



SANITARY, FROST FREE, ACCESSIBLE HYDRANTS

by

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INTRODUCTION AND SCOPE

Hydrants are used by the public to access water at most Forest Service recreation site facilities. In recent years new sanitary regulations have been established regarding backflow prevention of hydrants and hose bibs. Hydrants located outdoors are susceptible to damage from freezing conditions. The passage of the Americans with Disabilities Act (ADA) was a call to action to provide universal access.

The project goal was to provide information to the field on the performance of commercially available sanitary, frost free, accessible hydrants. This information has been developed for use by the field during procurement, selection, installation, and field testing of hydrants and backflow prevention devices. Consequently, there is a potential for considerable cost savings.

The objective of this project was to interact with manufacturers to develop a new hydrant or modify an existing hydrant to be accessible, sanitary and frost free. No hydrants were available commercially that met all criteria.

BACKGROUND

Conditions could exist at Forest Service recreation site facilities, where contaminated water may inadvertently be introduced to the water supply. If a garden hose connected to a hose bib or hydrant is used to clean lavatories or toilets, contaminated water could back flow into the hose. In addition, backflow can occur when the supply line pressure drops below the head water pressure in the hose. This pressure drop can occur if the water pressure in the supply line drops due to increased usage or if the end of the hose is elevated higher than the supply line. With the change in elevation, there is a corresponding change in head pressure and at a certain height, the water will backflow, especially when the supply side is shut off.

This method of cleaning lavatories and toilets is a common practice in Forest Service recreation site facilities.

DESIGN CRITERIA

The following design criteria were developed by San Dimas Technology and Development Center (SDTDC) for frost free, sanitary, accessible hydrants for use in Forest Service recreation site facilities:

- Controls activated with a maximum 5 pound force (22 N)
- Backflow prevention mechanism
- Frost free
- Self closing
- Designed to allow field testing to determine if the back flow prevention device is functional
- Hydrant functional at a supply line pressure as low as 20 psig (138 kPag)

CURRENT TECHNOLOGY

A commercial marketplace search was conducted based on the design criteria developed. There was no commercially available hydrant that met all design criteria. Hydrant manufacturers were encouraged to develop a prototype based on design criteria. Woodford Manufacturing Company and Murdock Company developed prototypes with a maximum 5 pound force (22 N) to activate controls, backflow prevention, frost free and self closing. These prototypes were also designed to allow field testing to determine if the backflow prevention device was operational.

PRODUCT TESTING

Testing was conducted by SDTDC on both prototypes. All testing was conducted with the water supply line pressure at 20 psig (138 kPag) and at increments of 10 psig (69 kPag) up to 60 psig (414 kPag). Both models performed well in the indicated pressure range and met all design criteria. These two hydrants are the Murdock, Inc. Model Number BFH-M92-FS and Woodford Manufacturing Company Model Number S4H.



The Murdock BFH-M92-FS, shown in figure 1, is a standpipe type frost free hydrant with a device containing an underground drain with a double check valve. When the hydrant handle is released, this drain automatically empties the water in the barrel to the underground surrounding soil. This hydrant is manufacturer rated for an operating pressure range of 20 to 45 psig (138 to 311 kPag). If the supply water pressure exceeds 45 psig (311 kPag), a pressure reducing valve must be installed in the supply line. The Murdock hydrant is painted green.

The vented double ball check valve is mounted below the frost line and is field testable. It should be replaced as needed by evacuating to below the frost line. Installation, maintenance and field testing instructions are contained in appendix A.

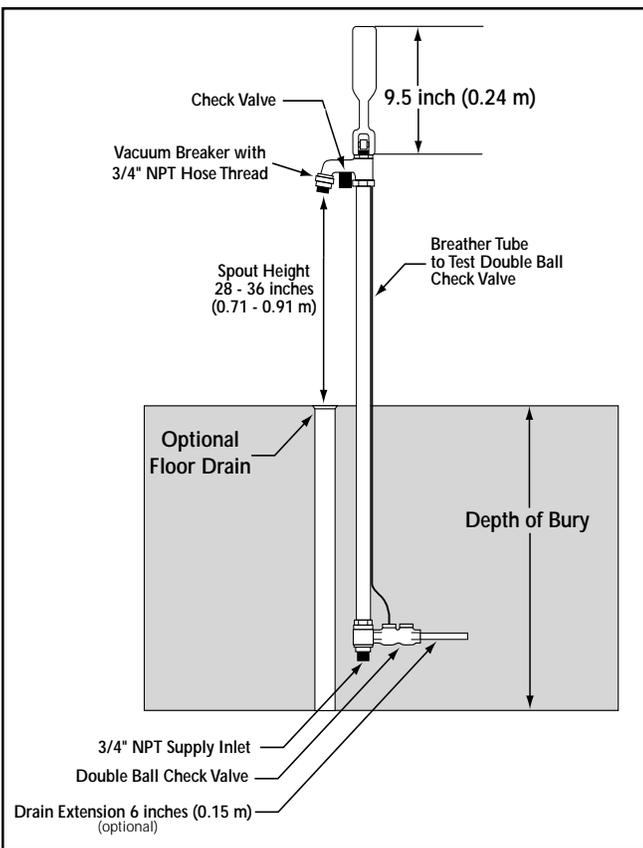


Figure 1—Murdock model BFH-M92-FS frost free, sanitary, accessible hydrant configuration.

The Woodford Model S4H, shown in figure 2, is a reservoir type frost free hydrant with an internal reservoir. The water in the barrel empties into an internal reservoir built in the hydrant, located below the frost line. When the handle is activated, the water in the internal reservoir drains out via a flow diverter. This diverter provides a path for water flow, when the hydrant is first turned on, evacuating the reservoir. Backflow prevention is provided by a double check valve backflow prevention device,

Woodford model 37HD. This double check valve device is field testable. It should be replaced as needed and does not require excavation to replace.

