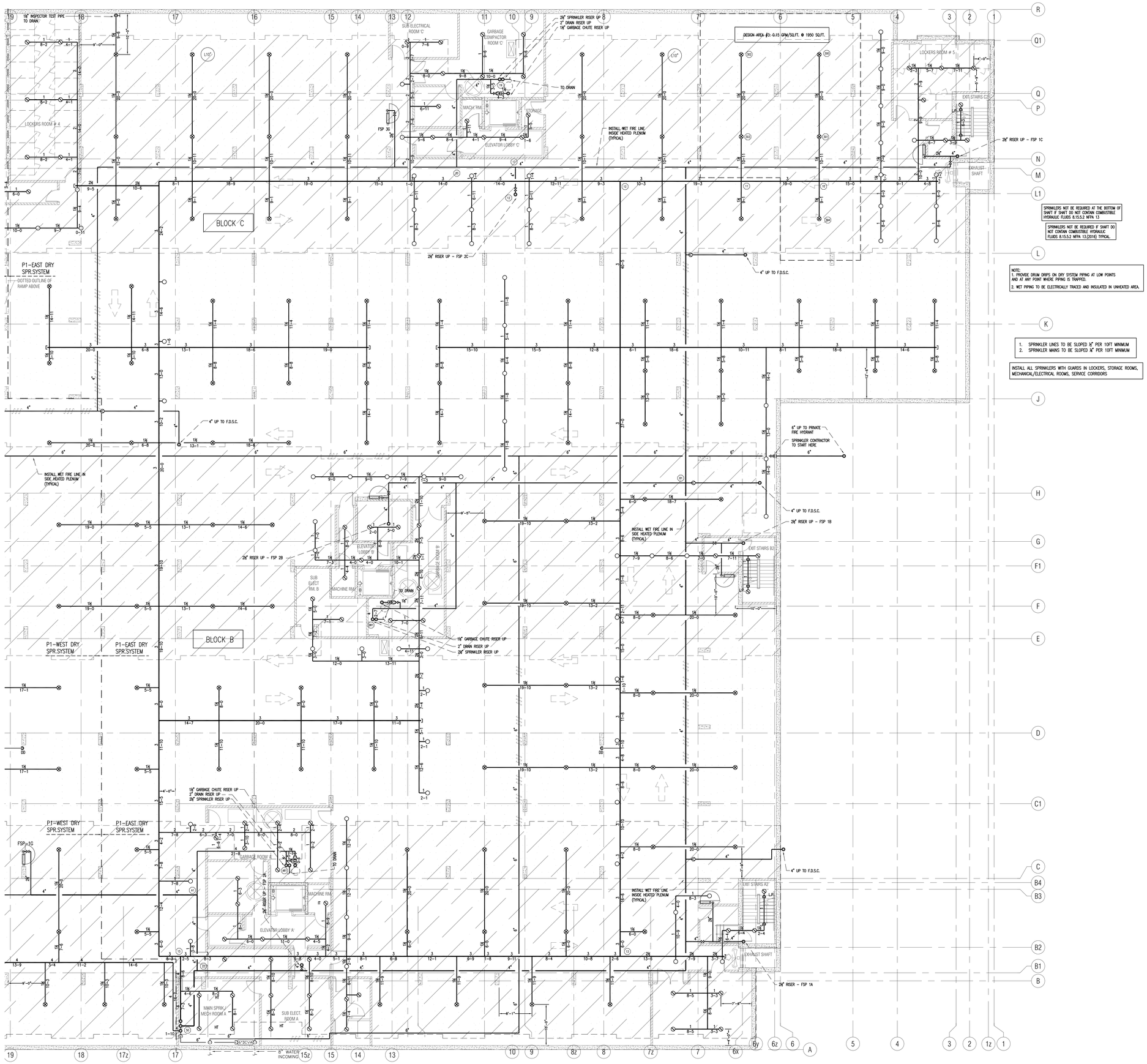


DESIGN AREA #3:
SPRINKLER SYSTEM DESIGNED FOR ORDINARY HAZARD GROUP 1.
0.15 GPM PER SQ.FT. OVER 1950 SQ.FT. (1300 + 30% DRY)
PLUS 250 GPM FOR HOSES.
AS PER NFPA 13.

