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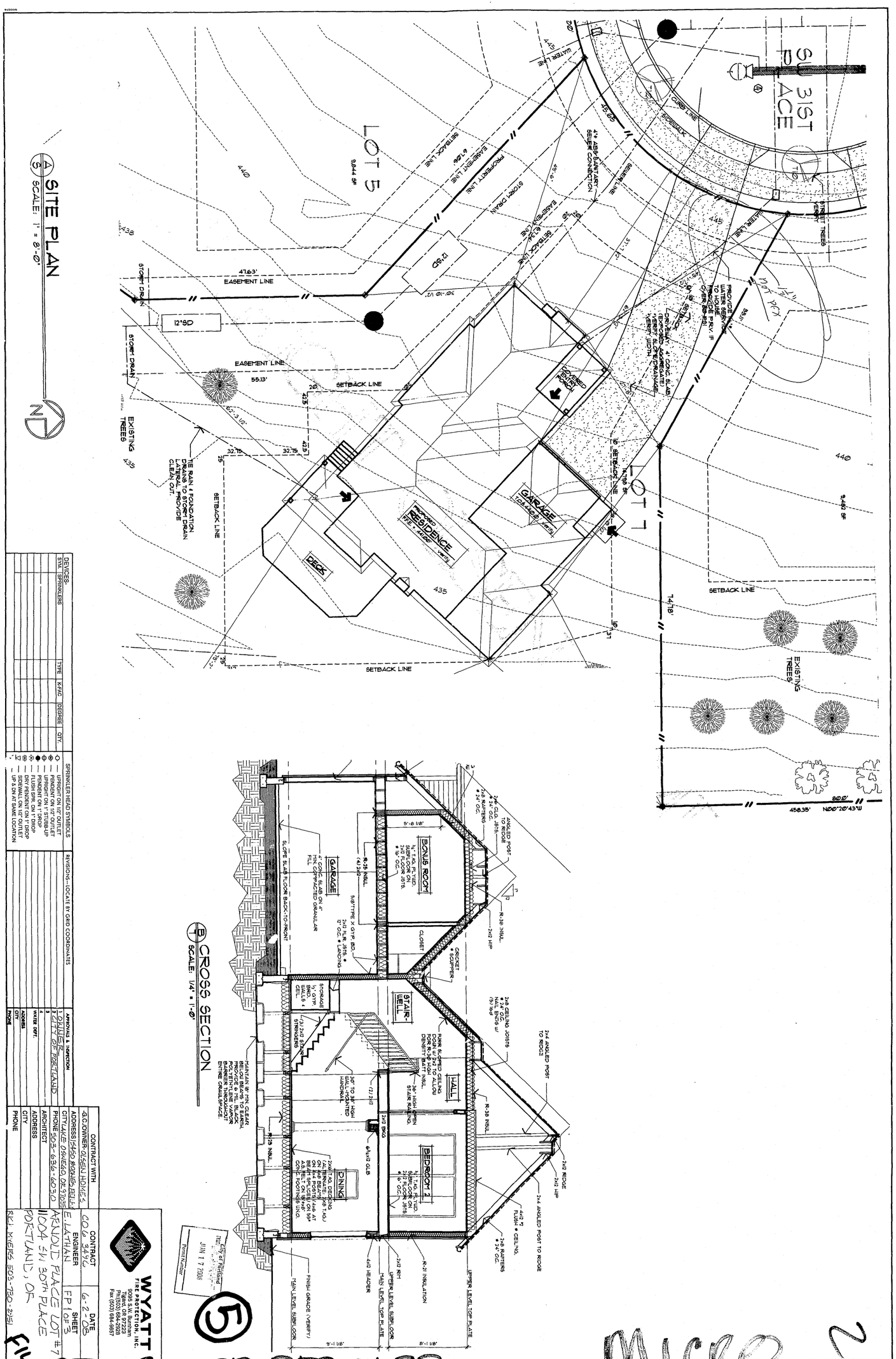

DEVICES-				
SYM.	SPRINKLERS	TYPE	K-FAC	DESIREE

QTY.	SPRINKLER HEAD SYMBOLS
◇	— UPRIGHT ON 1/2" OUTLET
◇	— RECESSED ON 1/2" OUTLET
◆	— UPRIGHT ON 1" STUB-UP
⊕	— PENDENT ON 1" DROP
⊕	— CONCEALED ON 1" DROP
⊕	— DRY PENDENT ON 1" DROP
⊕	— SIDEWALL ON 1/2" OUTLET
⊕	— UP & ON AT SAME LOCATION

REVISIONS--LOCATE BY GRID COORDINATES	APPROVAL & INSPECTION
1	CITY OF PORTLAND
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CITY OF PORTLAND
BUREAU OF DEVELOPMENT SERVICES
JUN 17 2008
Permit Number

CONTRACT WITH	
-G.C./OWNER: OLSEN HOMES	
ADDRESS: 5450 BONUS FELLS	
CITY: LAKE OSWEGO, OR 97035	
PHONE: 503-636-6030	
ARCHITECT	
ADDRESS	
CITY	
PHONE	

WYATT
FIRE PROTECTION, INC.
9085 S.W. Burnham
Tigard, OR 97223
Ph:(503) 684-2928
Fax:(503) 684-9857

