HYDRO FLOW PRODUCTS, INC.

Fire Pump Testing | Fire Flow Testing Hydrants | Standpipe Testing | Dechlorination | Main & Unidirectional Flushing | Apparatus Testing | Software

HYDRO FLOW PRODUCTS, INC.

Home of the
Hose Monster®

The Industry Standard in Fire Pump and Fire Flow Testing

For the people who test fire pumps and fire hydrants.

Our mission is to provide the best products in the world for testing fire pumps and fire hydrants. We are focused on providing solutions that verify fire protection systems perform when a fire occurs. We offer products that are safe, accurate, and simple to use. We attain the industry's highest certification and approval for the products we offer, and we support our products with knowledgeable and responsive customer service.

The Hose Monster product line:

- Enables precise flow-rate readings
- Neutralizes high-flowing water safely and conveniently and minimizes damage to landscape
- Allows flow-rate measurements to be taken several feet from discharge, which will keep you dry
- Saves time and money by conducting flow tests quicker and more accurately

Our latest innovations include:

- **Fire Pump Tester Software (page 28)**— A cloud-based software program that collects fire pump test results professionally, comprehensively and easily. FPT stores all of your fire pump information, calculates flow-rates and graphs pump test curves.
- **The In-line Pitotless Nozzle™ (page 10)** — An In-line flow measuring device ideal for flow testing standpipes, pressure-reducing valves, and hose cabinets. Now available for both 2 ½" and 1 ½" valve connections.
- **The BigBoy Hose Monster™ (page 13)** — A lightweight diffuser that measures high-flowing hydrants and reads GPM directly off the gauge.

Contact Information:

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Customer Service Hours:
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Website:
www.hosemonster.com

We're the Home of the Hose Monster®

Our business was launched in 1996 with our flagship product, the Hose Monster®. It was the first flow-measuring device to enable safe discharge of high-flowing water, minimizing property damage and traffic interference.

Client and Market Knowledge

The professionals at Hydro Flow Products understand the industries and sectors in which our clients operate. We turn our practical knowledge into clear advice and find solutions that nobody else can provide. When you face unique and challenging testing situations, our knowledgeable staff stands ready to find the best equipment and procedural solutions for you. Your satisfaction is the truest mark of our excellence.

We're the One-Source Solution for Your Testing Needs

- Fire Flow Testing Hydrants
- Fire Pump Testing
- Standpipe Testing
- Main Flushing and Unidirectional Flushing
- Apparatus Testing
- Dechlorination
- Software

Member of:

American Water Works Association

FDIC

NFPA® MEMBER

NFSA The Voice of the Fire Sprinkler Industry

AFSA American Fire Sprinkler Association

How to Place an Order:

1. Online: Go to www.hosemonster.com and click on the shopping cart

2. Phone: Call 1.888.202.9987 to speak with one of our helpful Customer service representatives

3. Send Purchase Orders to:
service@flowtest.com or fax to 847.434.0073.
(Note: Requires a credit account with HFP)

Shipping

- HFP will ship UPS Ground unless specified otherwise.
- Expedited shipping for next-day arrivals is available by request for shipments to US and Canada.
- In order for a product to be shipped out same day, the order must be received by 11:00 AM CT.
- Freight will be prepaid and added to each invoice.
- Freight costs are based on rates from UPS unless other shipping method is specified.
- For international shipments, our shipping rates do not include duties, taxes or other non-routine customs brokerage charges. The shipping carrier will provide the recipient of the package(s) with an invoice for imposed customs charges.

Payment Terms

- Prepayment via check, major credit card or bank transfer is preferred. Acceptable credit cards include: Visa, American Express, Master Card and Discover.
- Terms of Net 30 may be applied for with the following guidelines: the applying company has been in business for at least 5 years, and the applying company is of a reasonable size and in stable financial condition. Applying companies must fill out HFP's credit application and provide three trade references. HFP may deny applications for any reason at any time.

International Orders

International orders originating outside US and Canada are prepaid via bank transfer. Please contact us for instructions for conducting bank transfers.

Returns

We strive for complete customer satisfaction. If you are not satisfied with your purchase, please contact us. Returns are generally accepted within 30 days of purchase. A return authorization must be accompanied with any equipment you send back, and a 15% restocking fee may apply for used product. Call or e-mail us for a return material authorization (RMA).

Sales Tax

Sales tax will be added to shipments to Illinois and Indiana unless a valid and current tax-exempt certificate is on file with us. We do not collect sales tax for shipments outside of Illinois or Indiana.

To send us your tax-exemption certificate: fax to 847.434.0073 or e-mail PDF to: service@flowtest.com.

Warranty Policy

HFP manufactured products are warranted against manufacturing defects for a period of two years from the date of sale. The warranty does not cover damage to pitots which may become damaged by flushing debris. Additionally, the warranty does not include damage caused by improper use or connecting to incompatible equipment, nor shall it apply to products that have been altered or modified in any way. This warranty applies only to HFP manufactured products. All other products fall under their original manufacturer's warranty, if available. The unit will be repaired, replaced or partially refunded at the manufacturer's discretion. If found defective, contact Hydro Flow Products, Inc. at 847.434.0101 for the procedure and Return Material Authorization (RMA).

Important Notice

Hydro Flow Products, Inc. (HFP) reserves the right to make any changes to the information contained in this publication without prior notice. Hydro Flow Products, Inc. also reserves the right to correct any errors or misprints. Products and descriptions are subject to change without notice. Visit www.hosemonster.com for the latest product offerings and pricing. The information contained in this publication is not a formal interpretation of any code or standard. Any equipment recommendations or procedural information herein are for general purposes only and are not all-inclusive. Hydro Flow Products, Inc. is not liable for injury that results from the information contained herein. Always read instructions and follow a manufacturer's warnings prior to the use of any product.

Kits

Your all-in-one solution for Fire Pump Testing or Fire Flow Testing

The following kits are our recommended set-ups for Fire Pump Testing and Fire Flow Testing. Actual equipment needed may vary depending on intended use and preferences. Each component is sold as a separate line item and can be substituted. Contact us to determine the configuration best suited for your operation.

NH threaded coupling is standard. Other thread types are available by request.

Kits for Fire Pump Testing

FPTK1	Fire Pump Test Kit, Little Hose Monster, 3 Units	
ITEM #	**Qty.**	**Description**
HML	3	Little Hose Monster™
PN1.75GRV	3	1¾" Pitotless Nozzle, FM Approved (337 to 1011 GPM per nozzle)
H2H.25	3	2½" x 25' Hose
HMMT	1	Monster Tester, includes tube set and 0 to 60 psi gauge
STK	1	Little Hose Monster Stabilizer, for stacking HML, includes Tie Down
CASE2719FPT	1	Equipment Case, 27" x 19" x 10", special padding for HML Pump Test Kit

FPTK3	Fire Pump Test Kit, 2½" Hose Monster Steel, 3 Units	
ITEM #	**Qty.**	**Description**
HM2H	3	2½" Hose Monster with built-in pitot
HMP	1	Pitot Replacement Kit, for replacing damaged pitots
HMNI1.75	3	1¾" Nozzle Insert, FM Approved, for use with HM2H (282 to 771 GPM)
H2H.25	3	2½" x 25' Hose
HMMT	1	Monster Tester, includes tube set and 0 to 60 psi gauge
STA	2	Stacker for stacking HM2H, two required for each three units
RTD	1	Ratcheting Tie Down for stacked units, use with HM2H
CASE720	1	Gauge and Accessory Case, Seahorse, 19.8" x 15.5" x 7.5"

Kits

Kits for Fire Flow Testing Hydrants

FFTK	Fire Flow Test Kit, Little Hose Monster
ITEM #	**Description**
HML	Little Hose Monster™
PN2GRV	2" Pitotless Nozzle, FM Approved (493 to 1305 GPM)
HMRR12	Remote Reader Assembly, ¼" x 12' tube, two quick-connect adapters
GK100D4	Pressure Gauge, 4" dial, 0.5% accuracy rated, 0 to 100 psi (for nozzle pressure)
HGV25	Gate Valve, slow close, 2½" F NH x 2½" M NH
GCSW160	Gauge Cap, 2½" NH, includes 0 to 160 psi pressure gauge
HW107	Hydrant Wrench, adjustable, single spanner
WSPA101	Spanner Wrench, lightweight aluminum alloy
CASE920	Gauge and Accessory Case, Seahorse, 24" x 16" x 10" w/wheels and telescoping handle
H2H.10YR	2½" x 10' Hose, synthetic nitrile rubber

FFTK2	Fire Flow Test Kit, BigBoy Hose Monster
ITEM #	**Description**
HMBB4	BigBoy Hose Monster™, flow testing, 4" F NH swivel, gauge included (750 to 2700 GPM)
HGV45NST	Gate Valve, slow close, 4½" F NH x 4½" M NH
HMRR12	Remote Reader Assembly, ¼" x 12' tube, two quick-connect adapters
GCSW160	Gauge Cap, 2½" NH, includes 0 to 160 psi pressure gauge
HW107	Hydrant Wrench, adjustable, single spanner
WSPA101	Spanner Wrench, lightweight aluminum alloy
CASE720	Gauge and Accessory Case, Seahorse, 19.8" x 15.5" x 7.5"
H45.10.4	4½" F NH x 10' x 4" M NH Hose, connects to a 4½" outlet and reduces to 4"

Note: This kit connects to a 4½" connection. We can customize to 4", Storz or other sizes. Please specify when ordering.

Kits

FPTGK	Fire Pump Test Gauge Kit — Gauges commonly used in fire pump testing
ITEM #	**Description**
GK300D4	Pump Discharge Gauge, 4" dial, 0.5% accuracy rated, 0 to 300 psi
GK30-200	Pump Suction Gauge, 4" dial, 0.5% accuracy rated, 30 Hg to 200 psi
GK60D4	Discharge Flow-Rate Gauge, 4" dial, 0.5% accuracy rated, 0 to 60 psi (for nozzle pressure)
CASE520G	Gauge and Accessory Case, Seahorse, 15.1" x 12.4" x 6.9"
GKGLY4	Glycerin Refill for 4" Gauges, 8 oz.
GCCN	Gauge Certify and Calibrate to NIST (Qty. 3)

HMLK	Little Hose Monster Kit
ITEM #	**Description**
HML	Little Hose Monster™, 10" x 12", for use with Pilotless Nozzle™
PN1.75GRV	1¾" Pitotless Nozzle, FM Approved (331 to 993 GPM per nozzle)
GK100D4	Pressure Gauge, 4" dial, 0.5% accuracy rated, 0 to 100 psi
CASE720	Gauge and Accessory Case, Seahorse, 19.8" x 15.5" x 7.5"
HMRR12	Remote Reader Assembly, ¼" x ½' tube, two quick-connect adapters

Note: You may substitute Pitotless Nozzle size or gauge pressure range at no additional cost.
For more information and the most up-to-date pricing, visit www.hosemonster.com or call 1.888.202.9987.

PITOTLESS NOZZLE™

FM APPROVED

Take precision flow-rate measurements without a pitot!

With the Pitotless Nozzle, you'll never have to shut down in the middle of a test to change out a pitot because it got hit by a rock. Use the Pitotless Nozzle with the Little Hose Monster™ (**page 11**) or the 2½" Hose Monster® (**page 14**) in fire pump testing, fire flow testing or unidirectional flushing. You can also mount it directly on a hydrant, test header valve or any fixed 2½" outlet.

Flow-rate is determined by reading the nozzle's internal pressure. With no pitot in the stream, debris will pass through without causing damage. The unique and patented constant rate of area reduction shape of the Pitotless Nozzle creates a steady laminar flow. Even when the Pitotless Nozzle is attached directly to a hydrant nozzle, its gauge needle is steady.

- FM Approved for flow-rate accuracy
- Eliminates pitot replacements
- Measures flows from 50–1400 GPM
- Three sizes — 1⅛", 1¾", 2"
- Color coded for easy size identification
- Laminar flow eliminates turbulence and gauge needle bounce
- Hard-coat anodized aluminum construction
- Use with the Little Hose Monster or the 2½" Hose Monster

The nozzle's standard hose connection is a 2½" NH hard-coat anodized aluminum swivel coupling, but we can also provide Canadian or other thread types by request. The outlet end of the Pitotless Nozzle features NH threads for connection to the 2½" Hose Monster, or grooves for connection to the Little Hose Monster.

If you are attaching the Pitotless Nozzle directly to a fixed outlet, a stream shaper may be required to reduce turbulence and obtain accurate readings (**pages 25–26**). The thrust created by high-velocity water flow is dangerous to personnel and destructive to property, so be sure to clear a path for water discharge.

PN2GRV

PN2THD

PN1.75GRV

PN1.75THD

PN1.125GRV

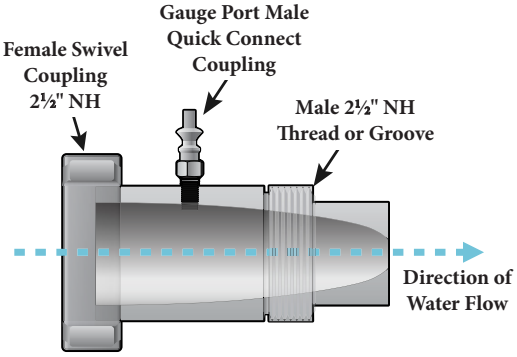
PN1.125THD

Grooved outlet for use with Little Hose Monster (HML)

ITEM #	Description
PN2GRV	2" Pitotless Nozzle, Grooved (493 to 1399 GPM)
PN1.75GRV	1¾" Pitotless Nozzle, Grooved (331 to 1041 GPM)
PN1.125GRV	1⅛" Pitotless Nozzle, Grooved (83 to 353)

Threaded outlet for use with 2½" Steel Hose Monster (HM2H)

ITEM #	Description
PN2THD	2" Pitotless Nozzle, Threaded (521 to 1399 GPM)
PN1.75THD	1¾" Pitotless Nozzle, Threaded (337 to 1041 GPM)
PN1.125THD	1⅛" Pitotless Nozzle, Threaded (84 to 355 GPM)

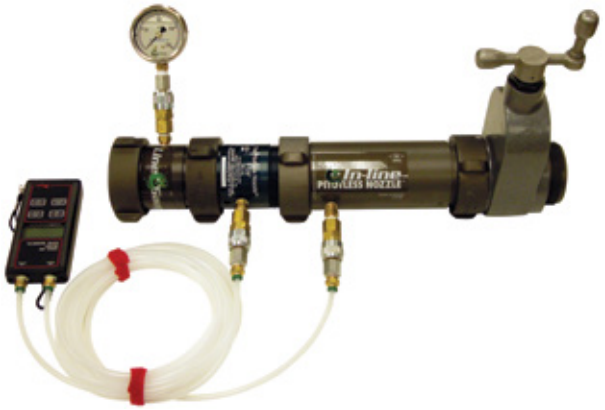


In-line PITOTLESS NOZZLE™

FM APPROVED

Use the In-line Pitotless Nozzle for flow testing standpipes, hose cabinets, pressure reducing valves, fire pumps or fire hydrants. Hose or piping can be attached downstream of the unit without affecting the accuracy of the readings.

- Versatility allows accurate flow-rate readings when discharging into a closed-loop system, a drain, a hose or open atmosphere
- Read flow-rates at the test header while discharging at hose end
- Now available for both 2½" and 1½" connections
- Four different sizes measure as low as 45 GPM up to 1432 GPM
- Made in the USA



1⅛" In-line Pitotless Nozzle Kit

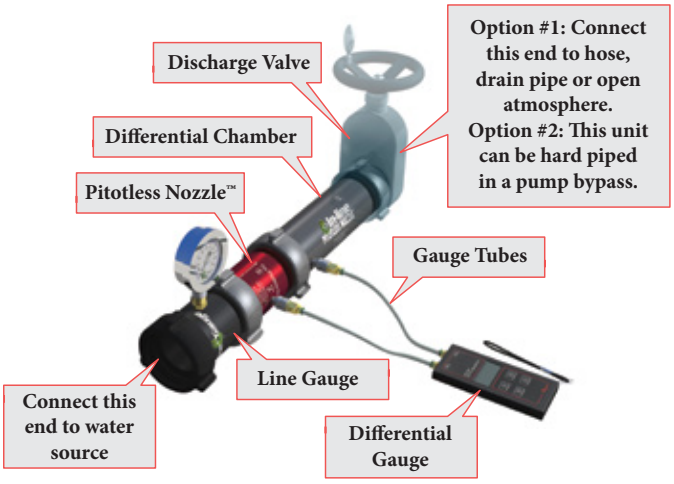
In-line Pitotless Nozzle Selection Chart

Use the chart below to select the correct nozzle size based on your expected flow range and the water source connection size.

