1400	1530	1660	2550	2720	3250	3440	3630

* Computed with Coefficient C = .90, to nearest 10 gallons per minute.
Table from "IFSTA" International Fire Service Training Association, Fourth Edition.

CORRECTION FACTORS FOR LARGE DIAMETER OUTLETS		(*) The stream from a large hydrant outlet 4 to 4-1/2 inches contains voids (i.e., the entire stream of water is not solid), and for this reason the standard flow formulas alone will not give accurate results for flows using these larger steamer outlets. Generally, the 2-1/2 inch outlets should be used. When a large outlet is used the standard formula answer must be multiplied by the factor in the adjacent table to get a fairly accurate flow result.
VELOCITY PRESSURE	FACTOR	
2 psi (13.8 kPa)	0.97	
3 psi (20.7 kPa)	0.92	
4 psi (27.6 kPa)	0.89	
5 psi (34.5 kPa)	0.86	
6 psi (41.4 kPa)	0.84	
7 psi (48.3 kPa) or over	0.83	



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We will not be responsible for: wear and tear; any improper installation, use, maintenance or storage; negligence of the owner or user; repair or modification after delivery; damage; failure to follow our instructions or recommendations; or anything else beyond our control. WE MAKE NO WARRANTIES, EXPRESS OR IMPLIED, OTHER THAN THOSE INCLUDED IN THIS WARRANTY STATEMENT, AND WE DISCLAIM ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. Further, we will not be responsible for any consequential, incidental or indirect damage (included, but not limited to, any loss or profits) from any cause whatsoever. No person has authority to change this warranty.

DISCHARGE TABLE FOR CIRCULAR OUTLETS* (US)

Outlet Pressure Measured by Pitot Gauge

<u>HK-25</u> Outlet Pressure in kPa	OUTLET DIAMETER IN MM											
	60	64	67	70	73	76	79	98	102(*)	111(*)	114(*)	117(*)
Liters per Minute												
5	484	550	603	658	716	776	839	1291	1398	1656	1746	1840
10	684	778	853	931	1012	1098	1186	1825	1977	2341	2470	2602
15	838	953	1045	1140	1240	1344	1453	2235	2422	2868	3025	3186
20	968	1101	1206	1317	1432	1552	1677	2581	2796	3312	3493	3679
25	1082	1231	1348	1472	1601	1736	1875	2886	3126	3702	3905	4113
30	1185	1348	1478	1613	1754	1901	2054	3161	3425	4056	4278	4506
35	1280	1456	1596	1742	1894	2054	2219	3415	3699	4381	4620	4867
40	1368	1557	1706	1862	2026	2195	2372	3650	3954	4683	4940	5203
45	1451	1651	1810	1975	2148	2328	2516	3871	4194	4967	5239	5519
50	1530	1741	1907	2082	2264	2455	2652	4081	4421	5236	5523	5817
55	1604	1826	2001	2184	2375	2574	2781	4281	4637	5492	5792	6101
60	1676	1907	2090	2281	2481	2689	2905	4471	4843	5736	6050	6373
65	1744	1985	2175	2374	2582	2799	3024	4653	5041	5970	6293	6633
70	1810	2060	2257	2463	2679	2904	3138	4829	5231	6195	6535	6883
75	1873	2132	2336	2550	2773	3006	3248	4999	5415	6413	6764	7125
80	1935	2202	2413	2634	2864	3105	3355	5162	5593	6623	6986	7358
85	1994	2270	2487	2715	2952	3200	3458	5321	5765	6827	7201	7589
90	2053	2335	2559	2794	3038	3293	3558	5476	5932	7025	7410	7805
95	2109	2399	2629	2870	3121	3383	3656	5625	6094	7217	7612	8019
100	2164	2462	2698	2945	3203	3471	3751	5772	6253	7405	7810	8227
105	2217	2522	2764	3017	3282	3557	3843	5914	6407	7589	8003	8430
110	2269	2582	2860	3089	3359	3640	3933	6054	6558	7766	8192	8628
115	2320	2640	2893	3158	3434	3722	4022	6190	6705	7940	8376	8822
120	2370	2697	2955	3225	3508	3803	4109	6323	6849	8112	8556	9012
125	2419	2752	3016	3292	3581	3881	4193	6453	6990	8279	8732	9198
130	2467	2807	3076	3358	3652	3958	4277	6581	7129	8443	8905	9380
135	2514	2860	3135	3422	3721	4033	4358	6706	7265	8604	9075	9559
140	2560	2913	3192	3484	3789	4107	4438	6829	7398	8761	9241	9734
145	2605	2964	3249	3546	3856	4180	4516	6950	7529	8917	9405	9907
150	2650	3015	3304	3607	3922	4251	4594	7069	7658	9069	9569	10076