CONTRACT	DATE
06 3496	6-2-08
ENGINEER	SHEET
E. LATHAN	FP1 OF 3

ARNOLD PLACE LOT #7
11004 SW 30TH PLACE
PORTLAND, OR

RKJ KYERS 503-730-2251

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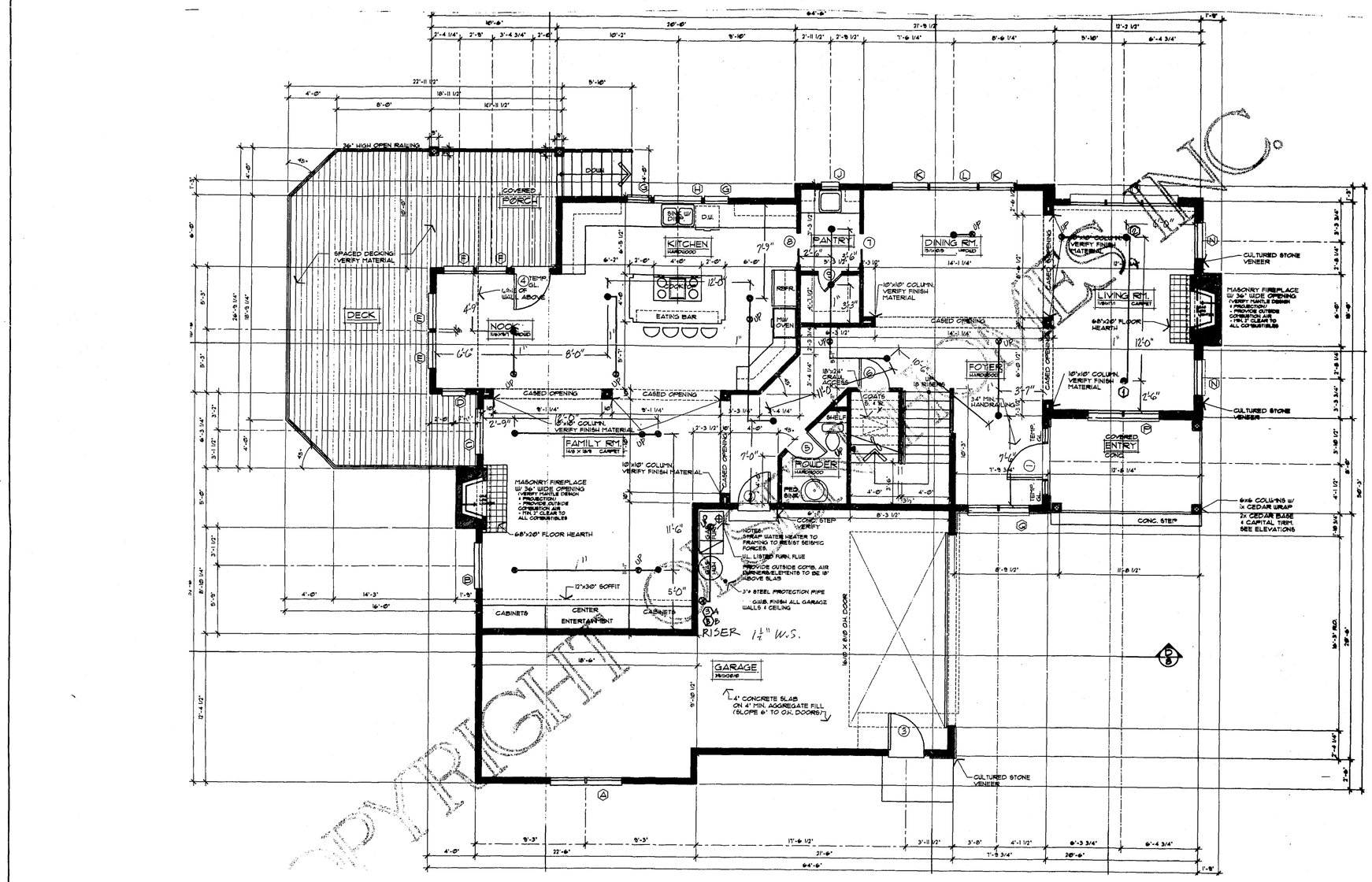
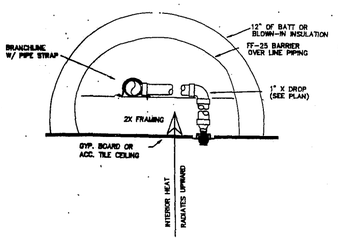
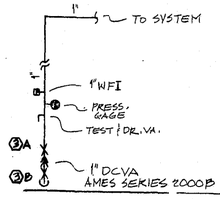
FILE 07-182888-DFS-01-RS

MICRO 2





TYPICAL INSULATION COVER TO BE PROVIDED BY OTHERS AFTER PIPING INSTALLATION



1ST FLOOR

City of Portland
Bureau of Development Services
JUN 13 2008
Reviewed for code compliance with the
for Residential Fire Systems

150 PSI
CHSNJM

Notes:

All pipe and fittings to be CPVC. 1"
All hangers to be CPVC Standoff type and located per NFPA 13 requirements.
Max. sprinkler spacing to be 16 x 16 w/8'-0" off walls.
1" sprinkler mains run at second floor with 1" drops to main floor sprinklers.

A/2 MAIN LEVEL FLOOR PLAN

SCALE: 1/4" = 1'-0"

1698 Sq. Ft.
TOTAL: 3,911 Sq. Ft.

DEVICES- SYM.	SPRINKLERS	TYPE	K-FAC.	DEGREE	QTY.
●	TYCO LF II ½" WHT. CONC.	SSP	4.9	155	15
◀	TYCO LF II ½" WHT. WHT.	HSW	4.2	155	1
					16

SPRINKLER HEAD SYMBOLS
- — UPRIGHT ON 1/2" OUTLET
- — PENDENT ON 1/2" OUTLET
- — UPRIGHT ON 1" STUBB-UP
- — PENDENT ON 1" DROP
- — FLUSH SPR. ON 1" DROP
- — DRY PENDENT ON 1" DROP
- — SIDEWALL ON 1/2" OUTLET
- — UP & DN AT SAME LOCATION

REVISIONS—LOCATE BY GRID COORDINATES

APPROVALS & INSPECTION
1 OWNER
2 CITY OF PORTLAND
3
4
WATER DEPT.
ADDRESS
CITY
PHONE

WYATT
FIRE PROTECTION, INC.
9095 S.W. Burnham
Tigard, OR 97223
Ph:(503) 684-2926
Fax (503) 684-9657

CONTRACT WITH	CONTRACT	DATE
-G.C./OWNER- OLSEN HOMES	06 3496	6-2-08
ADDRESS 15450 BOONES FERRY	ENGINEER E. LATHAN	SHEET FP 2 OF 3
CITY LAKE OSWEGO, OR. 97035	ARNOLD PLACE LOT #7	
PHONE 503-686-6030	11004 SW 30TH PLACE	
ARCHITECT	PORTLAND, OR	
ADDRESS		
CITY		
PHONE	RICK MYERS 503-730-2951	