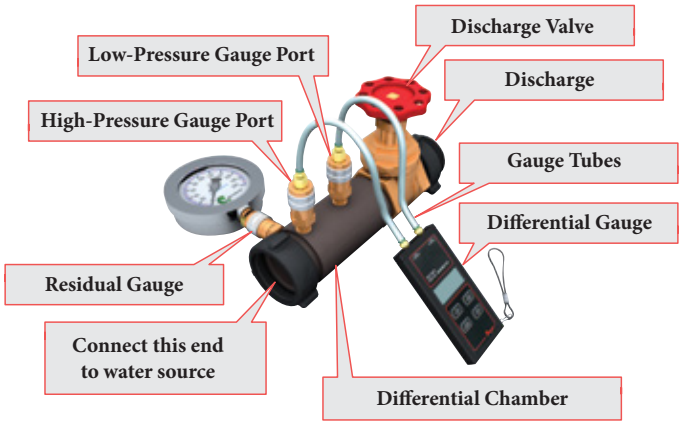
ITEM #	Description	Connects to	Flow Range (GPM)
INPN2	2" In-line Pitotless Nozzle Kit	2½"	523–1432
INPN1.75	1¾" In-line Pitotless Nozzle Kit	2½"	246–983
INPN1.125	1⅛" In-line Pitotless Nozzle Kit	2½"	86–321
INPN1.5	1½" In-line Pitotless Nozzle Kit	1½"	45–301
INPNK	In-line Pitotless Nozzle Kit, three nozzle sizes: 2", 1¾" and 1⅛"	2½"	86–1432

All Kits include a case for storing In-line Pitotless Nozzle components. NH threaded coupling is standard. Other thread types are available by request.

For 2½" connections: 2", 1¾" or 1⅛" In-line Pitotless Nozzle



NEW! For 1½" connections: 1½" In-line Pitotless Nozzle

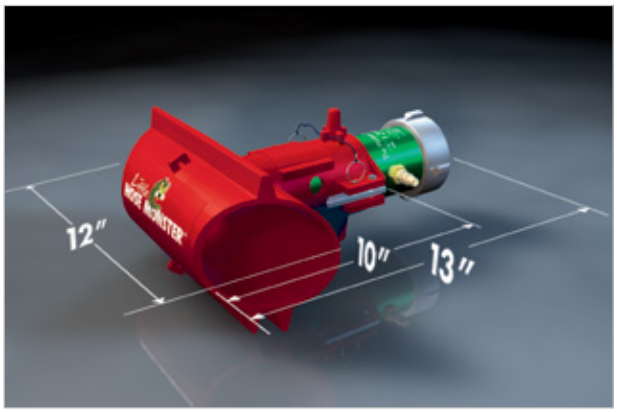


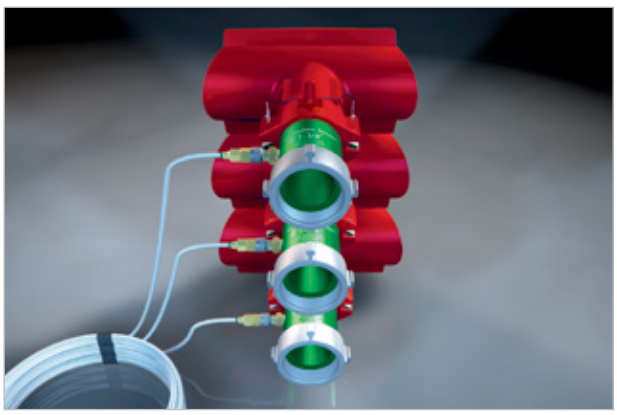
Small and lightweight — yet it neutralizes the tremendous force of discharge water just like the original Hose Monster®!

The Little Hose Monster™ has no pitot, so small rocks and debris pass right through the system without causing damage. It is designed to work with the Pitotless Nozzle™ (**page 9**), which is FM Approved for accuracy.

- **Pitotless —** Just push the Pitotless Nozzle into the inlet of the Little Hose Monster and insert the locking pins
- **Small —** Measures 12" wide x 10" deep
- **Lightweight —** Weighs only 3 pounds; with the Pitotless Nozzle and gauge, it weighs only 6 pounds
- **Durable —** Made from injection-molded, glass-filled polypropylene
- **Stackable —** Built-in stacking grooves enable you to stack up to three units with the Little Hose Monster Stabilizer and Tie Down (**page 12**), making it easy to move multiple units
- **Easy to Transport —** In our Pump Test Case (**page 27**), a complete pump test setup can be checked baggage for airline travel
- **Two-Year Warranty —** If the Little Hose Monster breaks during normal operation, we'll repair or replace it at no charge

*Note: A Pitotless Nozzle or a Flushing Nozzle (**page 12**) is required to flow water in the Little Hose Monster.*





ITEM#	Description
HML	Little Hose Monster

Flushing Nozzle

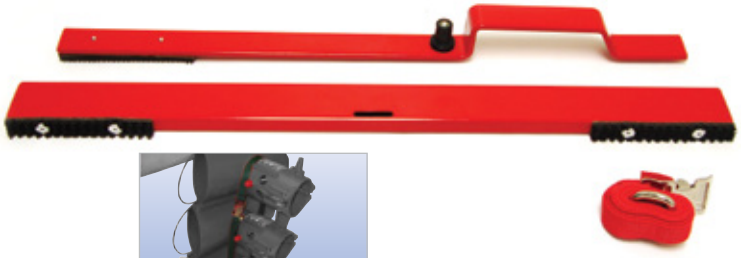
The Flushing Nozzle works with the Little Hose Monster™ and is ideal if you only need to perform flushing and do not need to measure flow-rate. It is a cost-effective substitute for the Pitotless Nozzle™.

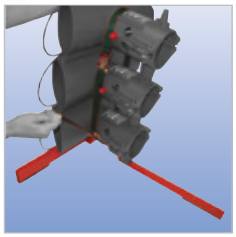
- When used with the Little Hose Monster, it neutralizes the tremendous force of discharge water just like the original Hose Monster®
- Made of aluminum with a hardened aluminum rocker lug coupling
- Compact size — 3" tall and weighs less than 1 pound
- Includes 2½" NH swivel (other thread specs available upon request)

ITEM#	Description
FN	Flushing Nozzle

Little Hose Monster Stabilizer

The Little Hose Monster Stabilizer enables you to stack two or more Little Hose Monsters and to keep them from tipping over when flowing water.





- A nylon strap wraps around the bottom of the stand and around the top of the stacked units to secure them together
- The simple design enables easy assembly and disassembly for transporting and storing

ITEM#	Description
STK	Little Hose Monster Stabilizer

Tie Down for Little Hose Monster

Tie Downs are necessary to secure a stack of Little Hose Monsters.

- Included with the Stabilizer (STK), but can also be purchased separately
- One red 48" spring buckle strap

ITEM#	Description
TD	Tie Downs for Little Hose Monster

Ideal for fire flow testing of hydrants or water main flushing!

- Read your GPM flow-rate directly on the gauge face while flowing
- Uses the patented Pitotless Nozzle™ so you'll never have to change out a pitot because it got hit by a rock
- Weighs only 13 pounds, yet handles high-flow hydrants up to 2700 GPM
- Flow from your hydrant pumper port — 4", 4½" or 5" Storz

The BigBoy Hose Monster™ is used for fire flow testing of hydrants, water main flushing and fire pump testing from connections 4" or larger. Incorporating the patented Pitotless Nozzle™ so rocks and flushing debris pass through without causing pitot damage, it is FM Approved and measures water flow-rates from 750 to 2700 GPM. The BigBoy Hose Monster body is made from rugged, durable polypropylene, and the Pitotless Nozzle is made from precision-machined aluminum.

Components Included

- **BigBoy Hose Monster Body** — Made from glass-filled polypropylene
- **BigBoy Pitotless Nozzle 4"** — Measures 750 to 2700 GPM; factory-installed
- **BigBoy GPM Gauge** — Reads both GPM flow-rate and psi; 4" dial; liquid-filled

The BigBoy GPM Gauge is calibrated to read flow-rate directly from the gauge face. No conversion chart is necessary. If you use another pressure gauge instead of the BigBoy GPM Gauge, the BigBoy Hose Monster flow chart must be used to convert from psi to GPM. A 0–60 psi gauge is the most suitable range. A BigBoy flow chart is provided with the original purchase, and additional copies are available at http://www.hosemonster.com/literature.html.

The BigBoy Hose Monster is intended to be used with a hose and should not be attached directly to a hydrant. The unit comes standard with a 4" NH (National Hose Thread) connection and can be flowed from a larger-sized connection by use of our reducing hose or adapters. We offer several hose options. Your hose choice will depend on: 1) the diameter of the water source connection, 2) the thread or connection type and 3) the hose length.

ITEM#	Description
HMBB4	The BigBoy Hose Monster

NH threaded coupling is standard. Other thread types are available by request.

Recommended hose options:

- For flowing from a 4½" NH hydrant connection: ITEM# H45.10.4
- For flowing from a 4" NH hydrant connection: ITEM# H4.10
- For flowing from a 5" Storz connection: ITEM# HS5.10.4

For more information on hoses, see **page 24**.

2½" Hose Monster with Built-In Pitot

The 2½" Hose Monster cancels the thrust of high-velocity water flow and is FM Approved for flow-rate accuracy. It includes a built-in, reversible pitot and measures flows from 533–1460 GPM. For lower flow-rates, use a Nozzle Insert (**page 15**).

Built-in pitot:

- **Precise and consistent** — Always in the center of the water stream and half the diameter from the nozzle outlet
- **Accurate** — Provides steady gauge readings and is FM Approved
- **Reversible** — Points downstream when rocks or debris may be present in the pump discharge, points upstream when the water is clear and ready for a reading
- **Durable stainless steel** — Resists damage from debris
- **Field replaceable** — Requires just a ⅛" hex wrench and a few minutes

ITEM#	Description
HM2H	2½" Hose Monster with Built-In Pitot

NH threaded coupling is standard. Other thread types are available by request.

2½" Hose Monster Flusher

- Similar to the 2½" Hose Monster, but without the ability to read flow-rates
- Does not include built-in pitot, but is upgradeable with the HMP (**page 15**)

ITEM#	Description
HM2HF	2½" Hose Monster Flusher

NH threaded coupling is standard. Other thread types are available by request.

4" and 4½" Hose Monster

These Hose Monster units use a precision-machined, internal orifice plate to measure flow-rates.

- Durable steel body
- Excellent for flow testing large-capacity systems and unidirectional flushing
- Use when flowing out of the steamer/pumper port of a hydrant

ITEM#	Description
HM4	4" Hose Monster
HM4H	4½" Hose Monster

NH threaded coupling is standard. Other thread types are available by request.

FM Nozzle Inserts

Nozzle Inserts obtain flow-rates lower than what the 2½" orifice on the HM2H can accurately measure. Use for flow rates lower than 533 GPM in the 2½" Hose Monster.

- FM Approved for flow-rate accuracy
- Simply slide a Nozzle Insert into the inlet of a 2½" Hose Monster (**page 14**)

ITEM#	Description	Flow Range
HMNI1.75	1¾" FM Nozzle Insert	282–771 GPM
HMNI1.125	1⅛" FM Nozzle Insert	118–324 GPM

Pitot Replacement Kit

The Pitot Replacement Kit is the entire pitot system for replacing damaged pitots in the 2½" Hose Monster.

- Includes pitot, two splash guards, spring, ball, pin, set screw, locking pin, chain and flow chart

ITEM#	Description
HMP	Pitot Replacement Kit

Pitot Accessory Kit

- Contains the internal components that work to keep the pitot in place
- Includes set screw, ball bearing, spring and ball stop
- Included in the Pitot Replacement Kit (HMP) and Pitot Rebuild (HMPR)

ITEM#	Description
HMBSG	Pitot Accessory Kit

Pitot Rebuild

This is our repair service for pitots that become damaged by flowing debris. You send your damaged pitot to us, we send you a refurbished one.

- Contact us for a return authorization that you will use as a packing slip
- Less than half the cost of purchasing a new pitot

ITEM#	Description
HMPR	Pitot Rebuild

Pitot Change-out Kit

- Use the Pitot Change-out Kit to make the job of adding and removing the built-in Pitot easier
- The ⅛" hex wrench is used to remove, install and adjust the pitot set screw with ease
- The magnet prevents the loss of the ball, spring, pin and set screw

ITEM#	Description
PCK	Pitot Change-out Kit

Stackers for 2½" Hose Monsters

- Enable Hose Monsters to be stacked up to three units high when flowing multiple hoses
- Two Stackers required per stack of three 2½" Hose Monsters
- A Ratcheting Tie Down (**below**) is required to secure the stack together

ITEM#	Description
STA	Stackers

Ratcheting Tie Down

- 6' nylon ratcheting strap
- Secures two or three stacked Hose Monsters

ITEM#	Description
RTD	Ratcheting Tie Down

Refurbish Service for Hose Monsters

Add years to the service life of your HM2H, HM4 and HM4H Hose Monster. Our refurbishing service repairs your unit and makes it look like new!

- The body is sand blasted, powder coated and inspected
- The unit receives a rebuilt pitot, new swivel coupling, new locking pin/chain, new decal and labels
- You receive what is essentially a new Hose Monster that retains its original FM Approvals

ITEM#	Description
HM2HR	2½" Hose Monster Refurbish
HM4R	4" Hose Monster Refurbish
HM4HR	4½" Hose Monster Refurbish

DECHLOR DEMON™

Neutralize chlorine in water during testing or flushing without affecting flow test results or adding stress to hydrant nozzles!

The Dechlor Demon uses ascorbic acid or other dechlorination agents to neutralize super-chlorinated water or regular potable water. What's more, its short 6" length adds no stress to hydrant nozzles. The Dechlor Demon can work within your existing testing/flowing regimen without the need for an entire new setup. It is available in sizes 2½", 4" or 4½", NH or your thread spec.

A Dechlor Demon assembly includes:

- Dechlor Demon body — 2½", 4" or 4½"
- 1-gallon or 10-gallon mixing tank
- Two pickup tubes with ball valves
- Two ¾" x 6' hoses with quick-connect couplings
- Indicating bypass valve

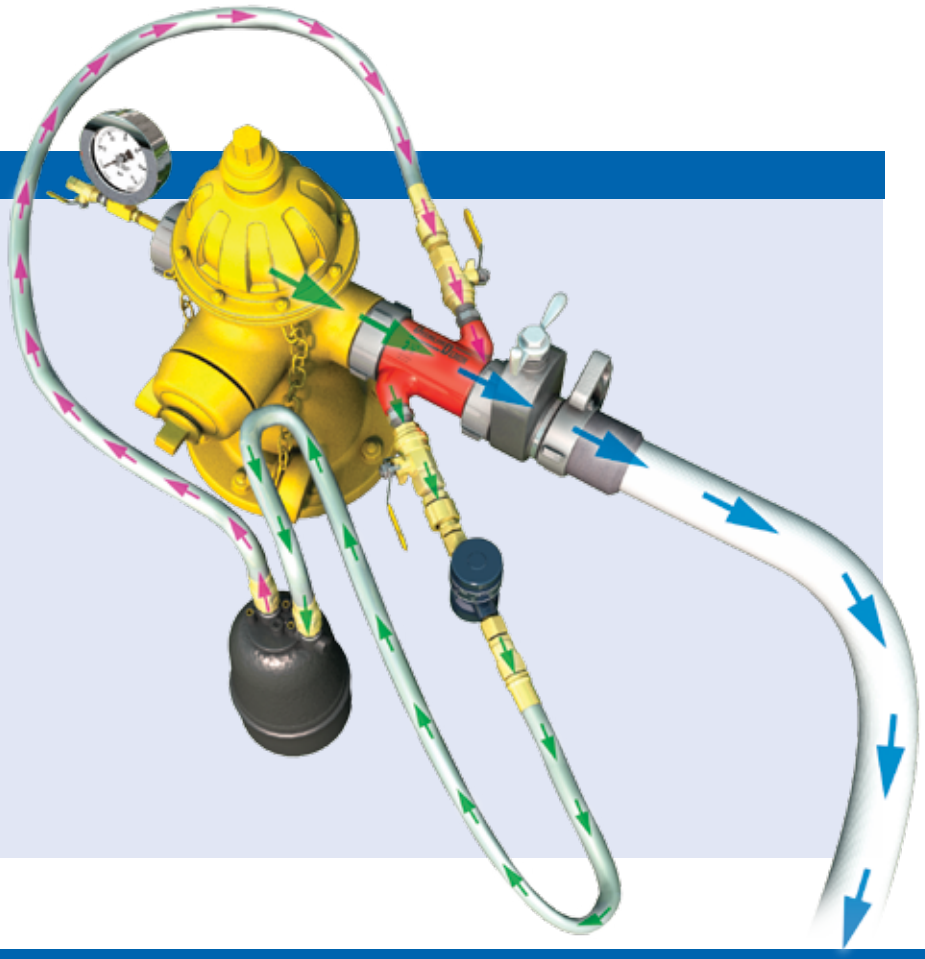
With its minimal moving parts and ease of use, the Dechlor Demon is one of the most effective dechlorinators available.

