

# Fire Protection Hydraulic Calculations

For

**Red Dot TI**  
**2504 East Main**  
**Puyallup, WA 98372**

For

**Poe Construction**  
**1519 W Valley Hwy N, Suite 103**  
**Auburn, WA 98001**



HYDRAULIC CALCULATIONS  
FOR

RED DOT TI  
2504 EAST MAIN PUYALLUP, WA

DRAWING NO. FP-3  
FILE NO. RED DOT TI-MOD4&6  
DATE: MAY 19, 2023

DESIGN DATA

REMOTE AREA NUMBER: MOD 4&6  
REMOTE AREA LOCATION: FP-3  
OCCUPANCY CLASSIFICATION: LIGHT HAZARD  
DENSITY: .1 GPM/ FT<sup>2</sup>  
AREA OF APPLICATION: 900 FT<sup>2</sup>  
COVERAGE PER SPRINKLER: 324 SQ FT MAX  
TYPE OF SPRINKLER: EC PENDENT  
SPRINKLER ORIFICE SIZE: 5.6K & 8.0k  
SPRINKLER WATER FLOW REQUIRED: 294.8 GPM  
ALLOWANCE  
INSIDE HOSE: 0 GPM  
OUTSIDE HOSE: 250 GPM  
WATER CURTAIN/EXPOSURE SPRINKLERS: N/A  
IN-RACK SPRINKLERS: N/A  
TOTAL WATER REQ'D (INCLUDING ALLOWANCE): 544.8 GPM @ 32.2 PSI  
TYPE OF SYSTEM: WET  
VOLUME OF DRY OR PREACTION SYSTEM: N/A

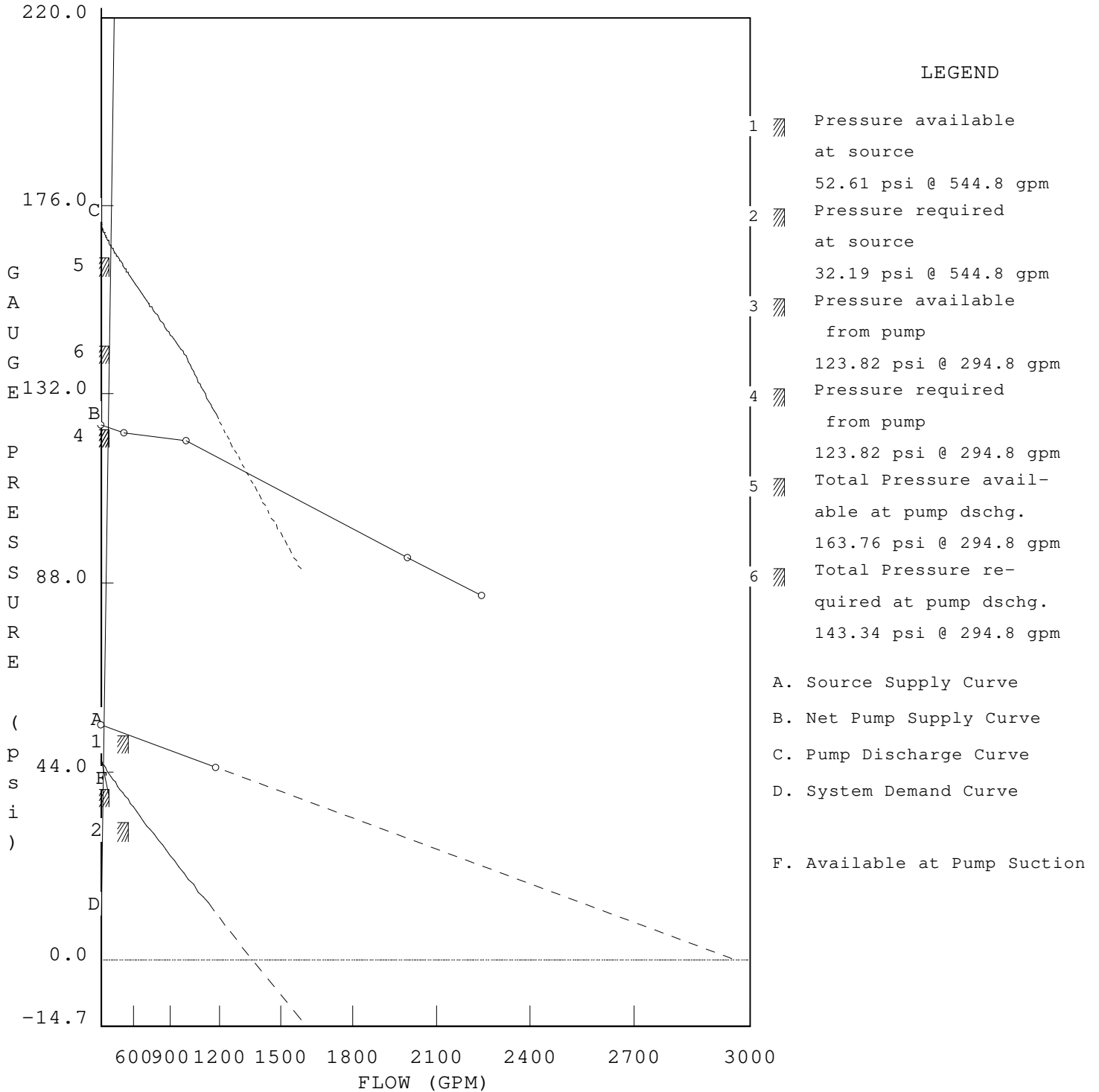
WATER SUPPLY INFORMATION:

LOCATION: SITE  
STATIC PSI: 55 PSI  
RESIDUAL PSI: 45 PSI  
GPM FLOW: 1,182 GPM  
ELEVATION: X FT  
DATE: X

INSTALLING CONTRACTOR: PATRIOT FIRE PROTECTION, INC.  
ADDRESS: 2707 70TH AVENUE EAST, TACOMA WA 98424  
NAME OF DESIGNER: DEREK STRICKLAND  
PHONE NUMBER: (253) 284-3449  
AUTHORITY HAVING JURISDICTION: CITY OF PUYALLUP

WATER SUPPLY ANALYSIS

Static: 55.00 psi Resid: 45.00 psi Flow: 1182.0 gpm



Note: (1) Dashed Lines indicate extrapolated values from Test Results

DATE: 5/19/2023

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JOB TITLE: RED DOT TI - MOD 4&6

NFPA WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	FLOW @ (GPM)	AVAIL. PRESS. (PSI)	TOTAL @ DEMAND (GPM)	REQ'D PRESS. (PSI)
SRC	55.0	45.0	1182.0	52.6	544.8	32.2

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	544.8 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	250.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	294.8 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)	NOTES
H1	8.5	K= 5.60	30.4	30.9	
H2	8.5	K= 5.60	30.7	31.0	
H3	8.5	K= 8.00	25.0	40.0	
H4	8.5	K= 8.00	27.3	41.8	
H5	8.5	K= 5.60	33.6	32.5	
H6	8.5	K= 5.60	33.9	32.6	
H7	8.5	K= 8.00	27.7	42.1	
H8	8.5	K= 8.00	30.2	44.0	
B1	9.5	- - - -	40.5	- - -	
B2	9.5	- - - -	40.8	- - -	
B3	9.5	- - - -	41.5	- - -	
B4	9.5	- - - -	45.3	- - -	
B5	9.5	- - - -	44.8	- - -	
B6	9.5	- - - -	45.1	- - -	
B7	9.5	- - - -	45.9	- - -	
B8	9.5	- - - -	50.0	- - -	
M1	9.5	- - - -	51.1	- - -	
M2	9.5	- - - -	56.4	- - -	
M3	33.0	- - - -	125.3	- - -	
20D	32.4	- - - -	129.5	- - -	
21	33.0	- - - -	129.2	- - -	
22	33.0	- - - -	129.2	- - -	
23	33.0	- - - -	129.2	- - -	
24	33.0	- - - -	129.2	- - -	
25	33.0	- - - -	129.2	- - -	
26	33.0	- - - -	129.2	- - -	
31	33.0	- - - -	129.0	- - -	
32	33.0	- - - -	129.0	- - -	
33	33.0	- - - -	129.0	- - -	
34	33.0	- - - -	129.0	- - -	
35	33.0	- - - -	129.0	- - -	
36	33.0	- - - -	129.0	- - -	
RT4	32.4	- - - -	129.7	- - -	
RH4	2.0	- - - -	143.2	- - -	
PD	2.0	- - - -	143.3	- - -	
PS	2.0	- - - -	19.5	- - -	

DATE: 5/19/2023

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JOB TITLE: RED DOT TI - MOD 4&6

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)	NOTES
FLG	0.5	- - - -	20.2	- - -	
DC1	-4.5	- - - -	27.5	- - -	
DC2	-4.5	- - - -	22.5	- - -	
UG1	-4.5	HOSE STREAM	27.5	250.0	
UG2	-4.5	- - - -	27.5	- - -	
UG3	-4.5	- - - -	27.6	- - -	
UG4	-4.5	- - - -	27.6	- - -	
SRC	-15.0	SOURCE	32.2	544.8	

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JOB TITLE: RED DOT TI - MOD 4&6

NFPA PIPE DATA

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)		
Frm Node	El (ft)	PT	(q)	Node/	Nom ID	Eq.Ln.	F	(Pe)	Notes
To Node	El (ft)	PT	Tot.(Q)	Disch	Act ID	(ft.)	T	Pf/ft.	(Pf)
Pipe: 1	Source		356.3	UG1			85.00	140	4.6
SRC	-15.0	32.2	188.5	UG3	D12.00	T:98.0	118.00		4.5
UG4	-4.5	27.6	544.8		12.460	2G:20.0	203.00	0.000	0.1
Pipe: 2	0.0	0.0					620.00	140	0.0
UG4	-4.5	27.6	188.5	UG2	D12.00	3G:30.0	30.00		0.0
UG3	-4.5	27.6	188.5		12.460		650.00	0.000	0.0
Pipe: 3	0.0	0.0					480.00	140	0.0
UG3	-4.5	27.6	188.5	UG1	D12.00	4G:40.0	40.00		0.0
UG2	-4.5	27.5	188.5		12.460		520.00	0.000	0.0
Pipe: 4	H.S.		250.0	Disch			695.00	140	0.0
UG2	-4.5	27.5	294.8	DC1	D12.00	G:10.0	54.00		0.0
UG1	-4.5	27.5	188.5		12.460	2F:44.0	749.00	0.000	0.0
Pipe: 5	H.S.		250.0	Disch			515.00	140	0.1
UG4	-4.5	27.6	294.8	DC1	D12.00	G:10.0	76.00		0.0
UG1	-4.5	27.5	356.3		12.460	3F:66.0	591.00	0.000	0.1
Pipe: 6	0.0	0.0				T:59.0	30.00	140	0.1
UG1	-4.5	27.5	294.8	DC2	D8.000	2G:14.0	88.50		0.0
DC1	-4.5	27.5	294.8		8.390	F:15.5	118.50	0.001	0.1
Pipe: 7		0.0		Fixed Pressure Loss Device					
DC1	-4.5	27.5	294.8	FLG		5.0 psi,	294.8	gpm	
DC2	-4.5	22.5	294.8						
Pipe: 8	0.0	0.0					80.00	140	2.2
DC2	-4.5	22.5	294.8	PS	D8.000	2L:44.0	44.00		2.2
FLG	0.5	20.2	294.8		8.390		124.00	0.001	0.1
Pipe: 9	0.0	0.0					12.37	120	0.7
FLG	0.5	20.2	294.8	PD	B8.000	2E:42.0	47.00		0.6
PS	2.0	19.5	294.8		8.249	G: 5.0	59.37	0.001	0.0
Pipe: 10	0.0	0.0		Fire Pump Rating		Avail.	Req'd.		
PS	2.0	19.5	294.8	RH4		gpm: 1500.0	294.8	294.8	
PD	2.0	143.3	294.8			psi: 105.0	123.8	123.8	
User Defined Five Point Pump Curve:									
gpm:	0.0	500.0	1000.0	2000.0	2250.0				
psi:	125.0	123.0	121.0	94.0	85.0				
Pipe: 11	0.0	0.0				ETCB	20.08	120	0.1
PD	2.0	143.3	294.8	RT4	B8.000		129.00		0.0
RH4	2.0	143.2	294.8		8.249		149.08	0.001	0.1
Pipe: 12	0.0	0.0				T:38.0	31.42	120	13.5
RH4	2.0	143.2	294.8	20D	B6.000	C:40.0	91.00		13.2
RT4	32.4	129.7	294.8		6.357	B:13.0	122.42	0.003	0.4

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Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)		
Frm Node	El (ft)	PT	(q) Node/	Nom ID	Eq.Ln.	F	(Pe)	Notes	
To Node	El (ft)	PT	Tot.(Q) Disch	Act ID	(ft.)	T	Pf/ft.	(Pf)	
Pipe: 13	0.0		75.7	22					
RT4	32.4	129.7	219.2	21	B6.000	2E:36.0	33.42	120	0.2
20D	32.4	129.5	294.8		6.357		36.00		0.0
							69.42	0.003	0.2
Pipe: 14	0.0		0.0				4.50	120	0.3
20D	32.4	129.5	219.2	M3	B6.000	T:38.0	38.00		0.3
21	33.0	129.2	219.2		6.357		42.50	0.002	0.1
Pipe: 15	0.0		15.7	32			5.50	120	0.3
20D	32.4	129.5	59.9	23	B6.000	T:38.0	38.00		0.3
22	33.0	129.2	75.7		6.357		43.50	0.000	0.0
Pipe: 16	0.0		15.3	33			10.00	120	0.0
22	33.0	129.2	44.7	24	B6.000	----	0.00		0.0
23	33.0	129.2	59.9		6.357		10.00	0.000	0.0
Pipe: 17	0.0		15.0	34			10.00	120	0.0
23	33.0	129.2	29.7	25	B6.000	----	0.00		0.0
24	33.0	129.2	44.7		6.357		10.00	0.000	0.0
Pipe: 18	0.0		14.9	35			10.00	120	0.0
24	33.0	129.2	14.8	26	B6.000	----	0.00		0.0
25	33.0	129.2	29.7		6.357		10.00	0.000	0.0
Pipe: 19	0.0		0.0				10.00	120	0.0
25	33.0	129.2	14.8	36	B6.000	----	0.00		0.0
26	33.0	129.2	14.8		6.357		10.00	0.000	0.0
Pipe: 20	0.0		0.0				10.00	120	0.0
32	33.0	129.0	75.7	M3	B4.000	----	0.00		0.0
31	33.0	129.0	75.7		4.260		10.00	0.002	0.0
Pipe: 21	0.0		75.7	31			10.00	120	0.0
33	33.0	129.0	-15.7	22	B4.000	----	0.00		0.0
32	33.0	129.0	59.9		4.260		10.00	0.001	0.0
Pipe: 22	0.0		59.9	32			10.00	120	0.0
34	33.0	129.0	-15.3	23	B4.000	----	0.00		0.0
33	33.0	129.0	44.7		4.260		10.00	0.001	0.0
Pipe: 23	0.0		44.7	33			10.00	120	0.0
35	33.0	129.0	-15.0	24	B4.000	----	0.00		0.0
34	33.0	129.0	29.7		4.260		10.00	0.000	0.0
Pipe: 24	0.0		29.7	34			10.00	120	0.0
36	33.0	129.0	-14.9	25	B4.000	----	0.00		0.0
35	33.0	129.0	14.8		4.260		10.00	0.000	0.0
Pipe: 26	0.0		75.7	31			610.75	120	0.2
22	33.0	129.2	-59.9	33	G3.000	4T:87.4	128.14		0.0
32	33.0	129.0	15.7		3.314	4F:20.4	738.89	0.000	0.2

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JOB TITLE: RED DOT TI - MOD 4&6

