

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND BUILDING PERMIT



This is to certify that

DA BRACKETT & COMPANY INC /Tim Davis Plumbing
& Heating

PERMIT ID: 2013-00343

Located at

45 PLYMOUTH ST

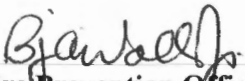
CBL: 343 B011001

has permission to **install NFPA 13D sprinkler system**

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be procured prior to occupancy.


Fire Prevention Officer

58

Code Enforcement Officer / Plan Reviewer

**THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
THERE IS A PENALTY FOR REMOVING THIS CARD**

PERMIT ID: 2013-00343

Located at: 45 PLYMOUTH ST

CBL: 343 B011001

BUILDING PERMIT INSPECTION PROCEDURES
Please call 874-8703 (ONLY)
or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

REQUIRED INSPECTIONS:

Final - Fire

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Date Applied For:	CBL:
2013-00343	02/20/2013	343 B011001

Location of Construction: 45 PLYMOUTH ST	Owner Name: DA BRACKETT & COMPANY IN	Owner Address: 84 COUNTRY LN	Phone:
Business Name:	Contractor Name: Tim Davis Plumbing & Heating	Contractor Address: P.O. Box 255 Lyman	Phone (207) 324-5237
Lessee/Buyer's Name	Phone:	Permit Type: Fire Suppression Water Based	

Proposed Use: Single Family Home	Proposed Project Description: install NFPA 13D sprinkler system
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Dept: Zoning **Status:** Approved **Reviewer:** Marge Schmuckal **Approval Date:** 02/20/2013
Note: **Ok to Issue:** ☒

Dept: Fire **Status:** Approved w/Conditions **Reviewer:** Ben Wallace Jr **Approval Date:** 02/21/2013
Note: **Ok to Issue:** ☒

- 1) All control valves shall be supervised in accordance with NFPA 13D. Pad locks shall only be installed on valves designed to be secured in the open position by pad lock.
- 2) The sprinkler system shall be installed in accordance with NFPA 13D.
- 3) A warning sign, with minimum ¼ in. letters, shall be affixed adjacent to the main shutoff valve and shall state the following:
Warning: The water system for this house supplies fire sprinklers that require certain flows and pressures to fight a fire. Devices that restrict the flow or decrease the pressure or automatically shut off the water to the fire sprinkler system, such as water softeners, filtrations systems, and automatic shut off valves, shall not be added to this system without a review of the fire sprinkler system by a fire protection specialist. Do not remove this sign.
- 4) A copy of the required state sprinkler permit with RMS signoff shall be provided prior to the final inspection.

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:

2013-00343

Issue Date:

CBL:

343 B011001

Location of Construction: 45 PLYMOUTH ST	Owner Name: DA BRACKETT & COMPANY INC	Owner Address: 84 COUNTRY LN PORTLAND, ME 04103		Phone:
Business Name:	Contractor Name: Tim Davis Plumbing & Heating	Contractor Address: P.O. Box 255 Lyman ME 04002		Phone (207) 324-5237
Lessee/Buyer's Name	Phone:	Permit Type: Fire Suppression Water Based		Zone: R3
Past Use: Single Family Home	Proposed Use: Single Family Home	Permit Fee: \$70.00	Cost of Work: \$5,000.00	CEO District: 8
Proposed Project Description: Install a fire sprinkler system <i>under construction</i> <i>2012-02-3279</i>		FIRE DEPT: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied <input type="checkbox"/> N/A <i>2/21/13</i>		INSPECTION: Use Group: Type:
		Signature: <i>[Signature]</i> (58)		Signature:
		PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.) Action: <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied Signature: Date:		

Permit Taken By:

LDOBSON

Date Applied For:

02/20/2013

Zoning Approval

- This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
- Building permits do not include plumbing, septic or electrical work.
- Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..

Special Zone or Reviews☐ Shoreland☐ Wetland☐ Flood Zone☐ Subdivision☐ Site PlanMaj ☐ Minor ☐ MM ☐

Date:

Zoning Appeal☐ Variance☐ Miscellaneous☐ Conditional Use☐ Interpretation☐ Approved☐ Denied

Date:

Historic Preservation☒ Not in District or Landmark☐ Does Not Require Review☐ Requires Review☐ Approved☐ Approved w/Conditions☐ Denied

Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT

ADDRESS

DATE

PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE

DATE

PHONE



Water-Based Fire Suppression System Permit

If you or the property owner owes real estate or property taxes or user charges on any property within the city, payment arrangements must be made before permits of any kind are accepted.

Installation address: 45 Plymouth St CBL: 45 Plymouth St
Exact location: (within structure) Basement, 1st & 2nd Flr
Type of occupancy(s) (NFPA & ICC): NFPA 130 Residential
Building owner: Dwight Brackett
Managing Supervisor (RMS): N/A Thomas Killen License No: 351
Supervisor phone: [REDACTED] E-mail: _____
Installing contractor: Tim Davis P & H Inc. License No: 831
Contractor phone: 207-467-1889 E-mail: TDPH Inc @ Yahoo. Com
The suppression work to be done will be: New: ☒ Renovation: ☐ Addition to existing system: ☐
This is an amendment to an existing permit: Yes: ☐ NO ☐ Permit no: _____
NFPA Standard this system is designed to: NFPA 130 Edition: 2010 Edition

*Non-NFPA systems are not approved for use within the City of Portland.

