- Hydrant Flow Measurement - Using the best options for the circumstances...

2022 Clean Safe
Drinking Water
Workshop

Tom Cameron
President / CEO



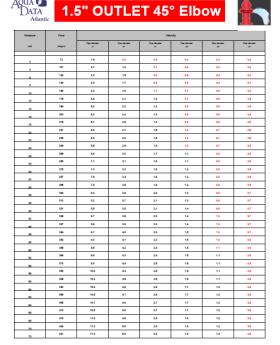
Measuring flow can be very simple or can be complex... Do what works best for you and your municipality...



# Drainage is Very Important







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Pressure	Row			Val	ocity		
		Pije (bride	Pys Garage	The decider		Pije Gander	Pipe decision
(m)	(get)	•		r r	Pye dander 15*	er er	te*
2	110	2.1	1.4	6.0	0.5	0.3	0.3
	145	2.0	1.7	1.0	0.6	0.4	0.3
	205	5.4	2.4	1.4	0.9	0.0	0.4
-	297	6.2	2.0	1.6	1.0	6.7	0.5
10	265	7.0	3.1	1.7	5.5	6.0	0.6
12	290	7.6	3.4	1.0	12	6.0	0.0
14	213	6.3	9.7	2.1	13	0.9	0.7
19	355	6.0	3.9	2.2	1.4	1.0	0.7
19	355	9.4	42	2.3	1.5	1.0	0.0
20	274	9.9	4.4	2.5	1.0	1.1	0.2
22	292	10.3	44	2.6	1.7	1.1	0.2
24	410	10.0	4.0	2.7	1.7	12	0.9
26	427	11.3	5.0	2.0	1.0	13	0.9
20	443	11.7	6.2	2.9	13	1.0	1.0
	453	12.1	5.4	1.0	13	1.0	1.0
12	474	12.8	6.6	8.1	2.0	1.4	1.0
14	400	12.0	6.7	5.2	2.1	1.4	1.1
	502	13.2	5.0	1.3	2.1	1.8	1.1
20	818	13.6	6.0	14	2.2	1.5	1.1
40	500	14.0	6.2	1.5	2.2	1.0	1.1
4	543	14.3	6.4	2.6	2.3	1.0	12
44	565	14.0	6.5	2.7	2.3	1.6	12
	503	15.0	6.7	2.7	2.4	1.7	12
40	500	16.3	6.0	3.0	2.4	1.7	12
50	592	15.6	6.3	3.9	2.5	1.7	1.3
62	604	15.0	7.5	4.0	2.5	1.0	13
54	615	16.2	7.2	4.1	2.6	1.0	13
56	627	16.6	7.3	41	2.6	1.0	13
50	600	16.0	7.5	4.2	2.7	1.9	1.4
60	549	17.1	7.6	43	2.7	1.9	1.4
62	669	17.4	7.2	43	2.0	1.9	1.4
64	670	17.7	7.0	ш	2.0	2.0	1.4
66	600	17.0	0.0	4.5	2.9	2.0	13
	690	18.2	8.1	4.5	2.9	2.0	1.5
92							