* Computed with Coefficient C =.90, to nearest 10 gallons per minute.
Table from "IFSTA" International Fire Service Training Association, Fourth Edition.

CORRECTION FACTORS FOR LARGE DIAMETER OUTLETS		(*) The stream from a large hydrant outlet 4 to 4-1/2 inches contains voids (i.e., the entire stream of water is not solid), and for this reason the standard flow formulas alone will not give accurate results for flows using these larger steamer outlets. Generally, the 2-1/2 inch outlets should be used. When a large outlet is used the standard formula answer must be multiplied by the factor in the adjacent table to get a fairly accurate flow result.
VELOCITY PRESSURE	FACTOR	
2 psi (13.8 kPa)	0.97	
3 psi (20.7 kPa)	0.92	
4 psi (27.6 kPa)	0.89	
5 psi (34.5 kPa)	0.86	
6 psi (41.4 kPa)	0.84	
7 psi (48.3 kPa) or over	0.83	



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DISCHARGE TABLE FOR CIRCULAR OUTLETS (US)

Outlet Pressure Measured by Pitot Gauge

Outlet Pressure in lbs. per sq. inch	Outlet Diameter in Inches			Outlet Pressure in lbs. per sq. inch	Outlet Diameter in Inches		
	2-1/2"	4"	4-1/2"		2-1/2"	4"	4-1/2"
	U.S. Gallons per Minute				U.S. Gallons per Minute		
1	160	390	500	34	920	1950	2470
2	220	550	700	36	950	2010	2540
3	280	640	810	38	970	2060	2610
4	320	720	910	40	1000	2120	2680
5	350	780	980	42	1020	2170	2750
6	390	830	1050	44	1050	2220	2810
7	420	890	1120	46	1070	2270	2870
8	450	950	1200	48	1090	2320	2940
9	480	1000	1270	50	1110	2370	3000
10	500	1060	1340	52	1140	2410	3060
11	520	1110	1410	54	1160	2460	3110
12	550	1160	1470	56	1180	2510	3170
13	570	1210	1530	58	1200	2550	3230
14	590	1250	1590	60	1220	2590	3280
15	610	1300	1640	62	1240	2640	3340
16	630	1340	1700	64	1260	2680	3390
17	650	1380	1750	66	1280	2720	3440
18	670	1420	1800	68	1300	2760	3490
19	690	1460	1850	70	1320	2800	3550
20	700	1500	1900	72	1340	2840	3600
21	720	1530	1940	74	1360	2880	3650
22	740	1570	1990	76	1370	2920	3690
23	760	1610	2030	78	1390	2960	3740
24	770	1640	2080	80	1410	3000	3790
26	800	1710	2160	85	1450	3090	3910
28	830	1770	2240	90	1500	3180	4020
30	860	1830	2320	95	1540	3260	4130
32	890	1890	2400	100	1580	3350	4240

2-1/2", 4" & 4-1/2" Computed with Coefficient C=.845, to nearest 10 gallons per minute

4" & 4-1/2" Correction Factors for large diameter outlets already figured in gpm's.

Large diameter openings do not flow solid water, the correction factor compensates for the voids.