LICENSED PROFESSIONAL ENGINEER
A. NOVOSSELOV
100338841
PROVINCE OF ONTARIO

MATERIAL NOTES

PIPING MATERIAL: MAINS – SCH. 40, 10 BLACK STEEL PIPE
LINES – SCH. 40, 10 BLACK STEEL PIPE
LINES – CPVC IN RESIDENTIAL UNITS (ONLY)

FITTING MATERIAL: MAINS – CUL LISTED GROOVED FITTINGS
LINES – CUL LISTED GROOVED FITTINGS

HANGER MATERIAL: MAINS – AS PER NFPA 13 REQUIREMENTS
LINES – AS PER NFPA 13 REQUIREMENTS

DESIGN: SPRINKLER SYSTEM – NFPA 13 (2016)

General Notes

1. All Pipe Locations are to be Field Measured Prior to Fabrication and Installation by Sprinkler Contractor.
2. All Dimensions Shown are Center to Center.
3. High Temperature Heads are to be Field Located Where Required.
4. All Heads, Pipes and Hangers are to be Installed per NFPA #13.
5. Hangers are to be U.L.C. Listed and F.M. Approved.
6. SPRINKLERS c/w HEAD GUARDS TO BE INSTALLED UNDER ALL OBSTRUCTIONS OVER 48" WIDE.
7. OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

Symbols

Symbol	Description
	Hydraulic Reference Points
[←#]	Elev. Below Top of Steel
[+#]	Elev. Above Finished Floor
+ (TOS 28-1)	Elev. of Top of Steel
	Ceiling Height
	Denotes Hangar Location
	Rise up or down
IT/HT	INTERMEDIATE/HIGH TEMPERATURE
	WIRE GUARD

Symbol	Description	Total
	3/4" 155°F SR EC-14 BRASS UPRIGHT K=14.0	110
	1/2" 155°F SR BRASS UPRIGHT K=5.6	148
	3/4" 155°F SR SW-20 SIDEWALL K=11.2	5
	1/2" 155°F QR BRASS UPRIGHT K=5.6	151
	1" 155°F SR DS-3 DRY SIDEWALL K=11.2	1
	FIRE HOSE CABINET – 100 FT OF 1½" LINED HOSE C/W COMBINATION FOG NOZZLE	12

Contract No. 2019-251
Drawn By: E.N.
Scale: 1/8"=1'-0"
Date: July, 2019
Approval By: A. NOVOSSELOV P. Eng.

Revisions:	Date:
Issued for Tender	Aug.01/19
Issued for Permit & Tender	Sep.18/19
Re-issued for Permit & Tender	Sep.21/20
Issued for Permit	Mar.03/21
1. Revised as per Architectural Addendum #8	Apr.02/21
2. Revised as per SI A01	Jun.07/21
3. Revised as per SI A03	Jul.17/21
4. Revised as City Comments	Jan.28/22

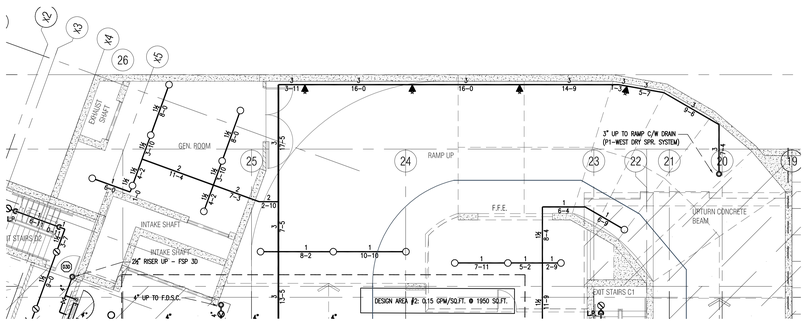
Elite Sprinkler Inc.
Automatic Fire Protection Sprinkler System Design
21 McDonnell Crescent, Bradford, Ontario, L3Z 0S7
T: 905-505-1370
www.elitesprinkler.ca