ITEM#	Description
DD2H	Dechlor Demon 2½" Assembly
DD4	Dechlor Demon 4" Assembly
DD4H	Dechlor Demon 4½" Assembly

How Does It Work?

A portion of the water flowing through the Dechlor Demon is diverted through the bypass into the mixing tank where it is combined with a concentrated dechlorinating agent. The bypass flow is controlled by a precision indicating valve. The concentrate is reintroduced into the Dechlor Demon, where it continues to mix with the flowing water. The chlorine is neutralized by the time it exits the hose.

See **pages 41–42** for more information.



Vita-D-Chlor Tablets

The safest and most environmentally conscious method of dechlorination. One gram of ascorbic acid (vitamin C) will neutralize 1 ppm (part per million) chlorine in 100 gallons of water. Visit http://www.vita-d-chlor.com/Calculator_Reservoir.htm to determine how much Vita-D-Chlor you will need.

- Sold in quantities of 40 or 140 tablets
- **Active ingredient** — Ascorbic acid (75%), 85 g (3 oz.) per tablet
- **Inert ingredient** — Water-soluble organic binder (25%)
- **Diameter** — 2⅝" (about the size of a hockey puck)

ITEM#	Description
VDC40	Vita-D-Chlor, 40 ascorbic acid tablets, 2½", 10.1 lb.
VDC140	Vita-D-Chlor, 140 ascorbic acid tablets, 2½", 35.5 lb. in 5-gallon pail

Bio Neutralizer Dechlorination Tablets

Sodium sulfite tablets instantaneously reduce free and combined chlorine in water or wastewater to non-detectable levels without affecting dissolved oxygen. Choose from 80 or 144 tablets in a resealable safety-latch pail. Listed as non-hazardous by the EPA when used as directed.

- **Active ingredient** — Sodium sulfite (35%)
- **Inert ingredient** — Water-soluble organic binder (65%)
- **Diameter** — 2⅝"
- **Thickness** — 1³⁄₁₆"
- **Weight** — 140 g (5 oz.) each
- **Appearance** — Green tablet with mild odor

ITEM#	Description
BN140	Bio Neutralizer, 144 sodium sulfite tablets, 45 lb.

Bio Max Dechlorinating Tablets

Bio Max tablets are the strongest products available for dechlorination. These sodium sulfite tablets instantaneously reduce free and combined chlorine in water or wastewater to non-detectable levels without affecting dissolved oxygen. This ensures the complete elimination of chlorine from any type of flow regardless of typical interferences, such as elevated ammonia levels or excess suspended solids. A resealable safety-latch pail contains 154 tablets. Listed as non-hazardous by the EPA when used as directed.

- **Active ingredient** — Sodium sulfite (92%)
- **Inert ingredient** — Water-soluble organic binder (8%)
- **Diameter** — 2⅝"
- **Thickness** — 1"
- **Weight** — 140 g (5 oz.) each
- **Appearance** — Blue-green tablet with herbal odor

ITEM#	Description
BM154	Bio Max, 154 sodium sulfite dechlorinating tablets, 48 lb.

Mixing Tank Assembly

Mixing tanks with manifold and fittings are available as replacements or as spares in two sizes: 1 gallon (DDTANK1) or 10 gallons (DDTANK10).

- Use an additional tank when dechlorinating large amounts of water
- With a second tank charged with fresh dechlorinating agent, the change-out of tanks results in minimal interruption of flow

ITEM#	Description
DDTANK1	Mixing Tank Assembly, 1 Gallon, 6" x 13", with manifold and QD couplings
DDTANK10	Mixing Tank Assembly, 10 Gallons, 10" x 35", with manifold and QD couplings

Indicating Bypass Valve

- Enables precise control of bypass flow and use of dechlorinating agent
- Includes male and female quick connectors so that it can be installed quickly and simply between a Dechlor Demon and a bypass hose

ITEM#	Description
DDVAIND.5	Indicating Bypass Valve, for precise flow control of dechlorinating agent

Dechlor Demon Hoses, ¾" x 6' or 20'

- Sold individually as replacements
- Two are needed for all Dechlor Demon sizes

ITEM#	Description
DDHOSE	Hose, ¾" x 6' bypass for all Dechlor Demon sizes
DDHOSE20	Extension Hose, ¾" x 20' bypass for all Dechlor Demon sizes

Gauge selection

Gauges read most accurately in the middle two-thirds of the dial. For best accuracy, use a gauge where your anticipated readings are around 50% of its maximum psi rating. For example, if gauge readings are anticipated to be around 30 psi all the time, it would be better to use a 0–60-psi gauge than a 0–100-psi gauge.

The increments are wider and easier to read with the smaller range gauge and bigger dials. Accuracy in collecting information is important. Differences of only a few psi in gauge readings can result in large differences in extrapolated flow-rates.

Static/residual readings from the gauge cap: 0–100 psi and 0–160 psi are most common. Anticipate the pressure range within your distribution system.

Fire flow test readings: The 0–60-psi or 0–100-psi gauges are the most common choices for taking Hose Monster® or Pitotless Nozzle™ readings. A higher range may be needed on water supplies where higher readings are anticipated.

Pump test readings: Most pitot or nozzle readings will be in the 15–45-psi range. The best-suited gauge would be in the 0–60-psi range.

Suction Compound Gauges for Fire Pumps: 30 HG to 160 psi; these gauges attach directly to the fire pump.

Discharge Pressure Gauge for Fire Pumps: 0–200-psi or 0–300-psi gauges attach directly to the fire pump.

Analog Gauges

Dial size: Either 2½" or 4"

Connection: ¼" NPT

Accuracy: ± 0.5% Full Scale for 4" Gauges; ± 1.0% Full Scale for 2½" Gauges

Range: 0 to 30, 60, 160, 200, 300, 600 psi

Filling: Glycerin

Included are: Gauge, brass tee, drain valve, brass nipple, quick-disconnect male plug and female coupler

- Laminated safety glass lens
- Full blow-out protection
- Designed and manufactured to minimize failure and to protect personnel and property
- All gauges tested at factory
- Certification to NIST standard available at additional charge

2½" Dial

4" Dial

Gauge Fittings (Included with Gauge Purchases)

Analog Gauges

ITEM#	Description
2½" Dials, 1% Accuracy Rated	
GK30	0–30 psi
GK60	0–60 psi
GK100	0–100 psi
GK160	0–160 psi
4" Dials, 0.5% Accuracy Rated	
GK60D4	0–60 psi
GK100D4	0–100 psi
GK160D4	0–160 psi
GK200D4	0–200 psi
GK300D4	0–300 psi
GK600D4	0–600 psi

ITEM#	Description
Compound Gauges, 4" Dial, 0.5% Accuracy Rated	
GK30-60	30 HG–60 psi
GK30-100	30 HG–100 psi
GK30-160	30 HG–160 psi
GK30-200	30 HG–200 psi
GK30-300	30 HG–300 psi
Specialty Gauges	
GK6.8BD4	Bar and psi Gauge, 4" dial, 0.5% accuracy rated, 0–6.8 Bar, 0–100 psi
GK10.9BD4	Bar and psi Gauge, 4" dial, 0.5% accuracy rated, 0–10.9 Bar, 0–160 psi
GKBBD4	BigBoy Hose Monster™ Gauge 0–2700 GPM, 4" dial, 0.5% accuracy rated, 0–60 psi

Digital Gauges

Dial size: 3½"

Connection: ¼" NPT

Accuracy: ± 0.5% Full Scale

Manufacturer: Dwyer

Battery Life: 2000 hours

Units: Digital pressure gauges have selectable units between psi, bar and kPa

Included are: Gauge, brass tee, drain valve, brass nipple, quick-disconnect male plug and female coupler

Digital Gauges

ITEM#	Description
Digital Gauges, 3½" Dial, 0.5% Accuracy Rated	
GKD50	0–50 psi
GKD100	0–100 psi
GKD200	0–200 psi
GKD300	0–300 psi
Digital Differential Gauge	
GKDD100	0.5% accuracy rated, 0–100 psi
GKDD200	0.5% accuracy rated, 0–100 psi

Line Gauge

- Measures static pressure and residual pressure in a water system
- Attaches directly to a valve, hydrant, standpipe or any other fixed outlet
- Connects to a hose, pipe or flow meter on the discharge side

ITEM#	Description
LG2.5	Line Gauge, 1% accuracy rated, 0 to 200 psi

Swivel Gauge Caps

Swivel Gauge Caps collect static/residual pressures from a hydrant in a fire flow test. They attach to a 2½" nozzle port on the test hydrant.

- Quarter-turn, ¼" ball valve is easy on the hands to operate
- Bleed valve enables air to vent out as the hydrant is opened
- Can be hand tightened with a gauge facing in the correct direction then snugged tight with the Spanner Wrench (**page 26**)
- Pressure gauge included

ITEM#	Description
GCSW160	Gauge Cap with Gauge, 2½" NH, includes 0–160 psi pressure gauge
GCSW200	Gauge Cap with Gauge, 2½" NH, includes 0–200 psi pressure gauge
GCSW300	Gauge Cap with Gauge, 2½" NH, includes 0–300 psi pressure gauge
GCSW	Gauge Cap without Gauge, 2½" NH

Glycerine Refills for Analog Gauges

Liquid required for refilling gauges that have leaked or have lost filling over time.

ITEM#	Description
GKGLY4	Glycerine Refill for 4" Gauges, 8 oz.
GKGLY2H	Glycerine Refill for 2½" Gauges, 2 oz.

Gauge Certification and Calibration to NIST

NFPA codes require calibrating gauges annually. Our service repairs and/or calibrates new or used gauges sent in to us. Call us for a return authorization.

- Includes disassembly, repair, calibration and a NIST certification paper
- Ensures accuracy of pressure gauges

ITEM#	Description
GCC2H	Gauge Certification and Calibration, 2½" dial
GCC4	Gauge Certification and Calibration, 4" dial
GCCN	Gauge Certification and Calibration, for new gauges only

Gauge Fittings

Gauge Fittings are included with all of our gauges. For replacements or unique configurations, order this gauge fittings kit, which includes:

- Brass tee, ¼"
- Drain cock
- Nipple, ¼" x 1½"
- Quick-disconnect male plug
- Quick-disconnect female coupling

ITEM#	Description
GCF	Gauge Fittings

Quick-Disconnect Couplings

Quick-Disconnect Couplings attach a gauge or the ¼" tube from the Remote Reader (**page 23**) or the Monster Tester™ (**page 23**) to the pitot or Pitotless Nozzle™ (**page 9**). After the male end of the coupling is threaded into the gauge port, no tools are necessary to attach and remove the gauge. Also, the gauge can be positioned by hand to always face up.

- Threaded connections are ¼" NPT (same as a gauge)
- Includes one male Quick-Disconnect Coupling and one female Quick-Disconnect Coupling

ITEM#	Description
QDCOUP	Quick-Disconnect Couplings

Gauge Boot

- Protective boots for 4"- and 2½"-diameter gauges
- Protect gauges against shock, impacts and corrosion
- Easily installed by hand
- Gauges sold separately

ITEM#	Description
GB4	4" Dial Gauge Boot
GB2H	2½" Dial Gauge Boot

Mini Laser Photo Tachometer

- Use for measuring pump RPM during a fire pump test
- Features 5-digit LCD display, last reading hold, Min./Max. and on-target indicator
- Includes 9V battery, 24" reflective tape and instructions

ITEM#	Description
TCHD	Mini Laser Photo Tachometer, ±0.05% accuracy rated, 2 to 99,999 RPM range

Monster Tester™

Multiple pressure readings require a crew. While one person adjusts the flow at the test valve header or the pump room, the other walks between live hose ends, taking pressure readings and communicating them back to the test header. This is time consuming and can result in inaccurate readings.

The Monster Tester enables up to seven independent pressure readings from a pitot, pump, standpipe, etc., to be taken at a point right next to the test valve header instead of running back and forth between live hose ends with a hand-held pitot. Flow adjustments can be made and pitot readings can be taken right at the test header. When the job layout permits, suction, discharge and all the pitot readings can be taken through the Monster Tester.

Setup takes less than two minutes. Connect one end of each ¼" pressure transmission tube to the gauge port of the Hose Monster® (**page 14**), Pitotless Nozzle™ (**page 9**), pump port or standpipe port. Plug in the other end to ports on the Monster Tester. Apply thread sealant tape to the gauge, and attach to the gauge port of the Monster Tester. It's that easy!

The Monster Tester includes:

- Monster Tester Manifold
- Gauge, 0–60 psi, 4" dial, 0.5% accuracy rated
- Six 60' tube sets, bundled and color-coded for easy handling and identification
- Six ¼" NPT push-to-connect tube fittings
- Case to conveniently house Monster Tester and accessories

Other possible configurations could include additional tube sets for reading more hoses or longer tube sets. Call us to discuss your particular application.

ITEM#	Description
HMMT	Monster Tester (gauge included)

Remote Readers

A Remote Reader enables you to take pitot readings from a single Hose Monster (**page 14**) or Pitotless Nozzle (**page 9**) while standing away from the flowing water. In a fire hydrant capacity flow test, the pitot gauge can be located next to the hydrant so that controlling the water flow and reading the residual pressure is easier. Use Remote Readers for fire flow testing, main flushing and pump testing. Also consider the QDCOUP (**page 22**) for connecting to a Hose Monster and the HMMT (**above**) for multiple readings from one gauge.

- Include a length of ¼" flexible tube and two ¼" NPT male x ¼" tube connector adapters
- One adapter threads into the gauge port on the pitot, and the other threads into the tee of the gauge kit

ITEM#	Description
HMRR12	Remote Reader Assembly, ¼" x 12' tube, two Quick-Connect adapters
HMRR40	Remote Reader Assembly, ¼" x 40' tube, two Quick-Connect adapter
HMRR60	Remote Reader Assembly, ¼" x 60' tube, two Quick-Connect adapters

Hoses

Hoses in various materials, diameters, lengths and thread-types are available through us. Let us know your requirements, and we will do our best to find it for you.

Selecting the Correct Length Hose

A shorter hose length means lower friction loss, and it's also less expensive. Hydrants are usually offset only a few feet from the street and oriented so that the nozzle ports are pointing parallel to the street and the pumper port is facing the street. The Hose Monster® requires only that sufficient drainage is available. An established lawn or a sidewalk can be acceptable places to position Hose Monsters.

- **Fire pump testing —** Hoses connect to the 2½" test header. They are usually 25 or 50 feet long so that water can be safely discharged at a suitable distance away from the building.
- **Flow testing from the 2½" hydrant nozzle —** A 2½" x 10' hose makes a gentle arc (no kinks) from the hydrant to the street gutter. Sometimes the combination of 5' and 10' hoses is a better option because it gives you the flexibility to put the Hose Monster 5, 10 or 15 feet away from the pumper port.
- **Flow testing from the hydrant pumper port —** When the hydrant is offset from the curb by a few feet and the pumper port is facing the street, a 5' hose normally positions the Hose Monster in the street gutter. For hydrants that are situated differently, a 10' length works better. This setup allows a short section of hose to come straight out of the hydrant to a Hose Monster positioned in the street gutter. You can use a 2½" hose from the pumper port by threading a Reducer Adapter (**page 25**) to the hydrant.

Hose Material

Polyester Jacket Polyurethane-Lined Hose — Designed for maximum strength and flow at minimum weight and friction loss. This hose is half the weight and one-third the bulk of conventional rubber-lined hoses and is constructed of high tensile-strength polyester yarn and lined with a high-tech EPDM tube. It's the ultimate in quality!

- Snag proof, kink resistant and immune to mildew or rot
- Hardened aluminum rocker lug couplings
- Service tested at 250 psi
- Pressure-proof tested at 500 psi
- Burst tested at 750 psi

Rubber Hose — This is the toughest hose available for fire flow testing, flushing and pump testing. Exposure to sea water and contamination by most chemical substances, hydrocarbons, oils, alkalis, acids and greases will have no effect on the short- or long-term performance of the hose.

