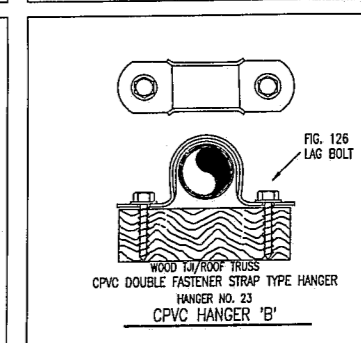
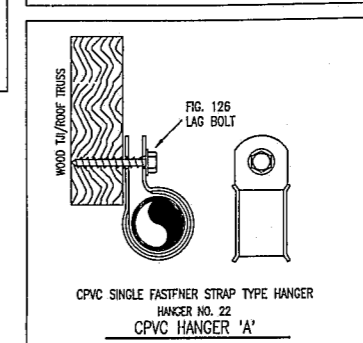
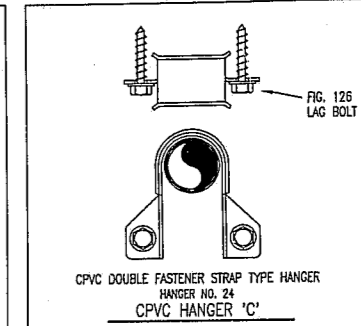
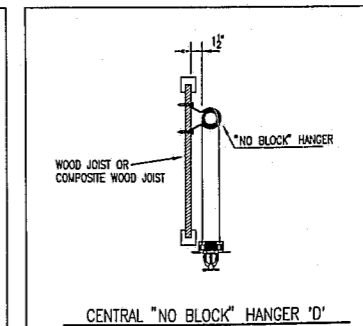
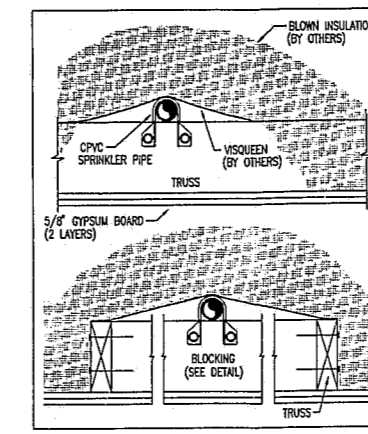
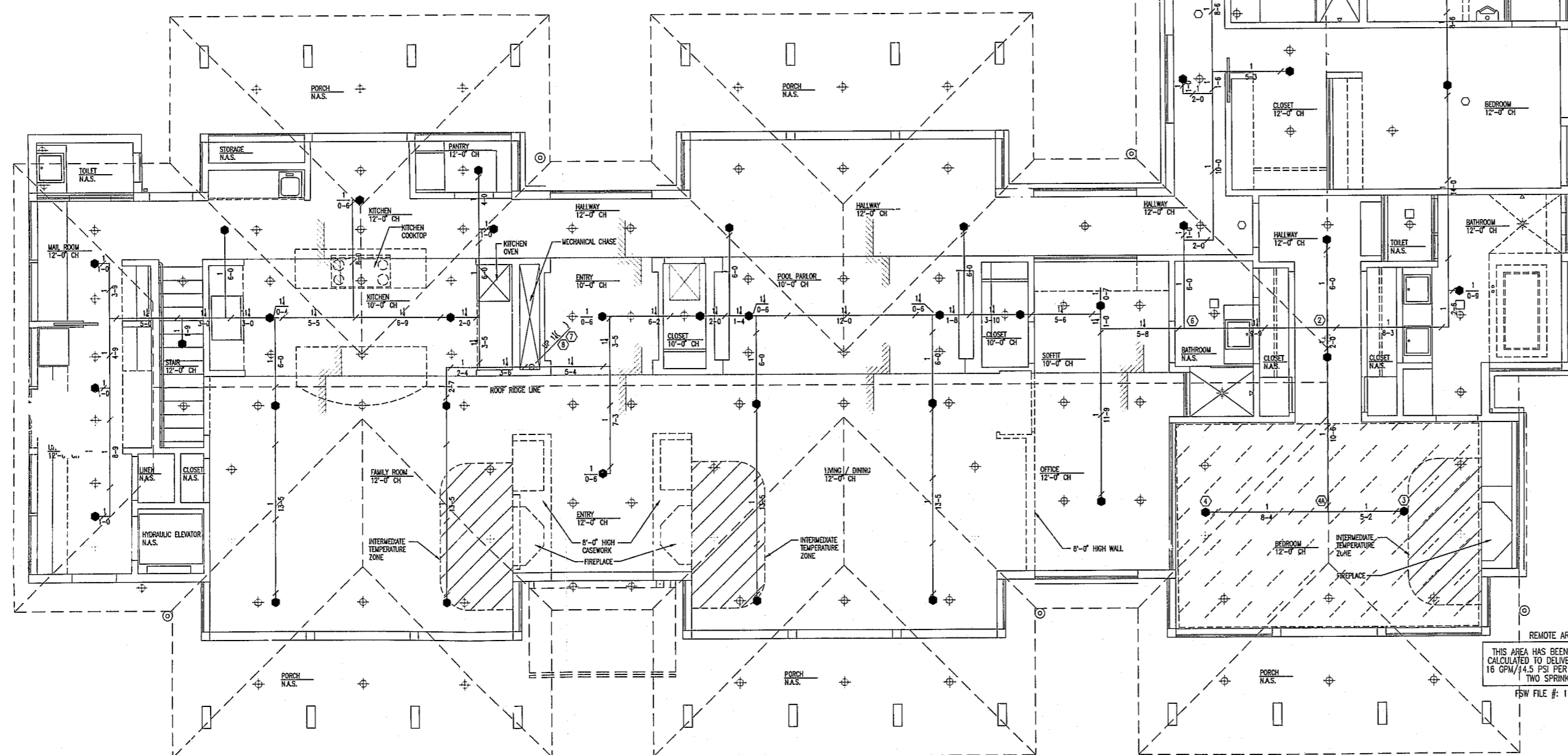
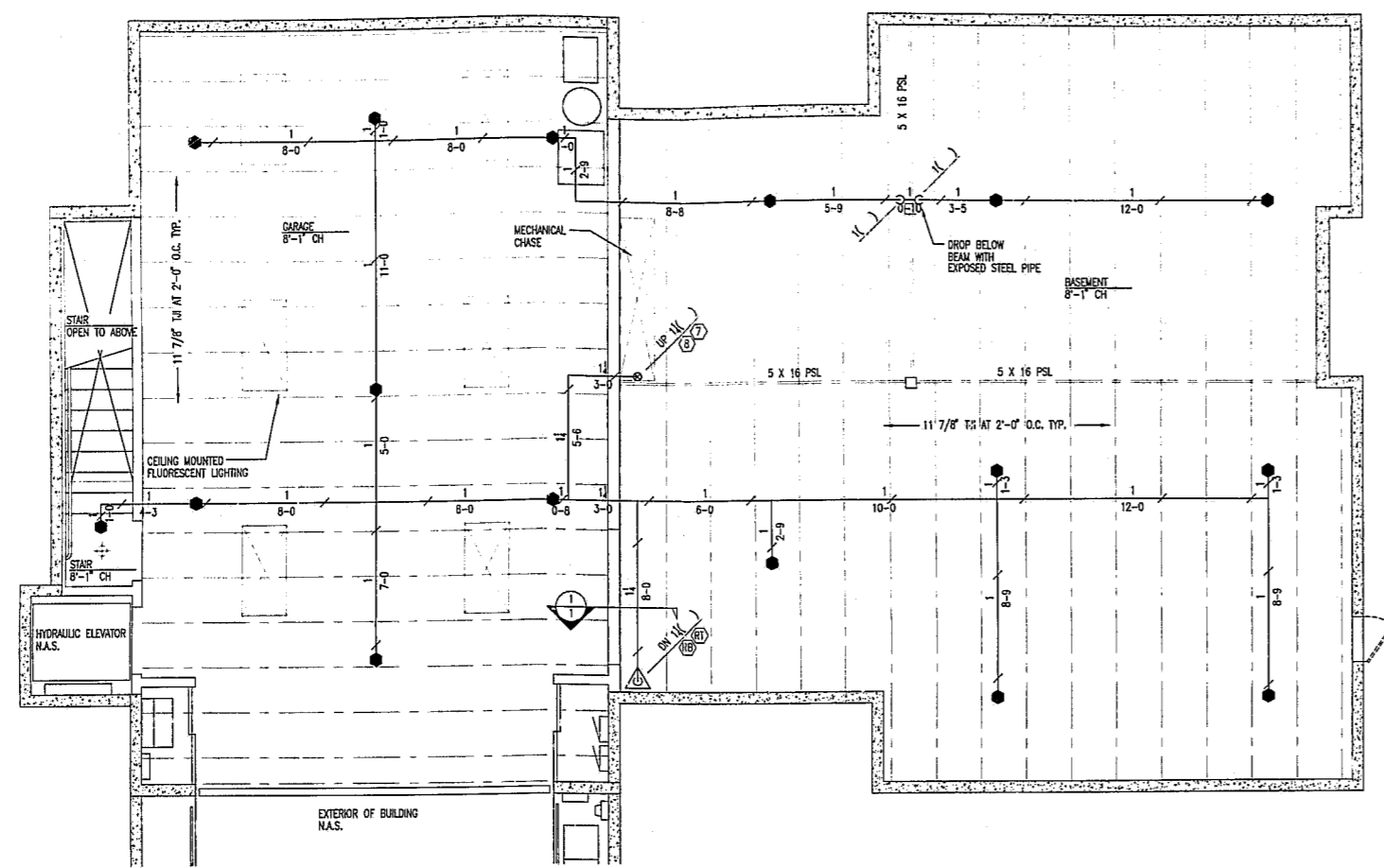
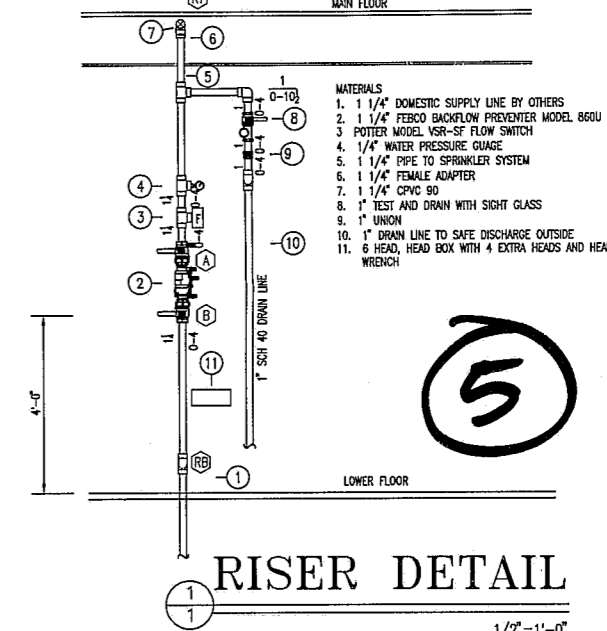


1225 SW HESSLER DR. DFS-01 RS03-156362



WATER FLOW DATA:	
STATIC:	63 PSI
RESIDUAL:	51 PSI
GPM FLOWING:	680 GPM
DATE: 4-7-05	
LOCATION: 1125 HESSLER DRIVE	
INFO FROM: PORTLAND WATER BUREAU	

SYSTEM DEMAND @ RISER BASE:	
REMOTE AREA 1:	33.0 GPM @ 33.8 F
REMOTE AREA 2:	32.1 GPM @ 35.1 F




PIPE TYPE	NOMINAL PIPE SIZE (IN.)						
CPVC	3/4	1	1 1/4	1 1/2	2	2 1/2	3

LOCATION OF SPRINKLERS PER NFPA 130
SPRINKLERS SHALL BE INSTALLED IN ALL AREAS.
EXCEPTION NO. 1: SPRINKLERS ARE NOT REQUIRED IN BATHROOMS OF 55 SQ. FT. AND LESS.