Contractor:
STAR FIRE systems
601 Edgeley Boulevard, Unit 9 & 10, Vaughan, ON. L4K 4G2
T: 905.326.6400 • F: 905.326.6813

Job:
ROYAL PINE
ATTMAR + PALLESCHI DRIVE
BRAMPTON, ON

Drawing Title
P1 LEVEL EAST

SHEET 1 of 7





FOR CONTINUATION SEE SP1

MATERIAL NOTES	
PIPING MATERIAL:	MAINS – SCH. 40, 10 BLACK STEEL PIPE LINES – SCH. 40, 10 BLACK STEEL PIPE LINES – CPVC IN RESIDENTIAL UNITS (ONLY)
FITTING MATERIAL:	MAINS – CUL LISTED GROOVED FITTINGS LINES – CUL LISTED GROOVED FITTINGS
HANGER MATERIAL:	MAINS – AS PER NFPA 13 REQUIREMENTS LINES – AS PER NFPA 13 REQUIREMENTS
DESIGN:	SPRINKLER SYSTEM – NFPA 13 (2016)

General Notes

1. All Pipe Locations are to be Field Measured Prior to Fabrication and Installation by Sprinkler Contractor.
2. All Dimensions Shown are Center to Center.
3. High Temperature Heads are to be Field Located Where Required.
4. All Heads, Pipes and Hangers are to be Installed per NFPA #13.
5. Hangers are to be U.L.C. Listed and F.M. Approved.
6. SPRINKLERS c/w HEAD GUARDS TO BE INSTALLED UNDER ALL OBSTRUCTIONS OVER 48" WIDE.
7. OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

Symbols

Symbol	Description
HP	Hydraulic Reference Points
[—•—]	Elev. Below Top of Steel
[—•—]	Elev. Above Finished Floor
+ (105 29-11)	Elev. of Top of Steel
⊕EB	Ceiling Height
—o/—	Denotes Hanger Location
o	Rise up or down
H/HT	INTERMEDIATE/HIGH TEMPERATURE
○	WIRE GUARD

Symbol	Description	Total
	SEE SP1	

Contract No.	2019-251
Drawn By:	E.N.
Scale:	1/8"=1'-0"
Date:	July, 2019
Approval By:	A. NOVOSSELOV P. Eng.

Revisions:	Date:
Issued for Tender	Aug.01/19
Issued for Permit & Tender	Sep.18/19
Re-Issued for Permit & Tender	Sep.21/20
Issued for Permit	Mar.03/21
1. Revised as per Architectural Addendum #8	Apr.02/21
2. Revised as per SI A01	Jun.07/21
3. Revised as per SI A03	Jun.17/21
4. Revised as City Comments	Jan.28/22

Elite Sprinkler Inc.
Automatic Fire Protection Sprinkler System Design
22 McDonnell Crescent, Bradford, Ontario, L3Z 0S7
T: 905-868-1170
www.elitesprinklers.ca
Contractor: STAR FIRE systems
401 Edgeley Boulevard, Unit 9 & 10, Vaughan, ON L4K 4G2
T: 905.326.6400 • F: 905.326.6813