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)	
Frm Node	El (ft)	PT	(q) Node/	Nom ID	Eq.Ln.	F	(Pe)	Notes
To Node	El (ft)	PT	Tot.(Q) Disch	Act ID	(ft.)	T	Pf/ft.	(Pf)
Pipe: 27	0.0		59.9 32		2E:20.4	610.75	120	0.2
23	33.0	129.2	-44.7 34	G3.000	4T:87.4	128.14		0.0
33	33.0	129.0	15.3	3.314	4F:20.4	738.89	0.000	0.2
Pipe: 28	0.0		44.7 33		2E:20.4	610.75	120	0.2
24	33.0	129.2	-29.7 35	G3.000	4T:87.4	128.14		0.0
34	33.0	129.0	15.0	3.314	4F:20.4	738.89	0.000	0.2
Pipe: 33	0.0		29.7 34		2E:20.4	610.75	120	0.2
25	33.0	129.2	-14.8 36	G3.000	4T:87.4	128.14		0.0
35	33.0	129.0	14.9	3.314	4F:20.4	738.89	0.000	0.2
Pipe: 38	0.0		0.0		2E:20.4	610.75	120	0.2
26	33.0	129.2	14.8 35	G3.000	4T:87.4	128.14		0.0
36	33.0	129.0	14.8	3.314	4F:20.4	738.89	0.000	0.2
Pipe: 39	0.0		294.8 M2		E:10.2	30.50	120	3.8
21	33.0	129.2	-75.7 31	G3.000	2T:43.7	64.07		0.0
M3	33.0	125.3	219.2	3.314	2F:10.2	94.57	0.040	3.8
Pipe: 40	0.0		294.8 M2		E:10.2	580.25	120	3.6
31	33.0	129.0	-219.2 21	G3.000	2T:43.7	64.07		0.0
M3	33.0	125.3	75.7	3.314	2F:10.2	644.32	0.006	3.6
Pipe: 41	0.0		151.1 B8			30.71	120	69.0
M3	33.0	125.3	143.7 M1	G1.500	E: 5.6	16.93		-10.2
M2	9.5	56.4	294.8	1.728	T:11.3	47.64	1.661	79.2
Pipe: 42	0.0		0.0			12.00	120	5.3
M2	9.5	56.4	143.7 B4	G1.500	----	0.00		0.0
M1	9.5	51.1	143.7	1.728		12.00	0.440	5.3
Pipe: 43	0.0		44.0 H8			2.00	120	6.4
M2	9.5	56.4	107.2 B7	G1.500	T:11.3	11.29		0.0
B8	9.5	50.0	151.1	1.728		13.29	0.483	6.4
Pipe: 43A	0.0		42.1 H7			16.00	120	4.1
B8	9.5	50.0	65.1 B6	G1.500	----	0.00		0.0
B7	9.5	45.9	107.2	1.728		16.00	0.256	4.1
Pipe: 43B	0.0		32.6 H6			7.66	120	0.8
B7	9.5	45.9	32.5 B5	G1.500	----	0.00		0.0
B6	9.5	45.1	65.1	1.728		7.66	0.102	0.8
Pipe: 43C	0.0		0.0			12.00	120	0.3
B6	9.5	45.1	32.5 H5	G1.500	----	0.00		0.0
B5	9.5	44.8	32.5	1.728		12.00	0.028	0.3
Pipe: 44	0.0		41.8 H4			2.00	120	5.8
M1	9.5	51.1	101.9 B3	G1.500	T:11.3	11.29		0.0
B4	9.5	45.3	143.7	1.728		13.29	0.440	5.8



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JOB TITLE: RED DOT TI - MOD 4&6

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)	
Frm Node	El (ft)	PT	(q) Node/	Nom ID	Eq.Ln.	F	(Pe)	Notes
To Node	El (ft)	PT	Tot.(Q) Disch	Act ID	(ft.)	T	Pf/ft.	(Pf)
Pipe: 44A	0.0		40.0 H3			16.00	120	3.7
B4	9.5	45.3	61.9 B2	G1.500	----	0.00		0.0
B3	9.5	41.5	101.9	1.728		16.00	0.233	3.7
Pipe: 44B	0.0		31.0 H2			7.66	120	0.7
B3	9.5	41.5	30.9 B1	G1.500	----	0.00		0.0
B2	9.5	40.8	61.9	1.728		7.66	0.093	0.7
Pipe: 44C	0.0		0.0			12.00	120	0.3
B2	9.5	40.8	30.9 H1	G1.500	----	0.00		0.0
B1	9.5	40.5	30.9	1.728		12.00	0.026	0.3
Pipe: 45	5.60		30.9 Disch			25.17	120	10.1
B1	9.5	40.5	0.0	A1.000	3E: 6.0	11.00		-0.4
H1	8.5	30.4	30.9	1.049	T: 5.0	36.17	0.291	10.5
Pipe: 46	5.60		31.0 Disch			25.17	120	10.2
B2	9.5	40.8	0.0	A1.000	3E: 6.0	11.00		-0.4
H2	8.5	30.7	31.0	1.049	T: 5.0	36.17	0.293	10.6
Pipe: 47	8.00		40.0 Disch			25.17	120	16.5
B3	9.5	41.5	0.0	A1.000	3E: 6.0	11.00		-0.4
H3	8.5	25.0	40.0	1.049	T: 5.0	36.17	0.469	17.0
Pipe: 48	8.00		41.8 Disch			25.17	120	18.0
B4	9.5	45.3	0.0	A1.000	3E: 6.0	11.00		-0.4
H4	8.5	27.3	41.8	1.049	T: 5.0	36.17	0.509	18.4
Pipe: 49	5.60		32.5 Disch			25.17	120	11.1
B5	9.5	44.8	0.0	A1.000	3E: 6.0	11.00		-0.4
H5	8.5	33.6	32.5	1.049	T: 5.0	36.17	0.319	11.5
Pipe: 50	5.60		32.6 Disch			25.17	120	11.2
B6	9.5	45.1	0.0	A1.000	3E: 6.0	11.00		-0.4
H6	8.5	33.9	32.6	1.049	T: 5.0	36.17	0.321	11.6
Pipe: 51	8.00		42.1 Disch			25.17	120	18.2
B7	9.5	45.9	0.0	A1.000	3E: 6.0	11.00		-0.4
H7	8.5	27.7	42.1	1.049	T: 5.0	36.17	0.515	18.6
Pipe: 52	8.00		44.0 Disch			25.17	120	19.8
B8	9.5	50.0	0.0	A1.000	3E: 6.0	11.00		-0.4
H8	8.5	30.2	44.0	1.049	T: 5.0	36.17	0.559	20.2

NOTES (HASS):

- (1) Calculations were performed by the HASS 8.8 R4 D computer program in accordance with NFPA13 (2019) under license no. 64620537 granted by HRS Systems, Inc. 208 Southside Square Petersburg, TN 37144 (931) 659-9760







HYDRAULIC CALCULATIONS  
FOR

RED DOT TI  
2504 EAST MAIN PUYALLUP, WA

DRAWING NO. FP-3  
FILE NO. RED DOT TI-DETAILED ASSEMBLY  
DATE: MAY 19, 2023

DESIGN DATA

REMOTE AREA NUMBER: 2  
REMOTE AREA LOCATION: FP-4  
OCCUPANCY CLASSIFICATION: ORDINARY HAZARD GROUP 2  
DENSITY: .2 GPM/ FT<sup>2</sup>  
AREA OF APPLICATION: 900 FT<sup>2</sup>  
COVERAGE PER SPRINKLER: 120 SQ FT  
TYPE OF SPRINKLER: PENDENT  
SPRINKLER ORIFICE SIZE: 5.6K  
SPRINKLER WATER FLOW REQUIRED: 250.7 GPM  
ALLOWANCE  
INSIDE HOSE: 0 GPM  
OUTSIDE HOSE: 250 GPM  
WATER CURTAIN/EXPOSURE SPRINKLERS: N/A  
IN-RACK SPRINKLERS: N/A  
TOTAL WATER REQ'D (INCLUDING ALLOWANCE): 500.7 GPM @ 20.0 PSI  
TYPE OF SYSTEM: WET  
VOLUME OF DRY OR PREACTION SYSTEM: N/A

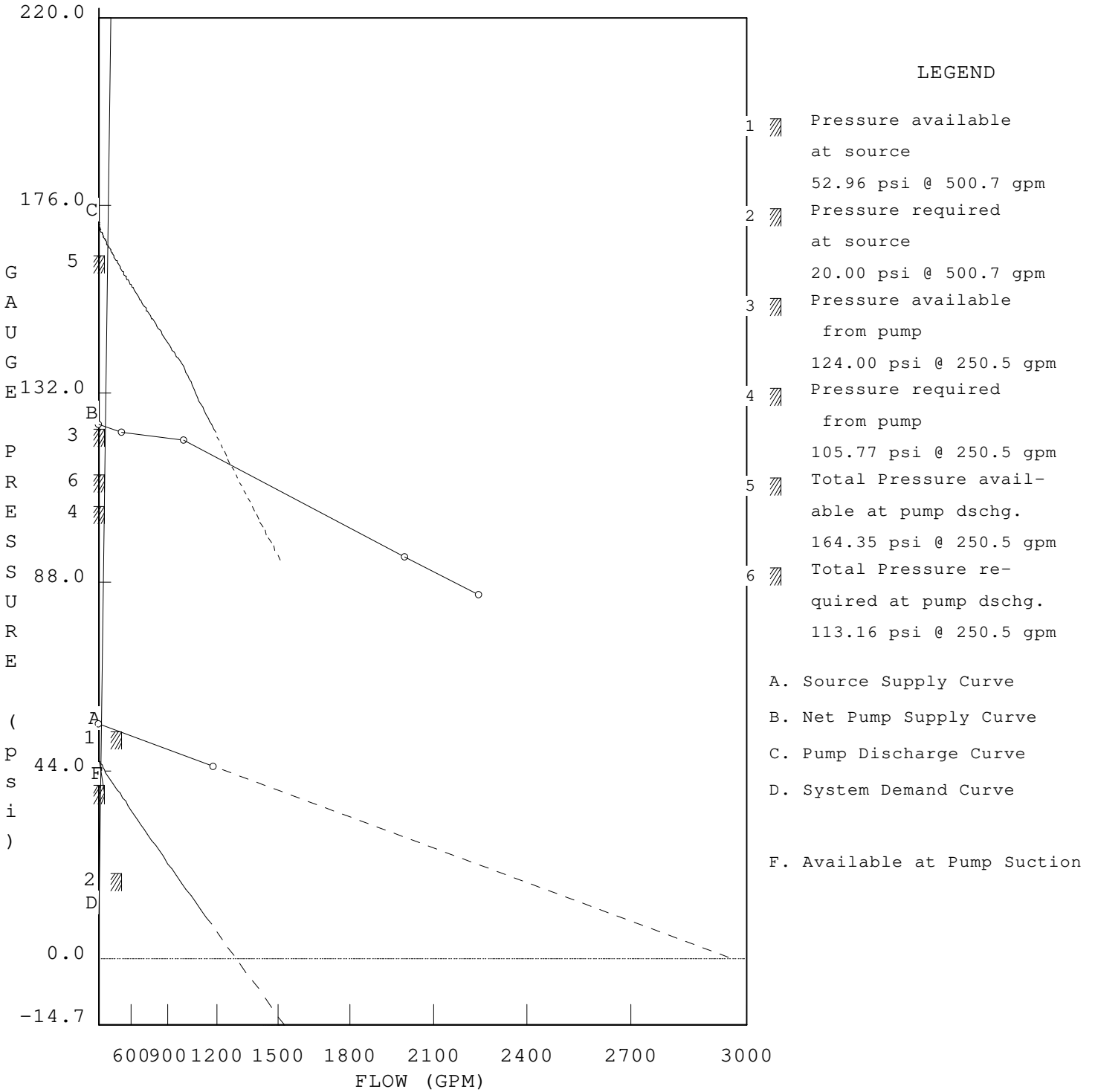
WATER SUPPLY INFORMATION:

LOCATION: SITE  
STATIC PSI: 55 PSI  
RESIDUAL PSI: 45 PSI  
GPM FLOW: 1,182 GPM  
ELEVATION: X FT  
DATE: X

INSTALLING CONTRACTOR: PATRIOT FIRE PROTECTION, INC.  
ADDRESS: 2707 70TH AVENUE EAST, TACOMA WA 98424  
NAME OF DESIGNER: DEREK STRICKLAND  
PHONE NUMBER: (253) 284-3449  
AUTHORITY HAVING JURISDICTION: CITY OF PUYALLUP

WATER SUPPLY ANALYSIS

Static: 55.00 psi Resid: 45.00 psi Flow: 1182.0 gpm



Note: (1) Dashed Lines indicate extrapolated values from Test Results

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JOB TITLE: RED DOT TI - DETAILED ASSEMBLY

NFPA WATER SUPPLY DATA

SOURCE NODE TAG	STATIC PRESS. (PSI)	RESID. PRESS. (PSI)	FLOW @ (GPM)	AVAIL. PRESS. (PSI)	TOTAL @ DEMAND (GPM)	REQ'D PRESS. (PSI)
SRC	55.0	45.0	1182.0	53.0	500.7	20.0

AGGREGATE FLOW ANALYSIS:

TOTAL FLOW AT SOURCE	500.7 GPM
TOTAL HOSE STREAM ALLOWANCE AT SOURCE	0.0 GPM
OTHER HOSE STREAM ALLOWANCES	250.0 GPM
TOTAL DISCHARGE FROM ACTIVE SPRINKLERS	250.7 GPM

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)	NOTES
H1	8.5	K= 5.60	18.4	24.0	
H2	8.5	K= 5.60	18.5	24.1	
H3	8.5	K= 5.60	19.0	24.4	
H4	8.5	K= 5.60	19.3	24.6	
H5	8.5	K= 5.60	19.2	24.6	
H6	8.5	K= 5.60	20.6	25.4	
H7	8.5	K= 5.60	20.8	25.5	
H8	8.5	K= 5.60	21.4	25.9	
H9	8.5	K= 5.60	21.7	26.1	
H10	8.5	K= 5.60	21.6	26.0	
B1	9.6	- - - -	24.1	- - -	
B2	9.6	- - - -	24.3	- - -	
B3	9.6	- - - -	25.0	- - -	
B4	9.6	- - - -	25.4	- - -	
B5	9.6	- - - -	25.3	- - -	
B6	9.6	- - - -	27.1	- - -	
B7	9.6	- - - -	27.3	- - -	
B8	9.6	- - - -	28.1	- - -	
B9	9.6	- - - -	28.5	- - -	
B10	9.6	- - - -	28.3	- - -	
M1	9.6	- - - -	26.7	- - -	
M2	9.6	- - - -	29.9	- - -	
M3	33.0	- - - -	93.9	- - -	
20E	33.0	- - - -	99.3	- - -	
21	33.0	- - - -	99.1	- - -	
22	33.0	- - - -	99.1	- - -	
23	33.0	- - - -	99.1	- - -	
24	33.0	- - - -	99.1	- - -	
25	33.0	- - - -	99.0	- - -	
26	33.0	- - - -	99.0	- - -	
27	33.0	- - - -	99.0	- - -	
31	33.0	- - - -	98.8	- - -	
32	33.0	- - - -	98.8	- - -	
33	33.0	- - - -	98.8	- - -	
34	33.0	- - - -	98.8	- - -	
35	33.0	- - - -	98.8	- - -	

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JOB TITLE: RED DOT TI - DETAILED ASSEMBLY

NODE ANALYSIS DATA

NODE TAG	ELEVATION (FT)	NODE TYPE	PRESSURE (PSI)	DISCHARGE (GPM)	NOTES
36	33.0	- - - -	98.8	- - -	
37	33.0	- - - -	98.8	- - -	
RT5	31.0	- - - -	100.2	- - -	
RH5	2.0	- - - -	113.1	- - -	
PD	2.0	- - - -	113.2	- - -	
PS	2.0	- - - -	7.4	- - -	
FLG	0.5	- - - -	8.1	- - -	
DC1	-4.5	- - - -	15.3	- - -	
DC2	-4.5	- - - -	10.3	- - -	
UG1	-4.5	HOSE STREAM	15.3	250.0	
UG2	-4.5	- - - -	15.4	- - -	
UG3	-4.5	- - - -	15.4	- - -	
UG4	-4.5	- - - -	15.4	- - -	
SRC	-15.0	SOURCE	20.0	500.7	



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JOB TITLE: RED DOT TI - DETAILED ASSEMBLY