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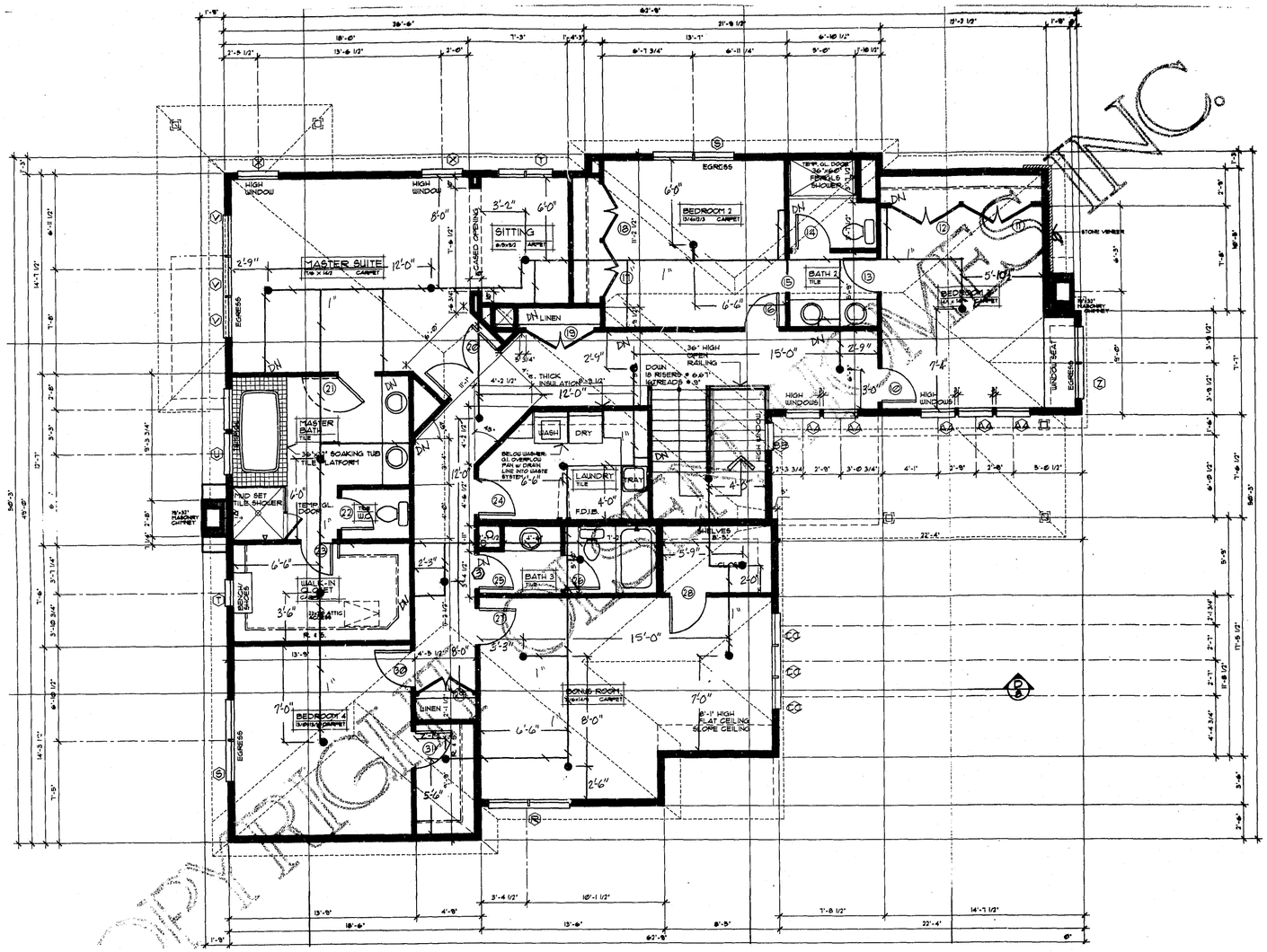

UPPER LEVEL FLOOR PLAN 2213 Sq. Ft.

SCALE: 1/4" = 1'-0" TOTAL: 3,311Sq. Ft.

DEVICES-

SYM.	SPRINKLERS	TYPE	K-FAC	DEGREE	QTY.
●	TYCO LFII 1/2" WHT. CONC.	SSP	4.9	155	20
					20

SPRINKLER HEAD SYMBOLS
- — UPRIGHT ON 1/2" OUTLET
- — PENDENT ON 1/2" OUTLET
- — UPRIGHT ON 1" STUBB-UP
- — PENDENT ON 1" DROP
- — FLUSH SPR. ON 1" DROP
- — DRY PENDENT ON 1" DROP
- — SIDEWALL ON 1/2" OUTLET
- — UP & DN AT SAME LOCATION

REVISIONS—LOCATE BY GRID COORDINATES

APPROVALS & INSPECTION
1 OWNER
2 CITY OF PORTLAND
3
4
WATER DEPT.
ADDRESS
CITY
PHONE

WYATT
FIRE PROTECTION, INC.
9095 S.W. Burnham
Tigard, OR 97223
Ph:(503) 684-2928
Fax (503) 684-9857

CONTRACT WITH	CONTRACT	DATE
G.C./OWNER- OLSEN HOMES	C06a 3496	6-2-08
ADDRESS 15450 BOONES FERRY	ENGINEER	SHEET
CITY LAKE OSWEGO, OR 97035	E. LATHAN	FP 3 OF 3
PHONE 503-636-6030	ARNOLD PLACE LOT #7	
ARCHITECT	11004 SW 30TH PLACE	
ADDRESS	PORTLAND, OR	
CITY		
PHONE	RICK MYERS 503-730-2951	

RS.07.182888 DFS.01.

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Building Permit Application

City of Portland
1900 SW 4th, Suite 5000, PO Box 8120, Portland, OR 97201
Phone: (503) 823-7363, Fax: (503) 823-3018
TDD: (503) 823-6868, Website: www.bds.ci.portland.or.us

Office Use Only	
Date received: 6/5/08	Permit no.:
By:	

TYPE OF WORK	
☐ New construction	☐ Demolition
☒ Addition/alteration/replacement	☐ Other:
CATEGORY OF CONSTRUCTION	
☒ 1- and 2-family dwelling	☐ Commercial/industrial
☐ Accessory building	☐ Multi-family
☐ Master builder	☐ Other:

JOB SITE INFORMATION AND LOCATION

Job site address: 11004 SW 30th Place
City/State/ZIP: Portland, OR
Suite/bldg./apt. no.: | Project name: Arnold Place
Cross street/directions to job site: Lot 7

Subdivision: | Lot no.:
Tax map/parcel no.:

DESCRIPTION OF WORK

Provide an automatic fire sprinkler system.

☐ PROPERTY OWNER	☐ TENANT
Name:	
Address:	
City/State/ZIP:	
Phone: ( )	Fax: ( )

☒ APPLICANT	☐ CONTACT PERSON
Business name: See Contractor info	
Contact name:	
Address:	
City/State/ZIP:	
Phone: ( )	Fax: ( )
E-mail:	

CONTRACTOR

Business name: Wyatt Fire Protection
Address: 9095 SW Burnham
City/State/ZIP: Tigard, OR 97223
Phone: (503) 684-2928 | Fax: (503) 684-9657
CCB lic.: 64077

Authorized signature:
Print name: Eugene Lathan | Date: 6-3-08

REQUIRED DATA: 1- AND 2-FAMILY DWELLING

Permit fees are based on the value of the work performed.* Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation	4,535
Number. of bedrooms:	
Number of bathrooms:	
Total number of floors:	
New dwelling area:	square feet
Garage/carport area:	square feet
Covered porch area:	square feet
Deck area:	square feet
Other structure area:	square feet

REQUIRED DATA: COMMERCIAL-USE CHECKLIST

Permit fees* are based on the value of the work performed. Indicate the value (rounded to the nearest dollar) of all equipment, materials, labor, overhead, and the profit for the work indicated on this application.