Download a new copy of this document from
www.portlandmaine.gov/fire for every submittal. Attach all working documents and complete approved submittals as may be required by the State Fire Marshal's Office on electronic PDF's in addition to full sized plans.

Contractor shall verify location and type of all FDCs shall be approved in writing by the Fire Prevention Bureau.

Submit all information to the Building Inspections Department, 389 Congress Street, Room 315, Portland, Maine 04101.

Prior to acceptance of any fire protection system, a complete commissioning and acceptance test must be coordinated with all fire system contractors and the Fire Department, and proper documentation of such test(s) provided.

All installation(s) must comply with NFPA and the Fire Department Technical Standard(s).

COST OF WORK: N/A
PERMIT FEE: _____

(\$10 PER \$1,000 + \$30 FOR THE FIRST \$1,000)

RECEIVED
FEB 20 2013
Dept. of Building Inspections
City of Portland Maine

Applicant signature: [Signature] Date: 2/13/13

12600
6200
18800

18200

6100

Uponor

700 AF9
AQUASAFE® Fire Safety System

5100

Uponor
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

[Handwritten signature]
2.9.12

Job Name : BRACKETT - One Head Calculation (H.14)
Drawing : RESIDENTIAL
Location : PLYMOUTH ST. PORTLAND ME 04101
Remote Area : LOOP
Contract : 120131-41N
Data File : 120131-41N Brackett.wx1

RECEIVED
FEB 20 2013
Dept. of Building Inspections
City of Portland Maine

HYDRAULIC DESIGN INFORMATION SHEET

Name - BRACKETT Date - 2/2/12
Location - PORTLAND ME 04101
Building - RESIDENTIAL System No. - LOOP
Contractor - RSD PLUMBING & HEATING Contract No. - 120131-41N
Calculated By - DEVON HUYNH Drawing No. - 11
Construction: (X) Combustible () Non-Combustible Ceiling Height VARIES
OCCUPANCY - RESIDENTIAL

S Type of Calculation: () NFPA 13 Residential () NFPA 13R (X) NFPA 13D
Y Number of Sprinklers Flowing: (X) 1 () 2 () 4 ()
S () Other
T () Specific Ruling Made by Date

E
M Listed Flow at Start Point - 18 Gpm System Type
Listed Pres. at Start Point - 17.52Psi (X) Wet () Dry
D MAXIMUM LISTED SPACING 18 x 18 () Deluge () PreAction
E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make RELIABE-ASSEMBLIES Model AFC43
I Elevation at Highest Outlet - 128 Feet Size 3/8 K-Factor 4.3
G Note: Temperature Rating 155
N

Calculation Gpm Required 18 Psi Required 60.3 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

W Water Flow Test; Pump Data: Tank or Reservoir:
A Date of Test - x Rated Cap. Cap.
T Time of Test - x @ Psi Elev.
E Static (Psi) - 80 Elev.
R Residual (Psi) - 75 Other Well
Flow (Gpm) - 300 Proof Flow Gpm
S Elevation - 98

P Location: x
P
L Source of Information: CITY SUPPLY
Y

Water Supply Curve (C)

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BRACKETT - One Head Calculation (H.14)