NFPA PIPE DATA

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)	
Frm Node	El (ft)	PT	(q) Node/	Nom ID	Eq.Ln.	F	(Pe)	Notes
To Node	El (ft)	PT	Tot.(Q) Disch	Act ID	(ft.)	T	Pf/ft.	(Pf)
Pipe: 1	Source	328.9	UG1			85.00	140	4.6
SRC	-15.0	20.0	171.7	UG3	D12.00 T:98.0	118.00		4.5
UG4	-4.5	15.4	500.7		12.460 2G:20.0	203.00	0.000	0.0
Pipe: 2	0.0	0.0				620.00	140	0.0
UG4	-4.5	15.4	171.7	UG2	D12.00 3G:30.0	30.00		0.0
UG3	-4.5	15.4	171.7		12.460	650.00	0.000	0.0
Pipe: 3	0.0	0.0				480.00	140	0.0
UG3	-4.5	15.4	171.7	UG1	D12.00 4F:88.0	88.00		0.0
UG2	-4.5	15.4	171.7		12.460	568.00	0.000	0.0
Pipe: 4	H.S.	250.0	Disch			695.00	140	0.0
UG2	-4.5	15.4	250.7	DC1	D12.00 G:10.0	54.00		0.0
UG1	-4.5	15.3	171.7		12.460 2F:44.0	749.00	0.000	0.0
Pipe: 4A	H.S.	250.0	Disch			515.00	140	0.1
UG4	-4.5	15.4	250.7	DC1	D12.00 G:10.0	76.00		0.0
UG1	-4.5	15.3	328.9		12.460 3F:66.0	591.00	0.000	0.1
Pipe: 5	0.0	0.0			T:59.0	30.00	140	0.0
UG1	-4.5	15.3	250.7	DC2	D8.000 2G:14.0	88.50		0.0
DC1	-4.5	15.3	250.7		8.390 F:15.5	118.50	0.000	0.0
Pipe: 6		0.0		Fixed Pressure Loss Device				
DC1	-4.5	15.3	250.7	FLG	5.0 psi,	250.7 gpm		
DC2	-4.5	10.3	250.7					
Pipe: 7	0.0	0.0				80.00	140	2.2
DC2	-4.5	10.3	250.7	PS	D8.000 2L:44.0	44.00		2.2
FLG	0.5	8.1	250.7		8.390	124.00	0.000	0.1
Pipe: 9	0.0	0.0				12.37	120	0.7
FLG	0.5	8.1	250.7	PD	B8.000 2E:42.0	47.00		0.6
PS	2.0	7.4	250.7		8.249 G: 5.0	59.37	0.001	0.0
Pipe: 10	0.0	0.0		Fire Pump Rating	Avail.	Req'd.		
PS	2.0	7.4	250.7	RH5	gpm: 1500.0	250.5	250.5	
PD	2.0	113.2	250.7		psi: 105.0	124.0	105.8	
User Defined Five Point Pump Curve:								
gpm:	0.0	500.0	1000.0	2000.0	2250.0			
psi:	125.0	123.0	121.0	94.0	85.0			
Pipe: 11	0.0	0.0			ETCB	21.75	120	0.1
PD	2.0	113.2	250.7	RT5	B8.000	129.00		0.0
RH5	2.0	113.1	250.7		8.249	150.75	0.001	0.1
Pipe: 12	0.0	0.0			T:38.0	29.00	120	12.8
RH5	2.0	113.1	250.7	20E	B6.000 C:40.0	91.00		12.6
RT5	31.0	100.2	250.7		6.357 B:13.0	120.00	0.002	0.3

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JOB TITLE: RED DOT TI - DETAILED ASSEMBLY

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)		
Frm Node	El (ft)	PT	(q) Node/	Nom ID	Eq.Ln.	F	(Pe)	Notes	
To Node	El (ft)	PT	Tot.(Q) Disch	Act ID	(ft.)	T	Pf/ft.	(Pf)	
Pipe: 13	0.0	0.0				14.67	120	1.0	
RT5	31.0	100.2	250.7	21	B6.000	2E:36.0	45.00	0.9	
20E	33.0	99.3	250.7		6.357	F: 9.0	59.67	0.002	0.1
Pipe: 14	0.0	18.3	31			34.08	120	0.2	
20E	33.0	99.3	232.4	22	B6.000	2E:36.0	36.00	0.0	
21	33.0	99.1	250.7		6.357		70.08	0.002	0.2
Pipe: 15	0.0	17.8	32			8.00	120	0.0	
21	33.0	99.1	214.6	23	B6.000	----	0.00	0.0	
22	33.0	99.1	232.4		6.357		8.00	0.002	0.0
Pipe: 16	0.0	17.5	33			10.00	120	0.0	
22	33.0	99.1	197.1	24	B6.000	----	0.00	0.0	
23	33.0	99.1	214.6		6.357		10.00	0.002	0.0
Pipe: 17	0.0	17.8	34			9.00	120	0.0	
23	33.0	99.1	179.3	25	B6.000	----	0.00	0.0	
24	33.0	99.1	197.1		6.357		9.00	0.001	0.0
Pipe: 18	0.0	143.7	M3			10.00	120	0.0	
24	33.0	99.1	35.6	26	B6.000	----	0.00	0.0	
25	33.0	99.0	179.3		6.357		10.00	0.001	0.0
Pipe: 19	0.0	17.8	36			8.00	120	0.0	
25	33.0	99.0	17.8	27	B6.000	----	0.00	0.0	
26	33.0	99.0	35.6		6.357		8.00	0.000	0.0
Pipe: 20	0.0	0.0				8.00	120	0.0	
26	33.0	99.0	17.8	37	B6.000	----	0.00	0.0	
27	33.0	99.0	17.8		6.357		8.00	0.000	0.0
Pipe: 21	0.0	36.1	33			8.00	120	0.0	
31	33.0	98.8	-17.8	22	B4.000	----	0.00	0.0	
32	33.0	98.8	18.3		4.260		8.00	0.000	0.0
Pipe: 22	0.0	53.6	34			10.00	120	0.0	
32	33.0	98.8	-17.5	23	B4.000	----	0.00	0.0	
33	33.0	98.8	36.1		4.260		10.00	0.000	0.0
Pipe: 23	0.0	71.4	35			9.00	120	0.0	
33	33.0	98.8	-17.8	24	B4.000	----	0.00	0.0	
34	33.0	98.8	53.6		4.260		9.00	0.001	0.0
Pipe: 24	0.0	107.0	M3			10.00	120	0.0	
34	33.0	98.8	-35.6	36	B4.000	----	0.00	0.0	
35	33.0	98.8	71.4		4.260		10.00	0.001	0.0
Pipe: 25	0.0	107.0	M3			8.00	120	0.0	
36	33.0	98.8	-71.4	34	B4.000	----	0.00	0.0	
35	33.0	98.8	35.6		4.260		8.00	0.000	0.0

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JOB TITLE: RED DOT TI - DETAILED ASSEMBLY

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)	Notes	
Frm Node	El (ft)	PT	(q) Node/	Nom ID	Eq.Ln.	F	(Pe)		
To Node	El (ft)	PT	Tot.(Q) Disch	Act ID	(ft.)	T	Pf/ft.		(Pf)
Pipe: 26	0.0	35.6	35			8.00	120	0.0	
37	33.0	98.8	-17.8	26	B4.000	----	0.00	0.0	
36	33.0	98.8	17.8		4.260	8.00	0.000	0.0	
Pipe: 27	0.0	0.0				612.17	120	0.3	
21	33.0	99.1	18.3	32	G3.000	8E:81.5	168.88	0.0	
31	33.0	98.8	18.3		3.314	4T:87.4	781.05	0.000	0.3
Pipe: 28	0.0	36.1	33			613.75	120	0.3	
22	33.0	99.1	-18.3	31	G3.000	8E:81.5	168.88	0.0	
32	33.0	98.8	17.8		3.314	4T:87.4	782.63	0.000	0.3
Pipe: 29	0.0	53.6	34			612.17	120	0.3	
23	33.0	99.1	-36.1	32	G3.000	8E:81.5	168.88	0.0	
33	33.0	98.8	17.5		3.314	4T:87.4	781.05	0.000	0.3
Pipe: 30	0.0	71.4	35		2E:20.4	610.75	120	0.3	
24	33.0	99.1	-53.6	33	G3.000	4T:87.4	128.14	0.0	
34	33.0	98.8	17.8		3.314	4F:20.4	738.89	0.000	0.3
Pipe: 31	0.0	250.7	M2		E:10.2	217.00	120	5.2	
25	33.0	99.0	-107.0	35	G3.000	2T:43.7	64.07	0.0	
M3	33.0	93.9	143.7		3.314	2F:10.2	281.07	0.018	5.2
Pipe: 32	0.0	250.7	M2		E:10.2	393.75	120	4.9	
35	33.0	98.8	-143.7	25	G3.000	2T:43.7	64.07	0.0	
M3	33.0	93.9	107.0		3.314	2F:10.2	457.82	0.011	4.9
Pipe: 36	0.0	35.6	35		2E:20.4	610.75	120	0.3	
26	33.0	99.0	-17.8	37	G3.000	4T:87.4	128.14	0.0	
36	33.0	98.8	17.8		3.314	4F:20.4	738.89	0.000	0.3
Pipe: 41	0.0	0.0			2E:20.4	610.75	120	0.3	
27	33.0	99.0	17.8	36	G3.000	4T:87.4	128.14	0.0	
37	33.0	98.8	17.8		3.314	4F:20.4	738.89	0.000	0.3
Pipe: 42	0.0	52.1	B9			32.00	120	64.0	
M3	33.0	93.9	121.7	M1	G1.500	3E:16.9	28.21	-10.1	
M2	9.6	29.9	250.7		1.728	T:11.3	60.21	1.231	74.1
Pipe: 43	0.0	49.2	B4			10.00	120	3.2	
M2	9.6	29.9	72.5	B3	G1.500	----	0.00	0.0	
M1	9.6	26.7	121.7		1.728		10.00	0.323	3.2
Pipe: 44	0.0	24.4	H3			2.17	120	1.7	
M1	9.6	26.7	48.1	B2	G1.500	T:11.3	11.29	0.0	
B3	9.6	25.0	72.5		1.728		13.46	0.124	1.7
Pipe: 45	0.0	24.1	H2			12.00	120	0.7	
B3	9.6	25.0	24.0	B1	G1.500	----	0.00	0.0	
B2	9.6	24.3	48.1		1.728		12.00	0.058	0.7

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JOB TITLE: RED DOT TI - DETAILED ASSEMBLY

Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)	
Frm Node	El (ft)	PT	(q) Node/	Nom ID	Eq.Ln.	F	(Pe)	Notes
To Node	El (ft)	PT	Tot.(Q) Disch	Act ID	(ft.)	T	Pf/ft.	(Pf)
Pipe: 46		0.0	0.0			12.00	120	0.2
B2	9.6	24.3	24.0	H1	G1.500	----	0.00	0.0
B1	9.6	24.1	24.0		1.728	12.00	0.016	0.2
Pipe: 47		0.0	24.6	H4		9.83	120	1.3
M1	9.6	26.7	24.6	B5	G1.500	T:11.3	11.29	0.0
B4	9.6	25.4	49.2		1.728	21.12	0.060	1.3
Pipe: 48		0.0	0.0			8.00	120	0.1
B4	9.6	25.4	24.6	H5	G1.500	----	0.00	0.0
B5	9.6	25.3	24.6		1.728	8.00	0.017	0.1
Pipe: 49		0.0	25.9	H8		2.17	120	1.9
M2	9.6	29.9	50.9	B7	G1.500	T:11.3	11.29	0.0
B8	9.6	28.1	76.8		1.728	13.46	0.138	1.9
Pipe: 50		0.0	25.5	H7		12.00	120	0.8
B8	9.6	28.1	25.4	B6	G1.500	----	0.00	0.0
B7	9.6	27.3	50.9		1.728	12.00	0.065	0.8
Pipe: 51		0.0	0.0			12.00	120	0.2
B7	9.6	27.3	25.4	H6	G1.500	----	0.00	0.0
B6	9.6	27.1	25.4		1.728	12.00	0.018	0.2
Pipe: 52		0.0	26.1	H9		9.83	120	1.4
M2	9.6	29.9	26.0	B10	G1.500	T:11.3	11.29	0.0
B9	9.6	28.5	52.1		1.728	21.12	0.067	1.4
Pipe: 53		0.0	0.0			8.00	120	0.1
B9	9.6	28.5	26.0	H10	G1.500	----	0.00	0.0
B10	9.6	28.3	26.0		1.728	8.00	0.019	0.1
Pipe: 54		5.60	24.0	Disch		23.17	120	5.8
B1	9.6	24.1	0.0		A1.000	3E: 6.0	11.00	-0.5
H1	8.5	18.4	24.0		1.049	T: 5.0	34.17	0.182
Pipe: 55		5.60	24.1	Disch		23.17	120	5.8
B2	9.6	24.3	0.0		A1.000	3E: 6.0	11.00	-0.5
H2	8.5	18.5	24.1		1.049	T: 5.0	34.17	0.184
Pipe: 56		5.60	24.4	Disch		23.17	120	6.0
B3	9.6	25.0	0.0		A1.000	3E: 6.0	11.00	-0.5
H3	8.5	19.0	24.4		1.049	T: 5.0	34.17	0.188
Pipe: 57		5.60	24.6	Disch		23.17	120	6.1
B4	9.6	25.4	0.0		A1.000	3E: 6.0	11.00	-0.5
H4	8.5	19.3	24.6		1.049	T: 5.0	34.17	0.191
Pipe: 58		5.60	24.6	Disch		23.17	120	6.0
B5	9.6	25.3	0.0		A1.000	3E: 6.0	11.00	-0.5
H5	8.5	19.2	24.6		1.049	T: 5.0	34.17	0.190

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Pipe Tag	K-fac	Add Fl	Add Fl To	Fit:	L	C	(Pt)	
Frm Node	El (ft)	PT	(q) Node/	Nom ID	Eq.Ln.	F	(Pe)	Notes
To Node	El (ft)	PT	Tot.(Q) Disch	Act ID	(ft.)	T	Pf/ft.	(Pf)
Pipe: 59		5.60	25.4 Disch			23.17	120	6.5
B6	9.6	27.1	0.0	A1.000	3E: 6.0	11.00		-0.5
H6	8.5	20.6	25.4	1.049	T: 5.0	34.17	0.203	6.9
Pipe: 60		5.60	25.5 Disch			23.17	120	6.5
B7	9.6	27.3	0.0	A1.000	3E: 6.0	11.00		-0.5
H7	8.5	20.8	25.5	1.049	T: 5.0	34.17	0.204	7.0
Pipe: 61		5.60	25.9 Disch			23.17	120	6.7
B8	9.6	28.1	0.0	A1.000	3E: 6.0	11.00		-0.5
H8	8.5	21.4	25.9	1.049	T: 5.0	34.17	0.210	7.2
Pipe: 62		5.60	26.1 Disch			23.17	120	6.8
B9	9.6	28.5	0.0	A1.000	3E: 6.0	11.00		-0.5
H9	8.5	21.7	26.1	1.049	T: 5.0	34.17	0.213	7.3
Pipe: 63		5.60	26.0 Disch			23.17	120	6.8
B10	9.6	28.3	0.0	A1.000	3E: 6.0	11.00		-0.5
H10	8.5	21.6	26.0	1.049	T: 5.0	34.17	0.212	7.2

NOTES (HASS):

- (1) Calculations were performed by the HASS 8.8 R4 D computer program in accordance with NFPA13 (2019) under license no. 64620537 granted by HRS Systems, Inc. 208 Southside Square Petersburg, TN 37144 (931) 659-9760
- (2) The system has been calculated to provide an average imbalance at each node of 0.005 gpm and a maximum imbalance at any node of 0.112 gpm.
- (3) Total pressure at each node is used in balancing the system. Maximum water velocity is 34.3 ft/sec at pipe 42.
- (4) The Minimum pump suction pressure under maximum calculated demand is 7.39 (psi)
- (5) Items listed in bold print on the cover sheet are automatically transferred from the calculation report.
- (6) Available pressure at source node SRC under full flow conditions is 52.52 psi with a flow of 556.30 gpm.