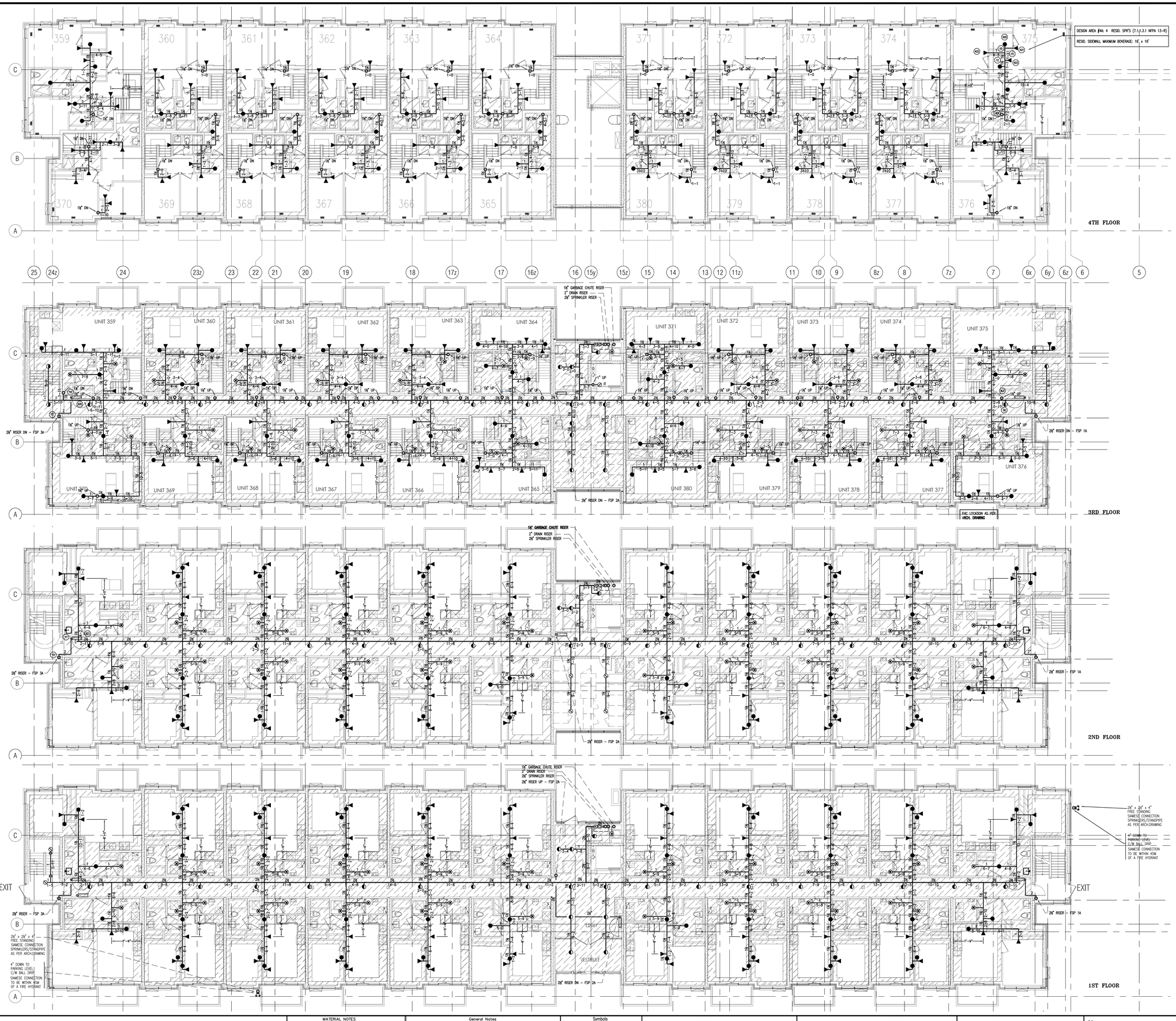
Job: ROYAL PINE
ATTMAR + PALLESCHI DRIVE
BRAMPTON, ON

Drawing Title: P1 LEVEL WEST

SHEET 2 of 7

DESIGN AREA #1 & #2:
SPRINKLER SYSTEM DESIGNED FOR ORDINARY HAZARD GROUP 1
0.15 GPM PER SQ.FT. OVER 1950 SQ.FT. (1500 + 30% DRY)
PLUS 250 GPM FOR HOSES.
AS PER NFPA 13.

LICENSED PROFESSIONAL ENGINEER
A. NOVOSSELOV
100039341
PROVINCE OF ONTARIO



DESIGN AREA #4A:
DESIGNED FOR RESIDENTIAL SPRINKLERS AS PER NFPA 13R SECTION 7.1.1.3.1 (2016 ED.).
– DESIGN AREA TO INCLUDE THE FOUR ADJACENT SPRINKLERS THAT PRODUCE THE GREATEST HYDRAULIC DEMAND