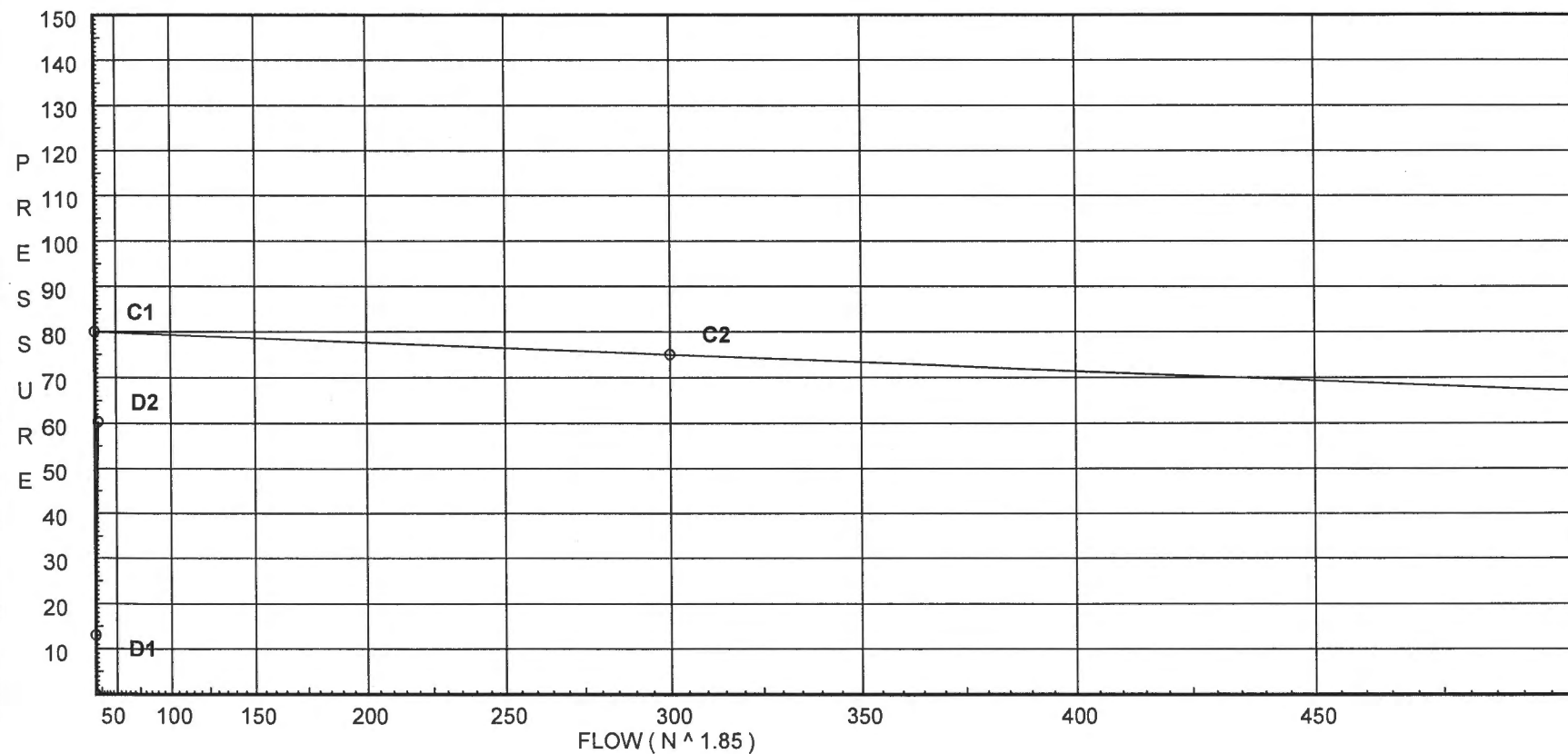
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Date 2/7/2012

City Water Supply:

C1 - Static Pressure : 80
C2 - Residual Pressure: 75
C2 - Residual Flow : 300

Demand:

D1 - Elevation : 12.993
D2 - System Flow : 17.9985
D2 - System Pressure : 60.296
Hose (Adj City) :
Hose (Demand) :
D3 - System Demand : 17.9985
Safety Margin : 19.676



Fittings Used Summary

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BRACKETT - One Head Calculation (H.14)

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Fitting Legend																					
Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
E	90° Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
R	CPVC Coupling Tee - Run	1	1	1	1	1	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
T	90° Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
U	UnAdjusted Fitting	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Utb	Aquapex Tee - Branch	2	6	6	9.08	12.88	13.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utr	Aquapex Tee - Run	1	2	2	1.64	2.39	2.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

Flow Summary - NFPA 2007

Uponor
BRACKETT - One Head Calculation (H.14)

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SUPPLY ANALYSIS

<i>Node at Source</i>	<i>Static Pressure</i>	<i>Residual Pressure</i>	<i>Flow</i>	<i>Available Pressure</i>	<i>Total Demand</i>	<i>Required Pressure</i>
STR	80.0	75	300.0	79.973	18.0	60.296

NODE ANALYSIS

<i>Node Tag</i>	<i>Elevation</i>	<i>Node Type</i>	<i>Pressure at Node</i>	<i>Discharge at Node</i>	<i>Notes</i>
H.14	128.0	4.3	17.52	18.0	
H.3	108.0		42.28		
H.1	108.0		42.26		
H.2	108.0		42.28		
M.20	108.0		42.71		
H.4	108.0		42.25		
T.21	108.0		42.72		
H.5	108.0		42.2		
T.22	118.0		37.06		
H.8	118.0		36.75		
H.6	118.0		37.34		
T.23	118.0		36.48		
T.24	118.0		37.59		
T.27	118.0		37.26		
T.26	118.0		37.37		
H.9	128.0		31.14		
H.10	118.0		37.41		
H.7	118.0		37.2		
M.29	118.0		37.39		
T.25	128.0		31.83		
H.12	128.0		31.76		
H.11	118.0		37.39		
H.16	118.0		35.91		
T.28	118.0		37.4		
M.30	128.0		32.44		
H.15	118.0		37.33		
H.13	128.0		28.77		
H.18	128.0		32.34		
H.19	128.0		32.12		
H.17	128.0		32.43		
S.1	104.0		45.14		
MTR	98.0		51.69		
STR	98.0		60.3		

Final Calculations - Hazen-Williams

Uponor
BRACKETT - One Head Calculation (H.14)