Valuation	
Existing building area:	square feet
New building area:	square feet
Number of stories:	
Type of construction:	
Occupancy groups:	
Existing:	
New:	

NOTICE

All contractors and subcontractors are required to be licensed with the Oregon Construction Contractors Board under ORS 701 and may be required to be licensed in the jurisdiction in which work is being performed. If the applicant is exempt from licensing, the following reasons apply:

BUILDING PERMIT FEES*

Please refer to fee schedule

Fees due upon application	
Amount received	
Date received:	

This permit application expires if a permit is not obtained within 180 days after it has been accepted as complete

* Fee methodology set by Tri-County Building Industry Service Board

tyco / Fire & Building Products

Technical Services: Tel: (800) 381-9312 / Fax: (800) 791-5500

rapidresponse™
HOME FIRE SPRINKLER SYSTEM

Series LFII Residential Concealed Pendent Sprinklers, Flat Plate 4.9 K-factor

General Description

The Series LFII (TY3596) 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 (TY3596) 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 (TY3596) has a 4.9 (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 (TY3596) 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 (TY3596) 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 (TY3596) 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.

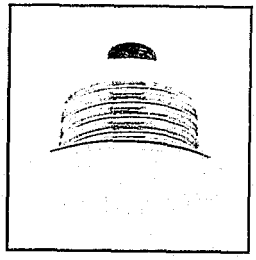
The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted with any questions.

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.

Sprinkler/Model Identification Number

SIN TY3596



Technical Data

Approvals:
UL and C-UL Listed.

Maximum Working Pressure:
175 psi (12,1 bar)

Discharge Coefficient:
K = 4.9 GPM/psi$^{1/2}$ (70,6 LPM/bar$^{1/2}$)

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

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	Bronze
Compression Screw	Brass
Deflector	Copper or Brass
Guide Pin Housing	Bronze

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)
		160°F/71°C Sprinkler
12 x 12 (3,7 x 3,7)	12 (3,7)	13 GPM (49,2 LPM) 7.0 psi (0,48 bar)
14 x 14 (4,3 x 4,3)	14 (4,3)	13 GPM (53,0 LPM) 7.0 psi (0,48 bar)
16 x 16 (4,9 x 4,9)	16 (4,9)	13 GPM (60,6 LPM) 7.0 psi (0,48 bar)
18 x 18 (5,5 x 5,5)	18 (5,5)	17 GPM (64,3 LPM) 12.0 psi (0.83 bar)
20 x 20 (6,1 x 6,1)	20 (6,1)	20 GPM (75,7 LPM) 16.7 psi (1,15 bar)

(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 WET PIPE HYDRAULIC DESIGN CRITERIA
FOR THE SERIES LFII (TY3596) RESIDENTIAL CONCEALED PENDENT SPRINKLER

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 (TY3596) 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 TFP490 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 is 8 feet (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).

Installation

The Series LFII (TY3596) 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 support cup 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-

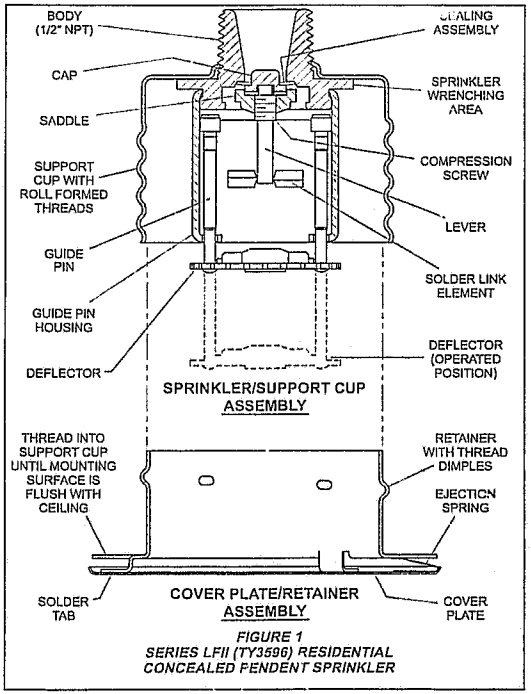


FIGURE 1
SERIES LFII (TY3596) RESIDENTIAL CONCEALED PENDENT SPRINKLER

mum 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 the Cover Plate/Retainer Assembly 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.

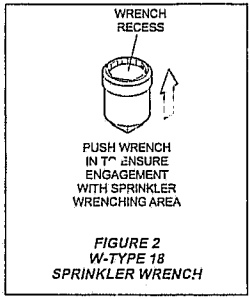


FIGURE 2
W-TYPE 18 SPRINKLER WRENCH

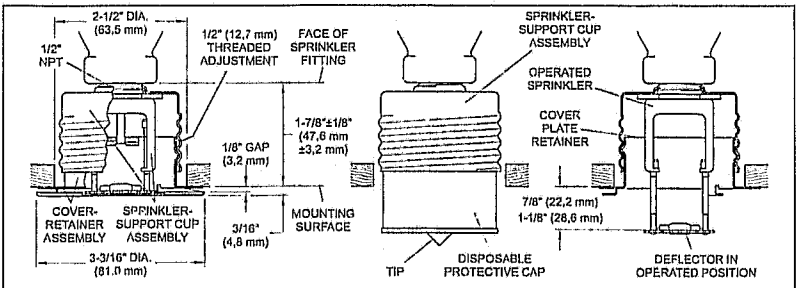


FIGURE 3
SERIES LFII (TY3596) RESIDENTIAL CONCEALED PENDENT SPRINKLER
INSTALLATION DIMENSIONS / PROTECTIVE CAP / ACTIVATED DEFLECTOR

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 Guide Pins 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 (TY3596) must be maintained and serviced in accordance with the following instructions:

NOTES

Absence of a Cover 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 & Building Products (TFBP) 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 TFBP. No warranty is given for products or components manufactured by companies not affiliated by ownership with TFBP 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 TFBP to be defective shall be either repaired or replaced, at TFBP's sole option. TFBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFBP 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 TFBP be liable, in contract, tort, strict liability or under any other legal theory, for incidental, incirect, special or consequential damages, including but not limited to labor charges, regardless of whether TFBP was informed about the possibility of such damages, and in no event shall TFBP's 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.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

Ordering Procedure

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

Sprinkler Assembly:

Series LFII (TY3596), K=4.9, Residential Concealed Pendent Sprinkler without Cover Plate Assembly, P/N 51-112-1-160.

Cover Plate Assembly:

Cover Plate Assembly having a (specify) finish for the Series LFII (TY3596), K=4.9, Residential Concealed Pendent Sprinkler, P/N (specify).

Chrome	P/N 56-122-9-135
Off White	P/N 56-122-0-135
Bright White	P/N 56-122-4-135
Flat White	P/N 56-122-5-135
White (RAL9010)*	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.

Series LFII Residential Horizontal Sidewall Sprinklers 4.2 K-factor

General Description

The Series LFII (TY1334) Residential Horizontal Sidewall Sprinklers are decorative, fast response, frangible bulb sprinklers designed for use in residential occupancies such as homes, apartments, dormitories, and hotels. When aesthetics and optimized flow characteristics are the major consideration, the Series LFII (TY1334) should be the first choice.

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 (TY1334) 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.