EXCEPTION NO. 2: SPRINKLERS ARE NOT REQUIRED IN CLOTHES CLOSETS, LINEN CLOSETS, AND PANTRIES WHERE THE AREA OF THE SPACE DOES NOT EXCEED 24 SQ. FT. AND THE LEAST DIMENSION DOES NOT EXCEED 3 FT. AND THE WALLS AND CEILING ARE SURFACED WITH NONCOMBUSTIBLE OR LIMITED-COMBUSTIBLE MATERIALS AS DEFINED IN NFPA 220, STANDARD ON TYPES OF BUILDING CONSTRUCTION.

GENERAL NOTES:

UNITS	CPVC (CHLORINATED POLYVINYL CHLORIDE) PIPE FIELD CUT TO THE LENGTHS INDICATED ON THE PLAN. ENDS FIELD CLEANED, CHAMFERED AND DEBURRED, FIELD JOINTS UNDERGO A COMBINATION AND SOLVENT CEMENT IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS, UTILIZED FOR WET-PIPE SYSTEMS ONLY.
HANGERS	PIPE HANGERS SHALL BE SIZED, SPACED AND INSTALLED AS REQUIRED BY NEPA STANDARDS. NO OTHER PIPING AND/OR DEVICES ARE TO BE ATTACHED TO THE SPRINKLER PIPE UNLESS SPECIFICALLY INDICATED. THE HANGERS HAS BEEN SPECIFICALLY DESIGNED FOR THE ADDITIONAL LOAD. THIS CONTRACT DOES NOT INCLUDE ANY MATERIAL OR DESIGNS TO IMPROVE THE STRUCTURAL STRENGTH OF THE BUILDING TO ENABLE IT TO CARRY THE LOAD OF THE FIRE PROTECTION SYSTEM. SEE DETAILS ON THIS SHEET FOR THE SPECIFIC HANGER ASSEMBLIES USED FOR THIS INSTALLATION. NEPA 1.3, 1088 (FIRE)

SPRINKLER SPACING TABLE - RESIDENTIAL CONCEALED PENDENT SPRINKLER RESIDENTIAL CONCEALED PENDENT TYCO MODEL #FLP1 - 1/2" ORIFICE					
PIPE SIZED CALCD USING THIS SPACING	SPRINKLER SPACING MAX.	SPRINKLER LOCATION MAX. (FROM SIDE WALLS)	MINIMUM FLOW FOR A HORIZONTAL CEILING (WVC, 2 IN. 12.5 SLOPE)	MINIMUM FLOW FOR A SLOPED CEILING (WVC, 8 IN. 12.5 SLOPE)	K-FACTOR
PLAN SYMBOL	FEET	FEET	GPM @ PSI	GPM @ PSI	U.S.
	12 x 12	7	11.0 @ 8.6	11.0 @ 8.6	4.2
	14 x 14	7	14.0 @ 11.1	14.0 @ 11.1	4.2
	16 x 16	8	18.0 @ 14.5	18.0 @ 11.4	4.2
	18 x 18	9	20.0 @ 22.7	20.0 @ 15.4	4.2
	20 x 20	10	22.0 @ 22.7	N/A	4.2
	24 x 24	12	26.0 @ 22.7	N/A	4.2

HANGER LEGEND										SPRINKLER LEGEND										SPRINKLER HEADS										SPRINKLER RISERS										REVISIONS										GENERAL NOTES										DESIGN CRITERIA AND NOTES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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City of Portland
 APPROVED

CONTRACT NAME: **RAMIS RESIDENCE** APR 15 2005
 1225 SW HESSLER DRIVE
 PORTLAND, OREGON (with Amendment)

CONTRACT WITH: **ARCON CONSTRUCTION**
 PO BOX 42292
 PORTLAND, OREGON
 CONTACT: MIKE KERR

PHONE: (503) 653-0904


Fire Systems West
 600 SE Maritime Avenue, suite 300
 Vancouver, WA 98682
 (503) 289-0906 fax (503) 289-2206

WA ST. CONTR LIC NO. FIRE SR1 14061 / OR ST. CONTR LIC NO. 49732

QUALITY CONTROL BY: _____ DATE: _____
 APPROVED FOR PURCHASER BY: _____ DATE: _____
 APPROVED FOR INSTALLATION BY: _____ DATE: _____

DESIGNER	DATE	JOB NO.	SHEET
JASON SAMPLIN	3-24-05	1-11-8524	1 OF 4

03-156362-DFS-01-RS

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APR 21 2005
MICROFILMED

5



Series LFII Residential Concealed Pendent Sprinklers, Flat Plate 4.2 K-factor

General Description

The Series LFII (TY2596) Residential Concealed Pendent Sprinklers are decorative, fast response, fusible solder sprinklers designed for use in residential occupancies such as homes, apartments, dormitories, and hotels.

The cover plate assembly conceals the sprinkler operating components above the ceiling. The flat profile of the cover plate provides the optimum aesthetically appealing sprinkler design. In addition, the concealed design of the Series LFII (TY2596) provides 1/2 inch (12.7 mm) vertical adjustment. This adjustment reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut to help assure a perfect fit installation.

The Series LFII are to be used in wet pipe residential sprinkler systems for one- and two-family dwellings and mobile homes per NFPA 13D; wet pipe residential sprinkler systems for residential occupancies up to and including four stories in height per NFPA 13R; or, wet pipe sprinkler systems for the residential portions of any occupancy per NFPA 13.

The Series LFII (TY2596) has a 4.2 (60.5) K-factor that provides the required residential flow rates at reduced

pressures, enabling smaller pipe sizes and water supply requirements.

The Series LFII (TY2596) has been designed with heat sensitivity and water distribution characteristics proven to help in the control of residential fires and to improve the chance for occupants to escape or be evacuated.

The Series LFII (TY2596) Residential Concealed Pendent Sprinklers are shipped with a Disposable Protective Cap. The Protective Cap is temporarily removed for installation, and then it can be replaced to help protect the sprinkler while the ceiling is being installed or finished. The tip of the Protective Cap can also be used to mark the center of the ceiling hole into plaster board, ceiling tiles, etc. by gently pushing the ceiling product against the Protective Cap. When the ceiling installation is complete the Protective Cap is removed and the Cover Plate Assembly installed.

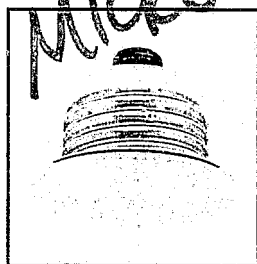
WARNINGS

The Series LFII (TY2596) Residential Concealed Pendent Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.

Sprinkler/Model Identification Number

SIN TY2596



Technical Data

Approvals:
UL and C-UL Listed, NYC Approved

City of Portland
Maximum Working Pressure:
175 psi (12.1 bar)

Discharge Coefficient:
K_f 4.2 GPM/psi^{0.5} (60.5 LPM/bar^{0.5})

Temperature Rating:
160°F/71°C Sprinkler with
135°F/57°C Cover Plate

Permit Number
Vertical Adjustment:
1/2 inch (12.7 mm)

Finishes:
Cover Plate:
Flat White, Bright White, Chrome, or
Custom

Physical Characteristics:

Body	Brass
Cap	Bronze
Saddle	Brass
Sealing Assembly	Beryllium Nickel w/ Teflon
Soldered Link Halves	Nickel
Lever	Brass
Compression Screw	Brass
Deflector	Copper

IMPORTANT

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

2
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Maximum Coverage Area ^(a) Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	Minimum Flow ^(b) and Residual Pressure For Horizontal Ceiling (Max. 2 Inch Rise for 12 Inch Run)	Minimum Flow ^(b) and Residual Pressure For Sloped Ceiling (Greater Than 2 Inch Rise Up To Max. 4 Inch Rise for 12 Inch Run)	Minimum Flow ^(b) and Residual Pressure For Sloped Ceiling (Greater Than 4 Inch Rise Up To Max. 6 Inch Rise for 12 Inch Run)
		160°F/71°C Sprinkler	160°F/71°C Sprinkler	160°F/71°C Sprinkler
12 x 12 (3,7 x 3,7)	12 (3,7)	13 GPM (49,2 LPM) 9,6 psi (0,66 bar)	18 GPM (68,1 LPM) 18,4 psi (1,27 bar)	18 GPM (68,1 LPM) 18,4 psi (1,27 bar)
14 x 14 (4,3 x 4,3)	14 (4,3)	14 GPM (53,0 LPM) 11,1 psi (0,77 bar)	18 GPM (68,1 LPM) 18,4 psi (1,27 bar)	18 GPM (68,1 LPM) 18,4 psi (1,27 bar)
16 x 16 (4,9 x 4,9)	16 (4,9)	16 GPM (60,6 LPM) 14,5 psi (1,00 bar)	18 GPM (68,1 LPM) 18,4 psi (1,27 bar)	18 GPM (68,1 LPM) 18,4 psi (1,27 bar)
18 x 18 (5,5 x 5,5)	18 (5,5)	20 GPM (75,7 LPM) 22,7 psi (1,57 bar)	20 GPM (75,7 LPM) 22,7 psi (1,57 bar)	N/A
20 x 20 (6,1 x 6,1)	20 (6,1)	24 GPM (90,8 LPM) 32,7 psi (2,25 bar)	26 GPM (98,4 LPM) 38,3 psi (2,64 bar)	N/A

(a) For coverage area dimensions less than or between those indicated, it is necessary to use the minimum required flow for the next highest coverage area for which hydraulic design criteria are stated.

(b) Requirement is based on minimum flow in GPM (LPM) from each sprinkler. The associated residual pressures are calculated using the nominal K-factor. Refer to Hydraulic Design Criteria Section for details.

TABLE A
NFPA 13D AND NFPA 13R HYDRAULIC DESIGN CRITERIA
FOR THE SERIES LFII (TY2596) RESIDENTIAL CONCEALED PENDENT SPRINKLER

Guide Pin Housing Bronze
Guide Pins Stainless Steel
Support Cup Steel
Cover Plate Copper
Retainer Brass
Cover Plate Ejection Spring Stainless Steel

†DuPont Registered Trademark

Operation

When exposed to heat from a fire, the Cover Plate, which is normally soldered to the Support Cup at three points, falls away to expose the Sprinkler Assembly. At this point the Deflector supported by the Arms drops down to its operated position. The fusible link of the Sprinkler Assembly is comprised of two link halves that are soldered together with a thin layer of solder. When the rated temperature is reached, the solder melts and the two link halves separate allowing the sprinkler to activate and flow water.

Design Criteria

The Series LFII (TY2596) Residential Concealed Pendent Sprinklers are UL and C-UL Listed for installation in accordance with the following criteria.

NOTE

When conditions exist that are outside the scope of the provided criteria, refer to the *Residential Sprinkler Design Guide TFP-490* for the manufacturer's recommendations that may be acceptable to the Authority Having Jurisdiction.

System Type. Only wet pipe systems may be utilized.

Hydraulic Design. The minimum required sprinkler flow rate for systems designed to NFPA 13D or NFPA 13R are given in Table A as a function of temperature rating and the maximum allowable coverage areas. The sprinkler flow rate is the minimum required discharge from each of the total number of "design sprinklers" as specified in NFPA 13D or NFPA 13R.

For systems designed to NFPA 13, the number of design sprinklers is to be the four most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in Table A for NFPA 13D and 13R as a function of temperature rating and the maximum allowable coverage area.
- A minimum discharge of 0,1 gpm/sq. ft. over the "design area" comprised of the four most hydraulically demanding sprinklers for the actual

coverage areas being protected by the four sprinklers.

Obstruction To Water Distribution. Locations of sprinklers are to be in accordance with the obstruction rules of NFPA 13 for residential sprinklers.

Operational Sensitivity. The sprinklers are to be installed relative to the ceiling mounting surface as shown in Figure 3.

Sprinkler Spacing. The minimum spacing between sprinklers shall be (2,4 m). The maximum spacing between sprinklers cannot exceed the length of the coverage area (Ref. Table A) being hydraulically calculated (e.g., maximum 12 feet for a 12 ft. x 12 ft. coverage area, or 20 feet for a 20 ft. x 20 ft. coverage area).