- 100% high-tenacity synthetic yarn, circularly woven and completely protected and locked in by tough, highly resistant synthetic nitrile rubber
- Tensile strength of lining and cover rated at 1500 psi
- Service tested at 300 psi
- Pressure-proof tested at 600 psi

Polyester Jacket Hose

ITEM#	Description
H2H.10	2½" x 10'
H2H.25	2½" x 25'
H2H.50	2½" x 50'
H4.5	4" x 5'
H4.10	4" x 10'
H45.5	4½" x 5'
H45.10	4½" x 10'

Rubber Jacket Hose

ITEM#	Description
H2H.10YR	2½" x 10'
H2H.25YR	2½" x 25'
H2H.50YR	2½" x 50'
H45.10.4	4½" F NH x 10' L x 4" M NH, reduces from 4½" outlet to 4" M NH
HS5.10.4	5" Storz x 10' L x 4" M NH, reduces from 5" Storz to 4" M NH

Other thread types are available. Contact us for availability and lead time.

Hydrant Gate Valves

Use these aluminum gate valves for fire flow testing and main flushing to control the water flow from the hydrant.

- Avoids water hammer and simplifies fire flow tests
- Connect directly to the nozzle port or the pumper port on a hydrant and then to a hose
- Special configurations such as Storz to NH are also available

ITEM#	Description
HGV25NST	Slow-Close Gate Valve, 2½" F NH x 2½" M NH
HGV4NST	Slow-Close Gate Valve, 4" F NH x 4" M NH
HGV45NST	Slow-Close Gate Valve, 4½" F NH x 4½" M NH

2½" Gate Valve

4" Gate Valve

Adapters

When you need to adapt between a local fire department thread and NH, Storz to NH or from one size to another, count on Hydro Flow Products, Inc.

We stock the most popular thread/size combinations you need in hard-coat anodized aluminum. And we can source other items not in stock. Call us for prices and lead times.

5" F Storz x 2½" M NH Adapter

2½" F NH x 4" M NH Adapter

4" or 4½" x 2½" M NH Reducer

ITEM#	Description
AD4.25NST	Reducer, 4" F NH x 2½" M NH (allows a 2½" gate valve or hose to be connected to the 4" or 4½" pumper port)
AD45.25NST	Reducer, 4½" F NH x 2½" M NH (allows a 2½" gate valve or hose to be connected to the 4" or 4½" pumper port)
AD45.4NST	Reducer, 4½" F NST x 4" M NH
AS50M45N	Adapter, Storz 5" x 4½" M NH (connects between 5" Storz and 4½" NH hose)
AS50M40N	Adapter, Storz 5" x 4" M NH (connects between 5" Storz and 4" NH hose)
AS50M25M	Adapter, Storz 5" x 2½" NH (connects between 5" Storz and 2½" NH hose)
AS5XS4	Reducer, Storz 5" x Storz 4" (adapts a hydrant from 5" Storz connection to 4" Storz connection)

Custom-made adapters for various thread types and sizes are available upon request.

Stream Shapers

Straighten water flow, prevent hose burn and arrest some debris. Connect the Stream Shaper between a hose valve or hydrant nozzle and the inlet side of the hose.

- Plastic tapered fins improve stream performance and lower costs
- Measures only 3" long

ITEM#	Description
SS1	2½" Stream Shaper with Plastic Fins
SS1RF	Replacement Stream Shaper Fins
SS2.5	2½" Stream Shaper, one-piece extruded aluminum body for durability

2½" Stream Straightener with Plastic Fins

Nozzle Extensions

In some cases, a Nozzle Extension should be used to smooth out water flow and eliminate air pockets if you are pulling suction on your gauge. This can happen if you are flowing from a smaller orifice to a larger orifice, or if you are attaching a Pitotless Nozzle™ directly to a test header without using hose.

ITEM#	Description
NE2HNH11	Nozzle Extension, 2½" NH x 11"
NE2HNH11WF	Nozzle Extension, 2½" NH x 11" with Fins

Elbows

- Use in fire pump testing and fire flow test operations
- Attach to a valve on the pump test header or hydrant nozzle to redirect the angle of the hose in order to minimize hose bend and kinks
- Cast aluminum
- Threads 2½" F NH x 2½" M NH, 200-psi wwp manufacturer rated

ITEM#	Description
EL452HNH	Elbow, 45°, 2½" NH, Stainless Steel
EL302HNH	Elbow, 30°, 2½" NH, Stainless Steel

Hydrant Wrench

- Removes hydrant caps
- Opens and closes hydrants
- Attaches or removes hose to and from hydrants and Hose Monster® units

ITEM#	Description
HW107	Hydrant Wrench, adjustable, single spanner

Spanner Wrench

- Tightens and loosens rocker lug and pin lug hose connections
- Use with all Hose Monster, Dechlor Demon™ and Pitotless Nozzle units
- Made from tough, light AL-MAG 35 alloy for heavy-duty use
- Weighs less than one pound

ITEM#	Description
WSPA101	Spanner Wrench, lightweight aluminum alloy

Wrench for Pitotless Nozzle

- Hole-type spanner wrench used as a holdback on the body of the Pitotless Nozzle
- Recommended for tightening Pitotless Nozzle to a HM2H or HM2HF

ITEM#	Description
WSPA104	Wrench for Pitotless Nozzle™, only needed if Pitotless Nozzle is used with HM2H or HM2HF (**page 14**)

Cases

Protect your flow test equipment in the field, in the truck and while not in use.

Our cases come with a three-piece foam set — egg crate-shaped foam in the lid plus pick-and-pluck foam in the bottom with a ½" foam cushion layer underneath. You remove pieces of foam to configure a case to your needs.

Neoprene perimeter O-ring seals make our Seahorse cases completely waterproof and airtight.

The CASE2719 is the largest case we offer and can store an entire fire pump test setup including four Little Hose Monster™ and Pitotless Nozzle™ units. Yet it is still small enough to check as airline baggage!

CASE920

CASE720 (contents sold separately)

CASE520

CASE2719FPT (contents sold separately, see Fire Pump Test Kit on page 6)

Cases

ITEM #	Description	Outer Dimensions	Capacity
CASE520	Case, Seahorse, pick-and-pluck foam	15.1" x 12.4" x 6.9"	3 or 4 pressure gauges or Pitotless Nozzle™ units
CASE520G	Case, Seahorse, closed-cell foam	15.1" x 12.4" x 6.9"	6 pressure gauges
CASE720	Case, Seahorse, pick-and-pluck foam	19.8" x 15.5" x 7.5"	4 to 6 pressure gauges or Pitotless Nozzles units and 1 Little Hose Monster
CASE920	Case, Seahorse, pick-and-pluck foam, wheels and telescoping handle	24" x 16" x 10"	1 Pitotless Nozzle, 1 Little Hose Monster and accessories used in our FFTK Fire Flow Test Kit
CASE2719	Case, pick-and-pluck foam, wheels and telescoping handle	27" x 19" x 10"	4 Pitotless Nozzles units, 4 Little Hose Monster units, 2 Little Hose Monster Stabilizers and several gauges
CASE2719FPT	Case, closed-cell foam, wheels and telescoping handle	27" x 19" x 10"	4 Pitotless Nozzles units, 4 Little Hose Monster units, 2 Little Hose Monster Stabilizers and several gauges

Fire Pump Tester Software™

Fire Pump Tester Software™ (FPT)

Use Fire Pump Tester Software to collect fire pump test results professionally, comprehensively and easily. FPT stores all of your fire pump information, calculates flow-rates and graphs pump test curves.

Features

Collect Critical Fire Pump Information

Record and store your fire pump technical specifications such as: job-site location, manufacture, model, rated capacity, rated pressures, rated speed, driver information, controller information, jockey pump information and much more. You can create additional custom fields for any other information you want to store.

Produce Pump Test Reports

The program produces professional PDF reports that can easily be printed out or emailed to your customer. Reports include a title page, fire pump specifications, fire pump test results and pump test curves. NFPA 25 requires that records be kept by the property owner of all inspection, testing and maintenance of the fire pump system (source: NFPA 25, 4.3, 2011).

Compare Pump Test Curves

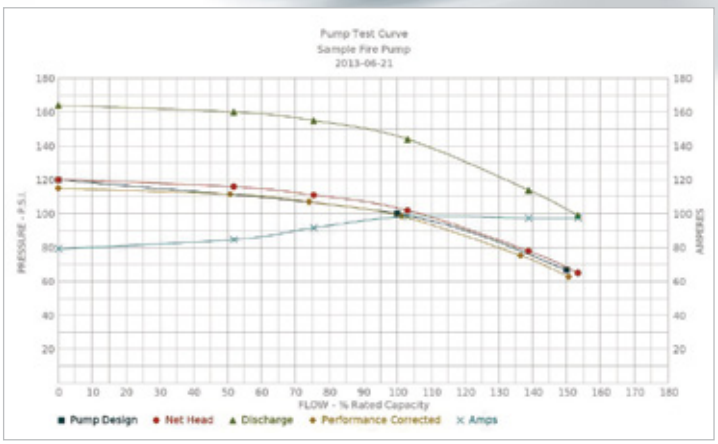
FPT generates graphs with the Pump Design Curve, Net Head Curve Discharge Curve, Performance Corrected Curve and Ampere Curve. The graphs make it easy to compare and visualize the pump performance compared to several different criteria.

Cloud Data Storage

All your data is securely stored in the cloud which allows it to be accessed on any device with an Internet connection. You will be able to easily access your past pump test results and compare it to your last pump test. Multiple users within your company may be added to your account and may access the same data. The program is accessed through the Internet so any software updates or new features will be added to the software with ease.

How do I get Started?

Visit https://fpt.hosemonster.com to sign up or go to www.hosemonster.com to learn more.



Fire Pump Testing

General

Fire pumps provide water supply to fire sprinkler systems where the public water supply pressure is too low or nonexistent. Water is supplied to the pump from public underground water mains, tanks, reservoirs or other static water sources. Fire pumps are powered by either electric motors, diesel engines and (less frequently) steam engines. A fire pump acceptance test is conducted after the pump is installed to demonstrate that the pump performs according to the manufacturer's specification. After the pump is installed, it should be flow tested once every year in order to identify deterioration of fire pump components or impairments to the water supply.

The Hose Monster® will make your job of testing fire pumps safe, simple and accurate. Tests can be conducted on gravel surfaces, lawns or landscaping without causing damage. All our Hose Monsters and nozzles are FM Approved. Prior to the Hose Monster, tests were conducted using playpipes and hand-held pitots which were both less accurate and damaging toward property, and water would have to be jetted out dozens of yards into the surrounding area.

How often do I test a fire pump?

According to NFPA, fire pumps are flow tested after initial installation according to the field acceptance test procedure (NFPA 20, 14.2, 2010). Thereafter, the annual fire pump test is performed (NFPA 25, 8.3.3, 2008).

Where do I find more information on fire pumps?

- NFPA 20 — For Installation of pumps and field acceptance tests
- NFPA 25 — For Inspection, testing, and maintenance of pumps; annual tests

Software for Fire Pump Testing

Use Fire Pump Tester Software (FPT) to collect fire pump test results professionally, comprehensively and easily. FPT stores all of your fire pump information, calculates flow-rates and graphs pump test curves.

Fire Pump Testing (continued)

Kits for Fire Pump Testing

The Fire Pump Test Kits below are all-in-one solutions we recommend for fire pump testing. Actual equipment needed may vary depending on job requirements and preferences.

Fire Pump Test Kit, Little Hose Monster (FPTK1)

Flow through three hoses using the Little Hose Monster and 1¾" Pitotless Nozzle.

ITEM #	Qty	Description
HML	3	Little Hose Monster™, 10" x 12"
PN1.75GRV	3	1¾" Pitotless Nozzle, FM Approved, (337 to 1011 GPM per nozzle)
H2H.25	3	2½" x 25' Hose
HMMT	1	Monster Tester™ with tube set and gauge, 0 to 60 psi, 0.5% accuracy rated
STK	1	Little Hose Monster Stabilizer for stacking HML, includes Tie Down
CASE2719FPT	1	Equipment Case, 27" x 19" x 10" closed cell foam for 3 HML, 3 PN and accessories

Fire Pump Test Kit, 2½" Hose Monster Steel (FPTK3)

Flow through three hoses using the 2½" Hose Monster® with built-in pitot.

ITEM #	Qty	Description
HM2H	3	2½" Hose Monster with built-in pitot
HMP	1	Pitot Replacement Kit for replacing damaged pitots
HMNI1.75	3	1¾" Nozzle Insert, FM Approved, for use with HM2H
H2H.25	3	2½" x 25' Hose
HMMT	1	Monster Tester with tube set and gauge, 0 to 60 psi, 0.5% accuracy rated
STA	2	Stacker for stacking HM2H, two required for each three units
RTD	1	Ratcheting Tie Down for stacked units, for use with HM2H
CASE720	1	Gauge and Accessory Case, Seahorse, 19.8" x 15.5" x 7.5"

Fire Pump Testing (continued)

What equipment do I need?

Equipment for fire pump testing may vary depending on job requirements and preferences. In general, the larger the fire pump, the more hoses and Hose Monsters you will need to flow.

1. **Little Hose Monster™ (HML)** — Built-in stacking grooves enable easy stacking of multiple units. Use one Little Hose Monster per flowing hose line. *
2. **Pitotless Nozzle™ (PN1.125GRV, PN1.75GRV, PN2GRV)** — Consider the minimum and maximum flow-rates that you will need to achieve based on the rated capacity of your fire pump. The 1¾" Pitotless Nozzle is the most commonly used sized for fire pump testing, but smaller pumps may require an even smaller nozzle size. Use one Pitotless Nozzle per flowing hose line.
3. **Test Hose (H2H.25, H2H.50)** — Hoses for pump testing are usually 2½" x 25' or 50' long. Length is determined by job conditions, such as needing a safe place to flow water with sufficient drainage. Available in either polyester or rubber.
4. **Monster Tester™ (HMMT)** — Enables multiple pressure readings from one gauge and the ability to make flow adjustments back at the test header with one person conducting the test. Use one unit per pump test setup. Measures up to seven flow readings.
5. **Discharge Flow-Rate Gauge (GK60D4)** — 0.5% accuracy rated 60-psi or 100-psi gauges with a 4" dial are common. Anticipate expected flow ranges using our flow charts so readings are in the middle third of the dial. If using a Monster Tester, only one flow gauge is needed. If not using the Monster Tester, one gauge per flowing hose line is needed.
6. **Case (CASE520, CASE720, CASE920, CASE2719)** — For storing and protecting pressure gauges and Pitotless Nozzle units. Use one case of a specified size. For storing up to four Little Hose Monsters and Pitotless Nozzles, check out our CASE2719FPT.
7. **Stabilizer (STK)** — A Stabilizer provides a wide base for stacks of two or three Little Hose Monster units to prevent them from tipping over. It includes a tie down to secure units together. Use one Stabilizer for each stack of Little Hose Monsters.
8. **Pump Discharge Gauge (GK200D4, GK300D4)** — A 200- or 300-psi pressure gauge with a 4" dial is common. According to NFPA 20, 4.10.1.2, "The dial should be at least 200 psi and be capable of indicating pressure to at least twice the rated working pressure of the pump." Use one gauge.
9. **Pump Suction Gauge (GK30-160, GK30-200)** — According to NFPA 20 4.10.1, "If the minimum pump suction pressure is below 20 psi at any flow condition, the suction gauge shall be a compound pressure and vacuum gauge." A compound gauge that reads from 30 Hg to 160 psi or 200 psi with a 4" dial is common. Use one gauge.

** A 2½" Hose Monster® with Built-in Pitot can be used in place of the Little Hose Monster for pump testing, but you will need FM Nozzle Inserts and Stackers instead of Pitotless Nozzle units and Stabilizers.*

Also consider:

10. **Stream Shaper (SS1)** — Use to prevent hose burn.
11. **45° or 30° Test Header Elbow (EL452HNH, EL302HNH)** — Re-angles the hose from the test header to minimize kinks and hose burn.
12. **Spanner Wrench (WSPA101, WSPA104)** — For attaching the hose to the test header or a 2½" Hose Monster. WSPA104 is used for attaching the 2½" Hose Monster to a Pitotless Nozzle.
13. **Gauge Calibration (GCCN, GCC4, GCC2H)** — We offer gauge calibration service, including a NIST certificate for new and used gauges. NFPA 20 requires test gauges be calibrated within 12 months prior to the test, and gauges should have a label with the last date of calibration (NFPA 20, 14.2.5.1.2, 2010).
14. **Tachometer (TCHD)**— Measures pump RPM.
15. **Clamp-on Ammeter** — Measures pump amperes.