This hydrant is manufacturer rated for an operating pressure range of 20 to 100 psig (138 to 690 kPag). If the supply water pressure exceeds 100 psig (690 kPag), install a pressure reducing valve in the supply line. The Woodford S4H hydrant is painted brown.

The hydrant must be operated at full flow, through the diverter for a minimum of 30 seconds before and after each use, to drain the hydrant and prevent freezing. The hydrant is completely sealed to prevent ground and surface water from entering the reservoir or service line. If the Woodford model S4H hydrant requires repair, the entire working portion of the hydrant can be removed from the reservoir without excavation. Installation, maintenance, and field testing instructions are contained in appendix B.

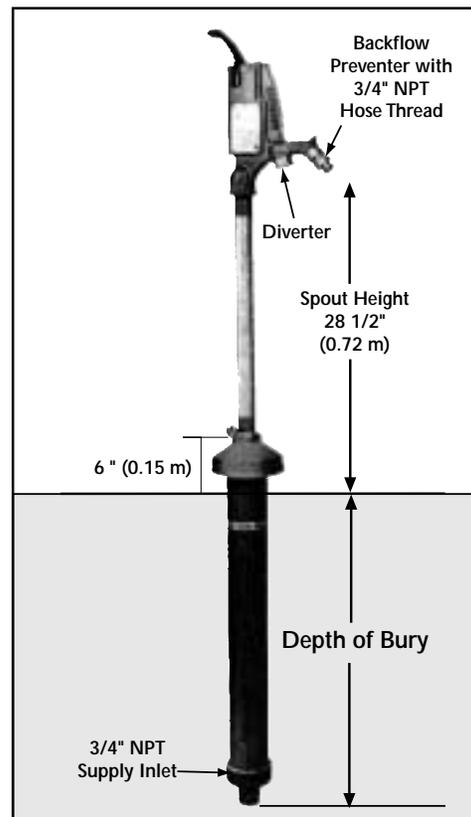


Figure 2—Woodford model S4H frost free, sanitary, accessible hydrant configuration.

BACK FLOW PREVENTION DEVICE

Both frost free, sanitary, accessible hydrants included a backflow prevention device, also suitable for use on hose bibs. Under current backflow prevention regulations, the water purveyor has primary responsibility to prevent water from unproved sources, such as toilets or other fixtures, from entering the public water supply.

In addition, the water purveyor is prohibited from installing or maintaining a water service connection where a health or pollution hazard exists, or may exist, unless the potable water system is protected against backflow by the use of an approved backflow prevention device installed at the point of delivery.

An approved backflow prevention device meets the performance and construction standards of American Society of Sanitary Engineering (ASSE) Standard 1052, "Hose Connection Backflow Prevention." In addition, ASSE 1052 requires that a double check valve backflow prevention device be installed to allow testing 'in place' to ensure proper function. There are only a few double check valve backflow devices commercially available that are suitable for use on hydrants or hose bibs that meet ASSE 1052.

At Forest Service recreation sites where the public has access to a water hydrant or a hose bib, all water hydrants and hose bibs require either a backflow prevention device, or a means to ensure that a garden hose or other backflow hazard cannot be connected. This can be achieved by outfitting all hydrants and hose bibs with double check valve backflow prevention devices approved in accordance with ASSE 1052. Woodford Manufacturing Company has also designed an add on type backflow preventer, Woodford Model 37HD1 to be added to existing hydrants requiring backflow prevention. See figure 3.

SDTDC tested the Woodford Model 37HD and the add on 37HD1 double check valve backflow prevention devices. These are approved backflow prevention devices in accordance with ASSE 1052, see figure 3 and appendix C. The current list price is \$33. All future hydrant and hose bib procurements should include a backflow prevention device as an integral part of the hydrant or hose bib.

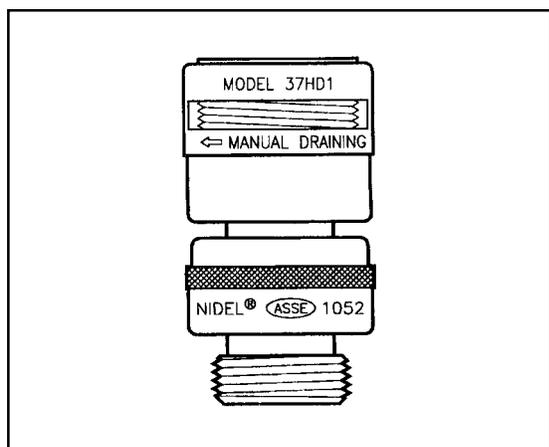


Figure 3—Woodford Model 37HD1 backflow prevention device.

In addition, hose bibs and faucets that are accessible to people with limited strength and/or dexterity of the hands are described in the Forest Service publication, *Update-Faucets for Recreation Sites*, 9123 2302-MTDC, March 1991.

HYDRANT INSTALLATION

Design guidelines for installation of accessible hydrants are described in the publication "A Design Guide, Universal Access to Outdoor Recreation", PLAE, Inc., Berkeley, CA, 1993. Copies of the Design Guide are available from PLAE at the address listed on the following page. Follow the manufacturer instructions for installation.

These guidelines are for all hydrants installed, including new construction and replacements through retrofit. In addition, specific manufacturer installation instructions are contained in appendices A and B.

- a. Spout Height. The spout shall be positioned at a minimum of 28 inches (0.71 m) and a maximum of 36 inches (0.91 m) above the ground.
- b. Spout Location. Hydrant spout shall be located at the front of the hydrant.
- c. Hydrant Controls. Hydrant controls and operating mechanisms shall be front mounted, or side mounted near the front. The height of the control mechanism shall not exceed 40 inches (1.02 m) above the ground. Design criteria includes being able to activate the controls with one hand, without tight pinching, grasping or twisting of the wrist. In addition, the maximum force required to activate the controls shall be 5 pounds force (22 N).
- d. Spout Pad. The pad must be a minimum 60 inches (1.5 m) by 60 inches (1.5 m) with a stable, firm, slip resistant surface with a maximum slope of three percent. Design the slope to drain water away from the user. See Figure 4. If gratings are provided, the grating space on one side shall be not greater than one-half inch (12.7 mm). If grating is elongated, the longest side shall be placed perpendicular to the dominant direction of travel as shown in figure 5.