Permit Number _____

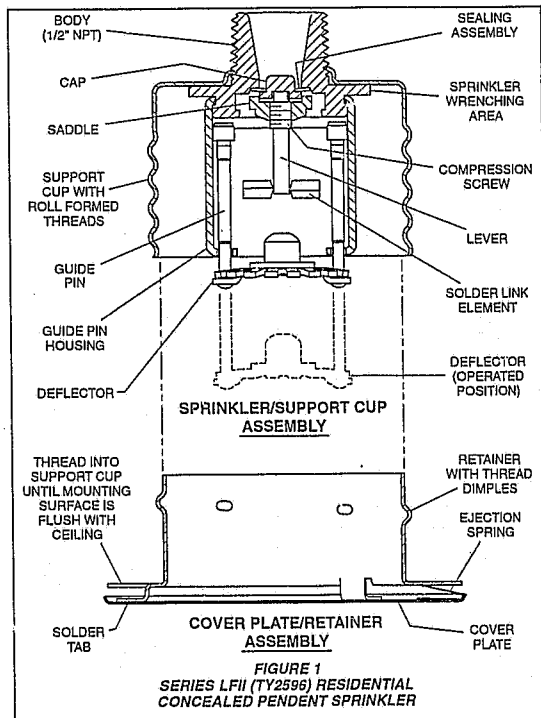
Installation

The Series LFII (TY2596) must be installed in accordance with the following instructions:

NOTES

Damage to the fusible Link Assembly during installation can be avoided by handling the sprinkler by the frame arms only (i.e., do not apply pressure to the fusible link Assembly).

A leak tight 1/2 inch NPT sprinkler joint should be obtained with a torque of 7 to 14 ft.lbs. (9,5 to 19,0 Nm). A maxi-



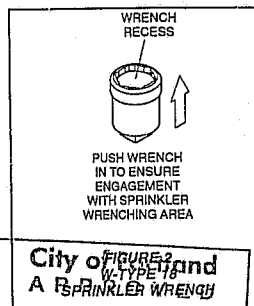
imum of 21 ft.lbs. (28.5 Nm) of torque is to be used to install sprinklers. Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in an Escutcheon Plate by under- or over-tightening the Sprinkler. Readjust the position of the sprinkler fitting to suit.

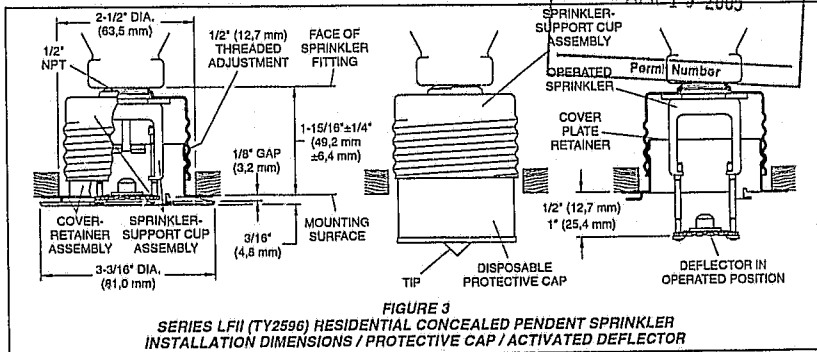
Step 1. The sprinkler must only be installed in the pendent position and with the centerline of the sprinkler perpendicular to the mounting surface.

Step 2. Remove the Protective Cap.

Step 3. With pipe thread sealant applied to the pipe threads, and using the W-Type 18 Wrench shown in Figure 2, install and tighten the Sprinkler/Support Cup Assembly into the fitting. The W-Type 18 Wrench will accept a 1/2 inch ratchet drive.



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Step 4. Replace the Protective Cap by pushing it upwards until it bottoms out against the Support Cup. The Protective Cap helps prevent damage to the Deflector and Arms during ceiling installation and/or during application of the finish coating of the ceiling. It may also be used to locate the center of the clearance hole by gently pushing the ceiling material against the center point of the Cap.

NOTE

As long as the protective Cap remains in place, the system is considered to be "Out Of Service".

Step 5. After the ceiling has been completed with the 2-1/2 inch (63 mm) diameter clearance hole and in preparation for installing the Cover Plate Assembly, remove and discard the Protective Cap, and verify that the Deflector moves up and down freely.

If the Sprinkler has been damaged and the Deflector does not move up and down freely, replace the entire Sprinkler assembly. Do not attempt to modify or repair a damaged sprinkler.

Step 6. Screw on the Cover Plate Assembly until its flange comes in contact with the ceiling.

Do not continue to screw on the Cover Plate Assembly such that it lifts a ceiling panel out of its normal position.

If the Cover Plate Assembly cannot be engaged with the Mounting Cup or the Cover Plate Assembly cannot be engaged sufficiently to contact the ceiling, the Sprinkler Fitting must be repositioned.

Care and Maintenance

The Series LFII (TY2596) must be maintained and serviced in accordance with the following instructions:

NOTES

Absence of an Escutcheon Plate may delay the sprinkler operation in a fire situation.

Before closing a fire protection system main control valve for maintenance work on the fire protection system which it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be

painted, plated, coated, or otherwise altered after leaving the factory. Modified or over heated sprinklers must be replaced.

Care must be exercised to avoid damage - before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any other authorities having jurisdiction. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.

NOTE

The owner must assure that the sprinklers are not used for hanging of any objects and that the sprinklers are only cleaned by means of gently dusting with a feather duster; otherwise, non-operation in the event of a fire or inadvertent operation may result.

It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified inspection Service in accordance with local requirements and/or national codes.

Limited Warranty

Products manufactured by Tyco Fire Products are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by Tyco Fire Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire Products or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association, and/or the standards of any other Authorities Having Jurisdiction. Materials found by Tyco Fire Products to be defective shall be either repaired or replaced, at Tyco Fire Products' sole option. Tyco Fire Products neither assumes, nor authorizes any person to assume for it, any other obligation in

connection with the sale of products or parts of products. Tyco Fire Products shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

IN NO EVENT SHALL TYCO FIRE PRODUCTS BE LIABLE, IN CONTRACT, TORT, STRICT LIABILITY OR UNDER ANY OTHER LEGAL THEORY, FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LABOR CHARGES, REGARDLESS OF WHETHER TYCO FIRE PRODUCTS WAS INFORMED ABOUT THE POSSIBILITY OF SUCH DAMAGES, AND IN NO EVENT SHALL TYCO FIRE PRODUCTS' LIABILITY EXCEED AN AMOUNT EQUAL TO THE SALES PRICE.

THE FOREGOING WARRANTY IS MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Ordering Procedure

When placing an order, indicate the full product name. Contact your local distributor for availability.

Sprinkler Assembly:

Series LFII (TY2596), K=4.2, Residential Concealed Pendant Sprinkler without Cover Plate Assembly.

P/N 51-122-1-150 Portland

Cover Plate Assembly:

Cover Plate Assembly having a (specify) finish for Series LFII (TY2596), K=4.2, Residential Concealed Pendant Sprinkler, P/N (specify).

Chrome.....	P/N 56-122-9-135
Oil White.....	P/N 56-122-9-135
Right White.....	P/N 56-122-4-135
Flat White.....	P/N 56-122-5-135
White (RAL 9010).....	P/N 56-122-3-135
Custom.....	P/N 56-122-X-135

*Eastern Hemisphere sales only.

Sprinkler Wrench:

Specify: W-Type 18 Sprinkler Wrench, P/N 56-000-1-265.

tyco / Flow Control / **Tyco Fire Products**

BlazeMaster®

FIRE SPRINKLER PIPE & FITTINGS SUBMITTAL SHEET

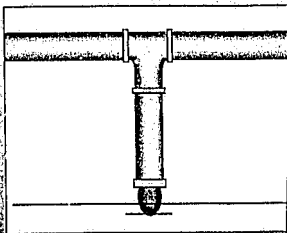
TYCO FIRE PRODUCTS

451 North Cannon Avenue
Lansdale, Pennsylvania 19446
www.tyco-fire.com

TECHNICAL SERVICES

TEL: (800) 381-9312 • FAX: (800) 791-5500

E-MAIL: techserv@tycofp.com



City of Portland
APPROVED

APR 15 2005

Permit Number

No. 19-1.5
TDB:5
4-1.1.20
9/2001



Introduction

Tyco Fire Products (TFP) BlazeMaster® CPVC pipe and fittings are designed exclusively for use in wet pipe automatic fire sprinkler systems. They are made from a specially developed thermoplastic compound composed of post chlorinated polyvinyl chloride (CPVC) resin and state of the art additives. TFP BlazeMaster® CPVC products are easier to install than traditional steel pipe systems, and at

the same time, they provide superior heat resistance and strength as compared to traditional CPVC and PVC piping materials used in the plumbing trade. Various adapters are available to connect CPVC pipe to metallic piping. All female pipe thread adapters have brass inserts for durability. Grooved adapters connect directly to grooved end valves and metallic pipe, with flexible grooved end couplings.

Technical Data

Sizes: 3/4" - 3"

Maximum Working Pressure: 175 psi

Approvals: UL, FM, CUL, NSF, Dade County, LPCB, MEA, and the City of Los Angeles

Note: See current TFP BlazeMaster installation instructions and Technical Manual, for exact listing/approval information

Manufacture Source: U.S.A.

Material:

Pipe: ASTM F442, SDR 13.5

Fittings: ASTM F438 (Sch. 40) and ASTM F439 (Sch. 80)

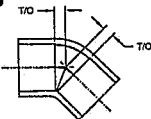
Color: Orange

Pipe

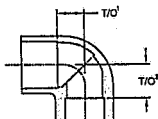
Nom. Pipe Size	Avg. O.D. Inches	Avg. I.D. Inches	Wt. Lbs./Ft.	Wt. H ₂ O filled Pipe Lbs./Ft.	Ft. of Pipe per Lift	Wt. per Lift Lbs.
3/4"	1.050	0.874	0.17	0.43	7875	1413
1"	1.315	1.101	0.26	0.67	5040	1320
1 1/4"	1.660	1.394	0.42	1.07	2835	1191
1 1/2"	1.900	1.598	0.55	1.40	2205	1136
2"	2.375	2.003	0.86	2.20	1260	1063
2 1/2"	2.875	2.423	1.26	3.22	1215	1531
3"	3.500	2.952	1.87	4.79	720	1344

Fittings

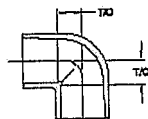
45° Elbow



Reducing
90° Elbow



90° Elbow

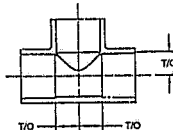


Part No.	Size	Sch.	T/O	Wt.
80050	3/4"	40	3/4"	0.08 lb.
80051	1"	40	3/4"	0.11 lb.
80052	1 1/4"	40	3/4"	0.20 lb.
80053	1 1/2"	80	1/2"	0.31 lb.
80054	2"	80	3/4"	0.56 lb.
80055	2 1/2"	80	1"	0.89 lb.
80056	3"	80	1 1/4"	1.19 lb.

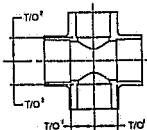
Part No.	Size	Sch.	T/O	Wt.
80032	1" x 3/4"	40	1 1/4" 1 1/2"	0.16 lb.

Part No.	Size	Sch.	T/O	Wt.
80025	3/4"	40	3/4"	0.09 lb.
80026	1"	40	3/4"	0.14 lb.
80027	1 1/4"	40	3/4"	0.21 lb.
80028	1 1/2"	80	1 1/4"	0.40 lb.
80029	2"	80	1 1/2"	0.70 lb.
80030	2 1/2"	80	1 3/4"	1.14 lb.
80031	3"	80	1 3/4"	1.82 lb.