2.0" OUTLET 90° Elboy

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Pressure	Flow	Velocity						
(**)	(mgm)	Pipe German	Pipe Gerieber	Plea decides:	Pipe decider 17	Ppe decate:	Pipe decrete 10"	
1	141	87	17	0.9	C.A	0.4	0.3	
	264	64	2.9	1.6	1.0	6.7	0.5	
	215	8.3	2.7	2.1	13	0.9	0.7	
,	273	8.0	44	2.5	1.6	1.1	0.0	
	423	15.1	5.0	2.0	1.0	12	0.9	
11	467	12.3	6.6	9.1	2.0	1.4	1.0	
- 19	500	13.4	6.0	9.3	2.1	1.8	1.1	
15	546	16.6	6.4	3.6	2.3	1.8	1.2	
17	601	15.3	6.0	9.0	2.4	17	1.2	
- 19	854	16.2	72	4.0	2.6	1.0	1.3	
21	646	17.0	7.6	43	2.7	1.9	1.4	
23	674	17.8	7.0	4.5	2.0	2.0	1.6	
25	716	15.6	6.3	4.6	1.0	2.1	5.8	
27	792	19.3	0.6	4.0	9.5	2.1	5.6	
29	759	26.0	0.9	5.0	5.2	2.2	1.6	
31	705	26.7	9.2	5.2	2.2	2.3	1.7	
33	810	21.3	9.5	5.3	2.4	2.4	1.7	
35	894	22.0	9.0	6.5	2.5	2.4	5.0	
97	867	22.6	10.0	6.6	2.6	2.6	5.0	
29	000	23.2	19.3	5.0	9.7	2.6	5.0	
41	902	23.0	10.6	5.9	3.0	2.6	5.0	
43	904	26.4	10.0	6.1	2.9	2.7	2.0	
45	ME	36.9	11.1	6.2	4.0	2.0	2.0	
47	201	25.5	11.3	6.4	4.1	2.0	2.1	
49	967	26.0	11.0	4.5	42	2.9	2.1	
61	1006	26.6	11.0	4.6	4.2	2.0	2.2	
53	1006	27.0	12.0	6.0	43	1.0	2.2	
55	1945	27.5	12.2	6.9	и	1.1	2.2	
67	1964	25.0	12.5	7.0	45	2.1	2.1	
59	1903	28.5	12.7	7.1	4.5	12	2.3	
81	1101	28.0	12.9	7.3	4.6	1.2	2.4	
63	1119	28.6	13.1	7.4	4.7	1.3	2.4	
65	1136	29.9	13.3	7.5	4.0	3.3	2.4	
67	1154	30.4	13.5	7.6	43	2.4	2.5	
69	1171	36.0	13.7	7.2	43	2.4	2.5	
	1100	21.3	13.9	7.0	6.0	3.5	2.6	

2.5" OUTLET 45° Elbow

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# Engineering flow charts for full flow 2.5" gate valves w/ or wo/ elbows..



(psi)

4

6

8

10

12

14

16

18



Length of pipe:	500
Velocity:	5
Flushing Time:	5

Pipe diameter

8"

8.0

1.2

1.5

1.7

1.9

2.1

2.2

2.4

2.5

Langth of Pine divided By Velocity

Pipe diameter

10"

0.5

8.0

0.9

1.1

1.2

1.3

1.4

1.5

1.6

AQUA DATA Atlantic	2.0" OUTLET 45°	Elb

Atlantic Atlantic	OUTLET 43	LIDOW	Velocity: Flushing Time:	5 5	times 1 divided by 60	

Atlantic	00122140	LIBOW	Velocity: Flushing Time:	5	times 1 divided by 60	
Pressure	Flow				Velocity	

Press	 Flow	
Atlantic		

(gpm)

128

180

221

255

285

312

337

361

383

Atlantic Velocity. 5 unles I divided by 60	Flushing Time: 5	
	Titalitie	)

Pipe diameter

3.4

4.8

5.8

6.7

7.5

8.2

8.9

9.5

10.1

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DATA Atlantic	2.0"	OUTLET 45°	Elbow	Undirectional	Velocity: Flushing Time:	5	times 1 divided by	

2 O' OUTLET 45° Elbour		Length of pipe:	500	Length of Pipe divided By Veloci
2.0 OUTLET 45 EIDOW	Paraley 1	Velocity:	5	times 1 divided by 60
		Flushing Time:	5	

Pipe diameter

6"

1.5

2.1

2.6

3.0

3.3

3.7

4.0

4.2

4.5

DATA Atlantic	OUTLET 45	EIDOW	Pulse	Velocity:	5	times 1 divided by 60
				Flushing Time:	5	