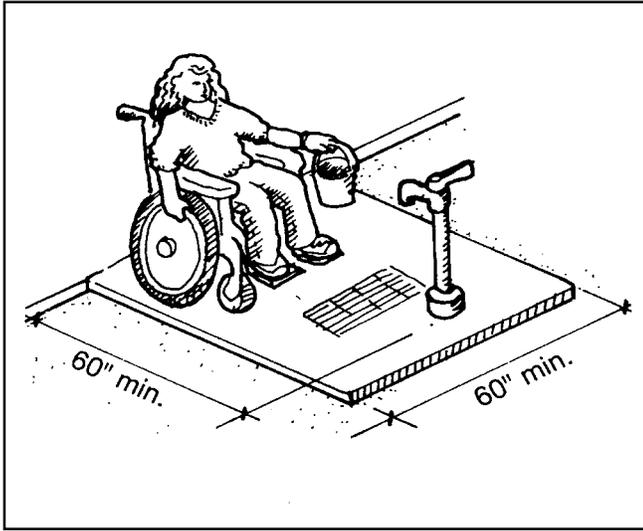


Figure 4—Spout pad configuration for accessibility.

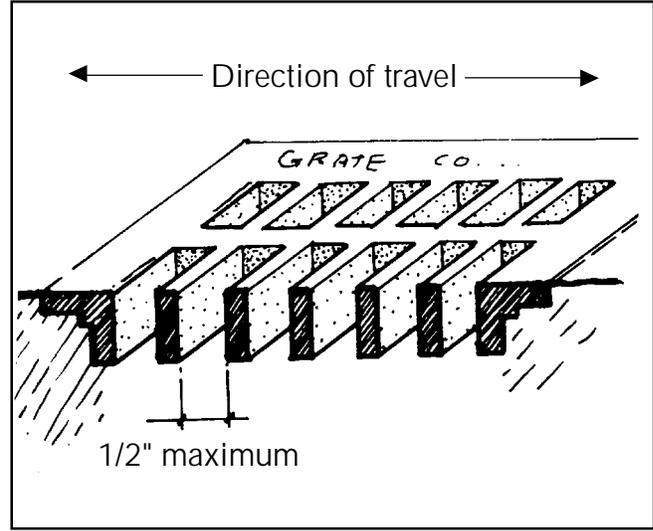


Figure 5—Grating configuration for accessibility.

It is recommended in all hydrant installations that a shutoff valve be installed ahead of the hydrant to facilitate maintenance.

If a hydrant is installed with a catch basin, turn over the gravel with a shovel at intervals in order to decrease the possibility of obstructing the outlet underground backflow prevention device from the accumulation of silt, soap or pan grease. Address drainage problems as they occur and if persistent ponding of water occurs, replace the gravel in the catch basin.

At installation of a Murdock hydrant, position the outlet of the underground backflow prevention device away from the user. In addition, an extended piece of brass pipe may be added to the outlet in order to further distance the outlet from the user, reducing the potential accumulation of silt, soap and pan grease. See figure 1. Cleaning of hydrants is described in the Forest Service publication, *Cleaning Recreation Sites*, 9523 1206-SDTDC, December 1995.

HYDRANT COST BY BURY DEPTH

The cost of hydrants by bury depth is as indicated in Table 1. These prices may not reflect Government discounts or a discount for large quantity orders. These are manufacturer's suggested list prices for 1999 and are subject to change without notice. Contact the manufacturer for addition performance features and replacement parts.

Table 1—Hydrant cost by bury depth.

Manufacturer	Cost by Bury Depth by foot (meter)						
	1 foot (0.30 m)	2 foot (0.61m)	3 foot (0.91m)	4 foot (1.2 m)	5 foot (1.5 m)	6 foot (1.8 m)	7 foot (2.1m)
Murdock Model BFH-M92-FS	\$247	\$247	\$270	\$292	\$315	\$337	\$359
Woodford Model S4H	\$550	\$565	\$580	\$595	\$610	\$625	\$640

MANUFACTURER INFORMATION

For further information regarding the products discussed in the *Tech Tip* contact the manufacturers at the addresses listed below.

Murdock, Inc.
2488 River Road
Cincinnati, OH 45204
513-471-7700

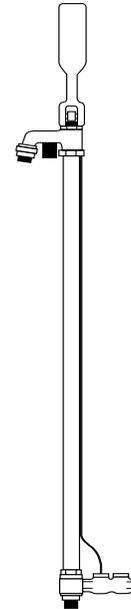
PLAE, Inc./MIG Communications
1802 Fifth Street
Berkeley, CA 94710
510-845-7549

Woodford Manufacturing Company
Attn: Sales Department
2121 Waynoka Road
Colorado Springs, CO 80915
719-574-1101

For additional technical information regarding these evaluations contact Lois Sicking, Project Leader, at 909-599-1267 x294, IBM address lsicking/wo.sdt dc or Internet email address at lsicking/wo_sdt dc@fs.fed.us

Model BFHM-92-FS Antifreezing, Paddle Handle, Post Hydrant With Attached Backflow Preventer, Self-draining

Model BFHM-92-FS delivers year-round service outside or in unheated buildings. The control valve is located below the frost line. A nozzle vacuum breaker prevents water contamination due to backflow. The supply column is evacuated through a double-ball check valve located at the bottom connection, vented by a check valve mounted in the nozzle. This unit incorporates a self-closing valve.



Suggested Specification

Hydrant shall be Murdock model BFHM-92-FS. Unit shall be capable of year-round use in freezing or inclement weather.

Hydrant should stand 28 to 36 inches high from grade level to the spout outlet. Unit shall extend below grade level so that supply inlet is positioned below frost line. Vented double-ball check valve shall be mounted below

frost line to evacuate water from inner supply column when valve is shut off. Check valve shall be mounted in nozzle to aid evacuation of supply column. To prevent supply contamination, vacuum breaker shall be permanently mounted to nozzle and threaded for 3/4-inch hose connection.