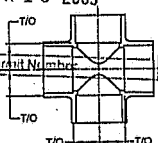
Tee



Reducing
Cross



Cross

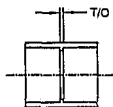


Part No.	Size	Sch.	T/O	Wt.
80000	3/4"	40	3/4"	0.11 lb.
80001	1"	40	3/4"	0.19 lb.
80002	1 1/4"	40	3/4"	0.26 lb.
80003	1 1/2"	80	1"	0.51 lb.
80004	2"	80	1 1/4"	0.90 lb.
80005	2 1/2"	80	1 1/2"	1.59 lb.
80006	3"	80	1 3/4"	2.41 lb.

Part No.	Size	Sch.	T/O	Wt.
80015	1" x 3/4"	40	1 1/4" 1 1/2"	0.28 lb.

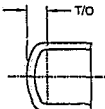
Part No.	Size	Sch.	T/O	Wt.
80009	3/4"	40	3/4"	0.13 lb.
80010	1"	40	3/4"	0.23 lb.
80011	1 1/4"	40	3/4"	0.34 lb.
80012	1 1/2"	80	1 1/4"	0.67 lb.
80013	2"	80	1 1/2"	1.00 lb.
80014	2 1/2"	80	1 3/4"	1.91 lb.
80008	3"	80	1 3/4"	2.89 lb.

Coupling



Part No.	Size	Sch.	T/O	Wt.
80075	1/2"	40	1/4"	0.07 lb.
80076	1"	40	1/4"	0.11 lb.
80077	1 1/4"	40	3/16"	0.12 lb.
80078	1 1/2"	80	3/16"	0.25 lb.
80079	2"	80	3/16"	0.38 lb.
80080	2 1/2"	80	3/16"	0.67 lb.
80081	3"	80	3/16"	0.91 lb.

Cap



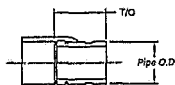
Part No.	Size	Sch.	T/O	Wt.
80100	1/2"	40	3/16"	0.04 lb.
80101	1"	40	3/16"	0.06 lb.
80102	1 1/4"	40	1/2"	0.10 lb.
80103	1 1/2"	80	3/4"	0.20 lb.
80104	2"	80	3/4"	0.31 lb.
80105	2 1/2"	80	3/4"	0.58 lb.
80106	3"	80	1"	0.88 lb.

Reducer Bushing



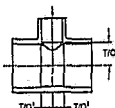
Part No.	Size	Sch.	T/O	Wt.
80200	1" x 3/4"	40	7/16"	0.04 lb.
80201	1 1/4" x 3/4"	40	7/16"	0.11 lb.
80202	1 1/2" x 1"	40	7/16"	0.12 lb.
80203	1 1/2" x 3/4"	80	3/4"	0.16 lb.
80204	1 1/2" x 1"	80	1/2"	0.14 lb.
80205	1 1/2" x 1 1/4"	80	3/4"	0.17 lb.
80206	2" x 3/4"	80	3/4"	0.27 lb.
80207	2" x 1"	80	1 1/4"	0.26 lb.
80208	2" x 1 1/4"	80	3/4"	0.24 lb.
80209	2" x 1 1/2"	80	7/16"	0.19 lb.
80215	2 1/2" x 1"	80	1 1/4"	0.42 lb.
80214	2 1/2" x 1 1/4"	80	1 1/4"	0.45 lb.
80213	2 1/2" x 1 1/2"	80	1 1/4"	0.46 lb.
80211	2 1/2" x 2"	80	1 1/4"	0.29 lb.
80210	3" x 2"	80	2 3/4"	0.72 lb.
80212	3" x 2 1/2"	80	1 1/4"	0.47 lb.

Grooved Coupling Adapter



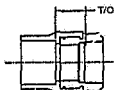
Part No.	Size	Sch.	T/O	Wt.	Pipe OD
80161	1 1/4" x 1 1/4" Grooved	40	2 3/16"	0.78 lb.	1 1/4" (1.660")
80162	1 1/2" x 1 1/2" Grooved	80	2 3/16"	0.95 lb.	1 1/2" (1.900")
80163	1 1/2" x 2 1/2" Grooved	80	2 3/16"	1.42 lb.	2" (2.375")
80164	2" x 3" Grooved	80	2 1/4"	3.00 lb.	3" (3.500")
80168	3" x 76.1mm Grooved	80	2 1/4"	2.72 lb.	76.1mm (3.000")

Reducing Tee



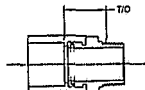
Part No.	Size	Sch.	T/O			Wt. lb.
			1	2	3	
80132	3/4" x 3/4" x 1"	40	3/4"	3/4"	3/4"	0.14
80133	1" x 3/4" x 3/4"	40	1 1/4"	1 1/4"	3/4"	0.14
80134	1" x 3/4" x 1"	40	3/4"	3/4"	3/4"	0.17
80250	1" x 1" x 3/4"	40	3/4"	3/4"	1 1/4"	0.16
80135	1 1/4" x 1" x 3/4"	40	1 1/4"	3/4"	1 1/4"	0.21
80136	1 1/4" x 1" x 1"	40	1 1/4"	3/4"	1 1/4"	0.22
80137	1 1/4" x 1" x 1 1/4"	40	1 1/4"	3/4"	1 1/4"	0.26
80261	1 1/4" x 1 1/4" x 1 1/4"	40	1 1/4"	1 1/4"	1 1/4"	0.23
80262	1 1/4" x 1 1/4" x 1"	40	1 1/4"	1 1/4"	1 1/4"	0.26
80138	1 1/4" x 1 1/4" x 1 1/2"	80	1 1/4"	1 1/4"	1 1/2"	0.43
80140	1 1/4" x 1 1/4" x 3/4"	80	1 1/4"	1 1/4"	1"	0.36
80141	1 1/4" x 1 1/4" x 1"	80	1 1/4"	1 1/4"	1 1/4"	0.38
80263	1 1/2" x 1 1/4" x 3/4"	80	1 1/4"	1 1/4"	1"	0.38
80264	1 1/2" x 1 1/4" x 1"	80	1 1/4"	1 1/4"	1"	0.38
80275	1 1/2" x 1 1/4" x 1 1/4"	80	1 1/4"	1 1/4"	1"	0.45
80265	2" x 2" x 3/4"	80	3/4"	3/4"	1 1/4"	0.61
80266	2" x 2" x 1"	80	3/4"	3/4"	1 1/4"	0.66
80274	2" x 2" x 1 1/4"	80	1"	1"	1 1/4"	0.74
80267	2" x 2" x 1 1/2"	80	1 1/4"	1 1/4"	1 1/4"	0.78
80271	2 1/2" x 2 1/2" x 1"	80	1 1/4"	1 1/4"	1 1/2"	1.43
80272	2 1/2" x 2 1/2" x 1 1/4"	80	1 1/4"	1 1/4"	1 1/4"	1.46
80273	2 1/2" x 2 1/2" x 1 1/2"	80	1 1/4"	1 1/4"	1 1/4"	1.48
80276	2 1/2" x 2 1/2" x 2"	80	1 1/4"	1 1/4"	1 1/4"	1.50
80270	3" x 3" x 1 1/4"	80	1 1/4"	1 1/4"	1 1/4"	2.28
80268	3" x 3" x 2"	80	1 1/4"	1 1/4"	1 1/4"	2.25
80269	3" x 3" x 2 1/4"	80	1 1/4"	1 1/4"	1 1/4"	2.44

Female Adapter



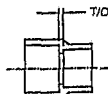
Part No.	Size	Sch.	T/O	Wt.
80142	3/4" x 3/4" NPT	40	3/4"	0.41 lb.
80145	1" x 1" NPT	40	3/4"	0.63 lb.
80146	1 1/4" x 1 1/4" NPT	40	3/4"	1.03 lb.
80147	1 1/2" x 1 1/2" NPT	80	1"	1.42 lb.
80148	2" x 2" NPT	80	1 1/4"	2.66 lb.

Male Adapter



Part No.	Size	Sch.	T/O	Wt.
80157	3/4" x 3/4" NPT	40	1 1/4"	0.33 lb.
80158	1" x 1" NPT	40	1 1/4"	0.56 lb.

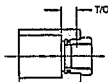
Reducing Coupling



Part No.	Size	Sch.	T/O	Wt.
80220	1" x 3/4"	40	1 1/4"	0.08 lb.

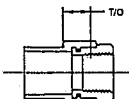


Sprinkler Head Adapter with Brass Threaded Insert



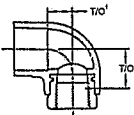
Part No.	Size	Sch.	T/O	Wt.
80175E	3/4" x 1/2" NPT	80	7/16"	0.20 lb.
80176E	1" x 1/2" NPT	80	7/16"	0.22 lb.
80177WL	3/4" x 1/2" NPT	40	9/16"	0.16 lb.
80179	1 x 3/4" NPT	40	7/8"	0.43 lb.

Sprinkler Head Adapter (Spigot) with Brass Threaded Insert



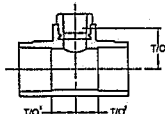
Part No.	Size	Sch.	T/O	Wt.
80177L	3/4" x 1/2" NPT	40	1/2"	0.16 lb.
80178	1" x 1/2" NPT	40	1/2"	0.20 lb.

Sprinkler Head Adapter 90° Elbow with Brass Threaded Insert



Part No.	Size	Sch.	T/O		Wt. lb.
			1	2	
80199	3/4" x 1/2" NPT	40	7/16"	15/16"	0.20
80189	1" x 1/2" NPT	40	9/16"	1 1/16"	0.26

Sprinkler Head Adapter Tee with Brass Threaded Insert

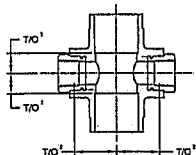


Sprinkler Head Adapter with Brass Threaded Insert



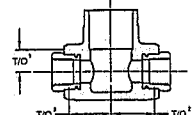
Part No.	Size	Sch.	T/O	Wt.
80175W	3/4" x 1/2" NPT	40	7/16"	0.19 lb.
80176W	1" x 1/2" NPT	40	7/16"	0.18 lb.

Back-to-Back Cross with Brass Threaded Insert



Part No.	Size	Sch.	T/O		Wt. lb.
			1	2	
80462	1" x 1" x 1/2" NPT x 1/2" NPT	40	7/16"	1 1/4"	0.46
80463	1" x 1" x 1/2" NPT x 1/2" NPT	40	7/16"	1 1/4"	0.47

Back-to-Back Tee with Brass Threaded Insert



Part No.	Size	Sch.	T/O		Wt. lb.
			1	2	
80459	1" x 1/2" NPT x 1/2" NPT	40	7/16"	1 1/4"	0.48
80460	1" x 1/2" NPT x 1/2" NPT	40	7/16"	1 1/4"	0.46

Part No.	Size	Sch.	T/O			Wt. lb.
			1	2	3	
80250	3/4" x 3/4" x 1/2" NPT	40	3/4"	7/8"	1 1/8"	0.22
80251	1" x 1" x 1/2" NPT	40	7/16"	7/16"	1 3/8"	0.29
80249	1" x 1" x 1" NPT	40	7/16"	7/16"	1 1/8"	0.73
80256	1 1/2" x 1" x 1/2" NPT	40	7/16"	7/16"	1 1/4"	0.30
80252	1 1/2" x 1 1/2" x 1/2" NPT	40	7/16"	7/16"	1 1/4"	0.31
80257	1 1/2" x 1 1/2" x 1/2" NPT	80	7/16"	7/16"	1 1/4"	0.43
80254	1 1/2" x 1 1/2" x 1/2" NPT	80	7/16"	7/16"	1 1/4"	0.46
80258	2" x 1 1/2" x 1/2" NPT	80	7/16"	7/16"	1 1/4"	0.56
80253	2" x 2" x 1/2" NPT	80	7/16"	7/16"	1 1/4"	0.62

Limited Warranty

Products manufactured by Tyco Fire Products are warranted solely to the original Buyer for ten (10) years against defects in material and workmanship when paid for and properly installed and maintained under normal use and service. This warranty will expire ten (10) years from date of shipment by Tyco Fire Products. No warranty is given for products or components manufactured by companies not affiliated by ownership with Tyco Fire Products or for products and components which have been subject to misuse, improper installation, corrosion, or which have not been installed, maintained, modified or repaired in accordance with applicable Standards of the National Fire Protection Association (NFPA), and/or the state codes of any other Authority Having Jurisdiction. Materials found by Tyco Fire Products to be defective shall be either repaired or replaced, at Tyco Fire Products sole option. Tyco Fire Products neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. Tyco Fire Products shall not be responsible for sprinkler system design errors or inaccurate or incomplete information supplied by Buyer or Buyer's representatives.