How many hoses and which size nozzles will be needed?

We generally recommend flowing a maximum of 500–750 GPM per hose stream. In our experience this allows most fire pumps to achieve flow at 150% rated capacity. If you are unable to achieve peak flows, add more hose streams or use shorter hose lengths. The exact number of hose streams will vary and is influenced by the pump supply pressure, length of hose and which size flow device you use.

If you are looking for a more simple answer, try this method:

GPM Flow at 150% Rated Capacity / 500 = Number of hose streams to use

Example: if you have a 1000 GPM rated fire pump, use three hose streams since 1500 / 500 = 3. This assumes 1¾" Pitotless Nozzles or 1¾" Nozzle Inserts are used.

Fire Flow Testing Hydrants

General

Fire flow tests are conducted on hydrants to determine water availability in planning for firefighting activities, fire sprinkler systems or domestic water demand. The tests are also useful in determining the general condition of the water distribution system by detecting closed valves or wall deposits. A well-maintained water system enables firefighters to extinguish flames and prevent large-scale damage or loss of life.

How often do I perform Fire Flow Tests on hydrants?

- AWWA recommends flow testing all areas at least every 10 years. (AWWA M17)
- NFPA requires flow testing of underground and exposed piping at least once every 5 years (NFPA 25, 7.3.1, 2008)

Where do I find more information on fire flow testing?

- NFPA 291 — Recommended practice for fire flow testing and marking of hydrants
- AWWA Manual 17 — Installation, field testing and maintenance of fire hydrants
- Hydro Flow Products Catalog — Includes Fire Flow Testing section with how-to instructions, a Fire Flow Test Calculator that calculates the rated capacity at 20 psi for a fire flow test and FAQs on Fire Flow Testing

Fire Flow Testing Hydrants (continued)

Kits for Fire Flow Testing Hydrants

The Fire Pump Test Kits below are all-in-one solutions we recommend for Fire Flow Testing. Actual equipment needed may vary depending on job requirements and preferences.

Fire Flow Test Kit, Little Hose Monster (FFTK)

Flow through the 2½" hydrant port with the Little Hose Monster™. It fits inside a CASE920 with wheels and telescoping handle for easy transportation. A 10' hose is carried outside the case.

ITEM #	Description
HML	Little Hose Monster, 3 lb., 10" x 12", for use with all Pitotless Nozzle™ sizes
PN2GRV	2" Pitotless Nozzle Grooved, FM Approved (490 to 1300 GPM)
HMRR12	Remote Reader Assembly, ¼" x 12' tube, two quick-connect adapters
GK100D4	Pressure Gauge, 4" dial, 0.5% accuracy rated, 0 to 100 psi (for nozzle pressure)
HGV25	Gate Valve, slow close, 2½" F NH x 2½" M NH
GCSW160	Gauge Cap, 2½" NST, with Pressure Gauge, 0 to 160 psi (for static/residual)
HW107	Hydrant Wrench, adjustable, single spanner
WSPA101	Spanner Wrench, lightweight aluminum alloy
CASE920	Gauge and Accessory Case, Seahorse, 24" x 16" x 10" with wheels and telescoping handle
H2H.10YR	2½" x 10' Hose, synthetic nitrile rubber

Fire Flow Test Kit, BigBoy Hose Monster (FFTK2)

Flow through the hydrant pumper port (4" or 4½") with the BigBoy Hose Monster™.

ITEM #	Description
HMBB4	BigBoy Hose Monster, flow testing, 4" F NH swivel, gauge included (750 to 2700 GPM)
HGV45NST	Gate Valve, slow close, 4½" F NH x 4½" M NH
HMRR12	Remote Reader Assembly, ¼" x 12' tube, two quick-connect adapters
GCSW160	Gauge Cap, 2½" NST, with pressure gauge, 0 to 160 psi (for static/residual)
HW107	Hydrant Wrench, adjustable, single spanner
WSPA101	Spanner Wrench, lightweight aluminum alloy
CASE720	Gauge and Accessory Case, Seahorse, 19.8" x 15.5" x 7.5"
H45.10.4	4½" F NH x 10' x 4" M NH Hose, connects to a 4½" outlet and reduces to 4"

Fire Flow Testing Hydrants (continued)

What equipment do I need for Fire Flow Testing?

1. **Hose Monster®**
   - BigBoy Hose Monster™ (HMBB4) — 750 to 2700 GPM. Lightweight, enables flow from hydrant pumper port and displays GPM flow-rate on gauge face.
   - Little Hose Monster™ (HML) — 1500 GPM or less. Small, lightweight and pitotless (no pitot damage from flushing debris).
2. **2" Pitotless Nozzle™ Grooved (PN2GRV)** — For use with the Little Hose Monster. The 2" Pitotless Nozzle measures from about 500 –1300 GPM and is the most common size for hydrant fire flow testing. Not needed if you are using the BigBoy Hose Monster.
3. **Discharge Flow-rate Gauge (GK100D4)** — 60- and 100-psi gauges are common. Anticipate pressure ranges within your distribution system so readings are in the middle third of the dial.
4. **Remote Reader (HMRR12)** — Enables you to take gauge readings at a convenient distance from discharge. Sold in three lengths, the 12' length is usually sufficient for fire flow testing.
5. **Test Hose (H2H.5, H2H.10RR, H4.5, H45.5)** — Length: For fire flow testing, 5' or 10' lengths are most common. Options for attaching a hose to a hydrant:
   - Attach a 2½"-diameter hose to the pumper port by using a reducer. This is our preferred option because it enables a Little Hose Monster™ or 2½" Hose Monster® to be used from the pumper port and usually positions discharge directly in street gutter.
   - Attach a 2½"-diameter hose to the nozzle port of the hydrant. The hydrant nozzle ports are usually located on the sides of the hydrant and parallel to the street. A 10' hose with a slight arc out of the nozzle port should discharge water in a street gutter.
   - Attach a 4" or 4½" hose to the pumper port of the hydrant. The pumper port of a hydrant is usually positioned so a 5' hose out of the pumper port should position discharge directly in street gutter. This is usually used with a BigBoy Hose Monster or 4½" Hose Monster, but can be used with the HML and HM2H if a reducer is attached to the end of the hose.
6. **Hydrant Gate Valve (HGV25, HGV4, HGV45)** — This enables greater control of the water flow and reduces stress and opportunities for water hammer when opening or closing hydrants.
7. **Gauge Cap (GCSW)** — This component collects static and residual pressure readings from a hydrant in a fire flow test. It attaches to the 2½" NST nozzle port on the residual hydrant.
8. **Static/Residual Pressure Gauges (GK160D4, GK100D4)** — 100- or 160-psi gauges are most common. Anticipate pressure ranges within your distribution system so readings are in the middle third of the dial.
9. **Hydrant Wrench (HW107)** — Enables you to unscrew caps and open a hydrant to flow water.
10. **Spanner Wrench (WSPA101)** — Attaches a hose to a hydrant or Pitotless Nozzle™

Also consider:

11. **Dechlor Demon™ (DD2H, DD4, DD4H)** — Designed for dechlorinating discharge water while flow testing without affecting flow-rate measurements. Contact your local authority having jurisdiction for more information when dealing with super-chlorinated water mains or discharging near lakes or rivers.
12. **Reducer Adapter (AD4.25, AD45.25)** — Enables a 2½" hose to be flowed from the pumper port of a hydrant so that a Little Hose Monster or a 2½" Hose Monster can be used. Adapters for flowing from a Storz connection also available.
13. **Gauge Case (Cases)** — Foam-padded cases keep gauges and Pitotless Nozzles protected and prevent damage.
14. **Gauge Calibration (GCC2H, GCC4)** — For fire flow testing, NFPA recommends test gauges be calibrated within 12 months prior to the test. We offer gauge calibration for new and used gauges that ensures accuracy. It comes with a NIST certificate.
15. **Stream Shaper (SS1)** — For high-pressure flow-rates, used to prevent hose burn.
16. **45° or 30° Test Header Elbow (EL452HNH, EL302HNH)** — Enables the hose to be angled differently and positions the discharge water in a different area.

Terminology for Fire Flow Testing

Flow Hydrant — The hydrant that flows water and measures the test flow-rate.

Hydrant Capacity Test — A type of fire flow test that evaluates the water supply available from the hydrant.

Main Capacity Test — A type of fire flow test that evaluates the water supply of the fire main at the location of the residual hydrant.

Nozzle Pressure — The pressure measured at a nozzle in a fire flow or fire pump test. It can describe the Pitotless Nozzle, hydrant nozzle or the orifice on the Hose Monster. Nozzle pressure, pitot pressure and velocity pressure are often used interchangeably.

Rated Capacity — The water supply available at a specified residual pressure (usually 20 psi).

Residual Hydrant — Also known as Test Hydrant. In a fire flow test, this hydrant measures static and residual pressures. Test results apply to this hydrant.

Residual Pressure — The pressure residing in the water distribution system when flowing in a fire flow test or any other actual flowing condition.

Static Pressure — Water distribution system pressure at zero test flow.

Test Flow-rate — The flow-rate of water that is discharged in a fire flow or fire pump test.

Test Hydrant — Also known as Residual Hydrant. In a fire flow test, this hydrant measures static and residual pressures. Test results apply to this hydrant.

Fire Flow Testing Hydrants (continued)

Hydrant Capacity Flow Test

Single-hydrant flow test

The Hydrant Capacity Test evaluates the water supply available from the hydrant. The information derived from this test is used by the fire service to plan for fighting fires. If all hydrants in a system are tested, partially closed valves and other obstructions will become known. This test uses a single hydrant as both the test hydrant and the flow hydrant.

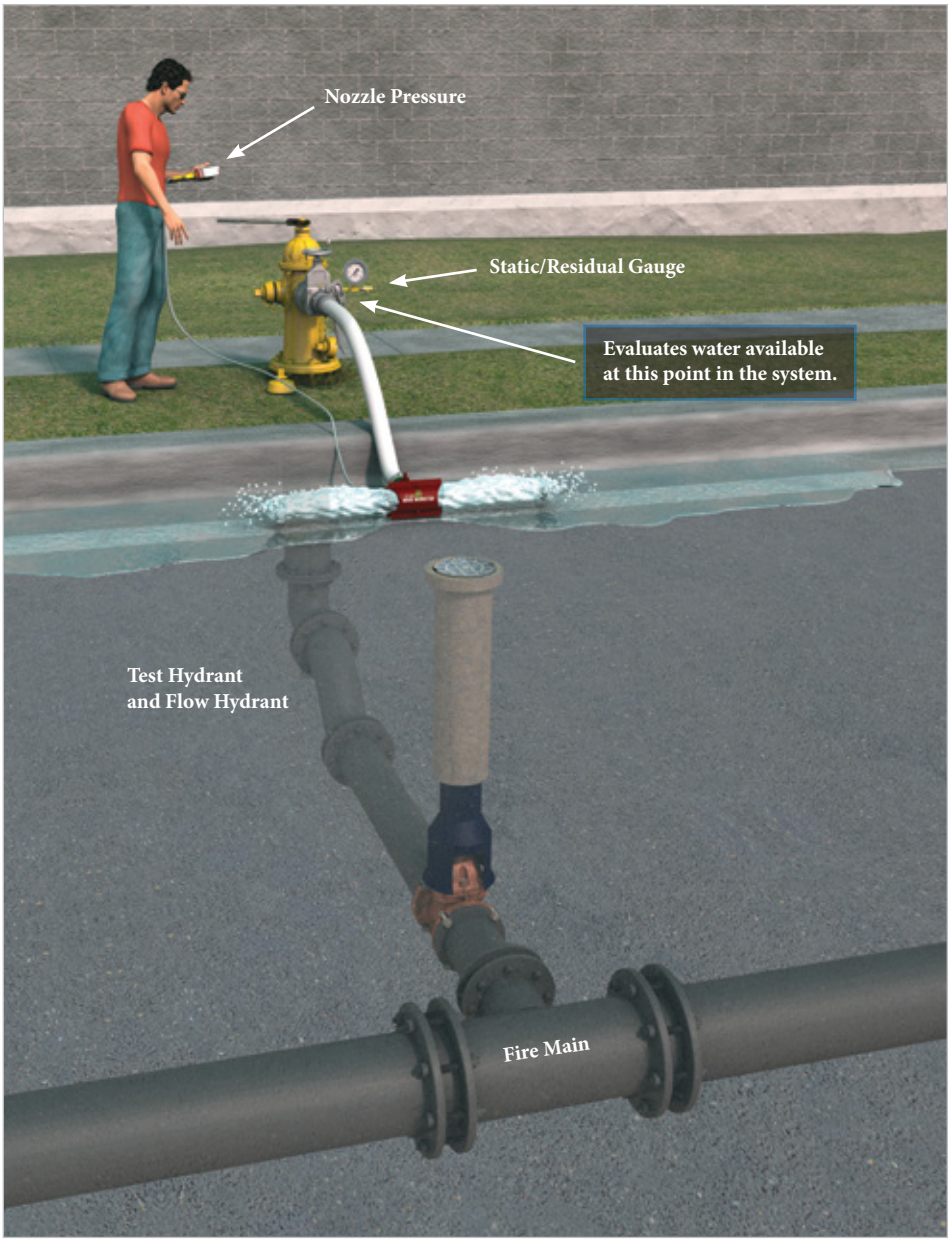
Setup
At the test hydrant
(pressure hydrant, static/residual hydrant):

1. Attach gauge cap.
2. Attach hydrant slow-close gate valve and tighten all other caps.
3. Set the Little Hose Monster™ with Pitotless Nozzle™ in an appropriate location for flowing water.
4. Attach hose to Pitotless Nozzle and Little Hose Monster assembly.
5. Attach Remote Reader assembly and gauge to Pitotless Nozzle.

Conduct the test

1. Slowly open the hydrant using the gauge cap to purge air from the hydrant. Close it when air is vented.
2. Record static pressure from gauge cap.
3. Slowly open hydrant gate valve to desired flow-rate (usually full open).
4. When the flow-rate stabilizes,
   a. Record nozzle pressure from the remote reader.
   b. Record the residual pressure reading from the gauge cap.

At this point, the test is complete.



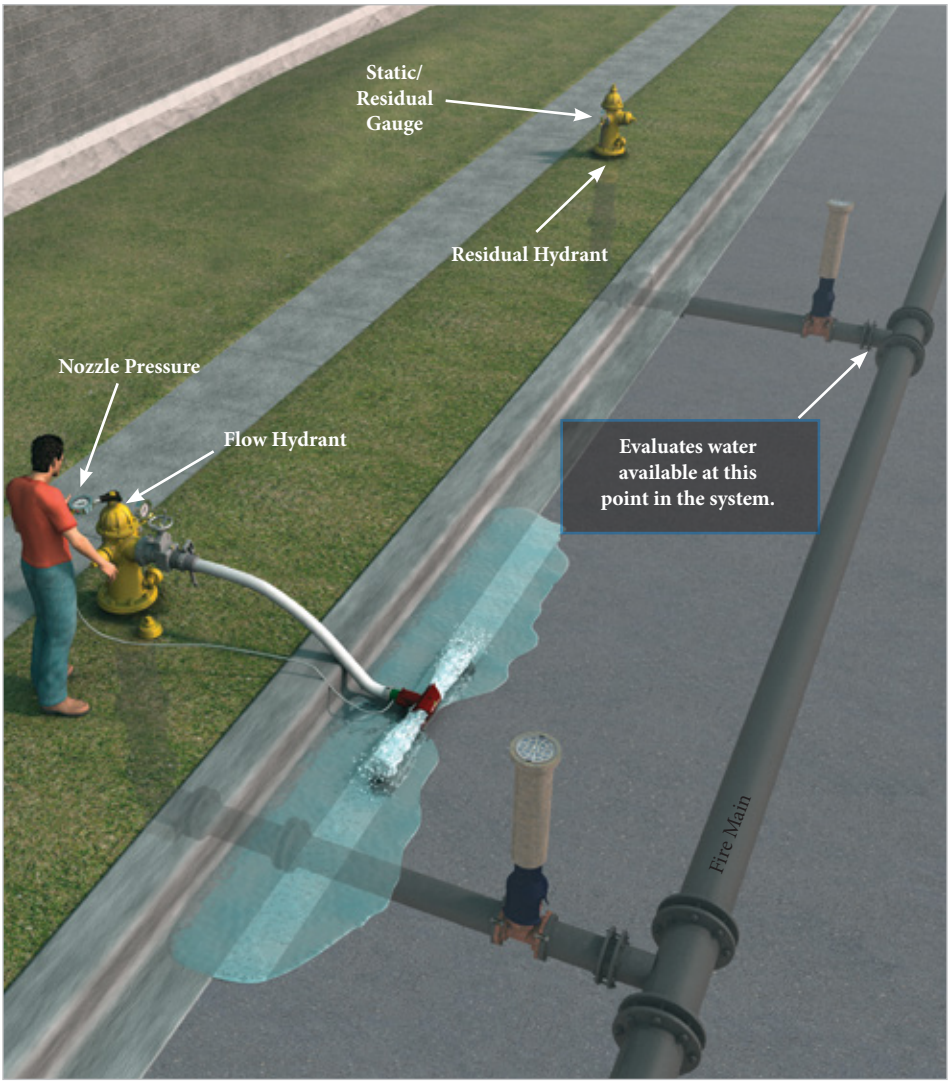
5. Slowly close gate valve, then close the hydrant. Remove test equipment from hydrant. Replace and tighten cap. If the hydrant is a dry barrel type, note that water drains properly from the hydrant. Remove Remote Reader and gauge from the Pitotless Nozzle.
6. Record the number of minutes that water was flowing. This can be used to account for the amount of water used during the flow test.