Nozzle and inner supply assembly shall incorporate solid-brass castings.

Supply line and control rod shall be mill-finish, galvanized steel pipe.



**Phone (513) 471-7700
Fax (513) 471-3299
jmurdock@ixnetcom.com
2400 River Road
Cincinnati, Ohio 45204**

APPENDIX A. MURDOCK MODEL BFHM-92-FS HYDRANT (continued)

Suggested Installation

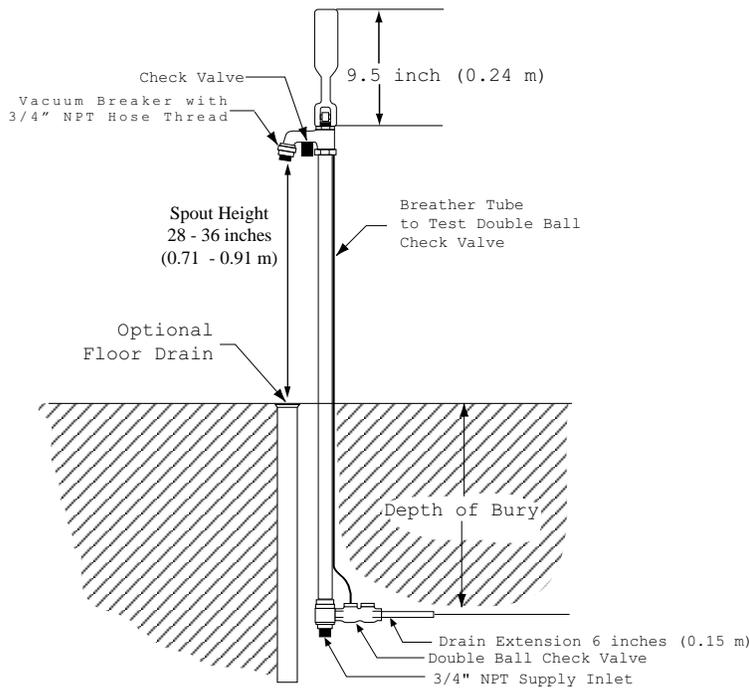
Prepare trench for water-supply line. Below hydrant location, prepare hole to trench depth and large enough for a person to work.

Lay water-supply line into trench. Depending on design and code requirements lay in drain line also. Install hydrant fully assembled as shipped.

Position hydrant at desired location and secure in a level position with support members, such as boards.

Purge water line. Connect water supply line, adding fittings as necessary. Supply water pressure shall not exceed 45 psi. If necessary, install pressure-reducing valve in supply line. Wrap double-ball check valve with filter fabric to prevent infiltration of debris, and place a minimum of three cubic feet of large broken rock around bottom of connection.

Back fill trench and hole. Compact back-filled earth. Remove bracing boards. If concrete slab is desired, prepare hole surrounding hydrant to accommodate concrete slab. Spread and compact gravel as necessary. Pour concrete to grade level and finish as necessary. You may wish to install an optional floor drain.



FIELD TEST INSTRUCTIONS FOR DOUBLE BALL CHECK VALVE

With the hydrant installed as recommended, move the lever handle to the on position. Water should flow from the nozzle. When the handle is released, the water flow should cease. If water exits from the breather tube, attached to the double ball check valve, then the valve is not functioning properly and the hydrant will not drain. In cold weather the hydrant will freeze. Remove the hydrant and check for damage to the valve or debris in the valve that is preventing the hydrant from draining.



Phone (513) 471-7700
 Fax (513) 471-3299
 jmurdock@ixnetcom.com
 2400 River Road
 Cincinnati, Ohio 45204

APPENDIX B. WOODFORD MODEL S4H HYDRANT

 **ADA Compliant**

The Model S4H is an automatic draining, pollution proof, frost proof Yard Hydrant, with ASSE 1052 double check backflow preventer. This hydrant is designed for use in public areas such as campgrounds and parks or any location where potable water is required.

Unlike conventional hydrants which drain the water into the ground, the Model S4H employs a reservoir below frost line to contain the water. The hydrant is completely sealed to prevent surface and ground water from entering reservoir or service line. The valve, with its unique venturi design, removes the stored water along with the water being used.

The Model S4H is equipped with a diverter spout, which allows the hydrant to be operated independently from the backflow preventer. When the hydrant is to be used with a hose, the diverter sleeve is pulled down during flow and water is automatically diverted to the backflow preventer hose connection. The diverter will work with or without a hose attached to the backflow preventer and will release automatically the hydrant any time it is shut off.

An important feature of the S4H is easy maintenance. The entire working portion of the hydrant can be removed from the reservoir without any excavation.

SPECIFICATIONS:

HOSE CONNECTION BACKFLOW PREVENTER

- NIDEL® Model 37HF
- ASSE 1052 Approved
- Field Testable (see instruction sheet)
- Two Check Valves

ADA COMPLIANT - Meets ADA requirements for height and 5 lbs. Max operating force.

PATENT - U.S. Patent number 5246028 (Additional Patents Pending)

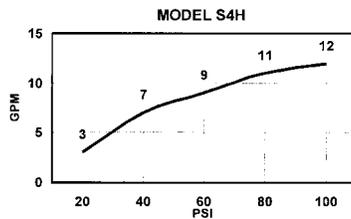
INLET - 1" female pipe thread

FINISH - Painted Forest Service brown.