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
H.14 to H.9	3.85 3.85	0.475 150.0 0.1937	42U	42.0 0.0 0.0	28.000 42.300 70.300	17.520 0.0 13.616			K Factor = 4.30 Vel = 6.97	
	0.0 3.85					31.136			K Factor = 0.69	
H.3 to H.1	-0.14 -0.14	0.475 150.0 -0.0004	42U	42.0 0.0 0.0	16.000 42.300 58.300	42.284 0.0 -0.025			Vel = 0.25	
H.1 to H.2	0.27 0.13	0.475 150.0 0.0004	42U	42.0 0.0 0.0	19.000 42.300 61.300	42.259 0.0 0.022			Vel = 0.24	
H.2 to H.3	-0.09 0.04	0.475 150.0 0.0	42U	42.0 0.0 0.0	18.000 42.300 60.300	42.281 0.0 0.003			Vel = 0.07	
	0.0 0.04					42.284			K Factor = 0.01	
M.20 to H.3	-0.88 -0.88	0.475 150.0 -0.0127	1T 21U	1.219 21.0 0.0	11.000 22.369 33.369	42.708 0.0 -0.424			Vel = 1.59	
	0.0 -0.88					42.284			K Factor = -0.14	
H.4 to H.1	0.07 0.07	0.475 150.0 0.0001	42U	42.0 0.0 0.0	33.000 42.300 75.300	42.251 0.0 0.008			Vel = 0.13	
H.1 to H.5	-0.28 -0.21	0.475 150.0 -0.0009	42U	42.0 0.0 0.0	30.000 42.300 72.300	42.259 0.0 -0.063			Vel = 0.38	
	0.0 -0.21					42.196			K Factor = -0.03	
M.20 to H.2	-0.85 -0.85	0.475 150.0 -0.0117	1T 21U	1.219 21.0 0.0	14.000 22.369 36.369	42.708 0.0 -0.427			Vel = 1.54	
	0.0 -0.85					42.281			K Factor = -0.13	
T.21 to M.20	-3.42 -3.42	1.054 150.0 -0.0034	1Utr	1.64 0.0 0.0	1.000 1.640 2.640	42.717 0.0 -0.009			Vel = 1.26	
	0.0 -3.42					42.708			K Factor = -0.52	
T.21 to S.1	18.00 18.0	1.244 150.0 0.0309	1T	3.443 0.0 0.0	19.000 3.443 22.443	42.717 1.732 0.694			Vel = 4.75	
	0.0 18.00					45.143			K Factor = 2.68	
M.20 to H.5	-0.88 -0.88	0.475 150.0 -0.0127	1T 21U	1.219 21.0 0.0	18.000 22.369 40.369	42.708 0.0 -0.512			Vel = 1.59	
	0.0									

Final Calculations - Hazen-Williams

Uponor
BRACKETT - One Head Calculation (H.14)

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Date 2/7/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	-0.88					42.196			K Factor = -0.14	
M.20 to H.4	-0.81	0.475 150.0	1T 21U	1.219 21.0	20.000 22.369	42.708 0.0				
	-0.81	-0.0108		0.0	42.369	-0.457			Vel = 1.47	
	0.0									
	-0.81					42.251			K Factor = -0.12	
H.5 to H.4	0.21	0.475 150.0	42U	42.0 0.0	18.000 42.300	42.196 0.0				
	0.21	0.0009		0.0	60.300	0.055			Vel = 0.38	
	0.0									
	0.21					42.251			K Factor = 0.03	
T.22 to H.8	-0.68	0.475 150.0	1R 21U	1.0 21.0	17.000 22.150	37.058 0.0				
	-0.68	-0.0079		0.0	39.150	-0.310			Vel = 1.23	
	0.0									
	-0.68					36.748			K Factor = -0.11	
H.6 to T.22	-0.68	0.475 150.0	21U 1R	21.0 1.0	11.000 24.150	37.335 0.0				
	-0.68	-0.0079	1Utb	2.0	35.150	-0.277			Vel = 1.23	
	0.0									
	-0.68					37.058			K Factor = -0.11	
T.23 to H.8	0.80	0.475 150.0	1R 21U	1.0 21.0	2.000 23.150	36.484 0.0				
	0.8	0.0105	1Utr	1.0	25.150	0.264			Vel = 1.45	
	0.0									
	0.80					36.748			K Factor = 0.13	
T.24 to H.6	-0.76	0.475 150.0	1R 21U	1.0 21.0	2.000 24.150	37.586 0.0				
	-0.76	-0.0096	1Utb	2.0	26.150	-0.251			Vel = 1.38	
H.6 to T.27	0.42	0.475 150.0	21U 1R	21.0 1.0	10.000 23.150	37.335 0.0				
	-0.34	-0.0022	1Utr	1.0	33.150	-0.072			Vel = 0.62	
T.27 to H.7	0.0	0.475 150.0	1R 21U	1.0 21.0	5.000 22.150	37.263 0.0				
	-0.34	-0.0022		0.0	27.150	-0.059			Vel = 0.62	
	0.0									
	-0.34					37.204			K Factor = -0.06	
T.26 to H.6	-0.26	0.475 150.0	1R 21U	1.0 21.0	4.000 24.150	37.374 0.0				
	-0.26	-0.0014	1Utb	2.0	28.150	-0.039			Vel = 0.47	
	0.0									
	-0.26					37.335			K Factor = -0.04	
H.2 to T.24	-0.76	0.475 150.0	21U 1R	21.0 1.0	16.000 22.150	42.281 -4.331				
	-0.76	-0.0095		0.0	38.150	-0.364			Vel = 1.38	
	0.0									
	-0.76					37.586			K Factor = -0.12	
H.9 to T.25	1.32	0.475 150.0	21U 1R	21.0 1.0	3.000 23.150	31.136 0.0				
	1.32	0.0266	1Utr	1.0	26.150	0.696			Vel = 2.39	