LICENSED PROFESSIONAL ENGINEER
A. NOVOSSELOV
100038641
PROVINCE OF ONTARIO

MATERIAL NOTES	
PIPING MATERIAL:	MAINS – SCH. 40, 10 BLACK STEEL PIPE LINES – SCH. 40, 10 BLACK STEEL PIPE LINES – CPVC IN RESIDENTIAL UNITS (ONLY)
FITTING MATERIAL:	MAINS – CUL LISTED GROOVED FITTINGS LINES – CUL LISTED GROOVED FITTINGS
HANGER MATERIAL:	MAINS – AS PER NFPA 13 REQUIREMENTS LINES – AS PER NFPA 13 REQUIREMENTS
DESIGN:	SPRINKLER SYSTEM – NFPA 13R (2016)

General Notes

1. All Pipe Locations are to be Field Measured Prior to Fabrication and Installation by Sprinkler Contractor.
2. All Dimensions Shown are Center to Center.
3. High Temperature Heads are to be Field Located Where Required.
4. All Heads, Pipes and Hangers are to be Installed per NFPA #13.
5. Hangers are to be U.L.C. Listed and F.M. Approved.
6. SPRINKLERS c/w HEAD GUARDS TO BE INSTALLED UNDER ALL OBSTRUCTIONS OVER 48" WIDE.
7. OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

Symbols

Symbol	Description
HR	Hydraulic Reference Points
[⇔■]	Elev. Below Top of Steel
[↔◦]	Elev. Above Finished Floor
⇔ (TOS) (BF-1)	Elev. of Top of Steel
⟨CB⟩	Ceiling Height
—//	Denotes Hanger Location
⊙	Rise up or down
IT/HT	INTERMEDIATE/HIGH TEMPERATURE
C	WIRE GUARD

Symbol	Description	Total
◀	1/2" 165°F QR VIKING VK480 RESID. WHITE CONCEALED SIDEWALL K=5.8	304
●	1/2" 155°F QR VIKING VK484 RESID. WHITE CONCEALED PENDENT K=4.9	243
⊗	1/2" 200°F QR VIKING VK484 RESID. WHITE CONCEALED PENDENT K=4.9	120
◑	1/2" 155°F QR WHITE CONCEALED PENDENT K=5.6	79
⊘	1/2" 155°F QR BRASS UPRIGHT K=5.6	7
FHC	FIRE HOSE CABINET – 100 FT OF 1½" LINED HOSE C/W COMBINATION FOG NOZZLE	9

Contract No.	2019-251
Drawn By:	E.N.
Scale:	1/8"=1'-0"
Date:	July, 2019
Approved By:	A. NOVOSSELOV P. Eng.

Revisions:	Date:
Issued for Tender	Aug.01/19
Issued for Permit & Tender	Sep.18/19
Re-Issued for Permit & Tender	Sep.21/20
Issued for Permit	Mar.03/21
2. Revised as per SI A01	Jun.07/21
3. Revised as per SI A03	Jul.17/21
4. Revised as City Comments	Jan.28/22

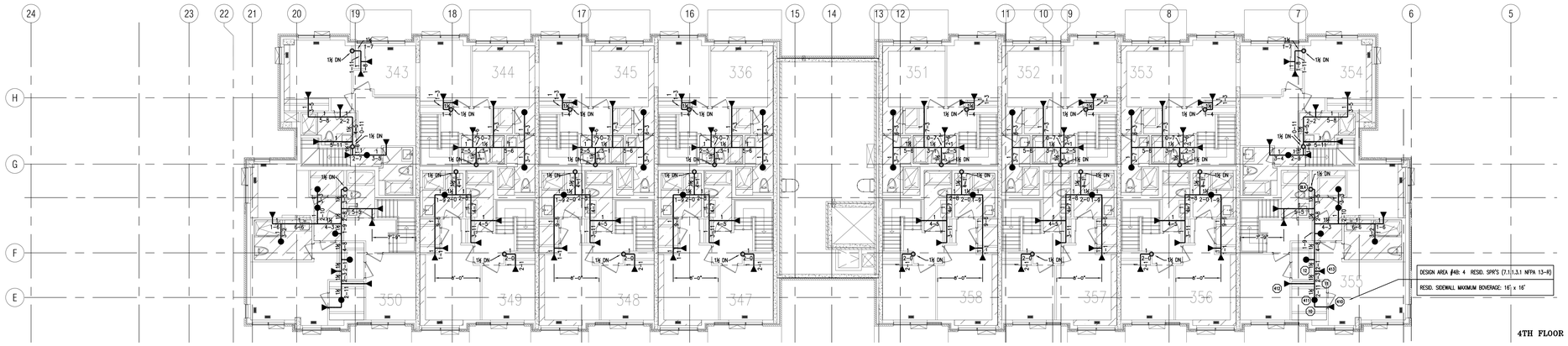
Elite Sprinkler Inc.
Authorized Fire Protection Sprinkler System Design
22 McDonnell Crescent, Bradford, Ontario, L3Z 0E7
T: 905-868-1570
www.elitesprinkler.ca