MIN PRESSURE - 20 psi

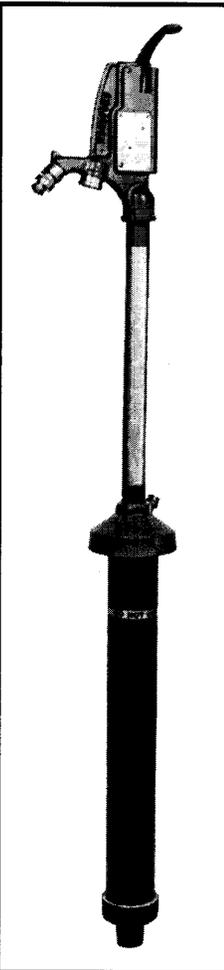
MAX PRESSURE - 100 psi

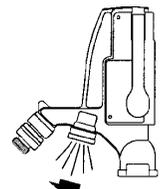
MAX TEMPERATURE - 120° F



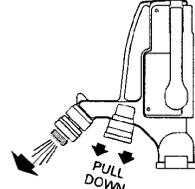
WOODFORD

Polution Proof
Automatic Draining
Backflow Protected
Freezeless Yard Hydrant
Model S4H

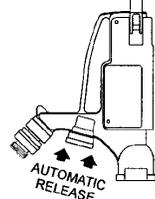




When the hydrant is opened to an ON position, water will flow through the diverter spout.



By pulling down on the diverter sleeve during flow, water will be diverted through the backflow preventer, and allow use with a hose.



When the hydrant is closed to an OFF position, the diverter will automatically release, allowing the hydrant to drain into the reservoir. The hydrant will drain even if a pressurized or non pressurized hose is attached.

WARNING
FOR WINTER USE: The hydrant must be operated at full flow, through the diverter, for a minimum of 30 seconds before and after each use to drain the hydrant and prevent freezing.

When ordering, specify bury depth.

WOODFORD MFG. CO. 08 99 VALVES 15P

WOODFORD MFG. CO. 08 99 VALVES 15P

APPENDIX B. WOODFORD MODEL S4H HYDRANT (continued)

INSTALLATION, MAINTENANCE AND TROUBLE SHOOTING OF THE WOODFORD MODEL S4H HYDRANT

INSTALLATION

The S4H is designed to be 28 1/2" from grade to the hose connection outlet. The reservoir of the S4H extends below bury depth (frostline). The supply line should be installed deeper than normal bury depth (see overall bury depth schedule).

For convenient maintenance, a shut-off valve ahead of each hydrant is recommended.

WARNING: FLUSH SUPPLY LINE BEFORE CONNECTING HYDRANT.

With the hydrant completely assembled, make the connection to the supply line, tightening with a pipe wrench on the inlet casting (#31).

The bottom of the casing cover (#21) must be 4 1/2" above grade to allow easy access to remove the three nuts.

MAINTENANCE

To remove hydrant from reservoir:

1. Turn off water supply.
2. Remove the three nuts located under the casing cover (#21).
3. Pull hydrant straight up and remove from the reservoir.

To reinstall:

1. Clean and inspect the two venturi O-rings (#38). Replace O-rings if damaged. Lubricate with silicone grease or other non-toxic lubricant that is safe for rubber.
2. Clean cup gasket (#22). Replace if damaged.
3. Insert hydrant in the reservoir. Align the studs with the holes in the flange. Replace and tighten the nuts.
4. Turn on water supply and check for leaks.

TROUBLE SHOOTING

1. WATER LEAKS FROM UNDERNEATH CASING COVER WHILE HYDRANT IS ON.

Tighten nuts (#24) under casing cover (#21). If leak persists, remove hydrant from reservoir and inspect cup gasket (#22) for cracks or damage. Remove cup gasket and measure from top of reservoir flange (#23) to top of reservoir (#28). Dimension should be 1/2". If necessary, adjust flange by threading flange on reservoir. Reinstall hydrant.

2. WATER LEAKS FROM DIVERTER, OR FILLS RESERVOIR, WHILE HYDRANT IS OFF.

Check linkage adjustment. With the head cover off, lift handle and check if the linkage (#10) has a small amount of play and is not binding. Adjust lock nut (#13) and swivel nut (#12) down to increase play. If hydrant continues to leak, valve plug (#34) may be fouled or damaged. Remove hydrant from the reservoir. Hold or lock the handle down in an open position. Remove snap ring (#37), screen (#36) and valve plug guide (#35). Unthread valve plug (#34) with screwdriver. Check for damage or obstruction. Check venturi O-rings (#38) for damage. Reinstall parts and hydrant.

CAUTION

A compressed spring can be dangerous. Be careful not to get fingers caught in linkage parts if spring were to suddenly expand.

FOR WINTER USE: The hydrant must be operated at full flow, through the diverter, for a minimum of 30 seconds before and after each use to drain the hydrant and prevent freezing.

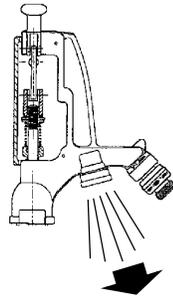
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APPENDIX B. WOODFORD MODEL S4H HYDRANT (continued)