Final Calculations - Hazen-Williams

Uponsor
BRACKETT - One Head Calculation (H.14)

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Date 2/7/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 1.32					31.832			K Factor = 0.23	
H.10 to T.26	-0.26 -0.26	0.475 150.0 -0.0014	21U 1R	21.0 1.0 0.0	2.000 22.150 24.150	37.407 0.0 -0.033			Vel = 0.47	
	0.0 -0.26					37.374			K Factor = -0.04	
H.7 to H.11	0.45 0.45	0.475 150.0 0.0036	42U	42.0 0.0 0.0	9.000 42.300 51.300	37.204 0.0 0.186			Vel = 0.81	
	0.0 0.45					37.390			K Factor = 0.07	
M.29 to H.8	-1.09 -1.09	0.475 150.0 -0.0187	1T 21U	1.219 21.0 0.0	12.000 22.369 34.369	37.389 0.0 -0.641			Vel = 1.97	
	0.0 -1.09					36.748			K Factor = -0.18	
T.25 to H.7	1.32 1.32	0.475 150.0 0.0266	1R 21U	1.0 21.0 0.0	17.000 22.150 39.150	31.832 4.331 1.041			Vel = 2.39	
	0.0 1.32					37.204			K Factor = 0.22	
M.29 to H.7	-0.53 -0.53	0.475 150.0 -0.0050	1T 21U	1.219 21.0 0.0	15.000 22.369 37.369	37.389 0.0 -0.185			Vel = 0.96	
	0.0 -0.53					37.204			K Factor = -0.09	
H.12 to T.23	0.80 0.8	0.475 150.0 0.0105	21U 1R	21.0 1.0 0.0	15.000 22.150 37.150	31.764 4.331 0.389			Vel = 1.45	
	0.0 0.80					36.484			K Factor = 0.13	
H.11 to H.3	0.70 0.7	0.475 150.0 0.0082	42U	42.0 0.0 0.0	26.000 42.300 68.300	37.390 4.331 0.563			Vel = 1.27	
	0.0 0.70					42.284			K Factor = 0.11	
H.16 to H.8	0.97 0.97	0.475 150.0 0.0152	42U	42.0 0.0 0.0	13.000 42.300 55.300	35.907 0.0 0.841			Vel = 1.76	
	0.0 0.97					36.748			K Factor = 0.16	
H.16 to H.5	1.30 1.3	0.475 150.0 0.0260	42U	42.0 0.0 0.0	33.000 42.300 75.300	35.907 4.331 1.958			Vel = 2.35	
	0.0 1.30					42.196			K Factor = 0.20	

Final Calculations - Hazen-Williams

Uponor
BRACKETT - One Head Calculation (H.14)