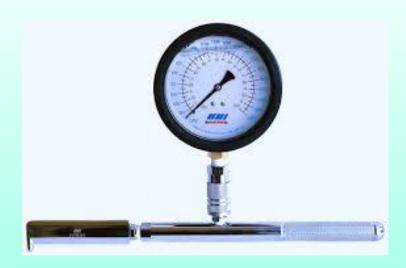












# Handheld pitot measuring tool

	THE SOURCE OF THE STREET STREET, STREE	THE THE THE PROPERTY IN THE PARTY AND THE	THE CASE CHAIN STREET, STREET, STREET,	Chiques serving may be a particular	WHITTH THE STREET WAS KIND FROM ST.	REALW BOLLSON WALL GOVERNMENT	Will Albertanion company	GENERAL BENEVAL MALENNE	HOUSE HARBING CONTRACT.	BRITANISM MANAGEMENT	TITLE THE STATE OF THE COLUMN	COMPANION CONTRACTOR	THE PLANT WITH STILL STREET	CHIEF THE TANK THE CALLS
	THE STREET STREET, SALES STREET, STREE	THE PROPERTY STREET, S	CONTRACTOR CONTRACTOR CONTRACTOR	Chicket Service Terres (1934) Gills	PORTET TERM (CLES INVINCED PRIN	ESTAN Sections/and min on	OTTO PATE BUILDINGS CONTOUR	SERVICE CONTRACTOR CONTRACTOR	HEAD STATE STATE STATE STATE STATE	STREET, STREET	THE THREE WAS ASSESSED.	CONTRACTOR STREET	HER WHEN THE SAME THE REAL	CONTRACTOR TOWN TO SELECT
	THE STREET STREET, SALES STREET, STREE	CONTRACTOR CONTRACTOR CONTRACTOR	TALEGRANI CHIMINAN MANAMATANI	Chicago Serrinare Interposation	THE THE PERSON NAMED AND POST OFFI	ESTAN Sections/and min on	OTTO PARENTAL MANAGEMENT	SERVICE CONTRACTOR CONTRACTOR	HOUSEMPHINE HOUSE HER	STREET, STREET	THE THREE WAS ASSESSED.	CHARLEST STATE STATE STATE	HER WINDS THE STATE THE SALE	COLUMN THE PART OF
	PARTY AND DESCRIPTION OF THE PARTY AND DESCRI	THE THE THE PROPERTY OF SECTION SERVICES	HELICALE CHILD THE PROPERTY OF THE PERSON NAMED IN COLUMN TO PERSON NA	This was sent ment from 1954 to	PORTUGE STATE STATE STATE OF	INTERNATIONAL PROPERTY OF	OTTEN PRINCIPAL CONTR	STREET ATTRIBUTED AND STREET	HOUSEMPENDEN HOLL	STREET, STREET	THE THE WASHINGTON	CHARLEST STREET, STREE	HERENI HITESAMI RECEN	COLUMN TOWNS TOWNS THE COLUMN TWO IS NOT THE
		COMPANY CONTROLLER SAME CORP.	THE GLASS CHILD STREET, STREET	HEIGHT STREET, THE STREET	HANDLE STREET,	KHM Senjangan ain	OTTHE PARTICION OF COMMA	SETTING THE PERSON AND	HOUSEMENT STREET	STREET, STREET	THE THE STREET STREET	CHARLES SANS THE PARTY.	HER MAN THE SAME THE	COLUMN TO STATE OF THE PARTY OF
		CONTRACTOR CONTRACTOR CONTRACTOR	THE STATE SHALL SHAWN WHILE THE PARTY SHALL	III) DAM SOTTOMET TOTAL STOR	DESTRUCTION OF STREET STREET	REALW Security Management	OTTHE PRESENCE CO.	SERVICE BEEN AND PART	HANSHING HOUSE	THE STATE OF THE S	INTERNATION IN	THE RESERVE AND STREET	HER MAN THE SAME THE	COLUMN THE STATE OF THE STATE O