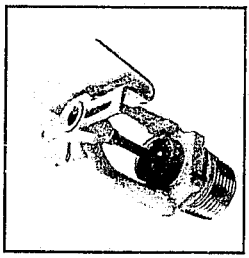
The recessed version of the Series LFII (TY1334) is intended for use in areas with finished walls. It employs a two-piece Style 20 Recessed Escutcheon. The Recessed Escutcheon provides 1/4 inch (6,4 mm) of recessed adjustment or up to 1/2 inch (12,7 mm) of total adjustment from the flush mounting surface position. The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the pipe nipples to the sprinklers must be cut.

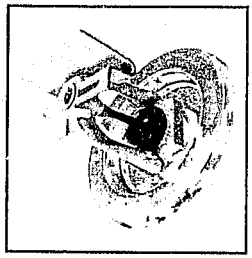
The Series LFII (TY1334) has been designed with heat sensitivity and water distribution characteristics proven to help in the control of residential fires and to improve the chance for occupants to escape or be evacuated.

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.

WARNINGS
The Series LFII (TY1334) Residential Horizontal Sidewall 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 TY1334

Components:
1 - Frame
2 - Button Assembly
3 - Sealing Assembly
4 - Bulb
5 - Compression Screw
6 - Deflector *

* Temperature rating is indicated on top of Deflector.

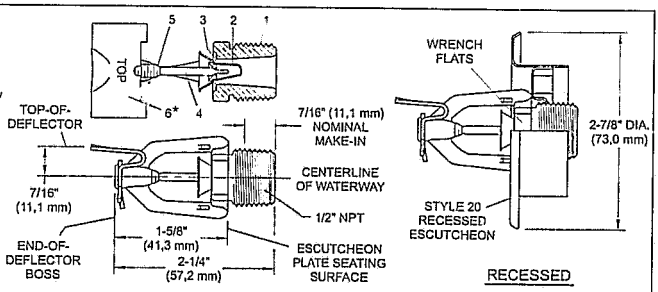


FIGURE 1
SERIES LFII (TY1334) RESIDENTIAL
HORIZONTAL SIDEWALL AND RECESSED HORIZONTAL SIDEWALL SPRINKLERS

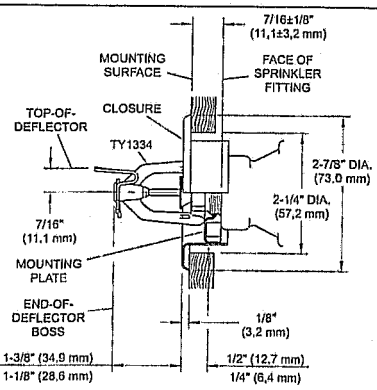


FIGURE 2
STYLE 20 RECESSED ESCUTCHEON
FOR USE WITH THE SERIES LFII (TY1334)
RESIDENTIAL HORIZONTAL SIDEWALL SPRINKLER

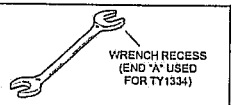


FIGURE 3
W-TYPE 6 SPRINKLER WRENCH

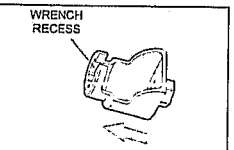


FIGURE 4
W-TYPE 7 RECESSED
SPRINKLER WRENCH

Technical Data

Approvals:
UL and C-UL Listed. NYC Approved under MEA 44-03-E.

Maximum Working Pressure:
175 psi (12,1 bar)

Discharge Coefficient:
K = 4.2 GPM/psi$^{1/2}$ (60,5 LPM/bar$^{1/2}$)

Temperature Rating:
155°F/68°C or 175°F/79°C

Finishes:
White Polyester Coated,
Chrome Plated, or Natural Brass

Physical Characteristics:

Frame	Brass
Button	Bronze
Sealing Assembly	Beryllium Nickel w/Teflon†
Bulb	3 mm dia. Glass
Compression Screw	Bronze
Deflector	Copper

†Dupont Registered Trademark

Operation

The glass Bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass Bulb allowing the sprinkler to activate and flow water.

Design Criteria

The Series LFII (TY1334) Residential Horizontal Sidewall 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 TFP490 for the manufacturer's recommendations that may be acceptable to the local 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, B, C, and D 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 Tables A, B, C, and D 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 with an end-of-deflector-boss to wall distance of 1-3/8 to 6 inches or in the recessed position using only the Style 20 Recessed Escutcheon as shown in Figure 2.

In addition the top-of-deflector-to-ceiling distance is to be within the range (Ref. Table A, B, C, or D) being hydraulically calculated.

Sprinkler Spacing. The minimum spacing between sprinklers is 8 feet (2,4 m). The maximum spacing between sprinklers cannot exceed the width 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 16 feet for a 16 ft. x 20 ft. coverage area).

Installation

The Series LFII (TY1334) must be installed in accordance with the following instructions:

NOTES

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch (1,6 mm).

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 maximum 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.

The Series LFII Horizontal Sidewall Sprinklers must be installed in accordance with the following instructions.

Step 1. Horizontal sidewall sprinklers are to be installed in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. The word "TOP" on the Deflector is to face towards the ceiling with the front edge of the Deflector parallel to the ceiling.

Step 2. With pipe thread sealant applied to the pipe threads, hand tighten the sprinkler into the sprinkler fitting.

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (Ref. Figure 3). With reference to Figure 1, the W-Type 6 Sprinkler Wrench is to be applied to the wrench flats.

The Series LFII Recessed Horizontal Sidewall Sprinklers must be installed in accordance with the following instructions.

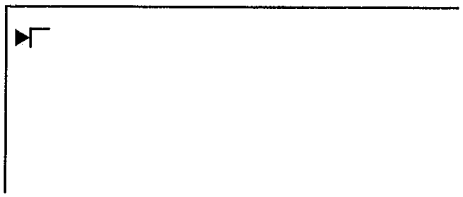
Step A. Recessed horizontal sidewall sprinklers are to be installed in the horizontal position with their centerline of waterway perpendicular to the back wall and parallel to the ceiling. The word "TOP" on the Deflector is to face towards the ceiling.

Step B. After installing the Style 20 Mounting Plate over the sprinkler threads and with pipe thread sealant applied to the pipe threads, hand tighten the sprinkler into the sprinkler fitting.

Step C. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (Ref. Figure 4). With reference to Figure 1, the W-Type 7 Recessed Sprinkler Wrench is to be applied to the sprinkler wrench flats.

Step C. After the wall has been installed or the finish coat has been applied, slide on the Style 20 Closure over the Series LFII Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the wall.