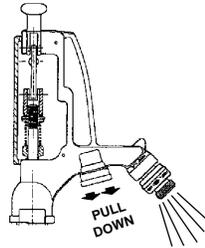
WOODFORD



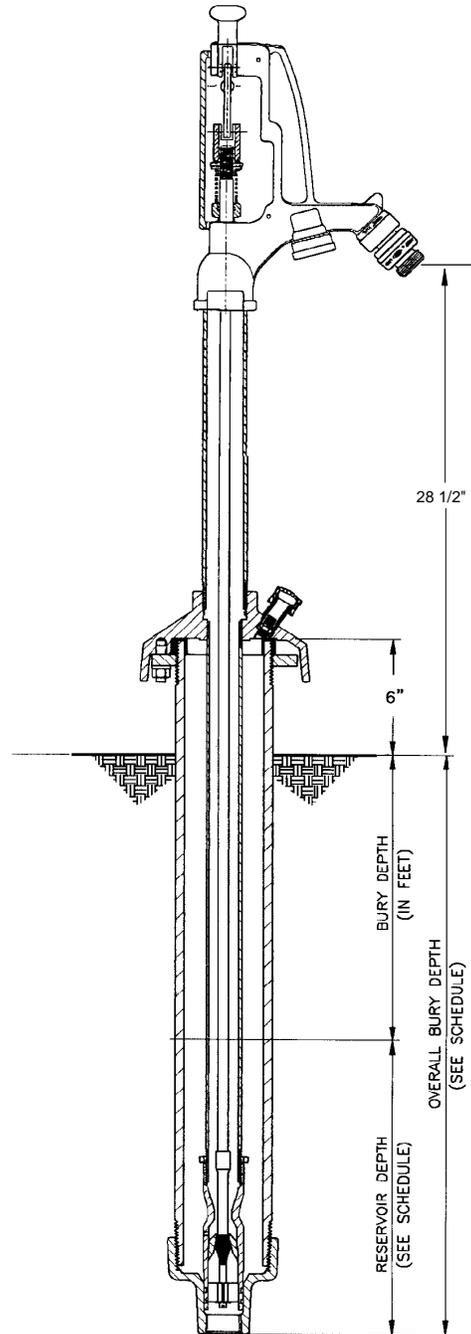
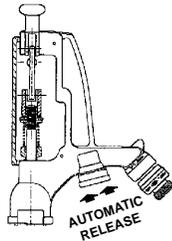
When the hydrant is opened to an ON position, water will flow through the diverter spout.



By pulling down on the diverter sleeve during flow, water will be diverted through the backflow preventer, and allow use with a hose.



When the hydrant is closed to an OFF position, the diverter will automatically release, allowing the hydrant to drain into the reservoir. The hydrant will drain even if a pressurized or non pressurized hose is attached.



Bury Depth - (feet)	1'	2'	3'	4'	5'	6'	7'
Reservoir Depth	12"	13 5/8"	15 3/8"	17"	18 7/8"	20 1/2"	22 1/4"
Overall Bury Depth	24"	37 5/8"	51 3/8"	65"	78 7/8"	92 1/2"	106 1/4"
Weight - (pounds)	36	40	45	48	54	58	62

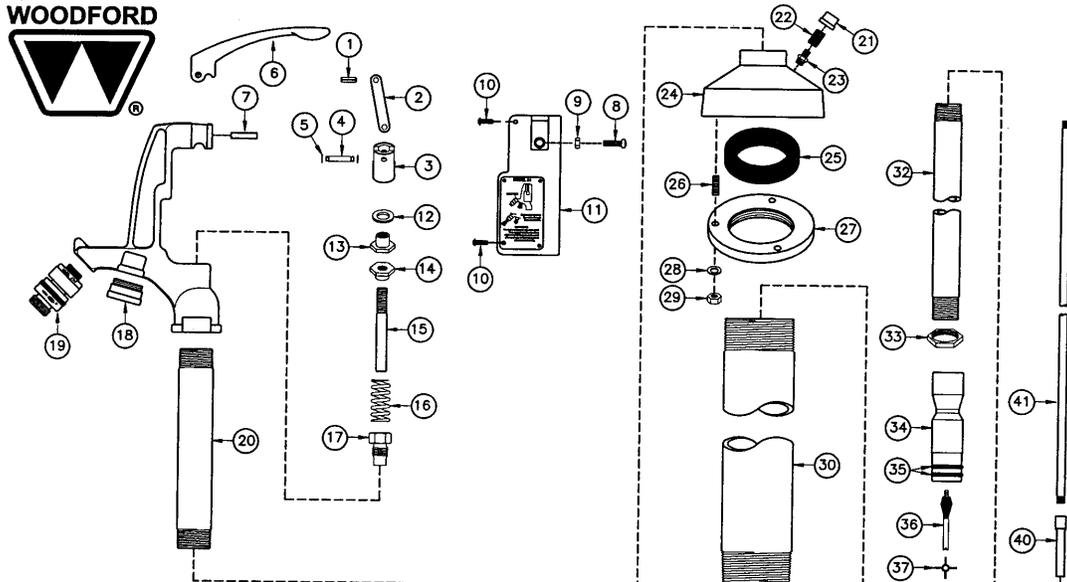
For more information write to...

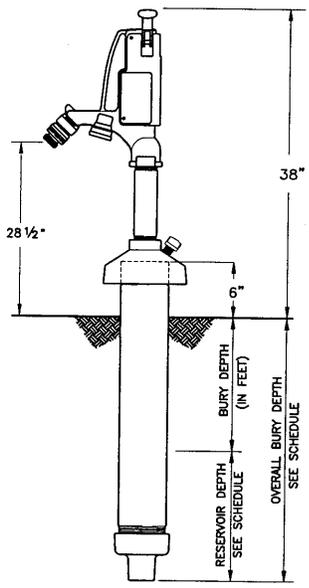
WOODFORD MANUFACTURING COMPANY

Sales Office:
2121 Waynoka Road • Colorado Springs, Colorado 80915

Phone:
(719) 574-1101 Fax: (719) 574-7621

APPENDIX B. WOODFORD MODEL S4H HYDRANT (continued)





MODEL S4H PARTS LIST

ITEM	PART #	DESCRIPTION
	15137	Operating Link Assembly (Includes Items 1-5)
1	10320	Roll Pin
2	10375	Clevis Link
3	10376	Clevis
4	10377	Clevis Pin
5	10319	E-Ring (2)
6	10553	Handle
7	10492	Handle Pin
8	10328	Stop Screw
9	10329	Jam Nut
10	10336	Head Cover Screws (4)
11	15231	Head Cover
12	10307	Washer
13	10308	Swivel Nut
14	10494	Lock Nut
15	10465	Operating Rod Extension
16	10489	Spring
17	15217	Packing Nut Assembly (Includes O-Ring-10464)
18	15220	Diverter Assembly
19	55053	37HF Backflow Preventer
20	10496	Upper Pipe
21	10555	Vent Cap
22	10556	3/8" Pipe Nipple
23	15136	Sniffer Valve
24	10554	Casing Cover
25	10491	Cup Gasket
26	10534	Threaded Stud (3)
27	10483	Reservoir Flange
28	10332	Flat Washer (3)
29	10331	Hex Nut (3)
30		RESERVOIR PIPE
		(Bury Depth & Length)
10511		1' Bury (27 7/16" Long)
10512		2' Bury (41 1/16" Long)
10513		3' Bury (54 15/16" Long)
10514		4' Bury (68 7/16" Long)
10515		5' Bury (82 5/16" Long)
10516		6' Bury (95 15/16" Long)
10517		7' Bury (109 11/16" Long)