DATE: 5/19/2023

P:\DESIGN\HASS\DEREKS\RED DOT TI-DETAILED ASSEMBLY.SDF

JOB TITLE: RED DOT TI - DETAILED ASSEMBLY

(7) PIPE FITTINGS TABLE

HASS Pipe Table Name: standard.pip

PAGE: A MATERIAL: S40 HWC: 120

Diameter (in)	Equivalent Fitting Lengths in Feet								
	E Ell	T Tee	L LngEll	C ChkVlv	B BfyVlv	G GatVlv	A AlmChk	D DPVlv	N NTee
1.049	2.00	5.00	2.00	5.00	6.00	1.00	10.00	2.00	5.00

PAGE: B MATERIAL: THNWL HWC: 120

Diameter (in)	Equivalent Fitting Lengths in Feet								
	E Ell	T Tee	L LngEll	C ChkVlv	B BfyVlv	G GatVlv	A AlmChk	D DPVlv	N NPTee
4.260	13.00	26.00	8.00	29.00	16.00	3.00	26.00	26.00	26.00
6.357	18.00	38.00	11.00	40.00	13.00	4.00	35.00	35.00	38.00
8.249	21.00	41.00	15.00	53.00	14.00	5.00	37.00	37.00	41.00

PAGE: D MATERIAL: DIRON HWC: 140

Diameter (in)	Equivalent Fitting Lengths in Feet								
	E Ell	T Tee	L LngEll	C ChkVlv	B BfyVlv	G GatVlv	N NPTee	F F45Ell	
8.390	31.00	59.00	22.00	76.00	20.00	7.00	59.00	15.50	
12.460	44.00	98.00	30.00	107.00	34.00	10.00	98.00	22.00	

PAGE: G MATERIAL: DynaFlow HWC: 120

Diameter (in)	Equivalent Fitting Lengths in Feet								
	E Ell	T Tee	L LngEll	C ChkVlv	B BfyVlv	G GatVlv	A AlmChk	D DPVlv	N NPTee
1.728	5.64	11.29	2.82	12.70	8.47	1.41	14.11	14.11	11.29
3.314	10.19	21.84	7.28	23.29	14.56	1.46	18.93	18.93	21.84





## F1FR56 Series Quick Response Sprinklers

K-factor 5.6 (80)

### Features

- Standard coverage quick-response sprinklers
- Upright, pendent, horizontal sidewall, and vertical sidewall deflectors
- Low profile, compact design
- Available in a wide variety of finishes

### Product Description

Reliable Model F1FR56 series sprinklers are quick-response standard spray automatic fire sprinklers utilizing a sensitive 3.0 mm glass bulb thermal element.

Pendent and horizontal sidewall sprinklers may be installed exposed or surface mounted using escutcheons such as the Reliable Models B, C, or HB (reference Technical Bulletin 204). When installed recessed or concealed, the Model F1FR56 series sprinklers are specifically listed with and may only be installed with listed Reliable escutcheons and cover plates. Refer to the technical information on the following pages for specific listings for recessed and concealed installations and refer to Figures 5 and 6 for dimensional information.

When fitted with an approved water shield, these sprinklers may be considered intermediate sprinklers for use in racks, below grated walkways, and other areas where intermediate level sprinklers are required.

Table A provides a summary of the approvals and availability of specific Model F1FR series sprinkler configurations. Additional technical information for each sprinkler model is provided on the following pages.



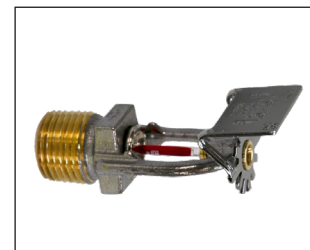
Model F1FR56 Pendent



Model F1FR56 Upright



Model F1FR56 Vertical Sidewall



Model F1FR56 Horizontal Sidewall

**Note:** Not all versions of the product are shown.

**Note:** This bulletin may contain information on New and Legacy sprinklers that reflects a dimensional change only. Sprinkler Identification Number (SIN), application, performance, and listings/approval are not otherwise affected. Sprinklers with New frames will include the suffix "N" in the order.

### F1FR Series Sprinklers Summary

Table A

Sprinkler Model	K-Factor gpm/psi <sup>1/2</sup> (lpm/bar <sup>1/2</sup> )	Orientation	Listings & Approvals	Max. Working Pressure psi (bar)	Sprinkler Identification Number (SIN)
F1FR56	5.6 (80)	Upright Intermediate Upright	cULus, FM, LPCB, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1425
		Pendent	cULus, FM, LPCB, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1414
		Concealed Pendent	cULus, VdS, EC, WM, UKCA	175 (12) 250 (17) (cULus only)	RA1414
		Horizontal Sidewall	cULus, FM	175 (12) 250 (17) (cULus only)	RA1435
		Vertical Sidewall	cULus, FM, LPCB, UKCA	175 (12)	RA1485



**Model F1FR56 Upright Sprinkler**

**SIN RA1425**

**Technical Specifications**

**Style:** Upright, Intermediate Upright

**Threads:** 1/2" NPT or ISO 7-R1/2

**Nominal K-Factor:** 5.6 (80 metric)

**Max. Working Pressure:**

175 psi (12 bar)

250 psi (17 bar) (cULus only)

**Material Specifications**

**Thermal Sensor:** 3 mm Glass Bulb

**Sprinkler Frame:** Brass Alloy

**Cap:** Bronze Alloy

**Sealing Washer:** Nickel with PTFE

**Load Screw:** Copper Alloy

**Deflector:** Brass Alloy

**Sprinkler Finishes**

(See Table B)

**Sensitivity**

Quick response

**Temperature Ratings**

135°F (57°C)

155°F (68°C)

175°F (79°C)

200°F (93°C)

286°F (141°C)

**Guards & Shields (New Frames)**

Factory Water Shield (cULus, FM)

F-1 Guard (cULus, FM)

F-3 Guard with Shield (cULus, FM)

**Guards and Shields (Legacy Frames)**

Factory Water Shield

C-1 Guard (FM)

C-3 Guard with Shield (cULus, FM)

D-1 Guard (cULus)

D-3 Guard with Shield (cULus)

**Sprinkler Wrench**

Model W2

Model J (New frame with guard installed)

Model JD (Legacy frame with guard installed)

**Listings and Approvals**

cULus Listed

FM Approved

LPCB

VdS

EC

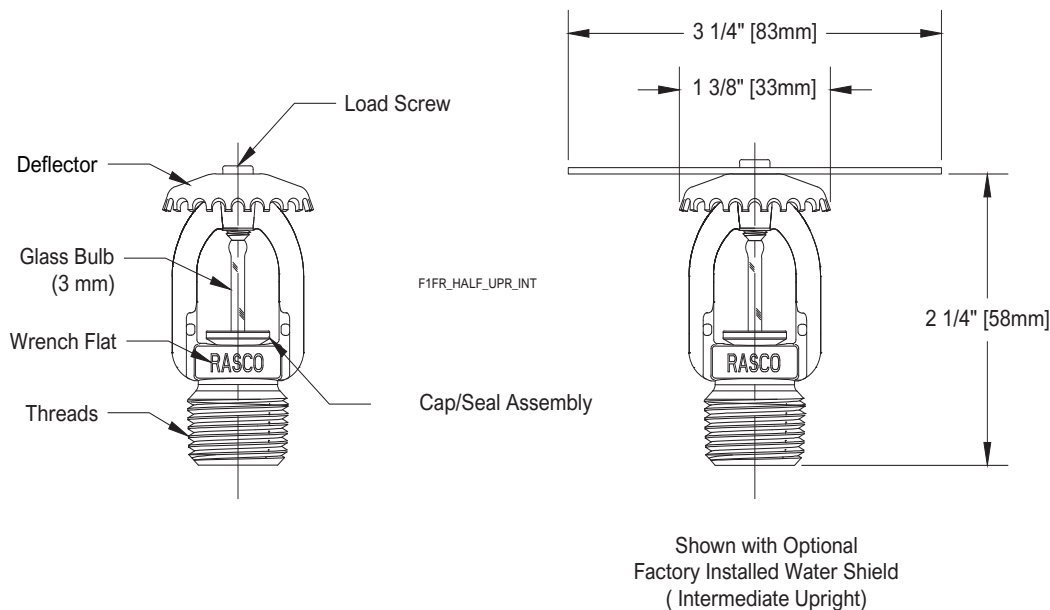
WM

UKCA: 0832-UKCA-CPR-S5045



**Model F1FR56 Upright Sprinkler Components and Dimensions**

**Figure 1**



**Technical Specifications**

**Style:**  
 Pendent  
 Recessed Pendent  
 Concealed Pendent  
**Threads:** 1/2" NPT or ISO 7-R1/2  
**Nominal K-Factor:** 5.6 (80 metric)  
**Max. Working Pressure:**  
 175 psi (12 bar)  
 250 psi (17 bar) (cULus only)

**Material Specifications**  
**Thermal Sensor:** 3 mm Glass Bulb  
**Sprinkler Frame:** Brass Alloy  
**Cap:** Bronze Alloy  
**Sealing Washer:** Nickel with PTFE  
**Load Screw:** Copper Alloy  
**Deflector:** Brass Alloy

**Sprinkler Finishes**  
 (See Table B)

**Sensitivity**  
 Quick response

**Temperature Ratings<sup>(1)</sup>**  
 135°F (57°C)  
 155°F (68°C)  
 175°F (79°C)  
 200°F (93°C)  
 286°F (141°C)

**Recessed Escutcheons**

Model F1 (cULus, LPCB, VdS, CE, WM)  
 Model F2 (cULus, FM, LPCB, VdS, CE, WM)  
 Model FP (cULus, VdS, CE, WM)

**Cover Plate**

Model CCP (cULus, VdS<sup>(2)</sup>, CE<sup>(2)</sup>)

**Guards & Shields (New Frames)<sup>(3)</sup>**

F-1 Guard (FM)  
 F-5 Guard/Shield Kit (FM)  
 F-7 Guard (cULus)  
 F-8 Guard/Shield Kit (cULus)  
 S-1 Shield (cULus, FM)

**Guards & Shields (Legacy Frames)<sup>(3)</sup>**

C-1 Guard (FM)  
 C-5 Guard/Shield Kit (FM)  
 D-1 Guard (cULus, FM)  
 D-4 Guard/Shield Kit (FM)  
 D-5 Guard/Shield Kit (cULus, FM)  
 S-1 Shield (cULus, FM)

**Sprinkler Wrenches**

Model W2 (pendent)  
 Model W4 (recessed or concealed)  
 Model J (New frame with guard installed)  
 Model JD (Legacy frame with guard installed)

**Listings and Approvals<sup>(4)</sup>**

cULus Listed  
 FM Approved  
 LPCB  
 VdS  
 EC  
 WM  
 UKCA: 0832-UKCA-CPR-S5045,  
 0831-UKCA-CPR-5072 (CCP)

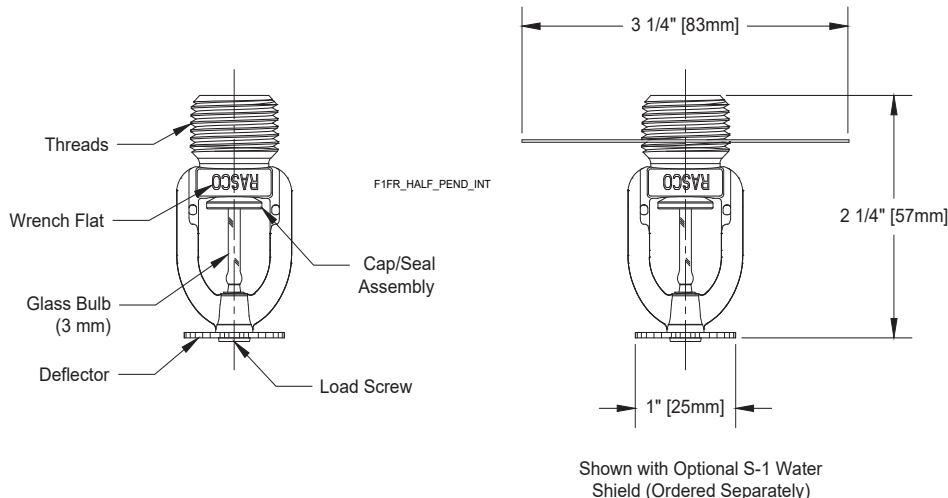


**Notes:**

1. 286°F (141°C) temperature rated sprinkler not listed for recessed or concealed use.
2. VdS and CE approval for CCP concealed use is for 155°C (68°C) sprinkler ONLY.
3. Not suitable for recessed or concealed installations.
4. When used surface mounted or exposed. See Recessed Escutcheon and Cover Plate section for specific approvals when installed recessed or concealed.

**Model F1FR56 Pendent Sprinkler Components and Dimensions**

**Figure 2**



**Note:** Please refer to Figure 8 for recessed and concealed installation.

**Technical Specifications**

**Style:**

Horizontal Sidewall  
Recessed Horizontal Sidewall

**Threads:** 1/2" NPT or ISO 7-R1/2

**Nominal K-Factor:** 5.6 (80 metric)

**Max. Working Pressure:**

175 psi (12 bar)  
250 psi (17 bar) (cULus only)

**Material Specifications**

**Thermal Sensor:** 3 mm Glass Bulb

**Sprinkler Frame:** Brass Alloy

**Cap:** Bronze Alloy

**Sealing Washer:** Nickel with PTFE

**Load Screw:** Copper Alloy

**Deflector:** Brass Alloy

**Sprinkler Finishes**

(See Table B)

**Sensitivity**

Quick response

**Temperature Ratings <sup>(1)</sup>**

135°F (57°C)  
155°F (68°C)  
175°F (79°C)  
200°F (93°C)  
286°F (141°C)

**Recessed Escutcheons<sup>(2)</sup>**

Model F1 (cULus)  
Model F2 (cULus, FM)  
Model FP (cULus)

**Guards & Shields (New Frames)<sup>(3)</sup>**

F-4 Guard (FM)  
F-7 Guard (cULus)

**Guards & Shields (Legacy Frames)<sup>(3)</sup>**

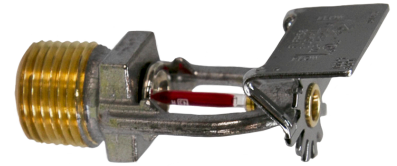
C1 Guard (FM)  
D1 Guard (cULus)

**Sprinkler Wrenches**

Model W2 (non-recessed)  
Model W4 (recessed)  
Model J (New frame with guard installed)  
Model JD (Legacy frame with guard installed)

**Listings and Approvals**

cULus Listed<sup>(4)</sup>  
FM Approved<sup>(5)</sup>

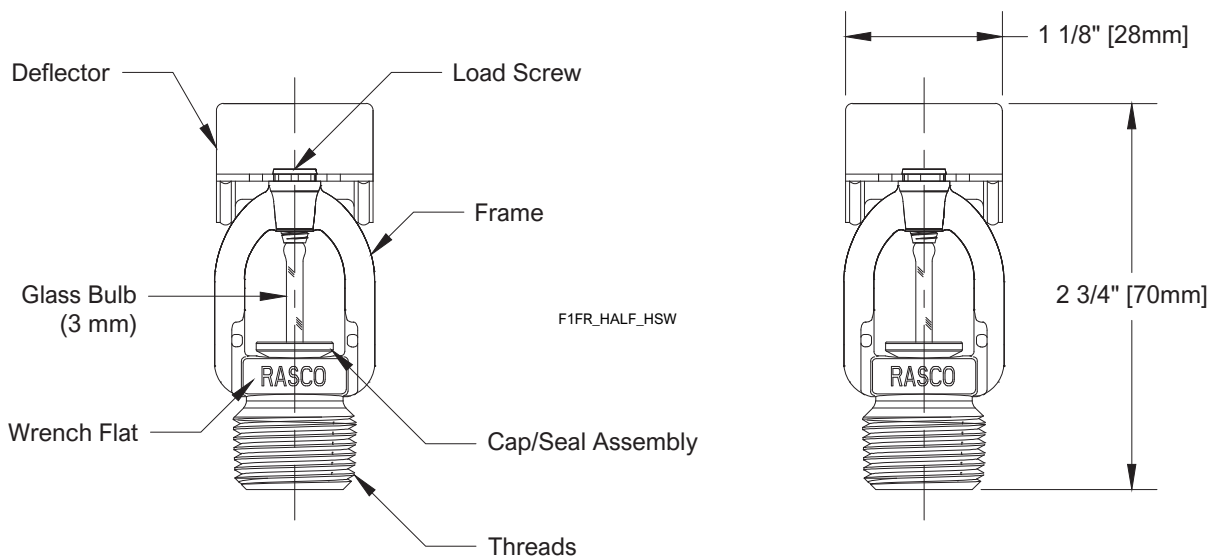


**Notes:**

1. 286°F (141°C) temperature rated sprinkler not listed for recessed use.
2. FM approved recessed installation when used with Model F2 escutcheon ONLY.
3. Not suitable for recessed horizontal sidewall installations.
4. cULus Listed for Light and Ordinary Hazard when installed exposed or surface mounted. Listed for Light Hazard ONLY when installed recessed.
5. FM Approved for Light Hazard ONLY.