(Continued on Page 8)



ELEVATION

Maximum Coverage Area [a] Width x Length [b] Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	Minimum Flow [c] and Residual Pressure			
		Top-Of-Deflector- To- Ceiling: 4 to 6 Inches (100 to 150 mm)		Top-Of-Deflector- To- Ceiling: 6 to 12 Inches (150 to 300 mm)	
		155°F/68°C	175°F/79°C	155°F/68°C	175°F/79°C
12 x 12 (3,7 x 3,7)	12 (3,7)	12 GPM (45,4 LPM) 8.2 psi (0,57 bar)	12 GPM (45,4 LPM) 8.2 psi (0,57 bar)	13 GPM (49,2 LPM) 9.6 psi (0,66 bar)	13 GPM (49,2 LPM) 9.6 psi (0,66 bar)
14 x 14 (4,3 x 4,3)	14 (4,3)	14 GPM (53,0 LPM) 11.1 psi (0,77 bar)	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	17 GPM (64,3 LPM) 16.4 psi (1,13 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)	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)
16 x 18 (4,9 x 5,5)	16 (4,9)	19 GPM (71,9 LPM) 20.5 psi (1,41 bar)	19 GPM (71,9 LPM) 20.5 psi (1,41 bar)	21 GPM (79,5 LPM) 25.0 psi (1,72 bar)	21 GPM (79,5 LPM) 25.0 psi (1,72 bar)
16 x 20 (4,9 x 6,1)	16 (4,9)	23 GPM (87,1 LPM) 30.0 psi (2,07 bar)	23 GPM (87,1 LPM) 30.0 psi (2,07 bar)	26 GPM (98,4 LPM) 38.3 psi (2,64 bar)	26 GPM (98,4 LPM) 38.3 psi (2,64 bar)

(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.

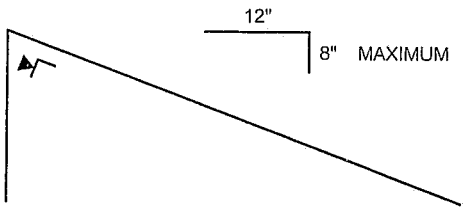
(b) Width (backwall where sprinkler is located) x Length (horizontal throw of sprinkler).

(c) 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.

(d) Sidewall sprinklers, where installed under a ceiling with a slope greater than 0 inch rise for a 12 inch run to a slope up to 2 inch rise for 12 inch run, must be located per one of the following:

- Locate the sprinklers at the high point of the slope and positioned to discharge down the slope.
- Locate the sprinklers along the slope and positioned to discharge across the slope.

TABLE A
NFPA 13D AND NFPA 13R WET PIPE HYDRAULIC DESIGN CRITERIA
FOR THE SERIES LFII (TY1334)
RESIDENTIAL HORIZONTAL SIDEWALL AND RECESSED HORIZONTAL SIDEWALL SPRINKLERS
FOR HORIZONTAL CEILING (Maximum 2 Inch Rise for 12 Inch Run)



ELEVATION

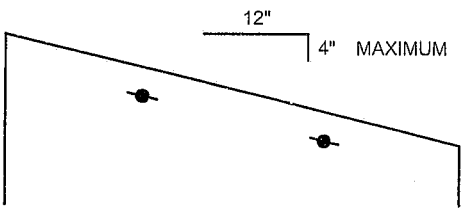
Maximum Coverage Area [a] Width x Length [b] Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	Minimum Flow [c] and Residual Pressure (I) Two sprinkler design with the sprinklers at the high point of the slope and positioned to discharge down the slope.			
		Top-Of-Deflector- To- Ceiling: 4 to 6 Inches (100 to 150 mm)		Top-Of-Deflector- To- Ceiling: 6 to 12 Inches (150 to 300 mm)	
		155°F/68°C	175°F/79°C	155°F/68°C	175°F/79°C
12 x 12 (3,7 x 3,7)	12 (3,7)	I 12 GPM (45,4 LPM) 8.2 psi (0,57 bar)	I 12 GPM (45,4 LPM) 8.2 psi (0,57 bar)	I 13 GPM (49,2 LPM) 9.6 psi (0,66 bar)	I 13 GPM (49.2 LPM) 9.5 psi (0,66 bar)
14 x 14 (4,3 x 4,3)	14 (4,3)	I 14 GPM (53,0 LPM) 11.1 psi (0,77 bar)	I 14 GPM (53,0 LPM) 11.1 psi (0,77 bar)	I 17 GPM (64.3 LPM) 16.4 psi (1,13 bar)	I 17 GPM (64.3 LPM) 16.4 psi (1,13 bar)
16 x 16 (4,9 x 4,9)	16 (4,9)	I 16 GPM (60.6 LPM) 14.5 psi (1,00 bar)	I 16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	I 18 GPM (68,1 LPM) 18.4 psi (1,27 bar)	I 18 GPM (68,1 LPM) 18.4 psi (1.27 bar)
16 x 18 (4,9 x 5,5)	16 (4,9)	I 19 GPM (71,9 LPM) 20,5 psi (1,41 bar)	I 19 GPM (71,9 LPM) 20.5 psi (1,41 bar)	I 21 GPM (79,5 LPM) 25.0 psi (1,72 uar)	I 21 GPM (79,5 LPM) 25.0 psi (1,72 bar)
16 x 20 (4,9 x 6,1)	16 (4,9)	I 24 GPM (90,8 LPM) 32.7 psi (2,25 bar)	I 24 GPM (90,8 LPM) 32.7 psi (2,25 bar)	I 26 GPM (98,4 LPM) 38.3 psi (2,64 bar)	I 26 GPM (98,4 LPM) 38.3 psi (2,64 bar)

(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) Width (backwall where sprinkler is located) x Length (horizontal throw of sprinkler).

(c) 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 B
NFPA 13D AND NFPA 13R WET PIPE HYDRAULIC DESIGN CRITERIA
FOR THE SERIES LFII (TY1334)
RESIDENTIAL HORIZONTAL SIDEWALL AND RECESSED HORIZONTAL SIDEWALL SPRINKLERS
FOR SPRINKLERS AT THE HIGH POINT OF THE SLOPE AND DISCHARGING DOWN THE SLOPE
(Greater Than 2 Inch Rise for 12 Inch Run Up To 8 Inch Rise for 12 Inch Run)