Fire Flow Testing (continued)

Main Capacity Flow Test

Two-hydrant flow test

A **Main Capacity Test** evaluates the water supply of the fire main at the location of the test hydrant. The information derived from this test is used by city planners and contractors to consider the water supply for general use and fire sprinkler systems.



Setup
At the test hydrant
(pressure hydrant, static/residual hydrant):

1. Attach gauge cap to test hydrant. Tighten all other caps.
2. Open test hydrant, vent air from hydrant body through the valve on the gauge cap assembly. Close it when air is vented.

At the flow hydrant

1. Set the Little Hose Monster™ with gauge to the Pitotless Nozzle™ in an appropriate location for flowing water.
2. Attach Remote Reader and gauge to the Pitotless Nozzle.
3. Attach hydrant gate valve to the hydrant and close the gate valve.
4. Tighten other caps.
5. Attach the hose to the Pitotless Nozzle and Little Hose Monster assembly.

Conduct the test

1. Record static pressure reading from gauge cap.
2. Slowly open hydrant using the gate valve to purge air from the hydrant. When hydrant is full of water, open gate valve to desired flow-rate (usually full open).
3. When the flow-rate stabilizes,

   a. Record nozzle pressure from the remote reader.

   At the test hydrant

   b. Record the residual pressure reading from the gauge cap.

At this point, the test is complete.

4. Slowly close gate valve on flow hydrant, then close the hydrant. Remove test equipment from hydrant. Replace and tighten cap. If the hydrant is a dry barrel type, note that water drains properly from the hydrant.
5. Record the number of minutes that water was flowing. This can be used to account for the amount of water used during the flow test.

At the test hydrant

6. Close the hydrant. Remove gauge cap and replace hydrant cap. If the hydrant is a dry barrel type, note that water drains properly from the hydrant.

Fire Flow Testing (continued)

How much is the friction loss when I use a hose?

There is friction loss when flowing through a hose, but in a fire flow test, it doesn't matter. The purpose of a fire flow test is to evaluate the water supply, or the flow-rate that will be available when the system is brought down to 20 psi residual.

A fire flow test requires three measurements: static pressure, residual pressure and test flow-rate. The reading from the gauge cap on the residual hydrant gives you static pressure and residual pressure. The Pitotless Nozzle™ or Hose Monster® gives you the test flow-rate.

The friction loss created in the hose results in a lower test flow-rate and a greater residual pressure. This will not affect the predicted flow at 20 psi as long as there is a sufficient drop in static-to-residual pressure. NFPA 291, 4.3.6, 2010 recommends a drop of at least 25% from static to residual pressure. AWWA M17 recommends a drop of at least 10 psi from static to residual pressure.

To illustrate that friction loss does not have an effect on the predicted flow-rate:

1. **Test #1** measures the test flow **through an open hydrant nozzle with a hand-held pitot**.
   - Static 85 psi
   - Residual 60 psi
   - Pitot 36 psi
   - Test flow 1007 GPM

Predicted flow at 20 psi = 1687 GPM

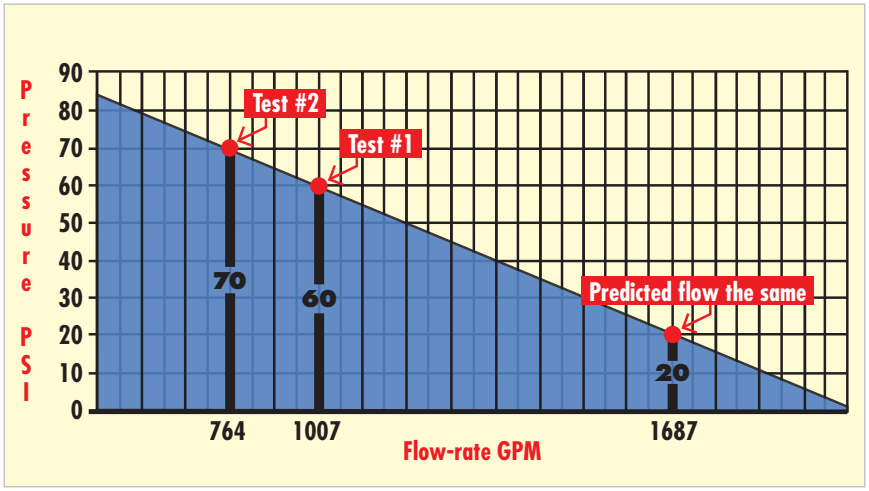
2. **Test #2** measures the test flow **through 2½" x 10' hose and the 2½" Hose Monster.**
   - Static 85 psi
   - Residual 70 psi
   - Pitot 20 psi
   - Test flow 764 GPM

Predicted flow at 20 psi = 1687 GPM

- Static pressure is equal in both tests. Flow test equipment does not affect static pressure.
- Test flow in Test #2 is less than in Test #1 because of the friction loss in 10' of hose.
- Residual pressure in Test #2 is greater than in Test #1. The friction loss in the hose causes a backpressure which increases residual pressure. The higher residual pressure compensates for the lower test flow-rate.
- Both flow tests result in a predicted flow at 20 psi that is equal. Test points from both tests fall on the same line of the graph.

In summary, the test *flows* will be different, but the difference will not affect the flow test. The Hose Monster and hose will result in a lower test flow-rate and a higher residual pressure. When all data is considered, the flow tests result in the same predicted flow-rates.

Flow Graph



Standpipe Testing

General

A standpipe is the vertical piping that connects fire sprinkler systems and hose stations between multiple floors. It is common to see standpipes in the stairwells of high-rise buildings or on rooftops. A standpipe test verifies the water supply, pump and piping at the topmost part of the system.

In the past, the only way to perform standpipe tests was with playpipes and hand-held pitots. Safely securing playpipes and controlling discharge water to avoid interfering with pedestrian and vehicle traffic was a significant challenge, typically requiring that testing be in the early morning hours. The introduction of the Hose Monster® line of equipment changed all that. The Hose Monster neutralizes the dangerous thrust and controls discharge water on the rooftop while minimizing hazards to pedestrians and property below. Flow-rate is measured with FM Approved accuracy.

In some cases, discharging the water can be a challenge since you may be in a stairwell or basement. The In-line Pitotless Nozzle™ can take flow-rate measurements at the valve, allowing you to run hose or piping to a drain or down several flights of stairs.

How often should I test rooftop standpipes?

Every five years. According to NFPA 25, 6.3.1.1, 2010, "A flow test shall be conducted every five years at the hydraulically most remote hose connections of each zone of an automatic standpipe system to verify the water supply still provides the design pressure at the required flows."

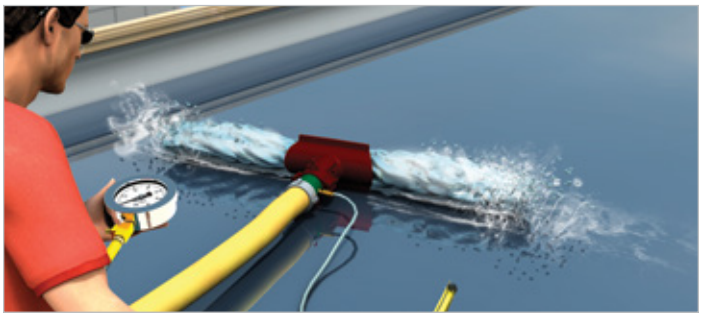
Where do I find more information on this testing?

- NFPA 25, Chapter 6 — For inspection, testing and maintenance of standpipe and hose systems
- NFPA 14 — For installation of standpipes

What equipment do I need?

A standpipe test requires a minimum flow-rate of 500 GPM for the most hydraulically remote standpipe and 250 GPM for each additional. This means that the user will have to measure 500 GPM for certain and 250 GPM if there are additional standpipes that need to be flow tested.

1. **Little Hose Monster™ (HML)** — Use one unit per flowing hose line.*
2. **Pitotless Nozzle™ (PN1.75, PN1.125)** — Use a 1¾" Pitotless Nozzle to read the first 500 GPM. If reading 250 GPM, a 1⅛" Pitotless Nozzle is required.
3. **In-line Pitotless Nozzle (INPN1.125, INPN1.5, INPN1.75, INPN2)** — Allows you to take the flow readings at the discharge valve with hose or piping attached downstream. Can be used in place of the Pitotless Nozzle and Little Hose Monster depending on your job conditions.
4. **Test Hose (H2H.10, H2H.25, H2H.50)** — The length of hose depends on the layout of the job. We offer 2½" x 10', 25' and 50' long. Shorter is usually better, easier to handle and has less friction loss. Use one hose per nozzle. Available for both 2½" and 1½" Standpipe connections.
5. **Discharge Flow-Rate Gauge (GK60D4, GK100D4)** — 60- or 100-psi gauges with a 4" dial are common.
6. **Remote Reader (HMRR12, HMRR40, HMRR60)** — Enables you to take gauge readings at a convenient distance from discharge. Sold in 12', 40' or 60' lengths.
7. **Case (CASE520, CASE720, CASE920, CASE2719)** — Store and protect pressure gauges and Pitotless Nozzles.



The Little Hose Monster and Pitotless Nozzle in a rooftop standpipe test.

The In-line Pitotless Nozzle in a stairwell standpipe test.

**The 2½" Hose Monster® with Built-in Pitot can be used in place of the Little Hose Monster for standpipe testing, but you will need Nozzle Inserts instead of Pitotless Nozzles.*

Also consider:

8. **Stream Shaper (SS1)** — Use to prevent hose burn.
9. **45° or 30° Test Header Elbow (EL452HNH, EL302HNH)** — Re-angles the hose from the test header to minimize kinks and hose burn.
10. **Spanner Wrench (WSPA101, WSPA104)** — For attaching the hose to the test header or to a 2½" Hose Monster.
11. **Gauge Calibration (GCCN, GCC2H, GCC4)** — We offer gauge-calibration service, including a NIST certificate for new and used gauges. NFPA recommends test gauges be calibrated within 12 months prior to the test.

Apparatus Fire Pump Testing

General

The apparatus fire pump test is conducted on pumps found in fire engines, trucks and water tenders. It can be performed using water drawn from a fire hydrant or from a draft source, such as a drafting pit, lake or river.

How often should I test a fire apparatus pump?

Annually. According to NFPA 1911, 18.2, 2007, "Service tests are conducted at least annually and whenever major repairs or modification to the pump or its components have been made."

Where do I find more information on apparatus testing?

- NFPA 1911, Chapter 18 — Performance testing of apparatus fire pumps
- NFPA 1911, Annex B — Conducting pump tests

What equipment do I need?

If discharging to a drainage area such as a boat ramp, the equipment would generally be the same as that used in a stationary fire pump test (see Fire Pump Testing, **pages 29–31**). In a drafting pit setup, Pitotless Nozzle™ units would be attached to a permanent fixture. In both cases, the Pitotless Nozzle sizes required depend on the flow-rates to be measured during the test.

1. **Little Hose Monster™ (HML)** — Use one Little Hose Monster per flowing hose line.*
2. **Pitotless Nozzle™ (PN1.125, PN1.75, PN2)** — Consider the minimum and maximum flow-rates that are required to measure. Use one Pitotless Nozzle per flowing hose line.
3. **Test Hose (H2H.25, H2H.50)** — Hoses for pump testing are commonly 2½" x 25' or 50' long. Length is determined by job conditions, such as needing a safe place to flow water with sufficient drainage.
4. **Suction Hose** — For drawing water from a hydrant or other draft source.
5. **Discharge Flow-rate Gauge (GK100D4, GK60D4)** — Anticipate expected flow ranges using our flow charts so readings are in middle of dial.
6. **Case (CASE520, CASE720, CASE920)** — For storing and protecting pressure gauges and Pitotless Nozzles units. Use one case of a specified size

**A 2½" Hose Monster® with Built-in Pitot can be used in place of the Little Hose Monster for apparatus testing, but you will need FM Nozzle Inserts and Stackers instead of Pitotless Nozzles and Stabilizers.*

Also consider:

7. **Stream Shaper (SS1)** — Use to prevent hose burn.
8. **45° or 30° Test Header Elbow (EL452HNH, EL302HNH)** — Re-angles the hose from the test header to minimize kinks and hose burn.
9. **Gauge Calibration (GCCN, GCC2H, GCC4)** — We offer gauge-calibration service, including a NIST certificate for new and used gauges. NFPA recommends test gauges be calibrated within 12 months prior to the test.

Conventional Hydrant Flushing

General

Conventional flushing is the practice of simply opening one or more fire hydrants and allowing the water to run until sediment or poor quality water is removed. Conventional flushing differs from unidirectional flushing in that no valves are closed to increase the velocity of water through the mains, making it less effective at cleaning the mains. Hydrant flushing differs from Fire Flow Testing because conventional flushing does not require any flow-rate measurements and does not measure water supply. Hydrant flushing is part of the hydrant's annual maintenance procedure described in NFPA 25 and AWWA M17.

Where do I find more information on Hydrant Flushing?

- NFPA 25, Chapter 7 — Private Fire Service Mains
- AWWA M17, Chapter 5 — Fire Hydrant Maintenance

How often do I flush hydrants?

NFPA 25, section 7.3.2 requires all hydrants be fully opened and given an inspection on an annual basis. Flow and pressure readings are not required during this annual inspection.

What equipment do I need?

1. Hose Monster®

- Little Hose Monster™ (HML) — Its benefits are its light weight (only 4 pounds) and low price. If using this option, a Flushing Nozzle (FN) is also needed.
- 2½" Hose Monster Flusher (HM2HF) — This model is the same as a regular 2½" Hose Monster except that it does not have a pitot installed. A pitot kit can always be purchased and installed later if you decide to take pressure readings.
- BigBoy Hose Monster (HMBB4) — For flowing from pumper port. It is larger and flows more water. It is made from ¼"-thick steel, which makes it exceptionally durable.

2. Hydrant Gate Valve (HGV25, HGV4, HGV45)

3. Test Hose (Hose)

4. Hydrant Wrench (HW107)

5. Spanner Wrench (WSPA101)

Also consider:

6. Dechlor Demon™ (DD2H, DD4, DD4H)

Procedure

1. Remove one cap from hydrant. Tighten all other caps.
2. Set the Hose Monster in an appropriate location for flowing water.
3. Attach hydrant gate valve on the hydrant, then attach the hose and Hose Monster.
4. Slowly open the hydrant by rotating the stem nut on top using the hydrant wrench. Open hydrant gate valve to begin flowing water.
5. Once sufficient water is discharged, slowly close hydrant gate valve. Slowly close hydrant. Replace and tighten caps. Remove Hose Monster. Roll up hose to the Hose Monster. If hydrant is dry barrel type, note that water drains properly from the hydrant.

Dechlorination

General

When chlorinated water is discharged in a flow test, it can drain into lakes, rivers and streams and harm aquatic life. According to AWWA, "Water released into the environment shall meet the applicable federal, state, provincial or local regulatory agency's residual chlorine limit." Your authority having jurisdiction provides dechlorination requirements.

Where do I find more information on dechlorination?

- ANSI/AWWA C655-09 standard for field dechlorination

How does it work?

A portion of the water flowing through the Dechlor Demon™ is diverted through the bypass into a mixing tank, where it is combined with a concentrated dechlorinating agent. The bypass flow is controlled by a precision indicating valve. The concentrate is reintroduced into the Dechlor Demon and hose, where it continues to mix with the flowing water. The chlorine is neutralized by the time it exits the hose.

Dechlorination (continued)

What equipment do I need?