IN NO EVENT SHALL TYCO FIRE PRODUCTS BE LIABLE IN CONTRACT, TORT, STRICT LIABILITY OR UNDER ANY OTHER LEGAL THEORY, FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LABOR CHARGES, REGARDLESS OF WHETHER TYCO FIRE PRODUCTS WAS INFORMED ABOUT THE POSSIBILITY OF SUCH DAMAGES, AND IN NO EVENT SHALL TYCO FIRE PRODUCTS LIABILITY EXCEED AN AMOUNT EQUAL TO THE SALES PRICE.

THE FOREGOING WARRANTY IS MADE IN LIEU OF ANY AND ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

APR 15 2005



MODEL 1000

TESTANDRAIN®

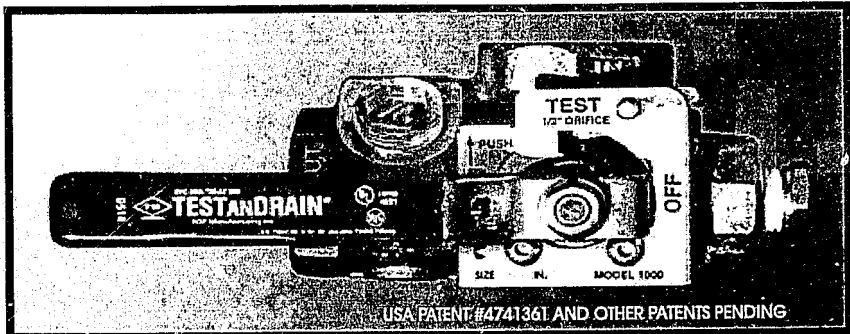
3/4"

1"

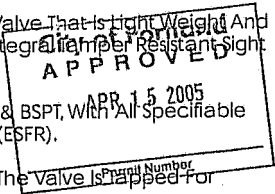
1 1/4"

1 1/2"

2"



- ☐ The AGF Manufacturing Inc. Model 1000 TESTANDRAIN Provides Both The Test Function And The Express Drain Function For A Wet Fire Sprinkler System.
- ☐ The Model 1000 Complies With All Requirements Of NFPA-13, NFPA-13R, And NFPA-13D.
- ☐ The Model 1000 TESTANDRAIN Is A Single Handle Ball Valve That Is Light Weight And Compact, Includes A Tamper Resistant Test Orifice, Integral Tamper Resistant Sight Glasses, And Is 300 PSI Rated.
- ☐ Available In A Full Range Of Sizes From 3/4" To 2" NPT & BSPT, With All Specifiable Orifice Sizes 3/8", 7/16", 1/2", 17/32", 5/8" (ELO), & 3/4" (ESFR).
- ☐ The Orifice Size Is Noted On The Indicator Plate And The Valve Is Labeled For A Pressure Gauge.
- ☐ Locking Kit Available Which Provides Superior Vandal Resistance And Prevents Unintentional Alarm Activation.



Check Out Our New AutoCAD Site!
Visit us
on the Internet
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MODEL 1000

300 PSI



TEST AND DRAIN

3/4"

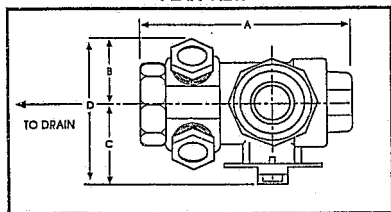
1"

1 1/4"

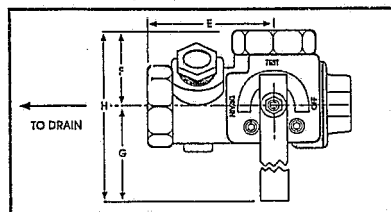
1 1/2"

2"

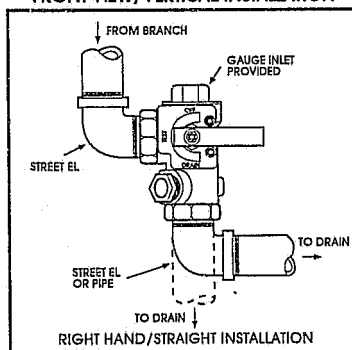
PLAN VIEW



FRONT VIEW/HORIZONTAL INSTALLATION



FRONT VIEW/VERTICAL INSTALLATION



APPROVALS:

- ☐ UL and ULC Listed
- ☐ FM Approved except 3/4"
- ☐ NYC-BSA NO. 720-8713M
- ☐ CA. State Fire Marshall

ORIFICE SIZE

AVAILABLE - 3/8, 7/16, 1/2, 17/32, ELO(5/8)*, ESFR(3/4)*

DIMENSIONS - INCHES

SIZE	A	B	C	D	E	F	G	H
3/4"	5 1/16" 128mm	1 1/2" 37.5mm	2 3/16" 55.6mm	3 5/8" 93.2mm	3 3/8" 85.8mm	1 13/16" 45.2mm	4 9/16" 117.1mm	6 3/8" 162.4mm
1"	5 1/16" 128mm	1 1/2" 37.5mm	2 3/16" 55.6mm	3 5/8" 93.2mm	3 3/8" 85.8mm	1 13/16" 45.2mm	4 9/16" 117.1mm	6 3/8" 162.4mm
1 1/4"	5 7/16" 137.7mm	1 11/16" 42.7mm	2 9/16" 65.3mm	4 1/4" 108.3mm	3 5/8" 82.8mm	1 15/16" 50.8mm	5 9/16" 141.3mm	5 1/2" 162.2mm
1 1/2"	6 7/16" 163.3mm	1 13/16" 45.5mm	3 1/4" 81.5mm	5 1/16" 127mm	3 7/8" 95.1mm	2 5/8" 66.7mm	8 1/4" 206.6mm	10 7/8" 273.6mm
2"	6 7/16" 163.3mm	1 13/16" 45.5mm	3 1/4" 81.5mm	5 1/16" 127mm	3 7/8" 95.1mm	2 5/8" 66.7mm	8 1/4" 206.6mm	10 7/8" 273.6mm

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MATERIAL LIST

PART: _____ Permit Number: _____ MATERIAL:

HANDLE STEM
BALL BODY
VALVE SEAT
INDICATOR PLATE
HANDLE LOCK

STEEL
ROD BRASS
C.P. BRONZE
BRONZE
IMPREGNATED TEFLON
STEEL
SPRING STEEL

*Available on 1 1/4" to 2" size units only. **3/4" UL Listed only.

AGF MANUFACTURING INC.

UL LISTING EX4019

AGF MANUFACTURING INC.

100 Quaker Lane
Malvern, PA 19355 USA
Telephone: (610) 240-4900
Fax: (610) 240-4906
www.testandrain.com



JOB NAME: _____
ARCHITECT: _____
ENGINEER: _____
CONTRACTOR: _____

2" ELO/ESFR IS UL LISTED & FM APPROVED
1 1/4" ELO/ESFR IS UL LISTED



BELLS PBA-AC & PBD-DC



6" BELL SHOWN

UL Listed, FM Approved

Sizes Available: 6" (150mm), 8" (200mm) and 10" (250mm)

Voltages Available: 24VAC
120VAC
12VDC (10.2 to 15.6) Polarized
24VDC (20.4 to 31.2) Polarized

Service Use: Fire Alarm
General Signaling
Burglar Alarm

Environment: Indoor or outdoor use (See Note 1)
-40° to 150°F (-40° to 66°C)
(Outdoor use requires weatherproof
backbox.)

Termination: 4 No. 18 AWG stranded wires

Finish: Red powder coating

Optional: Model BBK-1 weatherproof backbox

These vibrating type bells are designed for use as fire, burglar or general signaling devices. They have low power consumption and high decibel ratings. The unit mounts on a standard 4" (101mm) square electrical box for indoor use or on a model BBK-1 weatherproof backbox for outdoor applications. Weatherproof backbox model BBK-1, Stock No. 1500001.

ALL DC BELLS ARE POLARIZED AND HAVE BUILT-IN TRANSIENT PROTECTION:

SIZE (INCHES (mm))	VOLTAGE	MODEL NO.	STOCK NO.	CURRENT (MAX.)	TYPICAL dB AT 10 FT. (3m) (2)	MINIMUM dB AT 10 FT. (3m) (1)
6 (150)	12VDC	PBD126	1705012	.12A	85	76
8 (200)	12VDC	PBD128	1706012	.12A	90	76
10 (250)	12VDC	PBD1210	1710012	.12A	92	76
6 (150)	24VDC	PBD246	1706024	.06A	87	79
6 (200)	24VDC	PBD248	1708024	.06A	91	79
10 (250)	24VDC	PBD2410	1710024	.06A	94	79
6 (150)	24VAC	PBA246	1806024	.17A	91	76
8 (200)	24VAC	PBA248	1808024	.17A	94	76
10 (250)	24VAC	PBA2410	1810024	.17A	94	76
6 (150)	120VAC	PBA1206	1809120	.05A	92	82
8 (200)	120VAC	PBA1208	1808120	.05A	95	82
10 (250)	120VAC	PBA12010	1810120	.05A	99	85

City of Portland
APPROVED

APR 15 2005

Permit Number

Notes:

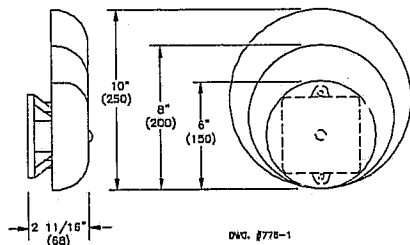
1. Minimum dB ratings are calculated from integrated sound pressure measurements made at Underwriters Laboratories as specified in UL Standard 464. UL temperature range is -30° to 150°F (-34° to 66°C).
2. Typical dB ratings are calculated from measurements made with a conventional sound level meter and are indicative of output levels in an actual installation.

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DIMENSIONS INCHES (mm)

FIG. 1

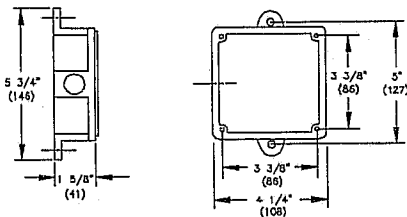
BELLS



DWG. #775-1

FIG. 2 WEATHERPROOF BACKBOX

BOX HAS ONE THREADED 1/2" CONDUIT ENTRANCE

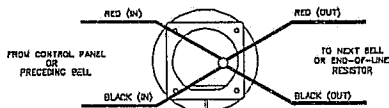


DWG. #775-2

FIG. 3

WIRING (REAR VIEW)

D.C. BELLS (OBSERVE POLARITY)

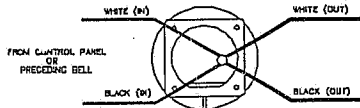


CAUTION:
WHEN ELECTRICAL SUPERVISION IS REQUIRED USE IN AND OUT LEADS AS SHOWN.

NOTES:

1. OBSERVE POLARITY TO RING D.C. BELLS.
2. RED WIRES POSITIVE (+)
3. BLACK WIRES NEGATIVE (-)

A.C. BELLS



CAUTION:
WHEN ELECTRICAL SUPERVISION IS REQUIRED USE IN AND OUT LEADS AS SHOWN.

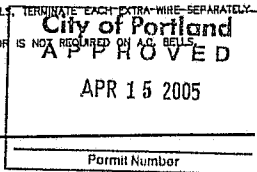
NOTES:

1. WHEN USING A.C. BELLS, TERMINATE EACH EXTRA-WIRE SEPARATELY AFTER LAST BELL.
2. END-OF-LINE RESISTOR IS NOT REQUIRED ON A.C. BELLS.