ITEM	PART #	DESCRIPTION
31	10482	Inlet Casting
32		LOWER PIPE
		(Bury Depth & Length)
10501		1' Bury (25 1/8" Long)
10502		2' Bury (38 3/4" Long)
10503		3' Bury (52 1/2" Long)
10504		4' Bury (66 1/8" Long)
10505		5' Bury (80" Long)
10506		6' Bury (93 5/8" Long)
10507		7' Bury (107 3/8" Long)
33	10334	1" Lock Nut
34	15233	Venturi Assembly
35	10321	Venturi O-Rings (2)
36	15134	Valve Plug
37	10332	Valve Plug Guide
38	10469	Inlet Screen
39	10323	Snap Ring #3000
40	10497	Coupling
41		OPERATING PIPE
		(Bury Depth & Length)
10521		1' Bury (46 1/2" Long)
10522		2' Bury (59 7/8" Long)
10523		3' Bury (73 5/8" Long)
10524		4' Bury (87 1/2" Long)
10525		5' Bury (101 1/8" Long)
10526		6' Bury (114 3/4" Long)
10527		7' Bury (128 1/2" Long)

Bury Depth	1'	2'	3'	4"	5"	6"	7"
Reservoir Depth	10 1/2"	11 7/8"	13 1/4"	14 5/8"	16"	17 3/8"	18 3/4"
Overall Bury Depth	22 1/2"	35 7/8"	49 1/4"	62 5/8"	76"	89 3/8"	102 3/4"
Weight (lbs)	36	40	45	49	54	58	62

* Must ship by truck line due to length.

For more information contact...

WOODFORD MANUFACTURING COMPANY

2121 Waynoka Road, Colorado Springs, Colorado 80915 • Phone: (719) 574-1101 • Fax: (719) 574-7621
To view our complete product line visit: www.woodfordmfa.com

APPENDIX C. WOODFORD MODEL 37HD1 AND 37HD2 DOUBLE CHECK VALVE BACKFLOW PREVENTION DEVICE

WOODFORD MFG. CO. 01 97 VALVES 15p

Nidel® Model 37HD1/37HD2 hose connection backflow preventer is designed to protect hose connections from backflow contamination for freezing and non-freezing conditions. Manual draining is required and provides easy, sure drainage during freezing weather. Uses include outside hose bibbs, wash racks, dairy barns and swimming pool areas.

Nidel® Hose Connection Backflow Preventer No Sprayback Model 37HD1 Model 37HD2



ASSE 1052 FIELD TESTABLE BACKFLOW PREVENTER

SPECIFICATIONS:

HOSE CONNECTION BACKFLOW PREVENTER -

- Nidel® Model 37HD1/37HD2 w/ 3/4" male hose thread.
- ASSE 1052 approved.
- IAPMO Listed.
- Field Testable. (see instruction sheet)
- Two check valves
- Non removable
- No splashback when shut off with pressurized hose.

EXTERIOR FINISH • Brass. Optional chrome plated

CONSTRUCTION • Brass and stainless steel

CHECK VALVES • Molded rubber diaphragms

NON-REMOVABLE • Bushing attached with LOCTITE®

THEFT RESISTANT • Stainless steel stop collar and stop screw. (Model 37HD2)

INLET • 3/4 inch female hose thread

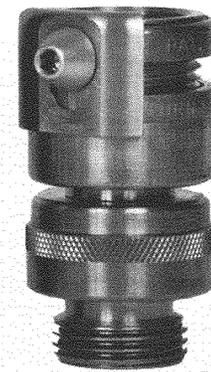
MAX PRESSURE • 125 psi

MAX TEMP. • 180° F

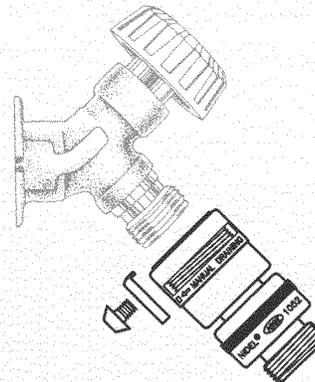
PATENTS • This product may be manufactured under one or more of the following patents:
U.S. Patents: 3,414,001; 4,178,956; 4,316,481; 4,532,954; D216,790; D216,791; D277,365; D277,366.
Canada Patents: 852,529; 865,995; 1,146,438. Other Patents Pending.



37HD1



37HD2
w/theft resistant collar



Typical application for
Hose Connection Backflow Preventer

COMPLETE* ASSEMBLY	REPAIR** ASSEMBLY	FINISH
37HD1-BR	55040	BRASS
37HD1-CH	55041	CHROME
37HD2-BR	55042	BRASS
37HD2-CH	55043	CHROME
REPAIR PARTS**		
32087	COLLAR	STAINLESS STL.
32088	SCREW	STAINLESS STL.

*USE STANDARD V/B DISCOUNT

**USE STANDARD PART DISCOUNT

WOODFORD MANUFACTURING COMPANY
2121 Waynoka Road • Colorado Springs, Colorado 80915
Phone (719) 574-1101 Fax (719) 574-7621

When ordering, specify model and finish.