1. **Dechlor Demon assembly (DD2H, DD4, DD4H)** — Flow from the hydrant nozzle (2½" NH) or pumper port (4" or 4½" NH). It includes:
   - Dechlor Demon body — 2½", 4" or 4½"
   - 1-gallon or 10-gallon mixing tank
   - Two pickup tubes with ball valves
   - Two ¾" x 6' hoses with quick-connect couplings
   - Indicating bypass valve
2. **Dechlorinating agent (VDC40, VDC140, BN140, BM154)** — An agent should be chosen on the basis of the chlorine concentration of your water system and the total amount of water to be flowed. We offer Vita-D-Chlor™ (vitamin C) and Bio Neutralizer (sodium bisulphate). Other agents may be used, but check with us first. See "Determining quantity of dechlorinating agent" (**below**).
3. **Residual chlorine measurement** — The chlorine measurement product will depend on the chlorine level to be expected. Take chlorine measurements before and during your flow test to make sure the correct amount of dechlorinating agent is being used.
   - **Test strips** — Measure free and total chlorine by comparing test strip to a color scale
   - **Colorimeter** — An electronic device that does a comparative scan of discharge water samples
   - **Swimming pool test kits** — A specified amount of reagents are put in and mixed with sample water in a test fixture; the resulting color is compared to a scale built into the fixture test kits; a specified amount of reagents is put in and mixed with sample water in a test fixture; the resulting color is compared to a scale built into the fixture
4. **Test Hose (H2H.5, H2H.10RR, H4.5, H45.5)** — At least 5' of hose is needed on the discharge end of the Dechlor Demon™ to enable mixing of dechlorinating agent with the water.

Fire flow test equipment

5. **Hose Monster® (HML, HM2H)**
6. **2" Pitotless Nozzle™ (PN2GRV, PN2THD)**
7. **Discharge Flow-Rate Gauge (GK100D4, GK60D4)**
8. **Remote Reader (HMRR12)**
9. **Test Hose (H2H.5, H2H.10RR, H4.5, H45.5)**

10. **Hydrant Gate Valve (HGV25, HGV4, HGV45)**
11. **Gauge Cap (GCSW)**
12. **Static/Residual Pressure Gauges (GK160D4, GK100D4)**
13. **Hydrant Wrench (HW107)**
14. **Spanner Wrench (WSPA101, WSPA104)**

Determining quantity of dechlorinating agent

There are three variables in determining how much agent to put in the tank:

- Chlorine content in water main
- Flow-rate through hydrant or pump
- Type of dechlorinating agent in mixing tank

All of these variables change during the flow test or flushing operation. Monitor chlorine levels in discharge using chlorine strips or hand-held meters to determine amount of dechlorinating agent required.

US regulations

Most states use the EPA's criterion for permissible residual chlorine concentration in receiving waters. It says that chlorine discharge in water releases into streams and wetlands shall not exceed 0.01 mg/L (or a more stringent limit depending on the state). It also says that the total residual chlorine level for receiving streams should not exceed 0.019 mg/L for a one-hour average or 0.011 mg/L for a four-day average during any three-year period (ANSI/AWWA C655-09, viii-ix, 2010).

Unidirectional Flushing

General

Unidirectional flushing is the process of cleaning the water mains of a water distribution system by flowing water in one direction through the mains. This is accomplished by closing specified valves and by flushing strategically located hydrants. By closing specified valves, the velocity of water through the mains is increased. The main purpose of unidirectional flushing is to improve water quality within the distribution system. It is generally considered to be more effective at removing sediments than conventional flushing and also uses less water.

Where can I find more information?

- AWWA Maintaining Water Distribution-System Quality
- AWWA Research Foundation — Investigation of Pipe Cleaning Methods

What equipment do I need?

1. **Hose Monster®**
   - BigBoy Hose Monster (HMBB4) — 750 to 2700 GPM. Lightweight, enables flow from hydrant pumper port and displays GPM flow-rate on gauge face.
   - Little Hose Monster™ (HML) — 1500 GPM or less. Small, lightweight and pitotless (no pitot damage from flushing debris).
   - 2½" Hose Monster (HM2H) — 1500 GPM or less. Steel body, built-in-pitot.
2. **2" Pitotless Nozzle™ (PN2GRV, PN2THD)**
3. **Discharge Flow-Rate Gauge (GK100D4, GK60D4)**
4. **Remote Reader (HMRR12)**
5. **Test Hose (H2H.5, H2H.10RR, H4.5, H45.5)**
6. **Hydrant Gate Valve (HGV25, HGV4, HGV45)**
7. **Hydrant Wrench (HW107)**
8. **Spanner Wrench (WSPA101, WSPA104)**
9. **Valve Exercising Equipment** — Spin Doctor® and ValveStar® by HURCO Technologies, Inc.®

Also consider:

10. **Dechlor Demon™ (DD2H, DD4, DD4H)**
11. **Reducer Adapter (AD4.25, AD45.25)**
12. **Gauge Case (CASE520, CASE720, CASE920, CASE2719)**
13. **Gauge Calibration (GCC2H, GCC4, GCCN)**
14. **Stream Shapers (SS1)**
15. **45° or 30° Test Header Elbows (EL452HNH, EL302HNH)**

The Process

1. Identify each main in the system. Determine the flushing point and the ability to isolate the main so the water supply passes through in one direction.
2. Determine the desired flushing velocity.
3. Develop a detailed plan of action with detailed work orders specifying which valves to close and which hydrants to flow.
4. Close the predetermined valves in your system.
5. At the flow hydrant, remove one cap from hydrant. Tighten all other caps.
6. Set the Hose Monster in an appropriate location for flowing water. Attach hydrant gate valve on the hydrant, then attach the hose and Hose Monster.
7. With the hydrant gate valve closed, slowly open the hydrant fully. Control water flow with hydrant gate valve.
8. Measure flow-rate from Hose Monster® to determine flushing velocity.
9. When flushing operation is complete, slowly close hydrant gate valve, then hydrant. Verify that hydrant is fully closed and drained. Remove equipment and replace caps.

Calculating Flow-rates

If you are using a software program to calculate flow, you may need to input a coefficient or k-factor into the program to calculate flow-rate. Using the coefficients (on next page) will give relatively accurate results. Check results against our flow charts to verify calculations were done correctly. Our flow charts are calculated using K-factors derived from testing at FM Approvals.

Here are the equations used for calculating flow-rates and predicting flow-rates. Use the orifice diameter, coefficient or K-factor found on the next page.

K-factor Formula

Computes a flow-rate in GPM given a psi and a K-factor of the flow device.

$$Q = \sqrt{P} \times K$$

Q = flow-rate in GPM, P = velocity pressure in psi,
K = K-factor of flow device

Theoretical Discharge through Circular Orifices Formula

Computes a flow-rate in GPM given a psi and coefficient of the flow device.

$$Q = 29.84 \times \sqrt{P} \times D^2 \times C$$

Q = flow-rate in GPM, P = velocity pressure in psi,
D = orifice diameter in inches,
C = coefficient of flow device

Equation for Determining Rated Capacity

Computes the flow-rate available at a specified residual pressure (a.k.a. Rated Capacity).

The example below enables you to find the predicted flow-rate at 20 psi residual pressure. Use this when fire flow testing hydrants.

$$Q_R = Q_F \times (H_R^{0.54} / H_F^{0.54})$$

Q_R = Flow-rate predicted at the desired residual pressure in GPM

Q_F = Total test flow-rate measured during test in GPM (GPM measured from Hose Monster or Pitotless Nozzle)

H_R = Pressure drop from static pressure to desired residual pressure (Static – 20 psi [if 20 psi is the desired residual pressure])

H_F = Actual pressure drop measured during the test (Static – Actual Residual)

(Source: NFPA 291, 2013)

Conversion Factors

Here are some conversion factors for switching between US and metric units:

Flow-rate:

US Gallons per Minute x 3.785 = Liters per Minute
Liters per Minute x 0.264 = US Gallons per Minute

US Gallons per Minute x 0.1337 = Cubic Feet per Minute
Cubic Feet per Minute x 7.481 = US Gallons per Minute

Volume:

US Gallons x 3.785 = Liters
Liters x 0.264 = US Gallons

US Gallons x 0.8327 = Imperial Gallons
Imperial Gallons x 1.201 = US Gallons

Cubic Feet x 7.48051945 = US Gallons
US Gallons x 0.1337 = Cubic Feet

Pressure:

psi x 0.0689 = Bars
Bars x 14.5038 = psi

psi x 6894.757 = Pascals
Pascals x 0.000145 = psi

Bars x 100,000 = Pascals
Pascals x 0.00001 = Bars

Weight of Water:

US Gallons of Water x 8.3454 = Pounds
Cubic Feet of Water x 62.42796 = Pounds

Length:

Meters x 3.2808 = Feet
Feet x 0.3048 = Meters

Coefficient and K-factor Table for Various Flow Devices

Pitotless Nozzle™

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
2" Pitotless Nozzle + Little Hose Monster™	156.0	1.31	2"	10–70	493–1305
2" Pitotless Nozzle + 2½" Hose Monster	164.8	1.38	2"	10–70	521–1379
2" Pitotless Nozzle + Open Atmosphere	167.2	1.40	2"	10–70	529–1399
1¾" Pitotless Nozzle + Little Hose Monster	104.7	1.15	1.75"	10–90	331–993
1¾" Pitotless Nozzle + 2½" Hose Monster	106.6	1.17	1.75"	10–90	337–1011
1¾" Pitotless Nozzle + Open Atmosphere	109.7	1.20	1.75"	10–90	347–1041
1⅛" Pitotless Nozzle + Little Hose Monster	37.2	0.98	1.125"	5–90	83–353
1⅛" Pitotless Nozzle + 2½" Hose Monster	37.4	0.99	1.125"	5–90	84–355
1⅛" Pitotless Nozzle + Open Atmosphere	37.0	0.98	1.125"	5–90	83–351

In-line Pitotless Nozzle™

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
2" In-line Pitotless Nozzle	165.3	1.38	2"	10–75	523–1432
1¾" In-line Pitotless Nozzle	109.9	1.20	1.75"	5–80	246–983
1⅛" In-line Pitotless Nozzle	38.4	1.02	1.125"	5–70	86–321
1½" In-line Pitotless Nozzle	31.7	1.06	1.0	2–90	45–301

BigBoy Hose Monster™

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
4 to 10 psi (BigBoy Hose Monster)	382.9	1.38	3.05"	4–10	766–1211
11 to 36 psi (BigBoy Hose Monster)	376.0	1.35	3.05"	11–36	1247–2256
37 to 53 psi (BigBoy Hose Monster)	372.0	1.34	3.05"	37–53	2263–2708

Note: Due to the shape and size of the BigBoy Pitotless Nozzle, the BigBoy Hose Monster uses three different K-factors over its operating range.

2½" Hose Monster®

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
2½" Hose Monster	168.67	0.906	2.5"	10–75	533–1460
1¾" Nozzle Insert	89.04	0.975	1.75"	10–75	282–771
1⅛" Nozzle Insert	37.36	0.99	1.125"	10–75	118–324

4" and 4½" Hose Monster®

Device	K-factor	Coefficient	Orifice Diameter	psi Range	Flow Range (GPM)
4½" Hose Monster	331.07	0.548	4.5"	10–75	1047–2867
4" Hose Monster	339.65	0.712	4"	10–75	1074–2941

Using Software

Use the table to the right if you are using software that requires the coefficient input to be less than '1.0'. Notice that the orifice diameter must be changed from its true diameter in order to accommodate the lower coefficient. This is necessary only for the 2" Pitotless Nozzle and the ¾" Pitotless Nozzle.

Device	Coefficient	Orifice Diameter
2" Pitotless Nozzle + Little Hose Monster	0.99	2.30"
2" Pitotless Nozzle + 2½" Hose Monster	0.99	2.36"
2" Pitotless Nozzle + Open Atmosphere	0.99	2.38"
1¾" Pitotless Nozzle + Little Hose Monster	0.99	1.88"
1¾" Pitotless Nozzle + 2½" Hose Monster	0.99	1.90"
1¾" Pitotless Nozzle + Open Atmosphere	0.99	1.93"

Note: If your software uses the Theoretical Discharge Formula, found in NFPA 291, 4.7.3, the coefficient of discharge can be used to produce flow rates that will match our flow charts.

A hand-held pitot directly at a hydrant outlet

Outlet Type	Coefficient
Outlet smooth and rounded	0.9
Outlet square and sharp	0.8
Outlet square and projecting into barrel	0.7
If a stream straightener is used	0.95

Classifying and Marking of Hydrants

Rated Capacity at 20 psi	Class	Marking Color of Hydrant Tops and Nozzles
≥1500 GPM	AA	Light Blue
1000–1499 GPM	A	Green
500–999 GPM	B	Orange
≤499 GPM	C	Red

The above are the NFPA hydrant classifications and color markings for various rated capacities. Source: NFPA 291, 5.1, 2010.

The Pitotless Nozzle™

Why should I use a Pitotless Nozzle?

Because there is no pitot, small rocks and other debris can pass harmlessly through the center of the nozzle. The same debris would likely damage a pitot if it were in use. Plus, the Pitotless Nozzle accurately measures internal pressure from the inside of the nozzle to determine the flow-rate.

Is the Pitotless Nozzle accurate?

Yes. The Pitotless Nozzle was tested extensively in two different private hydraulics laboratories before being tested at the FM Approvals lab in Rhode Island. K-factors are known and consistent. In addition, FM Approvals conducts regular audits of our manufacturing facility.

In what applications should the Pitotless Nozzle be used?

It is used in flow testing, pump testing or flushing. Use it with the Little Hose Monster, the 2½" Hose Monster or by connecting it directly to a hydrant nozzle or pump test header flowing openly to atmosphere. It also can be used on the end of a hose if it is solidly anchored. Call us if you are considering another application.

What are the minimum and maximum flow-rates that can be measured?

Rates as low as 50 GPM and as high as 1400 GPM can be measured. The nozzle comes in four sizes: 1", 1⅛", 1¾" and 2".

Can I connect the inlet of the Pitotless Nozzle to a test valve or hydrant nozzle, and then connect a hose to the outlet of the Pitotless Nozzle?

Use the In-line Pitotless Nozzle when you are flowing water in a closed loop or with hose or piping attached to the discharge side of the nozzle. The Pitotless Nozzle by itself will not work because the Pitotless Nozzle needs access to atmospheric pressure in order to take accurate readings.

Why do I get a suction or negative pressure when using the Pitotless Nozzle directly on a pump test header?

It is usually caused by the presence of air turbulence inside the Pitotless Nozzle. This can happen while opening a valve during a flow condition. This condition can sometimes be corrected by opening the header valve all the way and controlling the pump test flow from the valve at the pump. If this method does not work, attach a Stream Shaper, elbow or nozzle extension to the test header valve first, then attach the Pitotless Nozzle on the outlet end.

Little Hose Monster™

How much does the Little Hose Monster weigh?

By itself, it weighs only 3 pounds. With the Pitotless Nozzle and gauge, it weighs just 6 pounds.

Will it whip around because it is so light?

No. The weight is not what keeps it from whipping around. The thrust is cancelled by flowing water in two opposing directions.

The Little Hose Monster looks quite small. Will it break when flowing at high pressures?

The Little Hose Monster has been tested in numerous water flow situations as well as special destruction testing. We found that injection-molded, glass-filled polypropylene is exceptionally durable and difficult to damage — even when we try! But if your Little Hose Monster becomes damaged within two years, we'll replace it.

When I use the Little Hose Monster, it slides or moves laterally. How do I stop it from moving?

Such movement can occur if the hose is twisted or curved, or if the Little Hose Monster is on an incline. Straighten the hose first and make sure it is not twisted. You can also use the Little Hose Monster Stabilizer as an anchoring base.

When I stack the Little Hose Monsters three units high, the stack gets top heavy and falls over. How do I solve this problem?

Use the Little Hose Monster Stabilizer (STK). It adds stability and keeps the stacked units upright during heavy water flow. It consists of a specially designed metal base and a tie down.

What about dechlorination? Can I still dechlorinate with the Little Hose Monster?

Absolutely. Simply connect the Dechlor Demon™ to the hydrant, in line with the hose and the Little Hose Monster.

The Hose Monster®

How much does the 2½" Hose Monster weigh? It must be heavy to keep from whipping around.

The 2½" Hose Monster weighs 27 pounds, and the 4" and 4½" Hose Monsters each weigh 45 pounds. However, their weight is not what keeps them from whipping around. The thrust is cancelled by flowing water in two opposing directions. The Hose Monsters weigh as much as they do because of the durable material they are built with.

How much water can I flow through the Hose Monster without damaging it?