ELEVATION

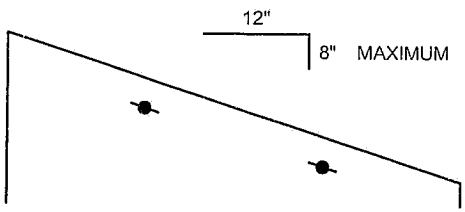
Maximum Coverage Area [a] Width x Length [b] Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	Minimum Flow [c] and Residual Pressure (II) Two sprinkler design with the sprinklers located along the slope and positioned to discharge across the slope. (III) Three sprinkler design when there are more than two sprinklers in a compartment and with the sprinklers located along the slope and positioned to discharge across the slope.							
		Top-Of-Deflector- To- Ceiling: 4 to 6 Inches (100 to 150 mm)				Top-Of-Deflector- To- Ceiling: 6 to 12 Inches (150 to 300 mm)			
		155°F/68°C		175°F/79°C		155°F/68°C		175°F/79°C	
12 x 12 (3,7 x 3,7)	12 (3,7)	II	16 GPM (60,6 LPM) 14,5 psi (1,00 bar)	II	16 GPM (60,6 l PM) 14.5 psi (1,00 bar)	II	18 GPM (68,1 LPM) 18.4 psi (1,27 bar)	II	18 GPM (68,1 LPM) 18.4 psi (1,27 bar)
14 x 14 (4,3 x 4,3)	14 (4,3)	II	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	II	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	II	18 GPM (68,1 LPM) 18.4 psi (1,27 bar)	II	18 GPM (68,1 LPM) 18.4 psi (1,27 bar)
16 x 16 (4,9 x 4,9)	16 (4,9)	II	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	II	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	II	18 GPM (68,1 LPM) 18.4 psi (1,27 bar)	II	18 GPM (68,1 LPM) 18.4 psi (1,27 bar)
16 x 18 (4,9 x 5,5)	16 (4,9)	II	22 GPM (83,3 LPM) 27.4 psi (1,89 bar)	II	22 GPM (83,3 LPM) 27.4 psi (1,89 bar)	II	22 GPM (83,3 LPM) 27.4 psi (1,89 bar)	II	22 GPM (83,3 LPM) 27.4 psi (1,89 bar)
16 x 20 (4,9 x 6,1)	16 (4,9)	III	23 GPM (87,1 LPM) 30.0 psi (2,07 bar)	III	23 GPM (87,1 .PM) 30.0 psi (2,07 bar)	III	26 GPM (98,4 LPM) 38.3 psi (2,64 bar)	III	26 GPM (98,4 LPM) 38.3 psi (2,64 bar)

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

(b) Width (backwall where sprinkler is located) x Length (horizontal throw of sprinkler).

(c) 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 C
NFPA 13D AND NFPA 13R WET PIPE HYDRAULIC DESIGN CRITERIA
FOR THE SERIES LFII (TY1334)
RESIDENTIAL HORIZONTAL SIDEWALL AND RECESSED HORIZONTAL SIDEWALL SPRINKLERS
FOR SPRINKLERS LOCATED ALONG A SLOPE AND DISCHARGING ACROSS THE SLOPE
(Greater Than 2 Inch Rise for 12 Inch Run Up To 4 Inch Rise for 12 Inch Run)



ELEVATION

Maximum Coverage Area [a] Width x Length [b] Ft. x Ft. (m x m)	Maximum Spacing Ft. (m)	Minimum Flow [c] and Residual Pressure (III) Three sprinkler design when there are more than two sprinklers in a compartment and with the sprinklers located along the slope and positioned to discharge across the slope. Top-Of-Deflector-To-Ceiling: 4 to 6 Inches (100 to 150 mm)			
		155°F/68°C		175°F/79°C	
12 x 12 (3,7 x 3,7)	12 (3,7)	III	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	III	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)
14 x 14 (4,3 x 4,3)	14 (4,3)	III	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	III	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)
16 x 16 (4,9 x 4,9)	16 (4,9)	III	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)	III	16 GPM (60,6 LPM) 14.5 psi (1,00 bar)
16 x 18 (4,9 x 5,5)	16 (4,9)	N/A		N/A	
16 x 20 (4,9 x 6,1)	16 (4,9)	N/A		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) Width (backwall where sprinkler is located) x Length (horizontal throw of sprinkler).

(c) 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 D
NFPA 13D AND NFPA 13R WET PIPE HYDRAULIC DESIGN CRITERIA
FOR THE SERIES LFII (TY1334)
RESIDENTIAL HORIZONTAL SIDEWALL AND RECESSED HORIZONTAL SIDEWALL SPRINKLERS
FOR SPRINKLERS LOCATED ALONG A SLOPE AND DISCHARGING ACROSS THE SLOPE
(Greater Than 4 Inch Rise for 12 Inch Run Up To 8 Inch Rise for 12 Inch Run)

Care and Maintenance

The Series LFII (TY1334) 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 sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers - before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (Ref. Installation Section).

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 & Building Products (TFBP) 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 TFBP. No warranty is given for product or components manufactured by companies not affiliated by ownership with TFBP 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 TFBP to be defective shall be either repaired or replaced, at TFBP's sole option. TFBP neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of products or parts of products. TFBP 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 TFBP 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 TFBP was informed about the possibility of such damages, and in no event shall TFBP's 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.

This limited warranty sets forth the exclusive remedy for claims based on failure of or defect in products, materials or components, whether the claim is made in contract, tort, strict liability or any other legal theory.

This warranty will apply to the full extent permitted by law. The invalidity, in whole or part, of any portion of this warranty will not affect the remainder.

Ordering Procedure

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

Sprinkler Assembly:

Series LFII (TY1334), K=4.2, Residential Horizontal Sidewall Sprinkler with (specify) temperature rating and (specify) finish, P/N (specify).

155°F/68°C or Chrome Plated	P/N 51-211-9-155
155°F/68°C White Polyester	P/N 51-211-4-155
155°F/68°C White (RAL9010)*	P/N 51-211-3-155
155°F/68°C Natural Brass	P/N 51-211-1-155
175°F/79°C or Chrome Plated	P/N 51-211-9-175
175°F/79°C White Polyester	P/N 51-211-4-175
175°F/79°C White (RAL9010)*	P/N 51-211-3-175
175°F/79°C Natural Brass	P/N 51-211-1-175

*Eastern Hemisphere sales only.

Recessed Escutcheon:

Specify: Style 20 Recessed Escutcheon with (specify*) finish, P/N (specify*).

*Refer to Technical Data Sheet TFP770.

Sprinkler Wrench:
Specify: W-Type 6 Sprinkler Wrench, P/N 56-000-6-387.

Specify: W-Type 7 Sprinkler Wrench, P/N 56-850-4-001.

SPRINKLER SYSTEM HYDRAULIC ANALYSIS

DATE: 11/2/2002
C:\HASS74\ARNOLDPL7.SDF
JOB TITLE: Arnold Place #7
WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	@ FLOW (GPM)	AVAIL. PRESS. (PSI)	@ TOTAL DEMAND (GPM)	REQ'D PRESS. (PSI)
4	85.0	20.0	1200.0	84.9	26.6	56.1

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	26.6 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	0.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	26.6 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)
1	18.0	K= 4.90	7.0	13.0
2	18.0	K= 4.90	7.8	13.7
3	19.0	- - - -	35.2	- - -
3A	2.0	- - - -	48.1	- - -
3B	2.0	- - - -	52.1	- - -
4	0.0	SOURCE	56.1	26.6