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APPENDIX C. WOODFORD MODEL 37HD AND 37HD1DOUBLE CHECK VALVE BACKFLOW PREVENTION DEVICE (continued)

INSTALLATION INSTRUCTIONS

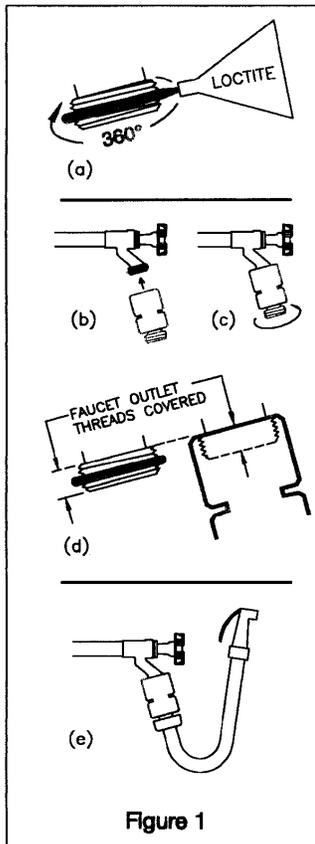
PURPOSE - To properly install the Model 37HD1/37HD2 Backflow Preventer onto a standard hose threaded outlet, carefully adhere to the instructions below.

PROCEDURE

- 1) The bushing is factory assembled and preset and should not be further modified, adjusted or removed.
- 2) Before attaching the Backflow Preventer, clean the faucet hose threads to remove any dirt, grease, loose paint or loose corrosion.
- 3) Open the tube of LOCTITE® RC/680 adhesive by snapping at the neck. Use the tube to apply a bead of adhesive 360° around the faucet hose thread near the middle of the thread. See Figure 1a.
- 4) Screw the Backflow Preventer assembly clockwise onto the hose threaded outlet only until the faucet outlet threads are just covered, and no further. See Figure 1b, 1c & 1d.
- 5) Wipe off any excess LOCTITE® RC/680 adhesive. It is important that the Backflow Preventer is not disturbed and that water is not turned on for at least 15 minutes. This will allow the LOCTITE® adhesive to properly cure between the bushing and the faucet hose thread.

CRITERIA

After 15 minutes, attach a hose and nozzle to the Backflow Preventer outlet. See Figure 1e. Turn on the water and check for leaks. No leak indicates a proper installation.



OPERATING INSTRUCTIONS

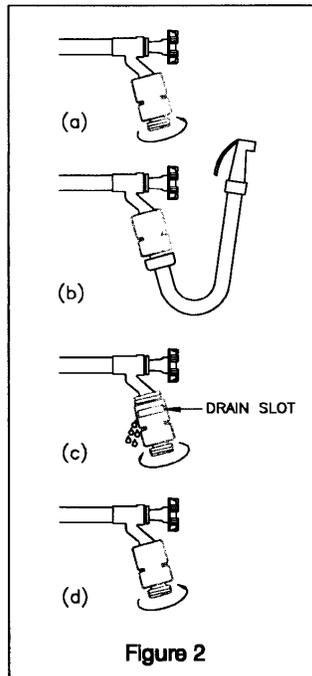
PURPOSE - For proper operation of the Model 37HD1/37HD2 Backflow Preventer as installed on a hose threaded outlet, carefully adhere to the instructions below.

PROCEDURE

- 1) During normal usage the Backflow Preventer must be turned clockwise hand tight to a seated position. See Figure 2a.
- 2) The faucet with the Backflow Preventer installed, may be operated with or without a hose attached. See Figure 2b.
- 3) When the Backflow Preventer is installed on a frost-proof faucet and freezing temperatures occur, shut off the water and turn the Backflow Preventer counter-clockwise until it starts draining, approximately 3 turns. Water will drain out of the faucet through the drain slots provided in the Backflow Preventer. See Figure 2c.
- 4) After the frost proof faucet has stopped draining, turn the Backflow Preventer clockwise hand tight back to a seated position. See Figure 2d. The faucet is now protected from freeze damage.

CRITERIA

The Model 37HD1/37HD2 Backflow Preventer must be tightly seated on all faucets in order to function properly. When freezing temperatures occur, manual draining of frost-proof faucets must be done to prevent freezing of the faucet and possible damage. This manual draining is achieved by turning the Backflow Preventer as described above.



FIELD TEST INSTRUCTIONS

PURPOSE - The instructions below are intended to encourage preventative maintenance by the end user of the Model 37HD1/37HD2 Backflow Preventer. These procedures shall verify the integrity of the outlet check valve.

PROCEDURE

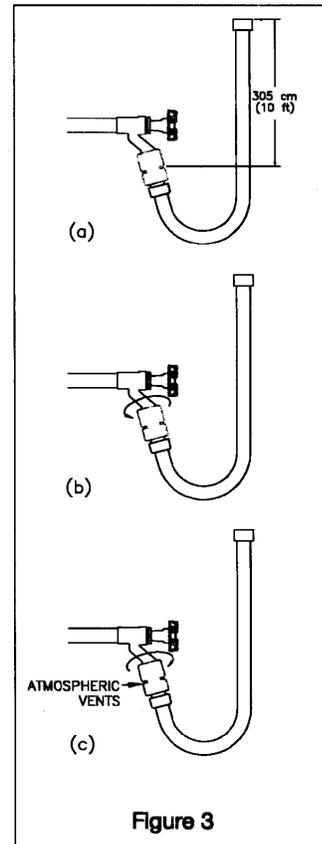
- 1) With the device installed in accordance to the manufacturer's instructions, attach a hose to the outlet of the Backflow Preventer as shown in Figure 3a. Raise the hose to a height of 305 cm (10 feet). Turn on the faucet and let water run to purge the hose of air. Turn off the faucet.
- 2) Turn the Backflow Preventer counter-clockwise 2 turns as shown in Figure 3b, while watching the atmospheric vents for leakage.*
- 3) Turn the Backflow Preventer clockwise back to a seated position as shown in Figure 3c.
- 4) Maintain the hose at a height of 305 cm (10 feet) for five minutes while watching the atmospheric vents for leakage.**

CRITERIA

* A small leakage at the atmospheric vents that does not exceed approximately 8 seconds duration is normal and indicates proper operation.

** Continuous leakage at the atmospheric vents that exceeds approximately 8 seconds indicates that the outlet check valve is faulty.

For continuous protection the Backflow Preventer shall be replaced if faulty.



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