DWG. #776-3

INSTALLATION

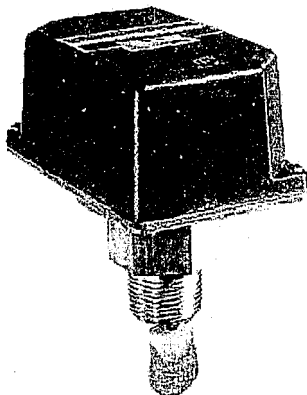
1. The bell should be mounted a minimum of 8 ft. (2.4m) from the floor or as close to the ceiling as possible.
2. Remove the gong.
3. Connect wiring (see Fig. 3).
4. Mount bell mechanism to backbox (bell mechanism must be mounted with the striker pointing down).
5. Reinstall the gong (be sure that the gong positioning pin, in the mechanism housing, is in the hole in the gong).
6. Test all bells for proper operation and observe that they can be heard where required (bells must be heard in all areas as designated by the authority having jurisdiction).





FOR SMALL PIPE

VSR-SF VANE TYPE WATERFLOW ALARM SWITCH WITH RETARD



Stock No. 1113000
U.S. Pat. No. 3921989, Canadian Pat. No. 1009680
Other Patents Pending

The Model VSR-SF is a vane type waterflow switch for use on wet sprinkler systems that use 1", 1 1/4", 1 1/2" or 2" pipe size. The unit may also be used as a sectional waterflow detector on large systems.

The unit contains two single pole double throw snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 8-10 gallons per minute or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

INSTALLATION: These devices may be mounted in horizontal or vertical pipe. On horizontal pipe they should be installed on the top side of the pipe where they will be accessible. The units should not be installed within 6" of a valve, drain or fitting which changes the direction of the waterflow. The unit has a 1" NPT bushing for threading into a non-corrosive TEE. See Fig. 2 for proper TEE size, type and installation.

Screw the device into the TEE fitting as shown in Fig. 2. Care

UL, ULC, CSFM Listed and NYMEA Accepted, CE Marked
Service Pressure: Up to 250 PSI
Minimum Flow Rate for Alarm: 8-10 GPM
Maximum Surge: 18 FPS

Enclosure: Die-cast, red enamel finish
Cover held in place with tamper resistant screws

Contact Ratings: Two sets of SPDT (Form C)
15.0 Amps at 125/250 VAC
2.0 Amps at 30 VDC

Conduit Entrances: Two knockouts provided for 1/2" conduit.

Usage: Listed plastic, copper and schedule 40 iron pipe.

Fits pipe sizes - 1", 1 1/4", 1 1/2" and 2"

Note: 12 paddles are furnished with each unit, one for each pipe size of threaded and sweat TEE, one for 1" CPVC, one for 1" CPVC (Central), one for 1 1/2" polybutylene and one for 1 1/2" threaded (Japan).
(CTS-Copper tubing size)

Environmental Specifications:

- Suitable for indoor or outdoor use with factory installed gasket and die-cast housing.
- NEMA 4/IP55 rated enclosure - use with appropriate conduit fitting.
- Temperature range: 40° F to 120° F (4.5° C to 49° C)

Caution: This device is not intended for applications in explosive environments.

Service Use:

- | | |
|--|----------|
| Automatic Sprinkler | NFPA-13 |
| One or two family dwelling | NFPA-13D |
| Residential occupancy up to four stories | NFPA-13R |
| National Fire Alarm Code | NFPA-72 |

Optional: Cover Tamper Switch Kit, Stock No. 0090018

must be taken to properly orient the device for the direction of waterflow.

The vane must not rub the inside of the TEE or bind in any way. The stem should move freely when operated by hand.

The device can also be used in copper or plastic pipe installations with the proper adapters so that the specified TEE fitting may be installed on the pipe run.

INSPECTION AND TESTING: Check the operation of the unit by opening the inspector's test valve at the end of the sprinkler line or the drain and test connection; if an inspector's test valve is not provided.

If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR-SF is not recommended or advisable.

The frequency of the inspection and testing and its associated protective monitoring system should be in accordance with the applicable NFPA Codes and Standards and/or authority having jurisdiction (manufacturer recommends quarterly or more frequently).

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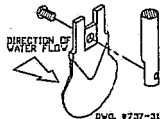
FOR SMALL PIPE

VSR-SF VANE TYPE WATERFLOW ALARM SWITCH WITH RETARD

FIG. 1

Retard Adjustment:

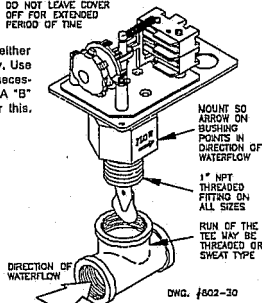
To change time, turn knob (either direction) for desired time delay. Use the minimum amount of retard necessary to prevent false alarms. A "B" setting is usually adequate for this. Factory set at "B".



Important:

There are 12 paddles furnished with each unit. One for each size of threaded, sweat or plastic TEE as described in Fig. 2. These paddles have raised lettering that shows the pipe size and type of TEE that they are to be used with. The proper paddle must be used. The paddle must be properly attached (see drawing) and the screw that holds the paddle must be securely tightened.

DO NOT LEAVE COVER OFF FOR EXTENDED PERIOD OF TIME



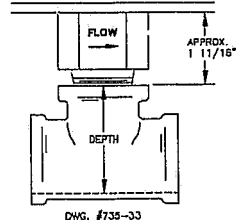
CAUTION:

To prevent leakage apply teflon tape sealant to male threads only. Do not use any other type of lubricant or sealant.

APPROX. RETARD SETTINGS (IN SEC.)

	A	B	C	D	E
0	10-25	20-40	35-55	50-70	60-90

FIG. 2



Screw the device into the TEE fitting as shown. Care must be taken to properly orient the device for the direction of the waterflow.

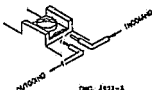
On sweat TEE's no threaded bushings, inserts or adapters are permitted unless they comply with the dimensions listed in the chart below.

Important - The depth to the inside bottom of the TEE should have the following dimensions:

APPROXIMATE DEPTH REQUIREMENT					
TEE SIZE	THREADED	SWEAT	CYS. POLYBUTYLENE	CPVC	
1" x 1/2" x 1"	2 1/16"	1 3/4"	N/A	2 7/16"	
1 1/4" x 1 1/4" x 1"	2 7/16"	2 1/8"	N/A	N/A	
1 1/2" x 1 1/2" x 1"	2 11/16"	2 1/4"	2 1/2"	N/A	
2" x 2" x 1"	3 3/16"	2 3/4"	N/A	N/A	

SWITCH TERMINAL CONNECTIONS CLAMPING PLATE TERMINAL

FIG. 3

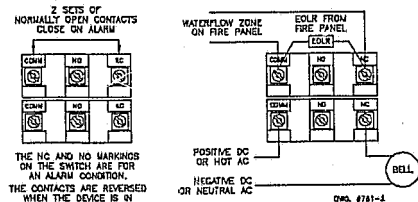


CAUTION:

An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate conductors. The wire must be severed, thereby providing supervision of the connection. An event that the wire becomes dislodged from under the terminal.

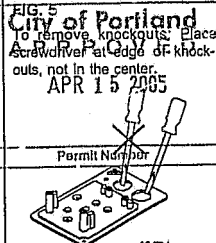
FIG. 4

TYPICAL ELECTRICAL CONNECTIONS



NOTES:

- The model VSR-SF has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other is used to operate a local audible or visual annunciator.
- For supervised circuits see "Switch Terminal Connections" drawing and caution note (Fig. 3).



APPLICATION WARNING

Due to the possibility of unintended discharges caused by pressure surges, trapped air, or short retard times, waterflow switches that are monitoring wet pipe sprinkler systems should not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems.



Series 2000B

Double Check Valve Assemblies

Sizes: 1/2" - 2" (15 - 60mm)

Features

- Ease of maintenance with only one cover
- Top entry
- Replaceable seats and seat discs
- Modular construction
- Compact design
- 1/2" - 2" (15 - 50mm) Cast bronze body construction
- Top mounted ball valve test cocks
- Low pressure drop
- No special tools required
- 1/2" - 1" (15 - 25 mm) have tee handles



2" 2000B HC
(50mm)



1/2" 2000B
(20mm)

Series 2000B Double Check Valve Assemblies shall be installed at referenced cross-connections to prevent the backflow of polluted water into the potable water supply. Only those cross-connections identified by local inspection authorities as non-health hazard shall be allowed the use of an approved double check valve assembly.

Check with local authority having jurisdiction regarding vertical orientation, frequency of testing or other installation requirements.

These valves meet the requirements of ASSE Std. 1015 and AWWA Std. C510 and are approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.

Available Models

Suffix:

- B - Quarter turn ball valves
- LBV - less ball valves
- LH - locking handle ball valves (open position)
- SH - stainless steel ball valve handles
- HC - 2 1/2" inlet/outlet fire hydrant fitting (2" valve)

Prefix:

- U - union connections

Pressure — Temperature

Temperature Range: 33°F - 140°F
(5°C - 60°C)

Maximum Working Pressure: 175psi
(12 bars)

Standards

ASSE Std. 1015, AWWA Std. C510
IAPMO PS31, CSA B64.5

Specifications

A Double Check Valve Assembly shall be installed at each noted location. The assembly shall consist of two positive seating check modules with calibrated springs and rubber seat discs. The check module seats and seat discs shall be replaceable. Service of all internal components shall be through a single access cover secured with stainless steel bolts. The assembly shall also include two resilient seat isolation valves and four top mounted, resilient seated test cocks. The assembly shall meet the requirements of ASSE Std. 1015 and AWWA Std. C510. Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. Assembly shall be an Ames Company Series 2000B

Approvals

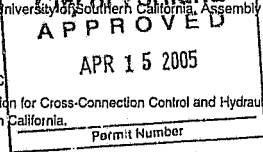
IAPMO, CSA, UPC

- ▲ Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.

- Model LBV is not listed.

- UL Classified (LBV models only) 1/2" - 2" (19 - 50mm)

- Horizontal and vertical "flow up" approval on all sizes.