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Date 2/7/2012

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
M.29 to H.10	0.14 0.14 0.0 0.14	0.475 150.0 0.0004	1T 21U	1.219 21.0 0.0	21.000 22.369 43.369	37.389 0.0 0.018			Vel = 0.25	
						37.407			K Factor = 0.02	
T.28 to M.29	-3.46 -3.46 0.0 -3.46	1.054 150.0 -0.0034	1Utr	1.64 0.0 0.0	1.000 1.640 2.640	37.398 0.0 -0.009			Vel = 1.27	
						37.389			K Factor = -0.57	
T.28 to T.21	14.58 14.58 0.0 14.58	1.054 150.0 0.0469	1Utb	9.08 0.0 0.0	12.000 9.080 21.080	37.398 4.331 0.988			Vel = 5.36	
						42.717			K Factor = 2.23	
M.29 to H.11	0.03 0.03 0.0 0.03	0.475 150.0 0.0	1T 21U	1.219 21.0 0.0	6.000 22.369 28.369	37.389 0.0 0.001			Vel = 0.05	
						37.390			K Factor = 0	
M.30 to H.9	-1.46 -1.46 0.0 -1.46	0.475 150.0 -0.0323	1T 21U	1.219 21.0 0.0	18.000 22.369 40.369	32.440 0.0 -1.304			Vel = 2.64	
						31.136			K Factor = -0.26	
M.30 to H.12	-1.18 -1.18 0.0 -1.18	0.475 150.0 -0.0215	1T 21U	1.219 21.0 0.0	9.000 22.369 31.369	32.440 0.0 -0.676			Vel = 2.14	
H.12 to H.13	-0.79 -1.97 0.0 -1.97	0.475 150.0 -0.0561	42U	42.0 0.0 0.0	11.000 42.300 53.300	31.764 0.0 -2.992			Vel = 3.57	
						28.772			K Factor = -0.37	
H.15 to H.10	0.26 0.26 0.0 0.26	0.475 150.0 0.0013	42U	42.0 0.0 0.0	14.000 42.300 56.300	37.332 0.0 0.075			Vel = 0.47	
H.10 to H.4	0.40 0.66 0.0 0.66	0.475 150.0 0.0075	42U	42.0 0.0 0.0	26.000 42.300 68.300	37.407 4.331 0.513			Vel = 1.19	
						42.251			K Factor = 0.10	
H.13 to H.14	-3.88 -3.88 0.0 -3.88	0.475 150.0 -0.1964	42U	42.0 0.0 0.0	15.000 42.300 57.300	28.772 0.0 -11.252			Vel = 7.02	
						17.520			K Factor = -0.93	
M.30 to T.28	11.12 11.12	1.054 150.0 0.0284	1Utb	9.08 0.0 0.0	13.000 9.080 22.080	32.440 4.331 0.627			Vel = 4.09	

Final Calculations - Hazen-Williams

Uponsor
BRACKETT - One Head Calculation (H.14)

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 11.12					37.398			K Factor = 1.82	
M.29 to H.16	-1.74 -1.74	0.475 150.0 -0.0444	1T 21U	1.219 21.0 0.0	11.000 22.369 33.369	37.389 0.0 -1.482			Vel = 3.15	
	0.0 -1.74					35.907			K Factor = -0.29	
H.11 to H.15	-0.23 -0.23	0.475 150.0 -0.0010	42U	42.0 0.0 0.0	14.000 42.300 56.300	37.390 0.0 -0.058			Vel = 0.42	
	0.0 -0.23					37.332			K Factor = -0.04	
M.30 to H.14	-6.26 -6.26	0.475 150.0 -0.4756	1T 21U	1.219 21.0 0.0	9.000 22.369 31.369	32.440 0.0 -14.920			Vel = 11.33	
	0.0 -6.26					17.520			K Factor = -1.50	
M.29 to H.15	-0.27 -0.27	0.475 150.0 -0.0014	1T 21U	1.219 21.0 0.0	18.000 22.369 40.369	37.389 0.0 -0.057			Vel = 0.49	
	0.0 -0.27					37.332			K Factor = -0.04	
H.18 to H.9	-1.07 -1.07	0.475 150.0 -0.0181	42U	42.0 0.0 0.0	24.000 42.300 66.300	32.339 0.0 -1.203			Vel = 1.94	
	0.0 -1.07					31.136			K Factor = -0.19	
M.30 to H.17	-0.13 -0.13	0.475 150.0 -0.0003	1T 21U	1.219 21.0 0.0	16.000 22.369 38.369	32.440 0.0 -0.013			Vel = 0.24	
	0.0 -0.13					32.427			K Factor = -0.02	
H.19 to H.13	-1.91 -1.91	0.475 150.0 -0.0528	42U	42.0 0.0 0.0	21.000 42.300 63.300	32.116 0.0 -3.344			Vel = 3.46	
	0.0 -1.91					28.772			K Factor = -0.36	
M.30 to H.18	0.39 0.39	0.475 150.0 -0.0029	1T 21U	1.219 21.0 0.0	13.000 22.369 35.369	32.440 0.0 -0.101			Vel = 0.71	
H.18 to M.30	-0.78 -0.39	0.475 150.0 0.0029	1T 21U	1.219 21.0 0.0	13.000 22.369 35.369	32.339 0.0 0.101			Vel = 0.71	
M.30 to H.19	1.05 0.66	0.475 150.0 -0.0073	1T 21U	1.219 21.0 0.0	22.000 22.369 44.369	32.440 0.0 -0.324			Vel = 1.19	
H.19 to M.30	-1.32 -0.66	0.475 150.0 0.0073	1T 21U	1.219 21.0 0.0	22.000 22.369 44.369	32.116 0.0 0.324			Vel = 1.19	

Final Calculations - Hazen-Williams

Uponor
BRACKETT - One Head Calculation (H.14)