Contractor:
STARFIRE systems
601 Edgeley Boulevard, Unit 9 & 10, Vaughan, ON L4K 4G2
T: 905.326.6400 • F: 905.326.6813

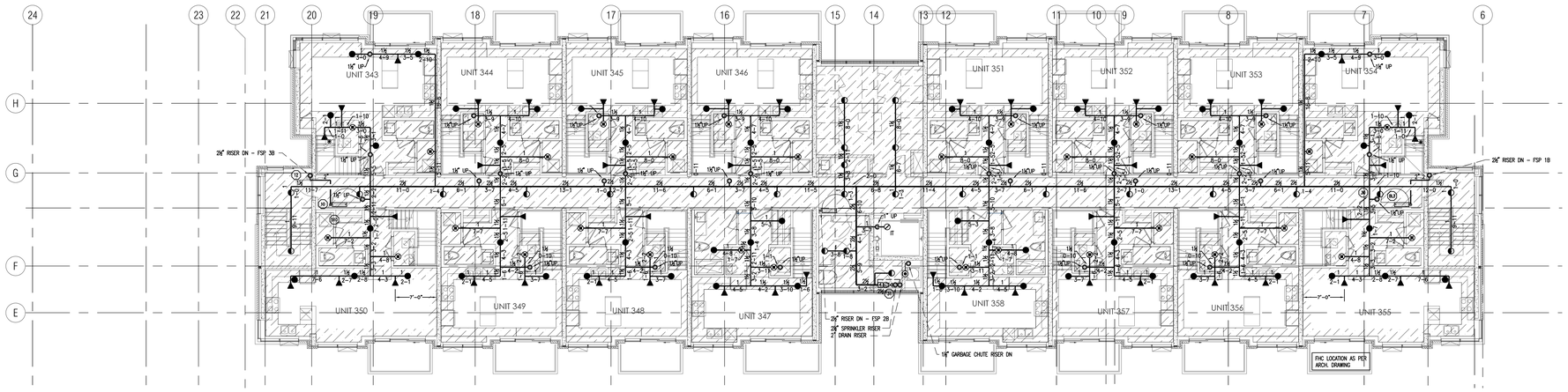
Job:
ROYAL PINE
ATTMAR + PALLESCHI DRIVE
BRAMPTON, ON