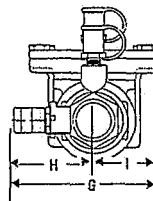
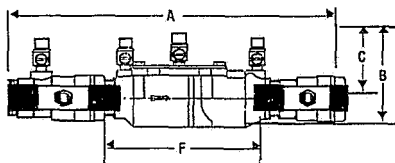


Job Name _____ Contractor _____
 Job Location _____ Approval _____
 Engineer _____ Contractor's P.O. No. _____
 Approval _____ Representative _____

Ames product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Ames Technical Service. Ames reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Ames products previously or subsequently sold.

www.amesfirewater.com

Dimensions - Weights



Suffix HC — Fire Hydrant Fittings dimension "A" = 23 1/2" (594mm)

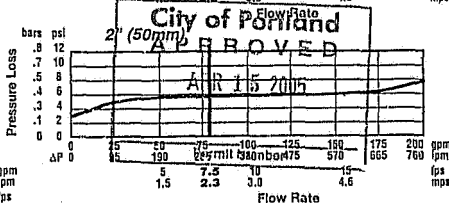
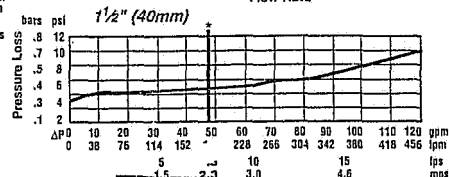
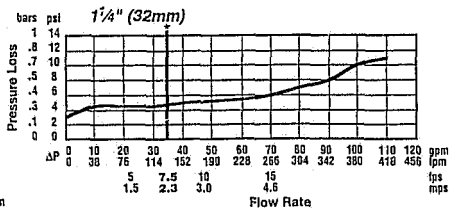
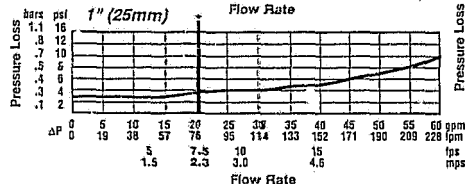
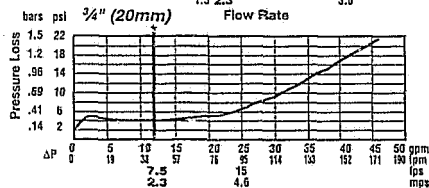
Model	Dimensions																Weight lbs. kgs.	
	Size (DN)	A		B		C		F		G		H		I				
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm				
2000R	1/4	15	10	254	4 1/4	117	2 1/4	62	5	127	3 1/4	85	2 1/4	59	2 1/2	4.5	2	
2000 1/4" AG	1/4	20	11 1/4	282	4	102	3 1/4	79	6 1/4	157	3 1/4	87	2 1/4	34	1 1/2	33	5	2.3
2000B	1	25	13 1/4	337	5 1/4	130	4	102	7 1/4	191	3 1/4	85	1 1/4	43	43	12	5.4	5.4
2000B	1 1/2	32	16 1/4	415	5	127	3 1/4	84	9 1/2	241	5	127	3	76	2	50	15	6.8
2000B	1 1/2	40	16 1/4	425	4 1/4	124	3 1/4	89	9 1/4	248	5 1/4	148	3 1/4	79	2 1/4	68	15.86	7.2
2000B	2	50	19 1/4	495	6 1/4	159	4	102	13 1/4	340	6 1/4	156	3 1/4	87	2 1/4	68	25.75	11.7

Strainer sold separately

Capacities

As compiled from documented Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California lab tests.

*Typical maximum system flow rate: (feet/sec., 2.3 meters/sec.)



A Division of Watts Regulator Company

www.amesfirewater.com

IMPORTANT: Inquire with governing authorities for local installation requirements.



1427 North Market Blvd. • Suite #9 • Sacramento, CA 95834 • Phone: 916-928-0123 • Fax: 916-928-9393

FIRE SYSTEMS WEST, INC.
600 S.E. MARITIME AVENUE, SUITE 300
VANCOUVER, WA 98661

HYDRAULIC CALCULATIONS

FOR

RAMIS RESIDENCE
REMOTE AREA 1

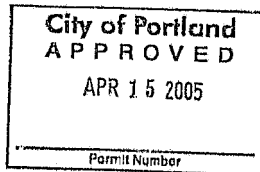
FILE NUMBER: 1118524-1

DATE: APR 11, 2005

-DESIGN DATA-

OCCUPANCY CLASSIFICATION:	RESIDENTIAL 13D
DENSITY:	16 gpm PER HEAD
AREA OF APPLICATION:	2 SPRINKLERS
COVERAGE PER SPRINKLER:	16' X 16' sq. ft.
NUMBER OF SPRINKLERS CALCULATED:	2 sprinklers
TOTAL SPRINKLER WATER FLOW REQUIRED:	32.0 gpm
TOTAL WATER REQUIRED (including hose):	32.1 gpm
FLOW AND PRESSURE (@ RB):	32.0 gpm @ 33.8 psi
SPRINKLER ORIFICE SIZE:	1/2 inch 4.2K
NAME OF CONTRACTOR:	ARCON CONSTRUCTION
DESIGN/LAYOUT BY:	JASON SAMPSON
AUTHORITY HAVING JURISDICTION:	CITY OF PORTLAND
CONTRACTOR CERTIFICATION NUMBER:	49732

CALCULATIONS BY MASS COMPUTER PROGRAM (LICENSE # 50090582)
HMS SYSTEMS, INC.
TUCKER, GA 30084



SPRINKLER SYSTEM HYDRAULIC ANALYSIS

Page 2

DATE: 4/11/2005

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JOB TITLE: RAMIS RESIDENCE

WATER SUPPLY DATA

SOURCE	STATIC	RESID.	FLOW	AVAIL.	TOTAL	REQ'D
NODE	PRESS.	PRESS.	@	PRESS.	@ DEMAND	PRESS.
TAG	(PSI)	(PSI)	(GPM)	(PSI)	(GPM)	(PSI)
SRC	63.0	51.0	680.0	63.0	32.1	47.5

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	32.1 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	32.1 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE		DISCHARGE (GPM)
			TOTAL (PSI)	NORMAL (PSI)	
1	13.0	K= 4.20	14.6	14.6	16.0
2	13.0	- - - -	17.1	17.0	- - -
3	13.0	- - - -	17.1	17.1	- - -
4	13.0	- - - -	17.1	17.1	- - -
4A	13.0	- - - -	17.1	17.1	- - -
5	13.0	K= 4.20	14.5	14.5	16.0
6	13.0	- - - -	17.2	16.9	- - -
7	13.0	- - - -	21.2	20.9	- - -
8	0.0	- - - -	27.9	27.6	- - -
RT	0.0	- - - -	30.1	29.8	- - -
RB	-7.0	- - - -	33.8	33.5	- - -
A	-7.0	- - - -	33.9	33.9	- - -
B	-7.0	- - - -	38.9	38.9	- - -
C	-3.0	- - - -	39.7	39.7	- - -
D	-3.0	- - - -	47.7	47.7	- - -
SRC	0.0	SOURCE	47.5	47.5	32.1

DATE: 4/11/2005

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JOB TITLE: RAMIS RESIDENCE

PIPE DATA

PIPE TAG	END	ELEV.	PT	PN	DISC.	Q(GPM)	DIA(IN)	LENGTH	PRESS.
NODES	(FT)	(PSI)	(PSI)	(GPM)		VEL(FPS)	HW(C)	(FT)	SUM.
							PL/FT		(PSI)
Pipe: 1						-16.0	1.101 PL	45.75 PF	2.5
1	13.0	14.6	14.6	16.0	5.4		150 FTG	10.0 PE	0.0
2	13.0	17.1	17.0	0.0			0.045 TL	55.75 PV	0.2
Pipe: 2						0.0	1.101 PL	5.17 PF	0.0
3	13.0	17.1	17.1	0.0	0.0		150 FTG	5.0 PE	0.0
4A	13.0	17.1	17.1	0.0			0.000 TL	10.17 PV	0.0
Pipe: 3						0.0	1.101 PL	8.33 PF	0.0
4	13.0	17.1	17.1	0.0	0.0		150 FTG	5.0 PE	0.0
4A	13.0	17.1	17.1	0.0			0.000 TL	13.33 PV	0.0
Pipe: 4						0.0	1.101 PL	12.50 PF	0.0
4A	13.0	17.1	17.1	0.0	0.0		150 FTG	5.0 PE	0.0
2	13.0	17.1	17.0	0.0			0.000 TL	17.50 PV	0.0
Pipe: 5						-16.0	1.394 PL	9.75 PF	0.2
2	13.0	17.1	17.0	0.0	3.4		150 FTG	1.0 PE	0.0
6	13.0	17.2	16.9	0.0			0.014 TL	10.75 PV	0.1
Pipe: 6						-16.0	1.101 PL	39.50 PF	2.7
5	13.0	14.5	14.5	16.0	5.4		150 FTG	21.0 PE	0.0
6	13.0	17.2	16.9	0.0			0.045 TL	60.50 PV	0.2
Pipe: 7						-32.0	1.394 PL	49.00 PF	4.0
6	13.0	17.2	16.9	0.0	6.7		150 FTG	28.0 PE	0.0
7	13.0	21.2	20.9	0.0			0.052 TL	77.00 PV	0.3
Pipe: 8						-32.0	1.394 PL	13.00 PF	1.0
7	13.0	21.2	20.9	0.0	6.7		150 FTG	7.0 PE	5.6
8	0.0	27.9	27.6	0.0			0.052 TL	20.00 PV	0.3
Pipe: 9						-32.0	1.394 PL	19.50 PF	2.2
8	0.0	27.9	27.6	0.0	6.7		150 FTG	24.0 PE	0.0
RT	0.0	30.1	29.8	0.0			0.052 TL	43.50 PV	0.3
Pipe: 10						-32.0	1.380 PL	8.00 PF	0.7
RT	0.0	30.1	29.8	0.0	6.9		120 FTG	---- PE	3.0
RB	-7.0	33.8	33.5	0.0			0.082 TL	8.00 PV	0.3
Pipe: 11						-32.0	1.380 PL	1.00 PF	0.1
RB	-7.0	33.8	33.5	0.0	6.9		120 FTG	---- PE	0.0
A	-7.0	33.9	33.9	0.0			0.082 TL	1.00 PV	0.3
Pipe: 12						FIXED PRESSURE LOSS DEVICE			
B	-7.0	0.0	38.9	0.0		5.0 psi,	32.0 gpm		
A	-7.0	0.0	33.9	0.0					

DATE: 4/11/2005

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JOB TITLE: RAMIS RESIDENCE

PIPE TAG	END	ELEV.	PT	PN	DISC.	Q(GPM)	DIA(IN)	LENGTH	PRESS.
NODES	(FT)	(PSI)	(PSI)	(GPM)		VEL(FPS)	HW(C)	(FT)	SUM.
							FL/FT		(PSI)
Pipe: 13						-32.0	1.394 PL	50.00	PF 2.6
B	-7.0	38.9	38.9	0.0	6.7	150 FTG	----		PE -1.7
C	-3.0	39.7	39.7	0.0		0.052 TL	50.00	PV	0.3
Pipe: 14						FIXED PRESSURE LOSS DEVICE			
D	-3.0	0.0	47.7	0.0		8.0 psi,	32.0 gpm		
C	-3.0	0.0	39.7	0.0					
Pipe: 15						-32.1	1.394 PL	20.00	PF 1.0
D	-3.0	47.7	47.7	0.0	6.7	150 FTG	----		PE -1.3
SRC	0.0	47.5	47.5	(N/A)		0.052 TL	20.00	PV	0.3

NOTES:

- (1) Calculations were performed by the HASS 7.6 computer program under license no. 50090582 granted by
HRS Systems, Inc.
4792 LaVista Road
Tucker, GA 30084
- (2) The system has been calculated to provide an average imbalance at each node of 0.013 gpm and a maximum imbalance at any node of 0.188 gpm.
- (3) Velocity pressures have been included in the calculation of the system pressures and flows. Maximum water velocity is 6.9 ft/sec at pipe 10.