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Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*****	Notes	*****
	0.0 -0.66					32.440			K Factor = -0.12	
H.16 to H.14	-4.01 -4.01	0.475 150.0 -0.2089	42U	42.0 0.0 0.0	25.000 42.300 67.300	35.907 -4.331 -14.056			Vel = 7.26	
	0.0 -4.01					17.520			K Factor = -0.96	
H.17 to H.19	-0.60 -0.6	0.475 150.0 -0.0062	42U	42.0 0.0 0.0	8.000 42.300 50.300	32.427 0.0 -0.311			Vel = 1.09	
	0.0 -0.60					32.116			K Factor = -0.11	
H.18 to H.17	0.28 0.28	0.475 150.0 0.0016	42U	42.0 0.0 0.0	14.000 42.300 56.300	32.339 0.0 0.088			Vel = 0.51	
H.17 to H.15	0.48 0.76	0.475 150.0 0.0095	42U	42.0 0.0 0.0	18.000 42.300 60.300	32.427 4.331 0.574			Vel = 1.38	
	0.0 0.76					37.332			K Factor = 0.12	
S.1 to MTR	18.00 18.0	0.911 150.0 0.1408	2E	3.041 0.0 0.0	25.000 3.041 28.041	45.143 2.599 3.948			Vel = 8.86	
MTR to STR	0.0 18.0	0.995 150.0 0.0917	1E 1T 1G	2.336 5.841 1.168	30.000 9.345 39.345	51.690 5.000 3.606			* Fixed loss = 5 Vel = 7.43	
	0.0 18.00					60.296			K Factor = 2.32	

Reliable®

Model RFC30 (SIN RA0611)
Model RFC43 (SIN RA0612)
Model RFC49 (SIN RA0616)
Residential Flat Concealed Sprinklers

A Residential Flat Concealed Sprinkler engineered for a minimum design density of 0.05 gpm/ft² with low GPM requirements.

Features

1. Very low water flow requirements.
2. ½" (13mm) Total adjustment.
3. Thread-On/Thread-Off or Push-On/Thread Off cover attachment option.
4. Smooth aesthetic ceiling profile.
5. Available in brass, chrome and black plated or painted finishes.

Listings & Approval

1. Listed by Underwriters Laboratories, and certified by UL for Canada (cULus)
2. NYC MEA 258-93-E

UL Listing Categories

Residential Automatic Sprinklers

UL Guide Number

VKKW

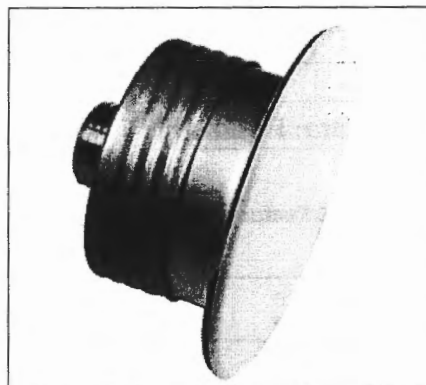
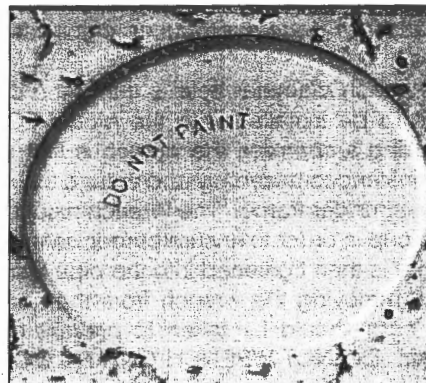
Product Description

Model RFC30, RFC43 and RFC49 Concealed Residential Sprinklers are fast response residential fusible solder link automatic sprinklers. Residential sprinklers differ from standard sprinklers primarily in their response time and water distribution patterns.

Model RFC30, RFC43 and RFC49 sprinklers discharge water in a hemispherical pattern below the sprinkler deflector. Residential distribution patterns are higher and generally contain a finer droplet size than standard sprinkler patterns.

The combination of speed of operation and high discharge pattern required for residential sprinklers has demonstrated, in fire testing, an ability for controlling residential fires, and thereby providing significant evacuation time for occupants.

The RFC30, RFC43 and RFC49 Sprinklers provide the best form of fire protection by combining an attractive appearance and ½" (13mm) of cover adjustment for ease of installation. The small diameter cover plate is easily and positively attached and blends into the ceiling, concealing



the most dependable fire protection available, an automatic sprinkler system.

The RFC30, RFC43 and RFC49 are UL Listed Residential Sprinklers to be installed in the residential portions of any occupancy in accordance with NFPA 13, 13R, & 13D.

The RFC30, RFC43 and RFC49 can reduce the need for precise cutting of drop nipples. The threaded cover plate assembly can be adjusted without tools to fit accurately against the ceiling. The fire protection system need not be shut down to adjust or remove the cover plate assembly.

Application and Installation

The RFC30, RFC43 and RFC49, for residential installations, use a 165°F (74°C) fusible solder link in a tuning fork style sprinkler frame with a drop-down deflector. This assembly is recessed into the ceiling and concealed by a flat cover plate. The cover plate is attached to the skirt, using 135°F (57°C) ordinary temperature classification solder. When the ceiling temperature rises, the solder holding the cover plate releases the cover allowing the deflector to drop into position and exposing the sprinkler inside to

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

ceiling temperature. The subsequent operation of the solder link opens the waterway and causes the deflector to drop into position to distribute the discharging water in a hemispherical pattern below the sprinkler deflector. Any adjustment of thread engagement between the cover plate and cup will assure that the drop-down deflector is properly located below the ceiling. The residential distribution pattern contains a finer droplet size than a standard sprinkler, and the pattern produces significantly higher wall wetting.