			TO STATE STREET, STATE STATE OF	Oliginal derretaries being bit	DOTTE THE LESS BEAR DESIGNATION OF	REALW Sections of the second	OTHER PRINCIPAL BOARD	GENERAL STATE OF STAT	HANGER HANGE HERE	STATE STATE STATE OF	THE PROPERTY OF	COLUMN STREET, STREET, STR.	HER PROBEERING STATE IN	COLUMN THE STATE OF THE STATE O
		CONTRACTOR	TO GLOSS CHILD STANDARD OF	Oliginal derretaries being bit	CHARLES STATE STATE STATE OF S	REALM Security Course	DESIGNATION OF STREET	STORY STREET, STORY	HENCEN STREET, STREET	STREET, STREET	THE STREET	THE PERSON NAMED IN	HER PROBESTION NAMED IN	CHARLES STATE STATE OF STATE O
		THE DESCRIPTION OF THE PROPERTY.	MACALLE CHANGE STATES	Illigate serrente error	CHARLES CONTRACTORS INVESTIGATION	REALW ROLL WING MAIN	OTHER PROPERTY.	GRID STERRING	HANGER HANGER	STATE STATE STATE	IIII IIII IIII IIII IIII IIII	COLUMN STATES	HER STREET, STREET,	CHARLES STATE OF STREET
		WHO THEY ENTERED BUT	TO GLOCIT CHILD THE SALE	III) OLD SETTING TO	HOND THE PERSON IN	HEATH REQUIRED	OTHER PROPERTY.	GRID STREET, S	HIN SHIP HAD BEEN	STREET, STREET	THE PROPERTY OF THE	CONTRACTOR OF STREET	HE WHITH SAID	COLUMN TRANSPORTER TO SERVICE
		REAL PROPERTY AND DESCRIPTIONS	MARKETT CHANGE AND PARTY.	III) DAM SETTING	INCOME TRANSPORTER IN	HEATH ROLLINGIA	OFFICE PROPERTY.	GENERALINERS	HANGELLE STEEL	CONTRACTOR OF STREET	THE SHARES	OF THE LAND	HEATTER WINES	COLUMN DESIGNATION OF
		STATE STATES	the gold distributy	(III) Outs 4 continues	DOMESTICAL STATES	REALING SOLD STATE	OFFICE PROPERTY.	GPINSTER BARN	HMANIMAN	STREET, STREET	THE SHADE	OUT HER LAND	HI WHITH	COLUMN DESCRIPTION
		STEEL STREET	MANAGEMENT STATES	Oligona serrent	HOTTER THE	REAL ROLL STATES	OFFICE PARTIES.	Grand Strategies	HAR STILL ST	STREET, STREET,	THE STATE OF	THE REAL PROPERTY.	HI WINDS	THE PROPERTY.
		THE PROPERTY COMME	HIGHER STANFORM	(III) Outs ferring	HOTHER THE STATE	HEATH READIN	OFFIC MINERAL	GPRESTILLING	HAMAGINE	STREET, STREET,	THE STATE OF	THE REAL PROPERTY.	HI WIND	STATE STATE OF
		THE PROPERTY.	THE CASE SHALL	(III) OUR HETTER	HOTHER TRAVE	REALWAYS SALES	OTHER PRINCIPAL	Generalia I	HARMIN	STREET, STREET,	THE STATE	DEPTH DE	HHAM	THE THE
		THE PROPERTY.	HILL GLANT CHIN	III) OUR SETT	IN STREET, THE	REPLY BOLD	OTHER PARK	Generalia I	H181	111111111111111111111111111111111111111	THEFT		HH MH	THE COURT
	1	THE PROPERTY.	HISTORY CHIL	III Quan lerr	HOTHERS IN	REPUBLICA	OFFICIAL PARK	General and	H181	111111111111111111111111111111111111111	THE		HHAM	THE REAL PROPERTY.
	1100	STREET, STREET	HALL WATER	III) Out of the	Hamme	REPUBLISH	HIII	GRID 9	100	Ē	Ē	-	HH	an anno
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#### Model II FLOW CHART