**Model F1FR56 Horizontal Sidewall Sprinkler Components and Dimensions**

**Figure 3**



**Note:** Please refer to Figure 9 for recessed installation.

**Technical Specifications**

**Style:**

Upright Vertical Sidewall  
Pendent Vertical Sidewall

**Threads:** 1/2" NPT or ISO 7-R1/2

**Nominal K-Factor:** 5.6 (80 metric)

**Max. Working Pressure:** 175 psi (12 bar)

**Material Specifications**

**Thermal Sensor:** 3 mm Glass Bulb

**Sprinkler Frame:** Brass Alloy

**Cap:** Bronze Alloy

**Sealing Washer:** Nickel with PTFE

**Load Screw:** Copper Alloy

**Deflector:** Brass Alloy

**Sprinkler Finishes**

(See Table B)

**Sensitivity**

Quick response

**Temperature Ratings**

135°F (57°C)

155°F (68°C)

175°F (79°C)

200°F (93°C)

286°F (141°C)

**Guards & Shields (New Frames)**

F-2 Guard (FM)

**Guards & Shields (Legacy Frames)**

C1 Guard (FM)

**Sprinkler Wrenches**

Model W2

Model J (New frame with guard installed)

Model JD (Legacy frame with guard installed)

**Listings and Approvals<sup>(1)</sup>**

cULus Listed

FM Approved

LPCB<sup>(2)</sup>

UKCA: 0832-UKCA-CPR-S5045

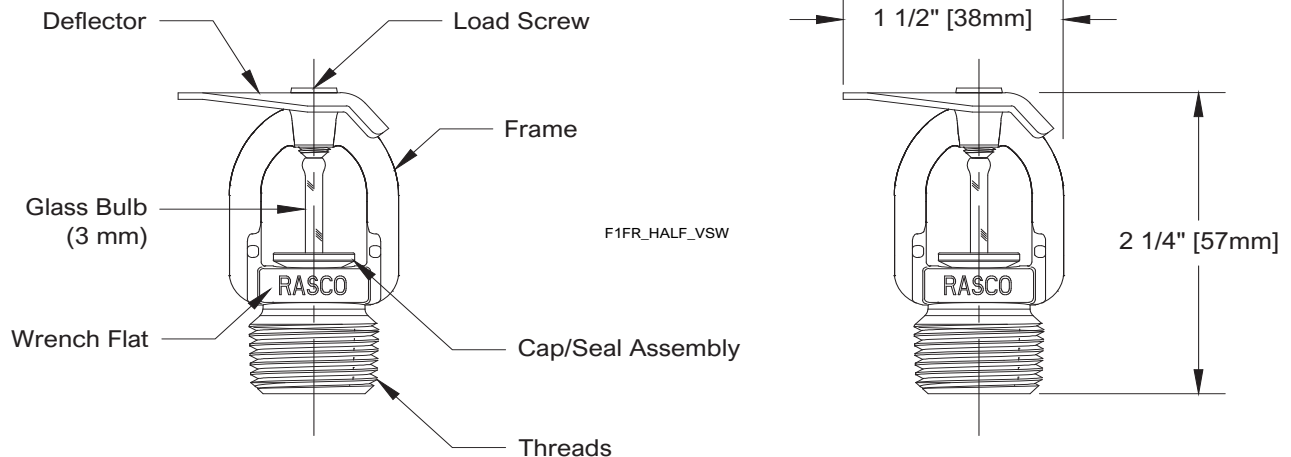


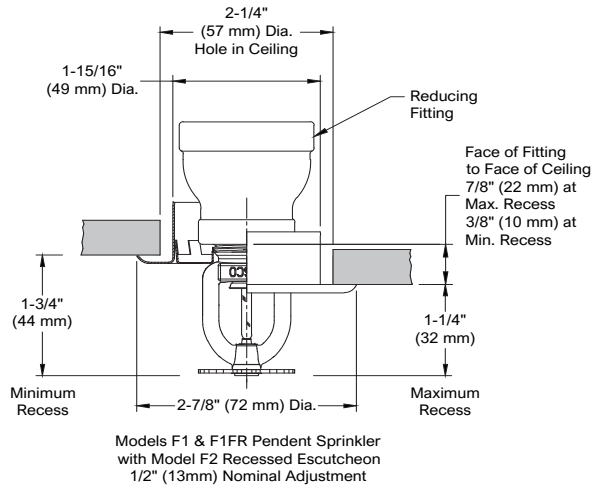
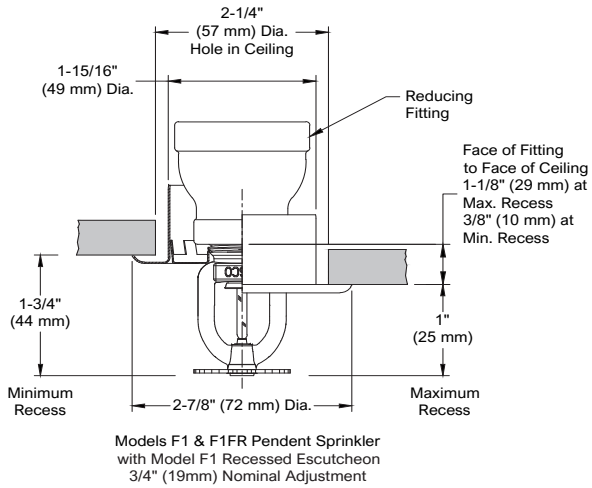
**Notes:**

1. Listed and approved for Light Hazard ONLY.
2. LPCB approved for use in pendent position ONLY.

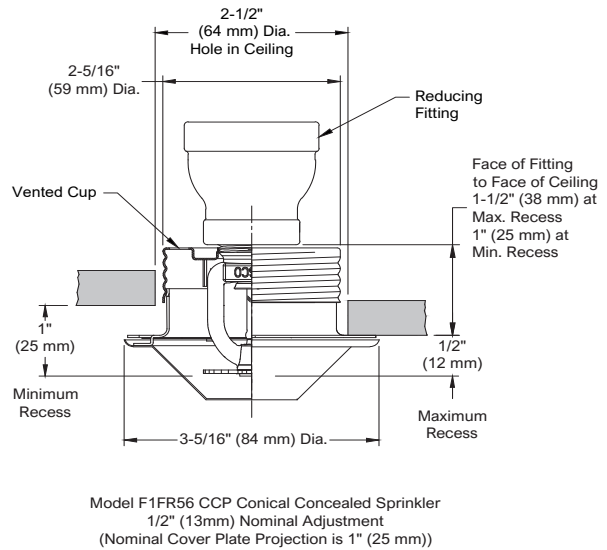
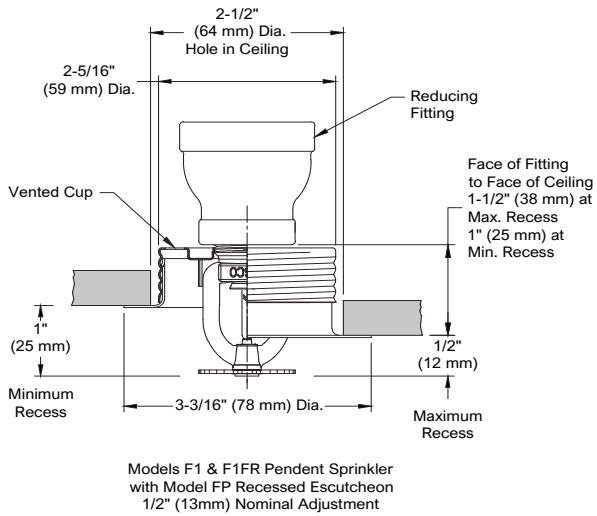
**Model F1FR56 Vertical Sprinkler Components and Dimensions**

**Figure 4**





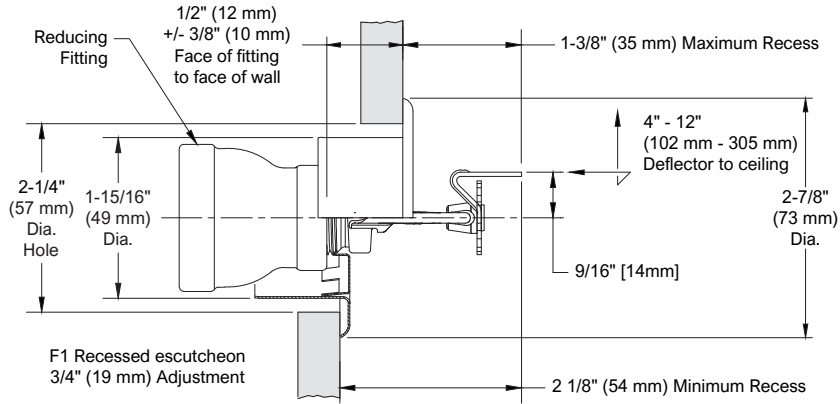
F1\_REC\_PEND\_CCP



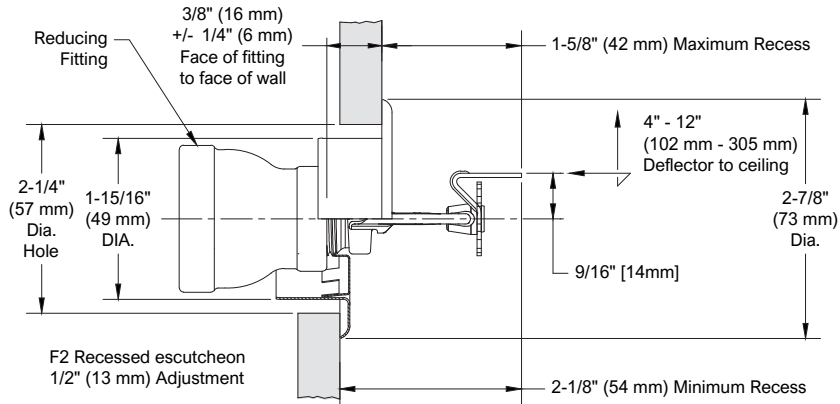
Note: Model FP recessed assemblies may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings in the Model FP cup are unobstructed following installation.

Note: Model CCP concealed assemblies may not be used where the pressure in the space above the ceiling is positive with respect to the protected area. Ensure that the openings in the Model CCP cup are unobstructed following installation.

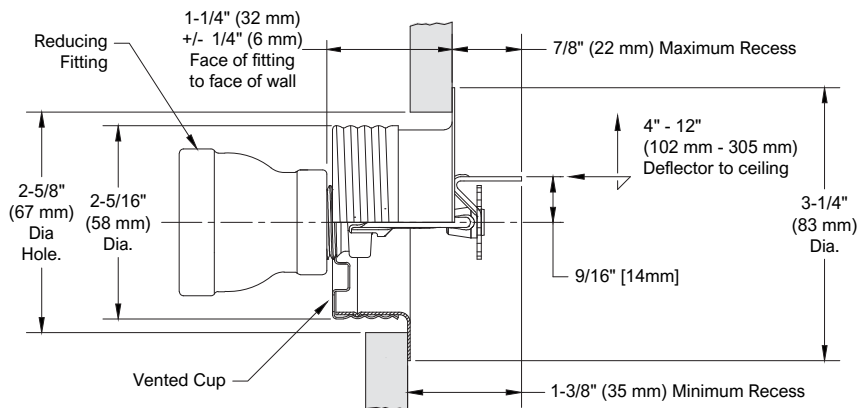




Model F1FR Horizontal Sidewall Sprinkler with Model F1 Recessed Escutcheon  
3/4" (19mm) Nominal Adjustment F1FR\_REC\_HSW



Model F1FR Horizontal Sidewall Sprinkler with Model F2 Recessed Escutcheon  
1/2" (13mm) Nominal Adjustment



Model F1FR Horizontal Sidewall Sprinkler with Model FP Recessed Escutcheon  
1/2" (13mm) Nominal Adjustment

Note: Model FP recessed assemblies may not be used where the pressure in the space behind the sprinkler is positive with respect to the space in the protected area. Ensure that the openings in the Model FP cup are unobstructed following installation.

## Wrenches



Model W2 (upright, pendent)



Model J (New frame with guard installed)  
Model JD (Legacy frame with guard installed, similar but with zinc finish)



Model W4  
(recessed, concealed pendent)

## Finishes<sup>(1)</sup>

Table B

Standard Finishes			Special Application Finishes		
Sprinkler	F1, F2 and FP <sup>(2)</sup> Escutcheons	CCP Cover Plate <sup>(2)</sup>	Sprinkler	F1, F2 and FP <sup>(2)</sup> Escutcheons	CCP Cover Plate <sup>(2)</sup>
Bronze	Brass	Chrome	Electroless Nickel PTFE <sup>(3)(4)</sup>	Bright Brass	Bright Brass
Chrome	Chrome	White Paint	Bright Brass <sup>(5)</sup>	Satin Chrome	Satin Chrome
White Polyester <sup>(3)</sup>	White Polyester		Satin Chrome	Custom Color Polyester	Custom Color Paint
			Custom Color Polyester <sup>(3)</sup>		

### Notes:

1. Paint or any other coating applied over the factory finish will void all approvals and warranties.
2. Model FP escutcheons and Model CCP sprinklers utilize a galvanized steel cup with a finished trim ring or cover plate.
3. cULus Listed as corrosion resistant.
4. FM Approved as corrosion resistant.
5. For 200°F (93°C) maximum temperature rated sprinklers only.

## Installation

Model F1FR Series sprinklers must be installed in accordance with NFPA13 and the requirements of all applicable authorities having jurisdiction. Model F1FR Series sprinklers must be installed with the Reliable sprinkler installation wrench identified in this Bulletin. Any other wrench may damage the sprinkler. The Models W2 and W4 wrenches have two sets of jaws. Use the smallest set of jaws that fit on the wrench flats of the sprinkler. A leak tight sprinkler joint can be obtained with a torque of 8 to 18 lb-ft (11 to 24 N-m). Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

Glass bulb sprinklers have orange bulb protectors or protective caps to minimize bulb damage during shipping, handling and installation. Reliable sprinkler installation wrenches are designed to install sprinklers with bulb protectors in place. Remove the bulb protector at the time when the sprinkler system is placed in service for fire protection. Removal of the bulb protector before this time may leave the bulb vulnerable to damage. Remove bulb protectors by undoing the clasp by hand. Do not use tools to remove bulb protectors.

## Maintenance

Reliable Model F1FR series sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any Authorities Having Jurisdiction.

Prior to installation, sprinklers should remain in the original cartons and packaging until used. This will minimize the potential for damage to sprinklers that could cause improper operation or non-operation.

Do not clean sprinklers with soap and water, ammonia liquid or any other cleaning fluids. Remove dust by gentle vacuuming without touching the sprinkler.

Replace any sprinkler which has been painted (other than factory applied). A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Failure to properly maintain sprinklers may result in inadvertent operation or non-operation during a fire event.

## Guarantee

For the guarantee, terms, and conditions, visit [www.reliablesprinkler.com](http://www.reliablesprinkler.com).

## Ordering Information

**Specify the following when ordering:**

### Model

- F1FR56

### Deflector/Orientation

- Upright
- Intermediate Upright
- Pendent
- CCP Concealed Pendent
- Horizontal Sidewall
- Vertical Sidewall

### Temperature Rating

- See sprinkler technical specifications

### Sprinkler Finish

- See Table B

### Recessed Escutcheon<sup>(1)(2)</sup>

- F1
- F2
- FP

### Escutcheon Finish

- See Table B

### CCP Cover Plate Temperature Rating

- 135°F (57°C) [For use with 135°F (57°C) and 155°F (68°C) sprinklers.]
- 165°F (74°C) [For use with 175°F (79°C) and 200°F (93°C) sprinklers.]

### CCP Cover Plate Finish

- See Table B

### Sprinkler Wrench

- Model W2
- Model W4 (recessed, concealed)
- Model J (New frame with guard installed)
- Model JD (Legacy frame with guard installed)

### Notes:

1. 286°F (141°C) sprinklers are not listed to be used recessed or concealed.
2. For FM, recessed sprinklers must use the Model F2 escutcheon.