After a 2⁵/₈ inch diameter hole is cut in the ceiling, the sprinkler is to be installed with the Model FC Wrench. When installing a sprinkler, the wrench is first positioned into the sprinkler/cup assembly and around the hexagonal body of the sprinkler frame. The Wrench must bottom out against the cup in order to ensure proper, safe installation. The sprinkler is then tightened into the pipe fitting. When inserting or removing the wrench from the sprinkler/cup assembly, care should be taken to prevent damage to the sprinkler. DO NOT WRENCH ON ANY OTHER PART

OF THE SPRINKLER/CUP ASSEMBLY. MODEL RFC30, RFC43 AND RFC49 CONCEALED SPRINKLERS MUST BE INSTALLED ONLY WITH 135°F RATED COVERS.

Note: A leak tight ½" NPT (R1/2) sprinkler joint can be obtained with a torque of 8-18 ft-lbs (10,8 - 24,4 N-m). Do not tighten sprinklers over maximum recommended torque. It may cause leakage or impairment of the sprinklers.

Cover assemblies provide up to ½" (13mm) of adjustment. Turn the cover clockwise until the flange is in contact with the ceiling. For the push-on/thread-off option, the cover assembly is pushed onto the cup and final adjustment is made by turning the cover clockwise until the skirt flange makes full contact with the ceiling. Cover removal requires turning in the counter-clockwise direction.

In ceilings that have a plenum space above the sprinkler, the plenum space may have neutral or negative pressurization but must not be positively pressurized. Inspect all sprinklers after installation to ensure that the gap between the cover plate and ceiling and the 4 slots in the cup are all open and free from any air flow impediment.

Temperature Rating

Sprinkler	Cover Plate	Max. Ambient Temp.
165°F/74°C	135°F/57°C	100°F/38°C

Installation Data: RFC30 (SIN RA0611)

Thread Size inch (mm)	K Factor	Sprinkler Spacing ft. (m)	Maximum Distance to Wall ft. (m)	Minimum Distance between sprinklers ft. (m)	Minimum Required Sprinkler Discharge	
					Flow gpm (Lpm)	Press. psi (bar)
½" (15mm)	3.0	12 x 12 (3.6x3.6)	6 (1.83)	8 (2.43)	9 (34.1)	9.0 (0.62)
½" (15mm)	3.0	14 x 14 (4.3x4.3)	7 (2.13)	8 (2.43)	10 (37.8)	11 (0.76)

Note: 1 bar = 100 Kpa

Installation Data: RFC43 (SIN RA0612)

Thread Size inch (mm)	K Factor	Sprinkler Spacing ft. (m)	Maximum Distance to Wall ft. (m)	Minimum Distance between sprinklers ft. (m)	Minimum Required Sprinkler Discharge	
					Flow gpm (Lpm)	Press. psi (bar)
½" (15mm)	4.3	12 x 12 (3.6x3.6)	6 (1.83)	8 (2.43)	12 (45)	7.8 (0.54)
½" (15mm)	4.3	14 x 14 (4.3x4.3)	7 (2.13)	8 (2.43)	13 (49)	9.1 (0.63)
½" (15mm)	4.3	16 x 16 (4.9x4.9)	8 (2.43)	8 (2.43)	13 (49)	9.1 (0.63)
½" (15mm)	4.3	18 x 18 (5.5x5.5)	9 (2.74)	8 (2.43)	18 (68)	17.5 (1.21)
½" (15mm)	4.3	20 x 20 (6.0x6.0)	10 (3.05)	8 (2.43)	21 (79)	23.8 (1.64)

Note: 1 bar = 100 Kpa

Installation Data: RFC49 (RA0616)

Thread Size inch (mm)	K Factor	Sprinkler Spacing ft. (m)	Maximum Distance to Wall ft. (m)	Minimum Distance between sprinklers ft. (m)	Minimum Required Sprinkler Discharge	
					Flow gpm (Lpm)	Press. psi (bar)
½" (15mm)	4.9	12 x 12 (3.6x3.6)	6 (1.83)	8 (2.43)	13 (49)	7.0 (0.48)
½" (15mm)	4.9	14 x 14 (4.3x4.3)	7 (2.13)	8 (2.43)	13 (49)	7.0 (0.48)
½" (15mm)	4.9	16 x 16 (4.9x4.9)	8 (2.43)	8 (2.43)	13 (49)	7.0 (0.48)
½" (15mm)	4.9	18 x 18 (5.5x5.5)	9 (2.74)	8 (2.43)	17 (64.3)	12.0 (0.83)
½" (15mm)	4.9	20 x 20 (6.0x6.0)	10 (3.05)	8 (2.43)	20 (75.7)	16.7 (1.14)

Note: 1 bar = 100 Kpa

FOR SLOPED CEILING APPLICATIONS SEE RASCO BULLETIN 035.