#### PITOT DIAMETER ORIFICE

PITOT	DIAMET	ER ORIFI	CE
PSI	2 1/2"		1 1/8"
10	533	282	118
11	559	295	124
12	584	308	129
13	608	321	135
14	631	333	140
15	653	345	145
16	675	356	149
17	695	367	154
18	716	378	159
19	735	388	163
20	754	398	167
21	773	408	171
22	791	418	175
23	809	427	179
24	826	436	183
25	843	445	187
26	860	454	191
27	876	463	194
28	893	471	198
29	908	479	201
30	924	488	205
31	939	496	208
32	954	504	211
33	969	511	215
34	984	519	218
35	998	527	221
36	1012	534	224
37	1026	542	227
38	1040	549	230
39	1053	556	233
40	1067	563	236
41	1080	570	239
42	1093	577	242

#### PITOT DIAMETER ORIFICE

PITOT	DIAMETE	R ORIFIC	E
PSI	2 1/2"	1 3/4"	1 1/8"
43	1106	584	245
44	1119	591	248
45	1131	597	251
46	1144	604	253
47	1156	610	256
48	1168	617	259
49	1180	623	262
50	1192	630	264
51	1204	636	267
52	1216	642	269
53	1228	648	272
54	1239	654	275
55	1251	660	277
56	1262	666	280
57	1273	672	282
58	1284	678	285
59	1295	684	287
60	1306	690	289
61	1317	695	292
62	1328	701	294
63	1338	707	297
64	1349	712	299
65	1359	718	301
66	1370	723	304
67	1380	729	306
68	1390	734	308
69	1401	740	310
70	1411	745	313
71	1421	750	315
72	1431	756	317
73	1441	761	319
74	1451	766	321
75	1460	771	324

### U. S. Patent # 5,069,073

Hydro Flow Products, Inc. 503 West Golf Road Arlington Heights, IL 60005 847/434-0101 847/434-0073 fax service@flowtest.com www.HoseMonster.com

## 2" Pitotless Nozzle™ GRV FLOW CHART





		ostet .	ore			nste <sup>1</sup>	are	$\overline{}$	points	Stet	ote .	_	
10. ac	Jest Interiore	Monster Open Auros	othe /	N. T	Jest Little Hose h	Open Armo	Sphe	Flow	Test Points	e Monster Open Armo	Softe		
10	/ Vite	/ 0 <sup>V</sup>	$\overline{}$	/ N	/ Vite	/ ov	$\overline{}$	140	/ Vite	/ ov	-	1	
PSI	GPM	GPM		PSI	GPM	GPM		GPM	PSI	9.1		4	
10 11	493 517	529 555		41	999 1011	1071 1084		500 562.5	10.7 13.0	11.3		1	
12	540	579		43	1011	1084		750				1	
									23.1	20.1		4	
13	562	603		44	1035	1109		1000	41.1	35.8		4	
14	584	626		45	1046	1122		1125	52.0	45.3		4	
15	604	648		46	1058	1134		1500	92.5	80.5		4	
16	624	669		47	1069	1146						1	
17	643	689		48	1081	1158				s chart are b			
18	662	709		49	1092	1170		on which device the Pitotless Nozzle is					
19	680	729		50	1103	1182		connecte					
20	698	748		51	1114	1194				nsibility to v rt and colun			
21	715	766		52	1125	1206		being use		rt and colun	nn is		
22	732	784		53	1136	1217		Little Hose Monster™ (HML).					
23	748	802		54	1146	1229				nn when the			
24	764	819		55	1157	1240				le is connec			
25	780	836		56	1167	1251		Litt	tle Hose M	onster.			
26	795	853		57	1178	1262		• 0	pen Atmo	sphere. Use	this		
27	811	869		58	1188	1273		col	lumn when	the Pitotles	s		
28	825	885		59	1198	1284		Nozzle is connected directly to a					
29	840	900		60	1208	1295		test header or hydrant flowing					
30	854	916		61	1218	1306		op op	enly to atm	osphere.			
31	869	931		62	1228	1317		This show	- :- FN4 A				
32	882	946		63	1238	1327				roved for flo			
33	896	960		64	1248	1338				risdiction to			
34	910	975		65	1258	1348				stions. Add			
35	923	989		66	1267	1358				s are availab			
36	936	1003		67	1277	1369				m/literature.l			
37	949	1017		68	1286	1379		1					
38	962	1017		69	1296	1389		1					
39	974	1044		70	1305	1399		1					
	987	1044		70	1000	1000		ł		Updated F	ab 2011		
40	36/	1057								Opdated F		J	







MANUFACTURED BY: Hydro Flow Products, Inc. 888.202.9987 TOLL FREE 847.434.0073 FAX Service@FlowTest.com EMAIL www.HoseMonster.com