# Reliable®

## F1FR80 Series Quick Response Extended Coverage QREC Sprinklers

K-factor 8.0 (115)

### Features

- Extended coverage quick-response sprinklers
- cULus 250psi (17.2 bar) rated
- Pendent and horizontal sidewall (EC-9) deflectors
- Low profile, compact design
- Available in a wide variety of finishes

### Product Description

Reliable Model F1FR80 QREC series sprinklers are quick-response extended coverage automatic fire sprinklers utilizing a sensitive 3.0 mm glass bulb thermal element for use in light hazard occupancies.

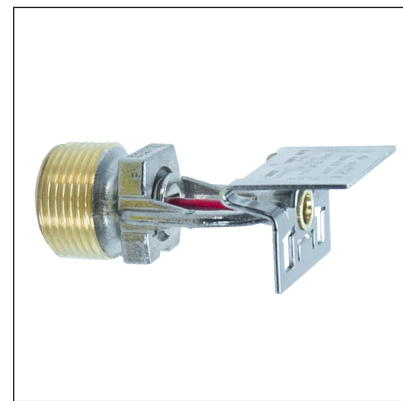
Pendent and horizontal sidewall sprinklers may be installed exposed or surface mounted using escutcheons such as the Reliable Models B, C, or HB (reference Technical Bulletin 204). When installed recessed or concealed, Model F1FR80 QREC series sprinklers are specifically listed with and may only be installed with listed Reliable recessed escutcheons and cover plates. Refer to the technical information on the following pages for specific listings for recessed and concealed installations and refer to Figures 3 and 4 for dimensional information.

Table A provides a summary of the approvals and availability of specific Model F1 series sprinkler configurations. Additional technical information for each sprinkler model is provided on the following pages.

**Note:** The EC-9 horizontal sidewall deflector is also available on the cULus Listed 300 psi (20.7 bar) Model SWC concealed sidewall sprinkler. Please reference Technical Bulletin 163.



Model F1FR80 QREC Pendent



Model F1FR80 QREC Sidewall

**Note:** Not all versions of product are shown.

### Sprinkler Summary

Table A

Sprinkler Model	K-Factor gpm/psi <sup>1/2</sup> (lpm/bar <sup>1/2</sup> )	Orientation	Listings & Approvals <sup>(1)</sup>	Max. Working Pressure psi (bar)	Sprinkler Identification Number (SIN)
F1FR80 QREC	8.0 (115)	Pendent	cULus FM <sup>(2)</sup>	250 (17.2) cULus 175 (12.0) FM	R4842
		Horizontal Sidewall			R4862

### Note:

1. Listed and approved for light hazard occupancies only.
2. When recessed, FM approved with F2 escutcheon only. Concealed pendent (CCP) not approved by FM.

**Technical Specifications**

**Style:**  
 Pendent  
 Recessed Pendent  
 Concealed Pendent  
**Threads:** 3/4" NPT or ISO 7-R3/4  
**Nominal K-Factor:** 8.0 (115)  
**Max. Working Pressure:**  
 175 psi (12.0 bar)  
 250 psi (17.2 bar)

**Material Specifications**  
**Thermal Sensor:** 3 mm Glass Bulb  
**Sprinkler Frame:** Brass Alloy  
**Cap:** Bronze Alloy  
**Sealing Washer:** Nickel with PTFE  
**Load Screw:** Copper Alloy  
**Deflector:** Brass Alloy

**Sprinkler Finishes**  
 (See Table E)

**Sensitivity**

Quick response

**Temperature Ratings**

135°F (57°C)  
 155°F (68°C)<sup>(1)</sup>

**Recessed Escutcheons**

Model F1  
 Model F2

**Cover Plates**

CCP (Conical)<sup>(2)</sup>

**Sprinkler Wrenches**

Model W2 (non-recessed)  
 Model W4 (recessed and concealed)

**Listings and Approvals**

cULus  
 FM

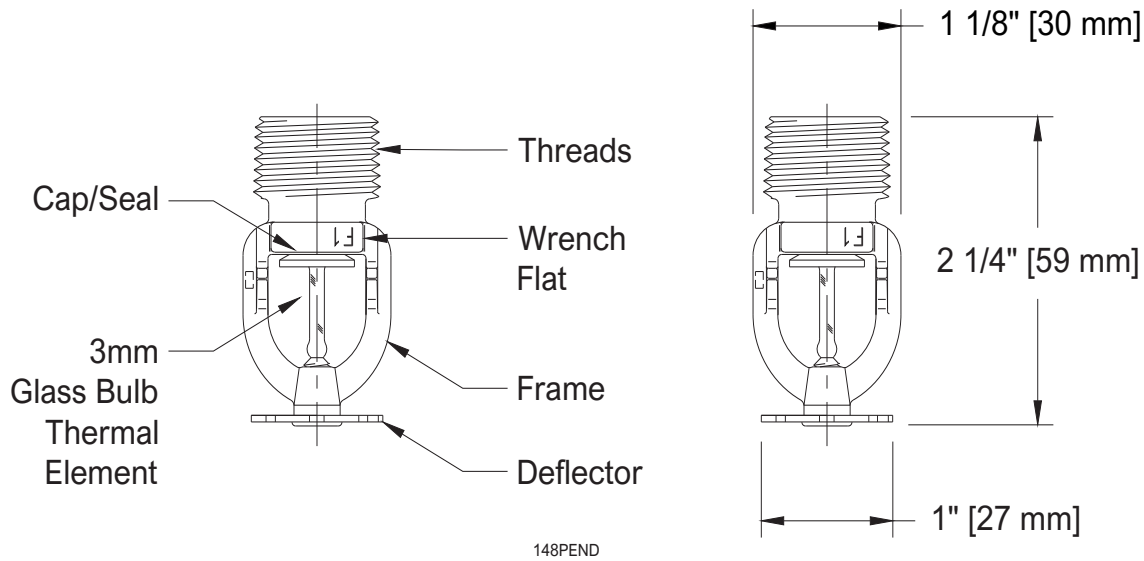


**Notes:**

1. 155°F (68°C) sprinkler is not cULus listed for 20' x 20' (6m x 6m) coverage area.
2. cULus only; 135°F (57°C) cover plate.

**Model F1FR80 QREC Pendent Sprinkler Components and Dimensions**

**Figure 1**



148PEND

**Note:** Please refer to Figure 3 for recessed and concealed installations.

**F1FR80 QREC Pendent Required Minimum Flow and Pressure**

**Table B**

Coverage Area ft x ft (m x m)	Flow gpm (L/min)	Pressure psi (bar)
16 x 16 (4.9 x 4.9)	26 (98.4)	10.6 (0.7)
18 x 18 (5.5 x 5.5)	33 (125.0)	17.0 (1.2)
20 x 20 (6.0 x 6.0) (1)	40 (151.4)	25.0 (1.7)

**Note:** cULus Listing for 20' x 20' (6.0 m x 6.0 m) coverage area is for 135°F (57°C) sprinkler only. 155°F (68°C) sprinkler is not cULus Listed for 20' x 20' (6.0 m x 6.0 m) coverage area.

**Technical Specifications**

**Style:**  
Horizontal Sidewall  
Recessed Horizontal Sidewall  
**Threads:** 3/4" NPT or ISO 7-R3/4  
**Nominal K-Factor:** 8.0 (115)  
**Max. Working Pressure:**  
175 psi (12.0 bar) (FM)  
250 psi (17.2 bar) (cULus)

**Temperature Ratings<sup>(1)</sup>**

135°F (57°C)  
155°F (68°C)  
175°F (79°C)

**Recessed Escutcheons**

Model F1<sup>(2)</sup>  
Model F2

**Material Specifications**

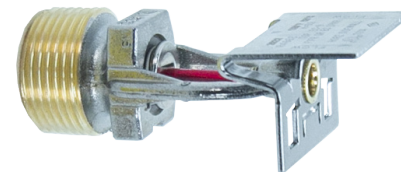
**Thermal Sensor:** 3 mm Glass Bulb  
**Sprinkler Frame:** Brass Alloy  
**Cap:** Bronze Alloy  
**Sealing Washer:** Nickel with PTFE  
**Load Screw:** Copper Alloy  
**Deflector:** Brass Alloy

**Sprinkler Wrenches**

Model W2 (non-recessed)  
Model W4 (recessed)

**Listings and Approvals<sup>(3)</sup>**

cULus  
FM



**Sprinkler Finishes**

(See Table E)

**Sensitivity**

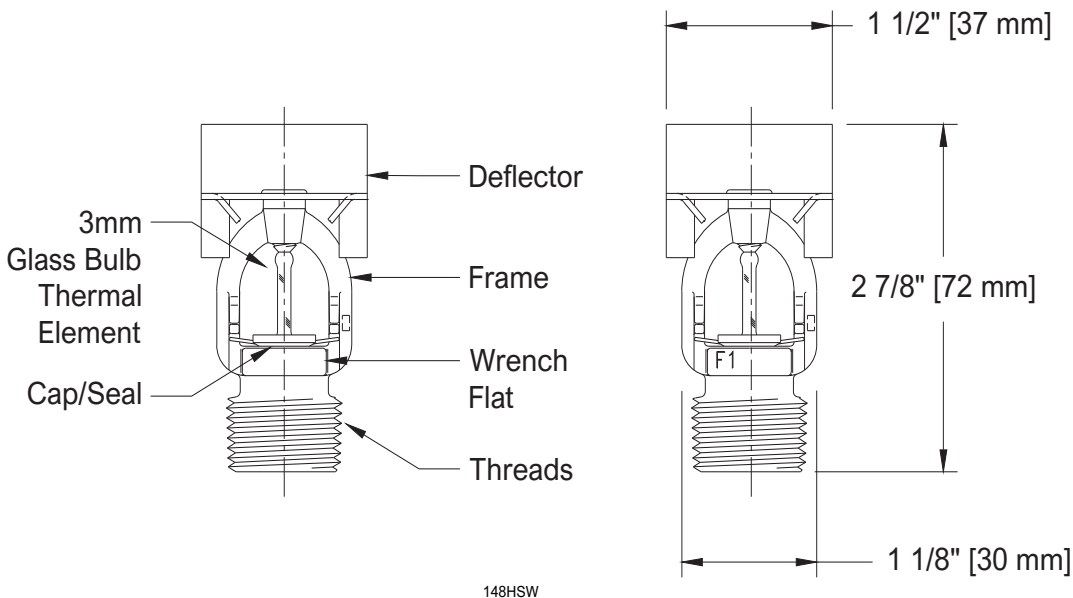
Quick response

**Notes:**

1. Temperature ratings may vary depending on coverage area selected. See Tables C and D.
2. Not approved by FM for recessed installation; must use Model F2.
3. Approvals may vary depending on coverage area selected. See Tables C and D.

**Model F1FR80 QREC Horizontal Sidewall (EC-9) Components and Dimensions**

**Figure 2**



**Note:** Please refer to Figure 3 for recessed installations.

**F1FR80 QREC Horizontal Sidewall Required Minimum Flow and Pressure: cULus**

**Table C**

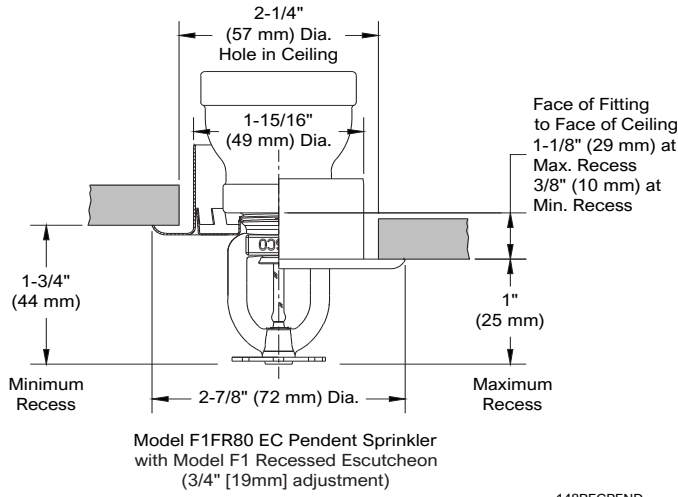
Coverage Area ft x ft (m x m)	Deflector Distance Inches (mm)	Temperature Rating	Flow gpm (L/min)	Pressure psi (bar)
14 x 26 (4.3 x 7.9)	4 – 6 (100 – 150)	135°F (57°C)	39 (147.6)	23.8 (1.6)
14 x 26 (4.3 x 7.9)	6 – 12 (150 – 300)	135°F (57°C) 155°F (68°C)	46 (174.1)	33.1 (2.3)
16 x 16 (4.9 x 4.9)	4 – 12 (100 – 300)	All	29 (109.8)	13.1 (0.9)
16 x 16 (4.9 x 4.9)	6 – 12 (150 – 300)	All	26 (98.4)	10.6 (0.7)
16 x 18 (4.9 x 5.5)	4 – 12 (100 – 300)	All	29 (109.8)	13.1 (0.9)
16 x 20 (4.9 x 6.0)	4 – 12 (100 – 300)	All	32 (121.1)	16.0 (1.1)
16 x 22 (4.9 x 6.7)	4 – 12 (100 – 300)	All	36 (136.3)	20.2 (1.4)
16 x 24 (4.9 x 7.3)	4 – 12 (100 – 300)	All	39 (147.6)	23.8 (1.6)
18 x 18 (5.5 x 5.5)	4 – 12 (100 – 300)	135°F (57°C) 155°F (68°C)	33 (124.9)	17.0 (1.2)
18 x 22 (5.5 x 6.7)	4 – 12 (100 – 300)	135°F (57°C) 155°F (68°C)	40.0 (151.4)	25.0 (1.7)

**F1FR80 QREC Horizontal Sidewall Required Minimum Flow and Pressure: FM**

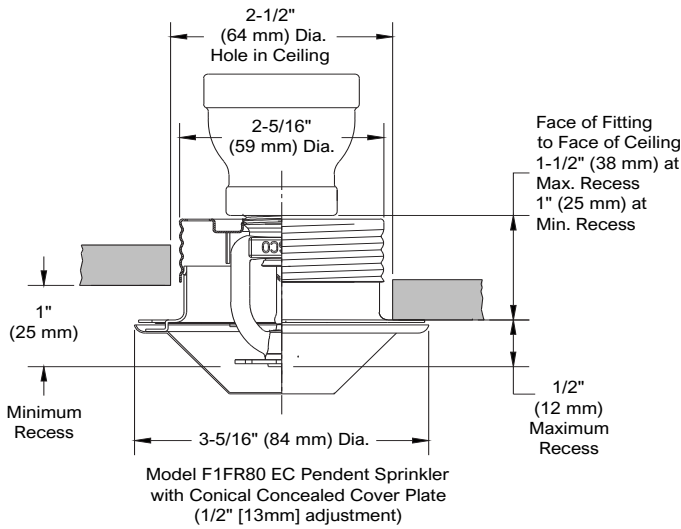
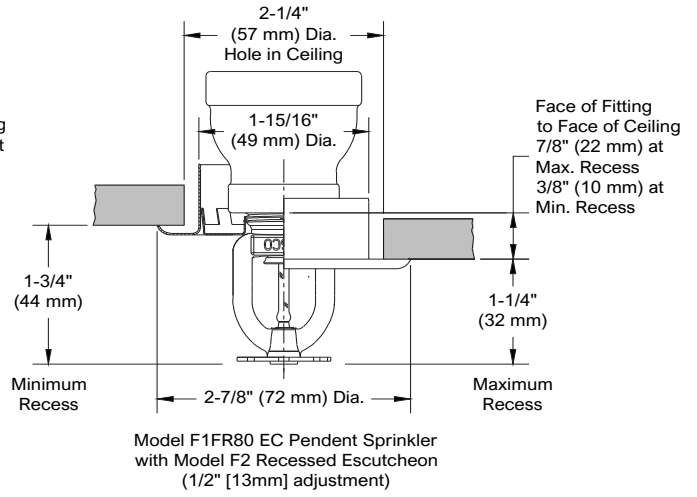
**Table D**