A lot, probably more water than your system can provide! Water never has and never will damage the Hose Monster.

Can I take flow readings by inserting a hand-held pitot in the vent hole on top of the Hose Monster®?

We do not recommend this method. The vent hole was not designed for flow readings, and the accuracy of that method has not been verified.

What are the maximum and minimum flow-rates I can read from the Hose Monster?

Our equipment can test water flow-rates as low as 45 GPM (1½" In-line Pitotless Nozzle™) up to 2941 GPM (4" Hose Monster). Call us or refer to flow charts to determine which equipment to select. The flow charts provided with the Hose Monsters and Pitotless Nozzles indicate the flow-rates for which we have supporting laboratory test data.

Why do I need an extra pitot when I get the 2½" Hose Monster?

Sometimes a piece of debris hits the Hose Monster's built-in pitot and damages it in the middle of a flow test or pump test. When this happens, you can change out the damaged pitot with the spare that you keep on hand. All you need is the Pitot Changeout Kit (PCK) — or a ⅛" hex wrench and magnet — and a few minutes. And be sure to save the old pitot! It can be rebuilt at the factory for far less than the cost of a new pitot. Contact us for a return authorization.

Where is the pitot in the 4" or 4½" Hose Monster?

These Hose Monsters use an FM-Approved orifice plate, not a pitot. It is ideal for flushing operations because it is both accurate and durable. We have never had a complaint of the orifice plate being damaged from flushing debris.

Can I thread the Hose Monster directly to the hydrant?

It is physically possible, but it shouldn't be done. The primary benefit of the Hose Monster is realized by using a hose. It gets the flowing water away from the hydrant and into the street gutter, plus it neutralizes the turbulence when flowing close to the hydrant nozzle. It's common to see a gauge needle bounce ±10 or more psi when measuring flow close to the hydrant.

Fire Pump Testing

How many Hose Monsters do I need for my pump test?

Generally, pump testers plan on flowing a maximum of 500 GPM per hose. There are other variables to consider such as pump capacity and hose length.

We created the Pump Test Hose Calculator that estimates the number of hoses required for a specific pump test based on the pump ratings/capacity, water supply, job conditions, hose diameter/length and nozzle size. Go to www.hosemonster.com and click on Resources.

Why should I use the Monster Tester™?

- **Without the Monster Tester —** Fire pump tests using multiple hoses require one gauge for each Hose Monster. It requires one person to adjust the water flow and another to take individual readings. Communication between both persons is via hand signals, radio or shouting. Mistakes happen.
- **With the Monster Tester —** One gauge is needed to take accurate readings of individual pitots. The Monster Tester can be remotely located at the test header so that the person adjusting the water flow can watch the pitot pressure change. Opening or closing the hose valve is like dialing in target pitot pressure.

Can the Little Hose Monster™ or regular Hose Monster be used on a rooftop standpipe test?

Yes. In fact, a rooftop standpipe test should not be conducted without a Hose Monster. A Hose Monster unit allows a rooftop flow test to be conducted any time of day because no water is dispersed over the side of the building. The Little Hose Monster with a 1¾" Pitotless Nozzle or the 2½" Hose Monster with an FM Nozzle Insert are often used. Either one is placed directly on the roof. The major difference between both options is that the Little Hose Monster and Pitotless Nozzle weigh only six pounds, whereas the Hose Monster weighs about 30 pounds.

How many hoses does NFPA require to be used?

NFPA does not specify the number of hoses required to perform a pump test. NFPA 20 Table 4.26 provides a required number of hose valves and the minimum hose valves size (typically 2½") for installation of pumps. However, the table does not require a specific number of hoses to be used during a flow test. Some AHJs misinterpret this as the number of hoses to be flowed in a pump test. It does not, and we've verified this with NFPA.

What is the maximum hose length allowable?

NFPA does not have a requirement for minimum or maximum hose length.

Does length of hose in a fire pump test affect the accuracy of the readings? What effect does friction loss have?

The accuracy of the readings is not affected by the hose length. The pump's net pressure (discharge minus suction) takes into account the extra work needed to pump water through longer hose. In certain job conditions, hose lengths greater than 50 feet may be required to discharge the water away from the building or landscaping. In these cases, friction loss may overcome the pump's ability to force enough water through the hoses. Additional hoses usually solve this problem. If the flow-rate per hose is low enough, a smaller nozzle size may be necessary.

What effect does flowing uphill or downhill with the Hose Monster have?

As long as you achieve your required flow (100%, 150%), the pump's net pressure (discharge minus suction) should not be affected. When flowing uphill, you might have to use either more hose lines or shorter hose due to the extra work the pump has to do.

My pressure reading from the Hose Monster is outside the range of the published flow chart. What is my flow-rate?

All of our flow-rate measuring devices are tested extensively at FM Approvals. Based on what we learn in those tests, a pressure and flow-rate range is chosen that is repeatable and accurate to within 2.5%. If a reading falls outside of the published range, it is not accurate to the tolerance we have established. The best solution is to switch to a smaller or larger nozzle size.

Fire Flow Testing

Why should I use a Hose Monster® over the hand-held pitot method?

A few reasons:

- The hand-held pitot requires perfect positioning where the pitot is half the orifice diameter away from discharge and the pitot tube is perpendicular to discharge. This is nearly impossible to hold by hand, which is why you will see a bouncing gauge needle and inaccurate readings.
- The hand-held pitot method requires you to guess the required coefficient depending on the shape of the hydrant nozzle. This is not always known.
- The hand-held pitot requires that the water is discharged out into the open. This method is a risk to safety and can also lead to property damage.
- The Little Hose Monster™ with the Pitotless Nozzle™ or the 2½" Hose Monster make it easy to take consistent and precise flow-rate measurements that are FM Approved for accuracy.

How much is the friction loss when I use a hose?

A hose causes friction loss, but it doesn't matter in a fire flow test. A fire flow test evaluates the water supply to determine what flow-rate will be available at 20 psi residual. A fire flow test requires three measurements: static pressure, residual pressure and test flow-rate. The reading from the gauge cap on the test hydrant gives you static and residual pressures. The Pitotless Nozzle or Hose Monster gives you the test flow-rate. The friction loss created in the hose results in lower test flow and, at the same time, greater residual pressure. This does not affect the predicted flow at 20 psi, as long as you're getting sufficient drop from static to residual. NFPA 291 recommends a drop of at least 25%, while AWWA M17 requires a minimum drop of 10 psi.

Previously we did hydrant fire flow tests using a hand-held pitot. Why are our discharge flows different?

The test flow-rate will be less, but the residual pressure will also be higher. This will not adversely affect the flow test when calculating water supply. Remember, the test flow-rate by itself doesn't mean much. You also need to take into account static and residual pressures. The discharge flow-rates are also influenced by whether you're flowing from the pumper port or the nozzle port of the hydrant, the length of hose and the flow test device.

Can we use the table found in NFPA 291 to determine the flow based on our reading of the gauge from the Hose Monster?

No. The table found in NFPA 291 is not the same as the Hose Monster flow chart. We provide appropriate flow charts with each Hose Monster or Pitotless Nozzle sold. Flow charts are also available on the Literature Rack of www.hosemonster.com. If you are taking hand-held pitot readings directly from a hydrant nozzle or pumper port, use NFPA Table 4.10.1 and apply the correct coefficient(s).

Do I take into account the hydrant coefficient when calculating flow-rate from the Hose Monster?

No. The flow-rate is measured correctly at the Pitotless Nozzle or the Hose Monster and not affected by the flow characteristics of the hydrant nozzle or pumper port.

Why should I use a Remote Reader?

Three good reasons. It enables you to take the pressure readings away from the flowing water, it keeps you dry, and it also encourages workers to remove and safely store the gauge after a flow test.

Is the Hose Monster or Pitotless Nozzle NFPA compliant? NFPA 291 outlines its procedure using a hand-held pitot.

NFPA 291 is a recommended practice but not a requirement. We are not aware of a standard that requires a hand-held pitot. NFPA does not yet require Approved/Listed devices for flow-rate measurement in either fire flow testing or fire pump testing. Standards tend to shy away from requiring a particular product to be used.

The Dechlor Demon™

Can the Dechlor Demon be used in fire flow testing and water main flushing operations?

Yes. That's what it is designed for.

What is the maximum and minimum flow-rate capacity of the Dechlor Demon?

The Dechlor Demon has the capacity to flow as much water as a Hose Monster — or more. The 2½" model has demonstrated that it can dechlorinate flow-rates as low as 100 GPM, which is the flow-rate to be expected from draining a chlorinated water tank.

Is it necessary to use the Hose Monster with the Dechlor Demon?

At least 5 feet of hose is necessary to use on the discharge side of the Dechlor Demon to ensure sufficient mixing of the dechlorinating agent with the chlorinated water. The Hose Monster or Little Hose Monster is necessary to cancel the thrust at the end of the hose.

What levels of chlorine can the Dechlor Demon dechlorinate?

It is designed to neutralize low concentrations of chlorine, such as those found in normal potable drinking water. It can also neutralize concentrations in super-chlorinated mains.

What chemicals can be used in the tank?

VC Mini Tabs and Vita-D-Chlor (both vitamin C) and Bio Neutralizer (sodium sulfite) are recommended. Other chemicals may be used, but check with us first.

Flow Test Terminology

Apparatus — A vehicle designed to assist in fighting fires. Also known as fire trucks, fire engines, water tenders and water tankers.

Authority Having Jurisdiction (AHJ) — An organization, office or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation or a procedure.

Bernoulli's Principle — States that a rise (fall) in pressure in a flowing fluid must always be accompanied by a decrease (increase) in the speed of the fluid. Also see Venturi Effect.

Chlorine — An oxidizer used to kill bacteria in drinking water and pools.

Coefficient — Coefficient of discharge or roughness coefficient. A number multiplied with a variable or an unknown quantity.

Conventional Flushing — The practice of opening one or more fire hydrants and allowing water to run until discharge water appears clean. This method does not guarantee removal of sediment or scouring of pipe. Unidirectional flushing is a more deliberate process used for a higher level of cleaning.

Dechlorination — Process of neutralizing the chlorine in discharge water. The standard for dechlorination is AWWA C655-09 Field Dechlorination.

Extrapolate — To infer or estimate by extending or projecting known information. With flow testing, the known information is static pressure and residual pressure at a known test flow-rate. The inference or estimation is flow-rate available at a specified residual pressure psi.

FM Approved — An approval by Factory Mutual, an internationally recognized testing facility that certifies fire-prevention products meet the highest standards.

Fire Flow Testing — A test performed to gather information needed to predict fire flow-rates at specific residual pressures. It measures the water supply at a given location.

Flow Device — Equipment used for measuring flow-rate in flow testing, main flushing or pump testing.

Flow Hydrant — In a fire flow test, the hydrant that flows water and measures the test flow-rate.

Flushing — The procedure of cleaning the inside of a water main by moving large amounts of water through a hydrant or fire pump.

Flushing Velocity — The speed at which water travels through a main while flushing.

Friction Loss — The resulting resistance as water moves along the inside wall of hose, mains, pipe or hose fittings. Friction loss increases exponentially as the flow-rate of water through the hose increases. Friction loss is also influenced by the diameter of hose, hose length and the inside jacket material.

Gauge Cap — A hydrant cap with a threaded opening for attaching a gauge and drain-cock at the end for relieving air pressure. The gauge cap measures static pressure and residual pressure during a fire flow test.

GPM — Gallons per minute. Describes the rate at which water flows.

Hazen-Williams Formula — Formula which relates the flow of water in a pipe with the physical properties of the pipe and the pressure drop caused by friction. It is used in the design of water pipe systems, such as fire sprinkler systems, water supply networks and irrigation systems. It is named after Allen Hazen and Gardner Stewart Williams.

Hydrant Nozzle — A hydrant nozzle is any of the openings to which the fire department would attach hose. The exterior thread connection is a specific thread spec, such as NH, NST or Storz.

Hydrant Capacity Test — A single-hydrant fire flow test procedure that evaluates the water supply available from the hydrant. In this test, the residual hydrant is the same as the flow hydrant.

Main — Refers to a water-distribution main, an underground piping network.

Main Capacity Test — A flow test involving two or more hydrants to evaluate the water supply available at the fire main at the point of the residual hydrant.

Main Flushing — The procedure of cleaning the inside of a water main by moving large amounts of water through a hydrant or fire pump.

NH — National Hose thread, the most common thread type found on fire hydrants, test headers and standpipes in the United States. (Also called NST — National Standard Thread.)

Nozzle Pressure — Internal pressure measured from the Pitotless Nozzle™.

Playpipe — A nozzle with 2½" inlet diameter x 30"-long pipe with a 1¾" or 1⅛" outlet. Commonly called Underwriter's Playpipe. It is UL® Listed for flow-rate measurement when used with the 1⅛" tip and a hand-held pitot. It is not known to be approved by any independent testing laboratory in the 1¾" size. A hand-held pitot and gauge are used to measure the velocity pressure.

Pitot — Regionally pronounced pee-toe or pit-tot. A pressure-measuring instrument used to measure fluid flow velocity. It is as an integral component of the 2½" Hose Monster®, with or without FM Nozzle Inserts. A hand-held pitot is also used with a pressure gauge to determine flow-rates through hydrant nozzles or other flow devices.

The pitot was invented by Italian-born French engineer Henri Pitot in the early 1700s and modified to its modern form in the mid-1800s by French scientist Henry Darcy. It is also used in aviation to determine air speed.

Flow Test Terminology (continued)

Pitot Formula — Theoretical discharge through circular orifices:

$$Q = 29.84 \times \sqrt{P} \times D^2 \times C$$

Where Q = flow-rate in GPM

P = pitot pressure in psi

D = orifice diameter in inches

C = coefficient of flow device

Pitot Pressure — The pressure measured at the pitot in a fire flow or fire pump test. Pitot pressure and velocity pressure can sometimes be used interchangeably.

Pitotless Nozzle™ — A specialty nozzle that is FM Approved for flow-rate measurements. No pitot is used. The pressure of the internal nozzle diameter is measured and corresponds to exact water flow-rates. Used in testing fire pumps and for hydrant flow testing.

Predicted Flow — The flow-rate predicted at a given residual pressure, usually 20 psi since most firefighters will bring the system pressure to this threshold when fighting a fire. A fire flow test measures static pressure, residual pressure and test flow-rate. These measurements are used to extrapolate predicted flow. The formula for determining predicted flow can be found in NFPA 291, 4.10.1.2, 2010:

$$Q_R = Q_F \times h_r^{0.54} / h_f^{0.54}$$

Q_R = flow predicted at desired residual pressure

Q_F = total flow measured during test

h_r = pressure drop to desired residual pressure

h_f = pressure drop measured during test

psi — Pounds per square inch. A unit of pressure.

Pumper Port — Also known as steamer port. It is the 4" or 4½" port on a hydrant.

Rated Capacity — In fire flow testing, it is the water supply available at a specified residual pressure (usually 20 psi). In fire pump testing, it describes the rated output of the fire pump in terms of a flow-rate such as GPM.

Residual Hydrant — Also known as Test Hydrant. In a fire flow test, this hydrant measures static and residual pressures. Test results apply to this hydrant.

Residual Pressure — The pressure residing in the water-distribution system when flowing in a fire flow test or any other actual flowing condition.

Rooftop Standpipe Testing — The procedure for testing the water supply of a standpipe at the roof level of a building.

Standpipe — Standpipe is a fire-protection system in high-rise buildings that provides water to fire hose stations.

Static Pressure — Water-distribution system pressure at zero test flow.

Steamer Port — Also known as the pumper port, the 4" or 4½" outlet of a hydrant.

Test Flow-Rate — The flow-rate of water that is discharged in a fire flow or fire pump test.

Test Hydrant — Also known as Residual Hydrant. In a fire flow test, this hydrant measures static and residual pressures. Test results apply to this hydrant.

Unidirectional Flushing — The procedure for moving water at high velocity one direction through a single segment of pipe. Closing specified valves in the water distribution system increases the velocity of water. When the pipe diameter and the discharge flow-rate are known, the flushing velocity can be determined.

UL® — Underwriters Laboratory, an internationally recognized testing laboratory.

Valve Exercising — The process of closing and opening a valve until it is determined to be mechanically sound.

Velocity Pressure — The pressure measured at the pitot or nozzle in a fire flow or fire pump test. Pitot pressure and velocity pressure can sometimes be used interchangeably.

Venturi Effect — The reduction in fluid pressure that results when a fluid flows through a constricted section of pipe. The effect holds true for the Pitotless Nozzle. As water flows through the Pitotless Nozzle, water speed increases and pressure decreases.

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