DATE: 11/2/2002 C:\HASS74\ARNOLDPL7.SDF

JOB TITLE: Arnold Place #7

PIPE DATA

PIPE TAG / END NODES	ELEV. (FT)	NOZ. (K)	PT (PSI)	DISC. (GPM)	Q(GPM) VEL(FPS)	DIA(IN) HW(C) FL/FT	LENGTH (FT)		PRESS. SUM. (PSI)
Pipe: 1					-13.0	1.000 PL	14.00	PF	0.8
1	18.0	4.9	7.0	13.0	5.3	150 FTG	E	PE	0.0
2	18.0	4.9	7.8	13.7		0.049 TL	16.39	PV	
Pipe: 2					-26.7	1.000 PL	93.00	PF	27.8
2	18.0	4.9	7.8	13.7	10.9	150 FTG	4E8T	PE	-0.4
3	19.0	0.0	35.2	0.0		0.185 TL	150.46	PV	
Pipe: 3					-26.7	1.000 PL	23.00	PF	5.6
3	19.0	0.0	35.2	0.0	10.9	150 FTG	3E	PE	7.4
3A	2.0	0.0	48.1	0.0		0.185 TL	30.18	PV	
Pipe: 4					FIXED PRESSURE LOSS DEVICE				
3B	2.0	0.0	52.1	0.0	4.0 psi, 26.7 gpm				
3A	2.0	0.0	48.1	0.0					
Pipe: 5					-26.6	1.500 PL	100.00	PF	3.1
3B	2.0	0.0	52.1	0.0	4.8	150 FTG	3ET	PE	0.9
4	0.0	SRCE	56.1	(N/A)		0.026 TL	121.41	PV	

NOTES:

(1) Calculations were performed by the HASS 7.4 computer program under license no. 5010113212 granted by
HASS Systems, Inc.
4792 LaVista Road
Tucker, GA 30084

(2) The system has been calculated to provide an average imbalance at each node of 0.034 gpm and a maximum imbalance at any node of 0.169 gpm.

3) Total pressure at each node is used in balancing the system. Maximum water velocity is 10.9 ft/sec at pipe 3.

(1) PIPE FITTINGS TABLE

Pipe Table Name: STANDARD.PIP

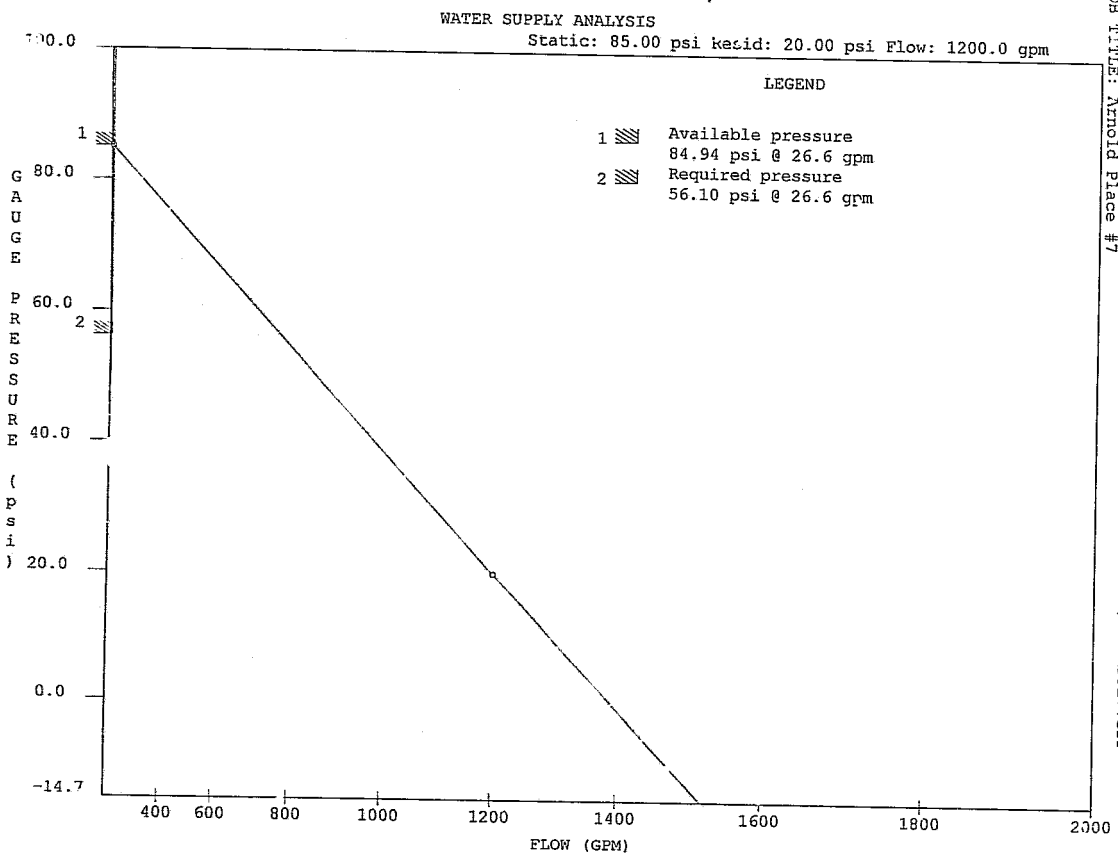
DATE: 11/2/2002 C:\HASS74\ARNOLDPL7.SDF

JOB TITLE: Arnold Place #7

PAGE: * 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
1.049	2.00	5.00	2.00	5.00	6.00	1.00	10.00	10.00	5.00
1.610	4.00	8.00	2.00	9.00	6.00	1.00	10.00	10.00	8.00


WATER SUPPLY ANALYSIS
Static: 85.00 psi Residual: 20.00 psi Flow: 1200.0 gpm
LEGEND
1 Available pressure
84.94 psi @ 26.6 gpm
2 Required pressure
56.10 psi @ 26.6 gpm
GAUGE PRESSURE (psi)
100.0
80.0
60.0
40.0
20.0
0.0
-14.7
400
600
800
1000
1200
1400
1600
1800
2000
FLOW (GPM)

Portland Water Bureau

TO:	MELISSA	FROM:	Mark Boyko
COMPANY:	WYATT FIRE PROTECTION		Portland Water Bureau
FAX:	503-684-9657	PHONE:	503-823-6035
PHONE:	503-684-2928	DATE:	3/21/2007
EMAIL:		# PAGES:	0

Flow Availability Estimate

A hydrant flow test was not available or could not be completed at the requested location. This is an estimated flow obtained using a hydraulic model.

Note: Simulated address is for the dead end 8-inch main west of SW 29th Court.

Simulation ID Number:	516
Assumed flow location:	3004 SW Comus
Map Number (quartersection):	4126
Pressure Zone:	ARNOLD 685 TANK
Main size:	8 inch
Elevation at simulated flow location:	439 feet
Maximum Static Hydraulic Grade Line:	685 feet
Maximum Static Pressure:	107 psi
STATIC PRESSURE to use for design: (80% of the nominal max static pressure)	85 psi
ESTIMATED FLOW:	1200 gpm
ESTIMATED RESIDUAL PRESSURE: (in the system, with the simulated flow)	20 psi

NOTE: The Water Bureau reserves the right to make future operational changes that may affect flow available at this location. The reported flow is available in the main before any service pipe, backflow prevention device, or meter. Less flow may be available through a hydrant at the given residual pressure.