Coverage Area ft x ft (m x m)	Deflector Distance Inches (mm)	Temperature Rating	Flow gpm (L/min)	Pressure psi (bar)
16 x 16 (4.9 x 4.9)	4 – 12 (100 – 300)	All	32 (121.1)	16.0 (1.1)
16 x 18 (4.9 x 5.5)	4 – 12 (100 – 300)	All	36 (136.3)	20.2 (1.4)
16 x 20 (4.9 x 6.0)	4 – 12 (100 – 300)	All	40 (151.4)	25.0 (1.7)
16 x 22 (4.9 x 6.7)	4 – 12 (100 – 300)	All	44 (166.6)	30.2 (2.1)
16 x 24 (4.9 x 7.3)	4 – 12 (100 – 300)	All	48 (181.7)	36.0 (2.5)

**Note:** 175°F (79°C) temperature rated sprinklers not FM approved for recessed installations.



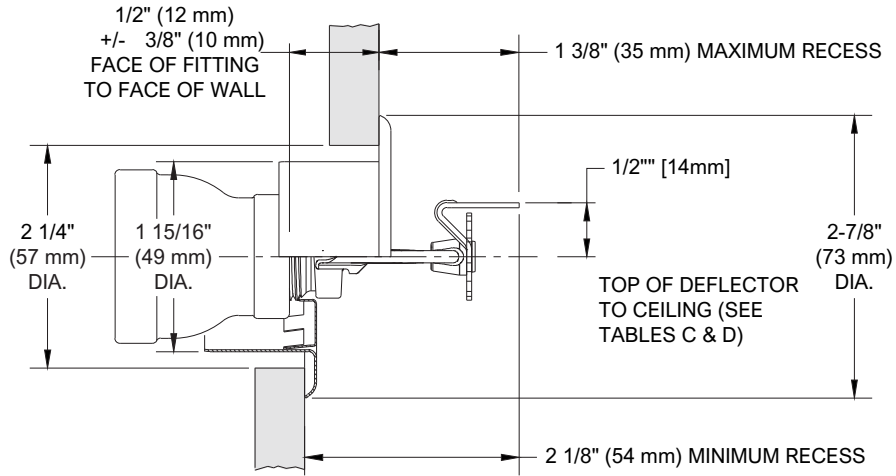
148RECPEND



Pendent with Model F1 Recessed Escutcheon (F2 similar)

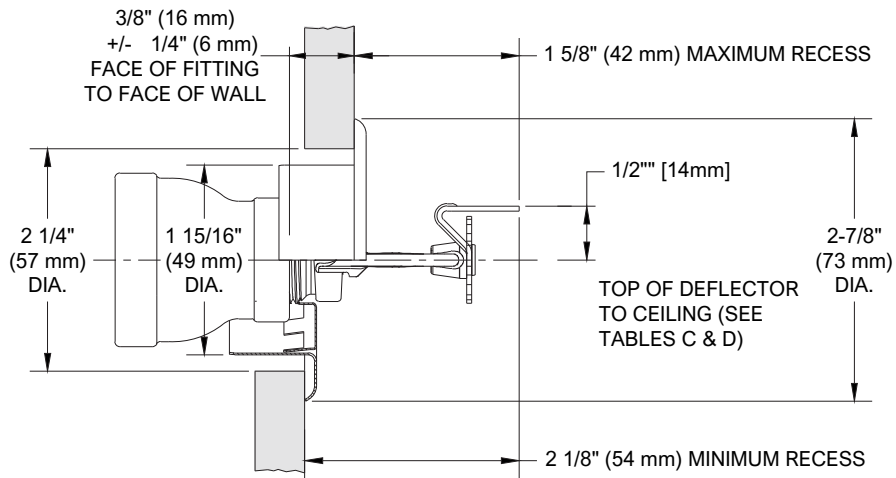


Pendent with Model CCP Cover Plate (Conical)

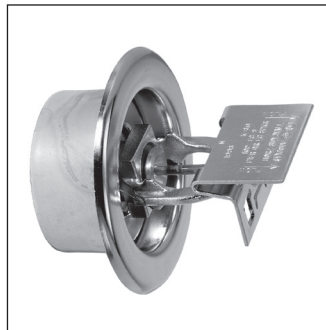


Model F1FR80 EC Horizontal Sidewall Sprinkler  
with Model F1 Recessed Escutcheon  
(3/4" [19mm] adjustment)

148RECHSW



Model F1FR80 EC Horizontal Sidewall Sprinkler  
with Model F2 Recessed Escutcheon  
(1/2" [13mm] adjustment)



Horizontal Sidewall with Model  
F1 Recessed Escutcheon  
(F2 similar)

## Wrenches



Model W2 (non-recessed)



Model W4 (recessed, concealed)

## Finishes<sup>(1)</sup>

Table E

Standard Finishes			Special Application Finishes		
Sprinkler	F1 and F2 Escutcheons	CCP Cover Plate <sup>(2)</sup>	Sprinkler	F1 and F2 Escutcheons	CCP Cover Plate <sup>(2)</sup>
Bronze	Brass	Chrome	Electroless Nickel PTFE <sup>(3)(4)</sup>	Bright Brass	Bright Brass
Chrome	Chrome	White Paint	Bright Brass	Satin Chrome	Satin Chrome
White Polyester <sup>(3)</sup>	White Polyester		Satin Chrome	Custom Color Polyester	Custom Color Paint
			Custom Color Polyester <sup>(3)</sup>		

### Notes:

1. Paint or any other coating applied over the factory finish will void all approvals and warranties.
2. The CCP assembly consists of a bronze sprinkler mounted in a galvanized steel cup with a finished cover plate.
3. cULus Listed as corrosion resistant.
4. FM Approved as corrosion resistant.

## Installation

Reliable Model F1FR80 QREC series sprinklers must be installed in accordance with NFPA 13 and the requirements of all authorities having jurisdiction using the Reliable sprinkler installation wrench specified in this bulletin. Any other wrench may damage the sprinkler. The Models W2 and W4 wrenches have two sets of jaws. Use the smallest set of jaws that fit on the wrench flats of the sprinkler. A leak free 3/4" (R3/4) sprinkler joint can be obtained with a torque of 14-20 lb-ft (19 - 27 N.m) after applying a thread sealant to the male threads of the sprinkler. Do not tighten sprinklers over the maximum recommended installation torque. Exceeding the maximum recommended installation torque may cause leakage or impairment of the sprinkler.

Glass bulb sprinklers have orange bulb protectors or protective caps to minimize bulb damage during shipping, handling and installation. Reliable sprinkler installation wrenches are designed to install sprinklers with bulb protectors in place. Remove the bulb protector at the time when the sprinkler system is placed in service for fire protection. Removal of the bulb protector before this time may leave the bulb vulnerable to damage. Remove bulb protectors by undoing the clasp by hand. Do not use tools to remove bulb protectors.

## Maintenance

Reliable Model F1FR80 QREC series sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any Authorities Having Jurisdiction.

Prior to installation, sprinklers should remain in the original cartons and packaging until used. This will minimize the potential for damage to sprinklers that could cause improper operation or non-operation.

Do not clean sprinklers with soap and water, ammonia liquid or any other cleaning fluids. Remove dust by gentle vacuuming without touching the sprinkler.

Replace any sprinkler which has been painted (other than factory applied). A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Failure to properly maintain sprinklers may result in inadvertent operation or non-operation during a fire event.

## Guarantee

For the guarantee, terms, and conditions, visit [www.reliablesprinkler.com](http://www.reliablesprinkler.com).

## Ordering Information

Specify the following when ordering:

### Model

- F1FR80 QREC

### Deflector/Orientation

- Pendent
- CCP Pendent
- Horizontal Sidewall (EC-9)

### Temperature Rating

- See sprinkler technical specifications

### Sprinkler Finish

- See Table B

### Recessed Escutcheon

- F1
- F2

### Escutcheon Finish

- See Table E

### Pendent Cover Plate

- CCP (Conical, 135°F [57°C] only)

### Cover Plate Finish

- See Table E

### Sprinkler Wrench

- Model W2 (non-recessed)
- Model W4 (recessed or concealed)



# Reliable®

## RASCOFLEX® Sprinkler Connections

cULus Listed, FM Approved

### Product Description

RASCOFLEX® Sprinkler Connections are intended to connect a branch line to a sprinkler using a flexible stainless steel hose assembly. RASCOFLEX® Sprinkler Connections are suitable for use in suspended and hard ceiling applications such as T-Bar ceiling grids, wood, metal stud, or hat furring channel hard lid ceilings. Every package contains one (1) fully assembled stainless steel flexible sprinkler system complete with hose, branch line connection, and sprinkler connection, as well as the pre-assembled bracket assembly to attach to the ceiling.

RASCOFLEX® Sprinkler Connections are designed for use in hydraulically calculated wet, preaction, or dry sprinkler systems per NFPA 13, 13R, 13D, and FM Global Loss Prevention Data Sheets.

### Technical Data

Table A

<b>Maximum Working Pressure</b>		FM: 200 psi (13.8 bar) UL: 175 psi (12.1 bar)
<b>Maximum Working Temperature</b>		300°F (149°C)
<b>Connections</b>	Inlet/Branch Line	1" NPT
	Outlet/Reducer	1/2" or 3/4" NPT
<b>Minimum Allowable Bending Radius</b>		UL: 3" (76 mm) FM: 7" (178 mm)
<b>Maximum Number of Bends</b>		See Friction Loss Chart
<b>Maximum K-Factor</b>	1/2" Outlet	5.6 (80 metric)
	3/4" Outlet	14.0 (200 metric)

### Maintenance

RASCOFLEX® Sprinkler Connections should be inspected and the sprinkler system maintained in accordance with NFPA 25, as well as the requirements of any Authorities Having Jurisdiction.

### Patents

RASCOFLEX® Sprinkler Connections may be covered by one or more of the following US Patent Nos. 10,173,088 and 10,328,296.

### Listings and Approvals

FM Approved Class No. 1637 (FM)

UL Listed and UL Certified for Canada to ANSI/UL 2443 (cULus)



RASCOFLEX® Sprinkler Connections

### Ordering Information

#### Specify:

##### Model Name

- Model RFB

##### Nominal Hose Length

- 24" (610 mm)
- 31" (790 mm)
- 40" (1015 mm)
- 48" (1220 mm)
- 60" (1525 mm)
- 72" (1830 mm)

Reducer Outlet: 1/2" NPT or 3/4" NPT

##### Reducer Type

###### Standard:

- 6-1/8" (155 mm) straight

###### Optional:

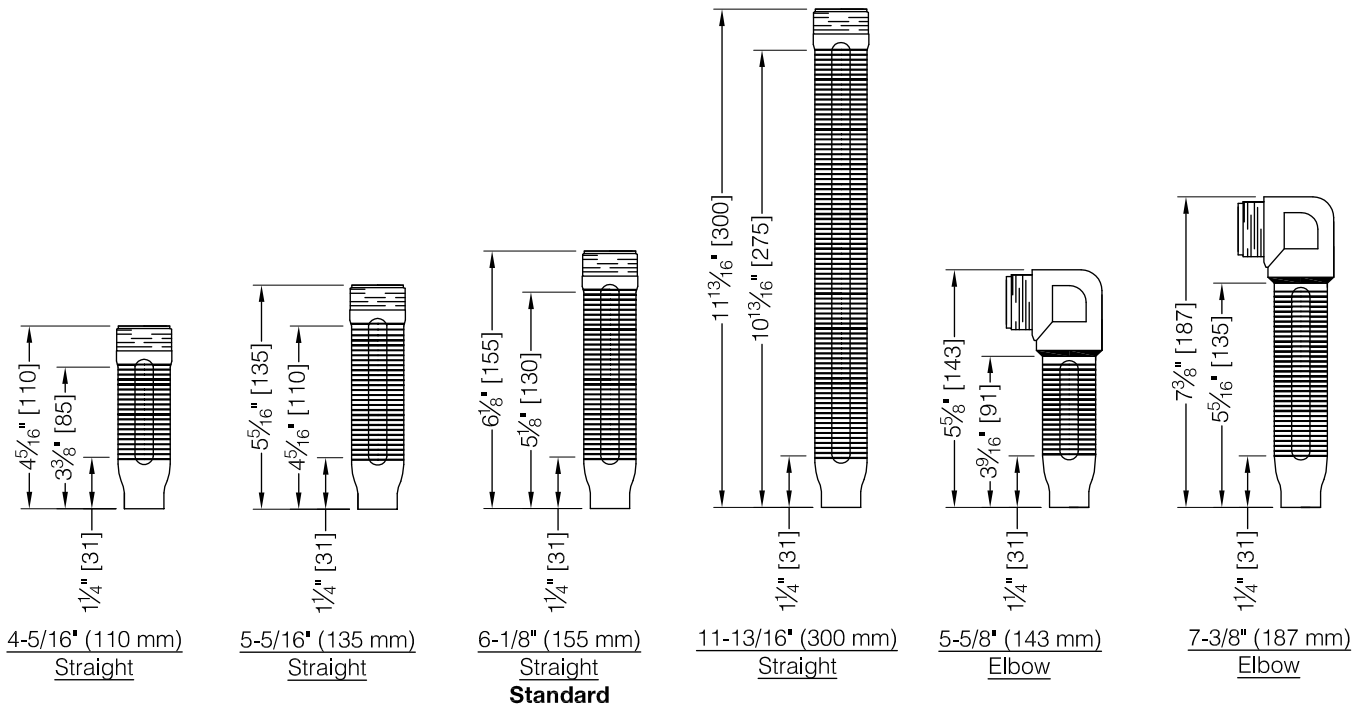
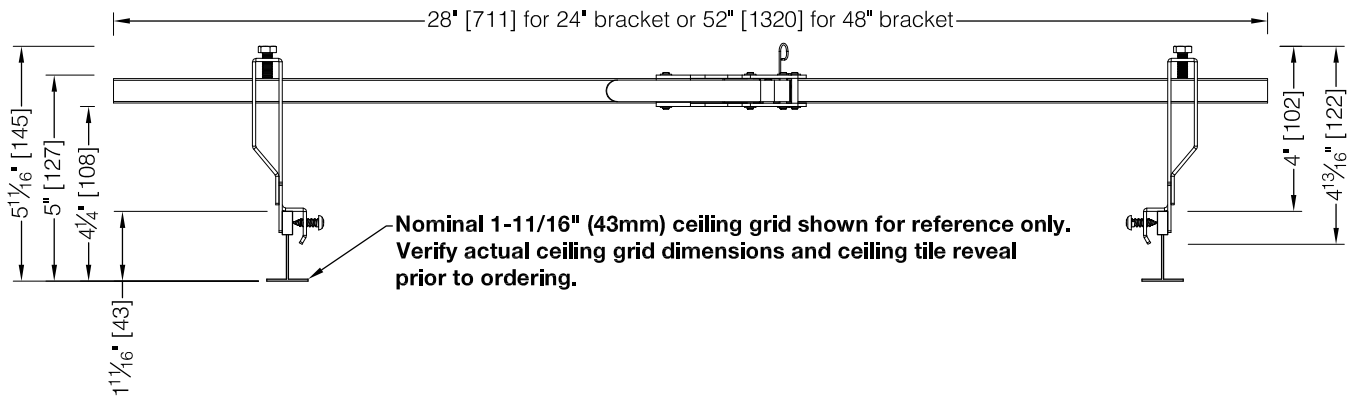
- 4-5/16" (110 mm) straight
- 5-5/16" (135 mm) straight
- 11-3/4" (300 mm) straight
- 5-5/8" (143 mm) elbow
- 7-3/8" (187 mm) elbow

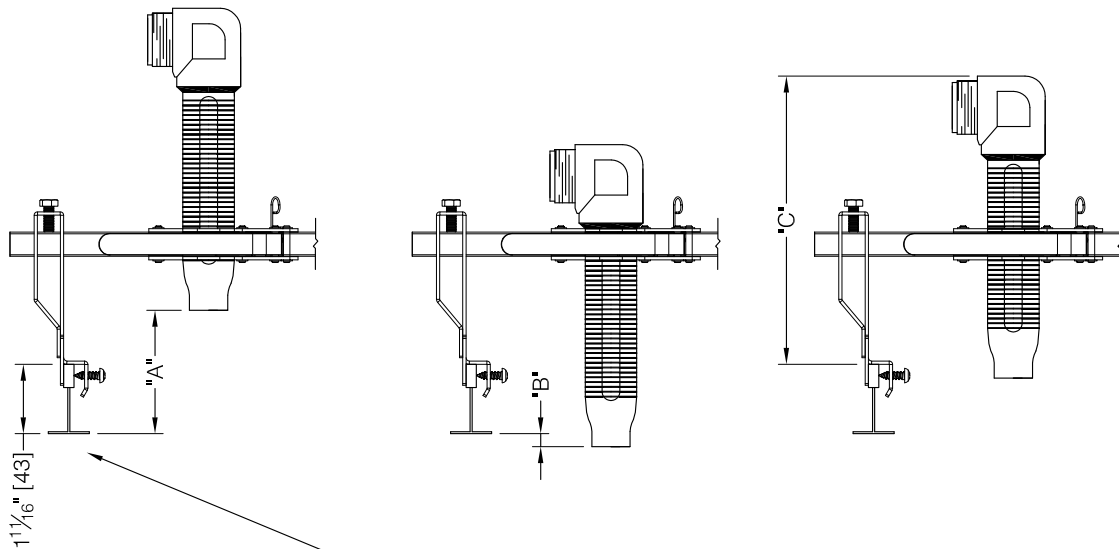
##### Bracket Assembly Length

- 24" (610 mm) standard
- 48" (1220 mm) optional

##### Accessories

- See Table F





Nominal 1-11/16" (43mm) ceiling grid shown for reference only. Verify actual ceiling grid dimensions and ceiling tile reveal prior to ordering.