(4) PIPE FITTINGS TABLE

Pipe Table Name: STANDARD.PIP

PAGE: *	MATERIAL: S40		HWC: 120							
Diameter	Equivalent Fitting Lengths in Feet									
(in)	E	T	L	C	B	G	A	D	N	
	El1	Tee	LngEl1	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	NPTee	
1.101	2.53	6.33	2.53	6.33	7.59	1.27	12.66	12.66	6.33	
1.394	3.15	6.30	2.10	7.35	6.30	1.05	10.50	10.50	6.30	

SPRINKLER SYSTEM HYDRAULIC ANALYSIS

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DATE: 4/11/2005

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JOB TITLE: RAMIS RESIDENCE

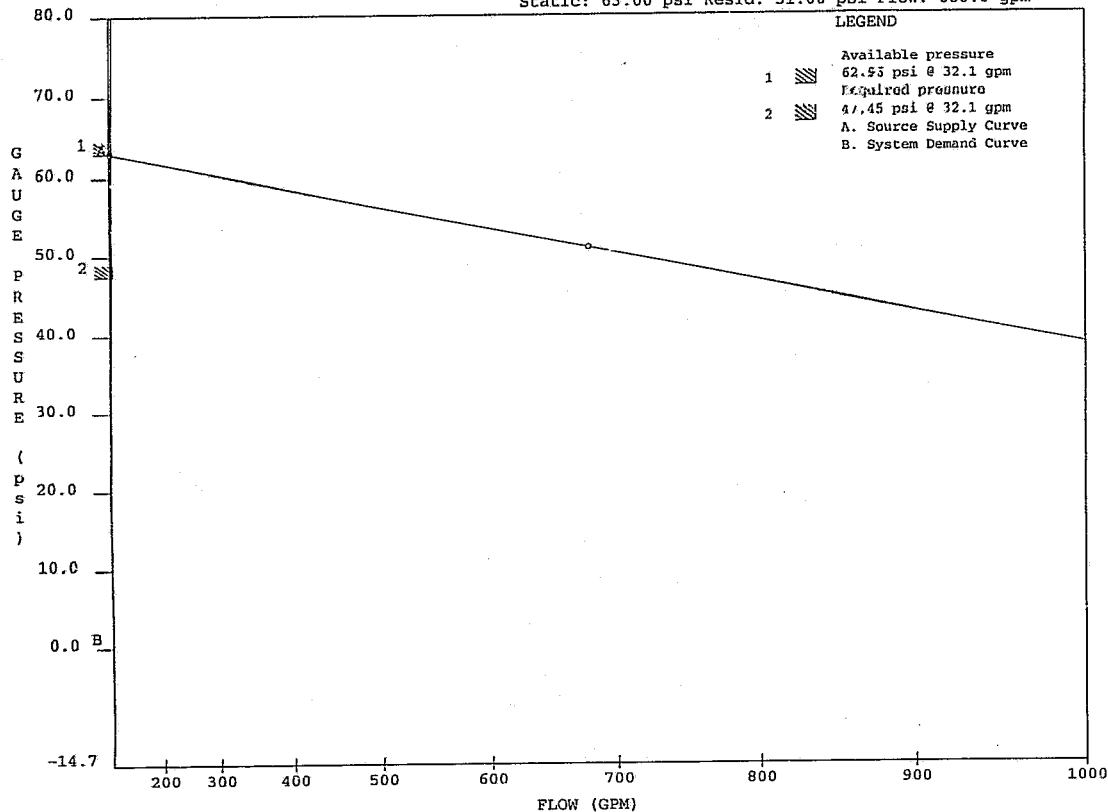
PAGE: A MATERIAL: S40 HWC: 120

Diameter Equivalent Fitting Lengths in Feet

(in)	E	T	L	C	B	G	A	D	N
	El1	Tee	LngEl1	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	NPTEE
1.380	3.00	6.00	2.00	7.00	6.00	1.00	10.00	10.00	6.00

WATER SUPPLY ANALYSIS

Static: 63.00 psi Resid: 51.00 psi Flow: 680.0 gpm



DATE: 4/11/2005
JOB TITLE: RAMIS RESIDENCE

SPRINKLER SYSTEM HYDRAULIC ANALYSIS

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FIRE SYSTEMS WEST, INC.
600 S.E. MARITIME AVENUE, SUITE 300
VANCOUVER, WA 98661

HYDRAULIC CALCULATIONS

FOR

RAMIS RESIDENCE
REMOTE AREA 2

FILE NUMBER: 1118524-2

DATE: APR 11, 2005

-DESIGN DATA-

OCCUPANCY CLASSIFICATION:	RESIDENTIAL 13D
DENSITY:	16 gpm PER HEAD
AREA OF APPLICATION:	2 SPRINKLERS
COVERAGE PER SPRINKLER:	16' X 16' sq. ft.
NUMBER OF SPRINKLERS CALCULATED:	2 sprinklers
TOTAL SPRINKLER WATER FLOW REQUIRED:	32.1 gpm
TOTAL WATER REQUIRED (including hose):	32.2 gpm
FLOW AND PRESSURE (@ RB):	32.1 gpm @ 35.1 psi
SPRINKLER ORIFICE SIZE:	1/2 inch 4.2K
NAME OF CONTRACTOR:	ARCON CONSTRUCTION
DESIGN/LAYOUT BY:	JASON SAMPSON
AUTHORITY HAVING JURISDICTION:	CITY OF PORTLAND
CONTRACTOR CERTIFICATION NUMBER:	49732

CALCULATIONS BY HASS COMPUTER PROGRAM (LICENSE # 50090582)
HRS SYSTEMS, INC.
TUCKER, GA 30084

SPRINKLER SYSTEM HYDRAULIC ANALYSIS

Page 2

DATE: 4/11/2005

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JOB TITLE: RAMIS RESIDENCE

WATER SUPPLY DATA

SOURCE	STATIC	RESID.	FLOW	AVAIL.	TOTAL	REQ'D
NODE	PRESS.	PRESS.	@	PRESS.	@	PRESS.
TAG	(PSI)	(PSI)	(GPM)	(PSI)	DEMAND	(PSI)
					(GPM)	
SRC	63.0	51.0	680.0	63.0	32.2	48.8

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	32.2 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	32.2 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE		DISCHARGE (GPM)
			TOTAL (PSI)	NORMAL (PSI)	
1	13.0	- - - -	18.0	18.0	- - -
2	13.0	- - - -	18.0	17.7	- - -
3	13.0	K= 4.20	14.6	14.6	16.1
4	13.0	K= 4.20	14.5	14.5	16.0
4A	13.0	- - - -	15.1	14.3	- - -
5	13.0	- - - -	18.5	18.5	- - -
6	13.0	- - - -	18.5	18.2	- - -
7	13.0	- - - -	22.5	22.2	- - -
8	0.0	- - - -	29.2	28.9	- - -
RT	0.0	- - - -	31.4	31.1	- - -
RB	-7.0	- - - -	35.1	34.8	- - -
A	-7.0	- - - -	35.2	35.2	- - -
B	-7.0	- - - -	40.2	40.2	- - -
C	-3.0	- - - -	41.0	41.0	- - -
D	-3.0	- - - -	49.0	49.0	- - -
SRC	0.0	SOURCE	48.8	48.8	32.2

DATE: 4/11/2005

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JOB TITLE: RAMIS RESIDENCE

PIPE DATA

PIPE TAG	END NODES	ELEV. (FT)	PT (PSI)	PN (PSI)	DISC. (GPM)	Q(GPM) VEL(FPS)	DIA(IN) HW(C) FL/FT	LENGTH (FT)	PRESS. SUM. (PSI)
Pipe: 1									
1		13.0	18.0	18.0	0.0	0.0	1.101 PL	45.75	PF 0.0
2		13.0	18.0	17.7	0.0	0.0	150 FTG	10.0	PE 0.0
							0.000 TL	55.75	PV 0.0
Pipe: 2									
3		13.0	14.6	14.6	16.1	5.4	1.101 PL	5.17	PF 0.5
4A		13.0	15.1	14.3	0.0	0.0	150 FTG	5.0	PE 0.0
							0.045 TL	10.17	PV 0.2
Pipe: 3									
4		13.0	14.5	14.5	16.0	5.4	1.101 PL	8.33	PF 0.6
4A		13.0	15.1	14.3	0.0	0.0	150 FTG	5.0	PE 0.0
							0.045 TL	13.33	PV 0.2
Pipe: 4									
4A		13.0	15.1	14.3	0.0	10.8	1.101 PL	12.50	PF 2.9
2		13.0	18.0	17.7	0.0	0.0	150 FTG	5.0	PE 0.0
							0.163 TL	17.50	PV 0.8
Pipe: 5									
2		13.0	18.0	17.7	0.0	6.7	1.394 PL	9.75	PF 0.6
6		13.0	18.5	18.2	0.0	0.0	150 FTG	1.0	PE 0.0
							0.052 TL	10.75	PV 0.3
Pipe: 6									
5		13.0	18.5	18.5	0.0	0.0	1.101 PL	39.50	PF 0.0
6		13.0	18.5	18.2	0.0	0.0	150 FTG	21.0	PE 0.0
							0.000 TL	60.50	PV 0.0
Pipe: 7									
6		13.0	18.5	18.2	0.0	6.7	1.394 PL	49.00	PF 4.0
7		13.0	22.5	22.2	0.0	0.0	150 FTG	28.0	PE 0.0
							0.052 TL	77.00	PV 0.3
Pipe: 8									
7		13.0	22.5	22.2	0.0	6.7	1.394 PL	13.00	PF 1.0
8		0.0	29.2	28.9	0.0	0.0	150 FTG	7.0	PE 5.6
							0.052 TL	20.00	PV 0.3
Pipe: 9									
8		0.0	29.2	28.9	0.0	6.7	1.394 PL	19.50	PF 2.2
RT		0.0	31.4	31.1	0.0	0.0	150 FTG	24.0	PE 0.0
							0.052 TL	43.50	PV 0.3
Pipe: 10									
RT		0.0	31.4	31.1	0.0	6.9	1.380 PL	8.00	PF 0.7
RB		0.0	31.4	31.1	0.0	6.9	120 FTG	----	PE 3.0
		-7.0	35.1	34.8	0.0	0.0	0.082 TL	8.00	PV 0.3
Pipe: 11									
RB		-7.0	35.1	34.8	0.0	6.9	1.380 PL	1.00	PF 0.1
A		-7.0	35.2	35.2	0.0	0.0	120 FTG	----	PE 0.0
							0.082 TL	1.00	PV 0.3
Pipe: 12									
B		-7.0	0.0	40.2	0.0	0.0	FIXED PRESSURE LOSS DEVICE		
A		-7.0	0.0	35.2	0.0	0.0	5.0 psi,	32.1 gpm	

DATE: 4/11/2005

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JOB TITLE: RAMIS RESIDENCE

PIPE TAG	END	ELEV.	PT	PN	DISC.	Q(GPM)	DIA(IN)	LENGTH	PRESS.
NODES	(FT)	(PSI)	(PSI)	(GPM)		VEL(FPS)	HW(C)	(FT)	SUM.
							FL/FT		(PSI)
Pipe: 13									
						-32.1	1.394 FL	50.00	PF 2.6
B	-7.0	40.2	40.2	0.0	6.7		150 FTG	----	PE -1.7
C	-3.0	41.0	41.0	0.0			0.052 TL	50.00	PV 0.3
Pipe: 14									
FIXED PRESSURE LOSS DEVICE									
D	-3.0	0.0	49.0	0.0			8.0 psi,	32.1 gpm	
C	-3.0	0.0	41.0	0.0					
Pipe: 15									
						-32.2	1.394 PL	20.00	PF 1.0
D	-3.0	49.0	49.0	0.0	6.8		150 FTG	----	PE -1.3
SRC	0.0	48.8	48.8	(N/A)			0.052 TL	20.00	PV 0.3

NOTES:

- (1) Calculations were performed by the HASS 7.6 computer program under license no. 50090582 granted by
HRS Systems, Inc.
4792 LaVista Road
Tucker, GA 30084
- (2) The system has been calculated to provide an average imbalance at each node of 0.022 gpm and a maximum imbalance at any node of 0.332 gpm.
- (3) Velocity pressures have been included in the calculation of the system pressures and flows. Maximum water velocity is 10.8 ft/sec at pipe 4.

(4) PIPE FITTINGS TABLE

Pipe Table Name: STANDARD.PIP

PAGE: *	MATERIAL: S40		HWC: 120		Equivalent Fitting Lengths in Feet						
Diameter (in)	E	T	L	C	B	G	A	D	N		
	E11	Tee	LngE11	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	NP Tee		
1.101	2.53	6.33	2.53	6.33	7.59	1.27	12.66	12.66	6.33		
1.394	3.15	6.30	2.10	7.35	6.30	1.05	10.50	10.50	6.30		

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JOB TITLE: RAMIS RESIDENCE

PAGE: A MATERIAL: S40 HWC: 120

Diameter Equivalent Fitting Lengths in Feet

(in)	E	T	L	C	B	G	A	D	N
	Ell	Tee	LngEll	ChkVlv	BfyVlv	GatVlv	AlmChk	DPVlv	NPTee
1.380	3.00	6.00	2.00	7.00	6.00	1.00	10.00	10.00	6.00

DATE: 4/11/2005
JOB TITLE: RAMIS RESIDENCE

SPRINKLER SYSTEM HYDRAULIC ANALYSIS

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WATER SUPPLY ANALYSIS

Static: 63.00 psi Resid: 51.00 psi Flow: 680.0 gpm