Minimum and Maximum Face of Fitting to Bottom of Ceiling Grid for Each Reducer

Table B

Fitting Distance	6-1/8" (155mm) Straight Standard	4-5/16" (110mm) Straight	5-5/16" (135mm) Straight	11-13/16" (300mm) Straight	5-5/8" (143mm) Elbow	7-3/8" (187mm) Elbow
Max. Face of Fitting Distance Above Bottom of Ceiling Grid	3" (77mm)	3" (7mm)	3" (7mm)	3" (7mm)	3" (7mm)	3" (7mm)
Max. Face of Fitting Distance from Bottom of Ceiling Grid	1/8" (3mm) below	1-5/8" (42mm) above	11/16" (17mm) above	6-3/8" (148mm) below	1-7/16" (36mm) above	5/16" (60mm) below

Note: Based on 1-11/16" (43mm) tall ceiling grid.

Fig. 3 Dimension C - Clearance Above Ceiling Required at Max. Sprinkler Recess

Table C

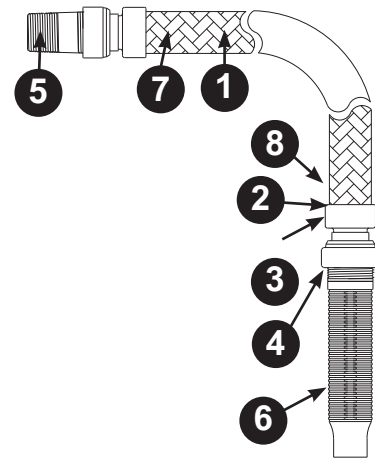
Recessed Escutcheon or Concealed/Flush Sprinkler	Reducer	
	5-5/8" (143mm) Elbow	7-3/8" (187mm) Elbow
F1 recessed escutcheon	NC	5-5/8" (144mm)
F2 or FV recessed escutcheon	NC	5-3/8" (138mm)
FP recessed escutcheon	NC	6-1/4" (160mm)
CCP conical concealed cover plate	NC	6-1/4" (160mm)
G4 series concealed sprinklers	5-5/8" (144mm)	7-3/8" (188mm)
G5 series concealed sprinklers	5-1/4" (134mm)	7" (179mm)
RFC series concealed sprinklers	5-1/4" (134mm)	7" (179mm)
XL commercial flush sprinkler with flat escutcheon	4-7/8" (125mm)	6-5/8" (169mm)
XL commercial flush sprinkler with conical escutcheon	4-3/8" (112mm)	6-1/8" (157mm)

Note: NC - Reducer not compatible with sprinkler adjustment range. Based on 1-11/16" (43mm) tall ceiling grid and flush ceiling tile.

**Materials**

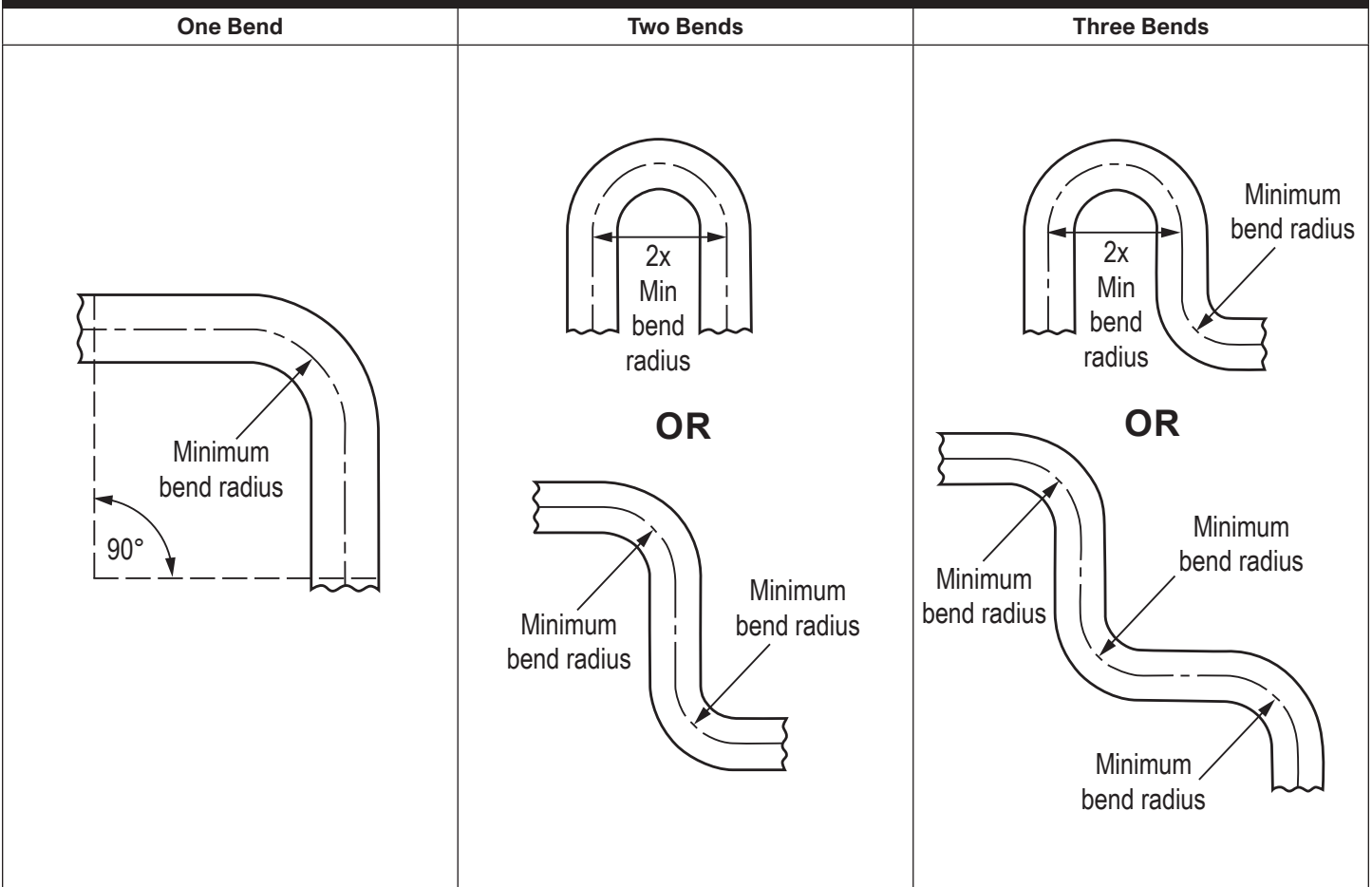
**Figure 4**

Number	Item Description	Material
1	Flexible Hose/Bellow	AISI Type 304 Stainless Steel
2	Isolation Ring	Nylon 66
3	Gasket	EPDM
4	Nut	Zinc Plated Carbon Steel
5	Branch Line Nipple (1")	Zinc Plated Carbon Steel
6	Reducer	Zinc Plated Carbon Steel
7	Braid	AISI Type 304 Stainless Steel
8	Welded Collar Fitting	AISI Type 304 Stainless Steel
-	Bar Stock	Zinc Plated SGCC Steel
-	Brackets: Center and Side	Zinc Plated SPCC Steel



**Flexible Hose Number of Bends**

**Figure 5**



Do NOT install the RASCOFLEX™ straight. Some flexibility in the form of an allowable bend (or bends) must be provided.



cULus Friction Loss Data

**Table D**

Nominal Length of Flexible Hose in (mm)	Reducer		Maximum Sprinkler K-Factor gpm/psi <sup>1/2</sup> (lpm/bar <sup>1/2</sup> )	Maximum Number of 90° Bends at 3" (76mm) Bend Radius	Equivalent Length of 1" (33.7mm) Sch. 40 Pipe (C=120), ft (m)
	NPT Threads	Type			
24 (610)	1/2	Straight	5.6 (80)	2	10 (3)
	3/4	Straight	14.0 (200)	2	13 (4)
31 (790)	1/2	Straight	5.6 (80)	3	14 (4.3)
	3/4	Straight	14.0 (200)	3	16 (4.9)
40 (1015)	1/2	Straight	5.6 (80)	4	21 (6.4)
	3/4	Straight	14.0 (200)	4	23 (7)
48 (1220)	1/2	Straight	5.6 (80)	4	24 (7.3)
	3/4	Straight	14.0 (200)	4	26 (7.9)
60 (1525)	1/2	Straight	5.6 (80)	4	25 (7.6)
	3/4	Straight	14.0 (200)	4	30 (9.1)
72 (1830)	1/2	Straight	5.6 (80)	5	36 (11)
	3/4	Straight	14.0 (200)	5	33 (10.1)

**UL Notes:**

1. Available data for use with 6.1" straight reducers.
2. Sprinkler K-Factor: 5.6 (80 metric) for 1/2-inch reducer and 14.0 (200 metric) for 3/4-inch reducer.
3. RASCOFLEX® Sprinkler Connections have been tested and approved by Underwriter's Laboratories, Inc. for use in wet, preaction, and dry sprinkler systems per NFPA 13, 13D, 13R and UL2443.



FM Friction Loss Data

**Table E**

Nominal Length of Flexible Hose in (mm)	Reducer		Maximum Sprinkler K-Factor gpm/psi <sup>1/2</sup> (lpm/bar <sup>1/2</sup> )	Maximum Number of 90° Bends at 7" 178mm Bend Radius	Equivalent Length of 1" (33.7mm) Sch. 40 Pipe (C=120), ft (m)
	NPT Threads	Type			
24 (610)	1/2	Straight	5.6 (80)	1	9.7 (2.9)
	1/2	90° Elbow	5.6 (80)	0	11.5 (3.5)
	3/4	Straight	8.0 (115)	1	9.9 (3)
			11.2 (160)	1	9.8 (2.9)
			14.0 (200)	1	9.6 (2.9)
	3/4	90° Elbow	8.0 (115)	0	10.2 (3.1)
			11.2 (160)	0	10 (3)
			14.0 (200)	0	9.8 (2.9)
	31 (790)	1/2	Straight	5.6 (80)	2
1/2		90° Elbow	5.6 (80)	2	15.8 (4.8)
3/4		Straight	8.0 (115)	2	13.7 (4.1)
			11.2 (160)	2	12.9 (3.9)
			14.0 (200)	2	12.2 (3.7)
3/4		90° Elbow	8.0 (115)	2	14.5 (4.4)
			11.2 (160)	2	13.7 (4.1)
			14.0 (200)	2	13 (3.9)
40 (1015)		1/2	Straight	5.6 (80)	2
	1/2	90° Elbow	5.6 (80)	2	21.6 (6.6)
	3/4	Straight	8.0 (115)	2	18.5 (5.6)
			11.2 (160)	2	17.4 (5.3)
			14.0 (200)	2	16.3 (4.9)
	3/4	90° Elbow	8.0 (115)	2	20 (6)
			11.2 (160)	2	18.9 (5.7)
			14.0 (200)	2	20 (6)
	48 (1220)	1/2	Straight	5.6 (80)	3
1/2		90° Elbow	5.6 (80)	3	25.9 (7.9)
3/4		Straight	8.0 (115)	3	22.7 (6.9)
			11.2 (160)	3	21.5 (6.5)
			14.0 (200)	3	20.5 (6.2)
3/4		90° Elbow	8.0 (115)	3	24.8 (7.5)
			11.2 (160)	3	23.6 (7.2)
			14.0 (200)	3	22.6 (6.8)

FM Friction Loss Data (cont.)

Table E




Nominal Length of Flexible Hose in (mm)	Reducer		Maximum Sprinkler K-Factor gpm/psi <sup>1/2</sup> (lpm/bar <sup>1/2</sup> )	Maximum Number of 90° Bends at 7" (178mm) Bend Radius	Equivalent Length of 1" (33.7mm) Sch. 40 Pipe (C=120), ft (m)	
	NPT Threads	Type				
60 (1525)	1/2	Straight	5.6 (80)	4	23.7 (7.2)	
	1/2	90° Elbow	5.6 (80)	4	33.1 (10)	
	3/4	Straight	8.0 (115)	4	29.1 (8.8)	
			11.2 (160)	4	28 (8.5)	
			14.0 (200)	4	27 (8.2)	
	3/4	90° Elbow	8.0 (115)	4	32.2 (9.8)	
			11.2 (160)	4	31.1 (9.5)	
			14.0 (200)	4	30 (9.1)	
	72 (1830)	1/2	Straight	5.6 (80)	4	28.4 (8.6)
		1/2	90° Elbow	5.6 (80)	4	40.4 (12.3)
3/4		Straight	8.0 (115)	4	35.5 (10.8)	
			11.2 (160)	4	34.3 (10.4)	
			14.0 (200)	4	33.2 (10.1)	
3/4		90° Elbow	8.0 (115)	4	39.5 (12)	
			11.2 (160)	4	38.3 (11.6)	
			14.0 (200)	4	37.2 (11.3)	

**FM Notes:**

1. RASCOFLEX® Sprinkler Connections have been tested and approved by FM Approvals for use in wet, preaction, and dry sprinkler systems per FM data sheets 2-0, 2-5, and 2-8 per FM1637.
2. Maximum sprinkler K-Factor: 5.6 (80 metric) for 1/2-inch reducer and 14.0 (200 metric) for 3/4-inch reducer.
3. Differences in equivalent lengths are due to varying test methods, per FM 1637 standards.
4. Above data of friction loss for use with 6.1" straight reducers.

Accessories List

Table F

 <p>5-5/8" (143mm) Elbow Reducer-Short 1/2": 7M99003303 3/4": 7M99003305</p>	 <p>7-3/8" (187mm) Elbow Reducer-Long 1/2": 7M99003302 3/4": 7M99003304</p>	 <p>4-5/16" (110mm) Straight Reducer 1/2": 7M99003306 3/4": 7M99003325</p>
 <p>5-5/16" (135mm) Straight Reducer 1/2": 7M99003307 3/4": 7M99003326</p>	 <p>Replacement 6-1/8" (155mm) Standard Straight Reducer 1/2": 7M99003308 3/4": 7M99003327</p>	 <p>11-13/16" (300mm) Straight Reducer 1/2": 7M99003309 3/4": 7M99003328</p>
 <p>Hat Channel End Bracket- Short 3" (76mm) 7M99003310</p>	 <p>Hat Channel End Bracket- Long 3-3/4" (95mm) 7M99003311</p>	 <p>Metal Stud End Bracket-Short 1-1/2" (38mm) 7M99003312</p>
 <p>Metal Stud End Bracket- Long 2-1/16" (53mm) 7M99003313</p>	 <p>T-Bar End Bracket- Short 2-5/8" (68mm) 7M99003314</p>	 <p>T-Bar End Bracket- Long 4-1/8" (105mm) 7M99003316</p>
 <p>Wood Beam Stud End Bracket 7M99003317</p>	 <p>Replacement Center Bracket 7M99003321</p>	 <p>3" (76 mm) Bend Radius Indicator 7M99004179</p>
 <p>Replacement 1" NPT Inlet Adapter 7M99003322</p>	 <p>#2 Square Drive Bit 7M99004539</p>	 <p>Replacement Gasket 7M99004319</p>
 <p>48" (1220mm) Bracket Assembly 7M99003301</p>		