Drawing Title
BUILDING A

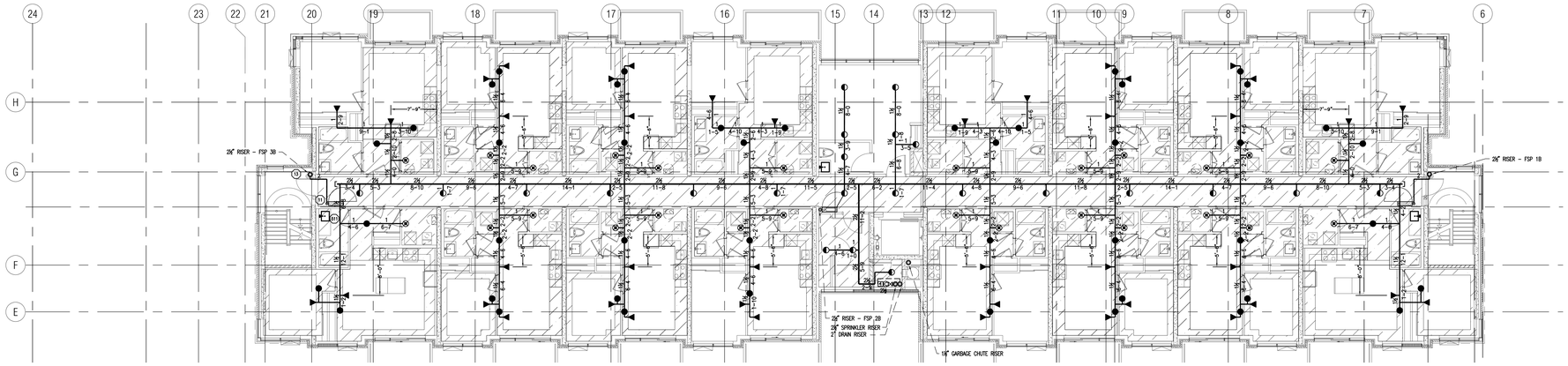
SHEET 3 of 7



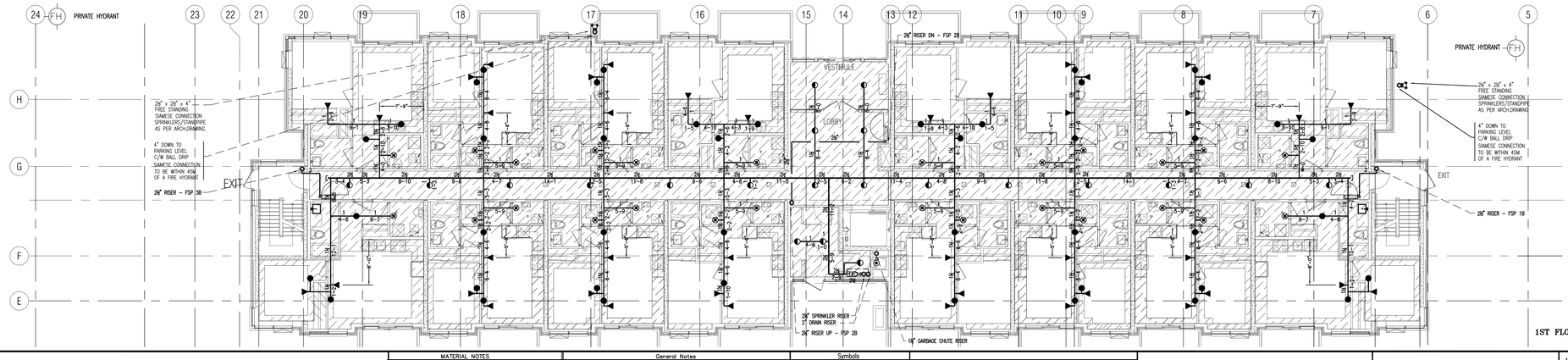
4TH FLOOR



3RD FLOOR



2ND FLOOR



1ST FLOOR

DESIGN AREA #4B:

DESIGNED FOR RESIDENTIAL SPRINKLERS AS PER NFPA 13R SECTION 7.1.1.3.1 (2016 ED.).
– DESIGN AREA TO INCLUDE THE FOUR ADJACENT SPRINKLERS THAT PRODUCE THE GREATEST HYDRAULIC DEMAND

A. NOVOSSELOV
100338841
Sept. 2019

MATERIAL NOTES

PIPING MATERIAL:	MAINS – SCH. 40, 10 BLACK STEEL PIPE LINES – SCH. 40, 10 BLACK STEEL PIPE LINES – CPVC IN RESIDENTIAL UNITS (ONLY)
FITTING MATERIAL:	MAINS – CUL LISTED GROOVED FITTINGS LINES – CUL LISTED GROOVED FITTINGS
HANGER MATERIAL:	MAINS – AS PER NFPA 13 REQUIREMENTS LINES – AS PER NFPA 13 REQUIREMENTS
DESIGN:	SPRINKLER SYSTEM – NFPA 13R (2016)

General Notes

1. All Pipe Locations are to be Field Measured Prior to Fabrication and Installation by Sprinkler Contractor.
2. All Dimensions Shown are Center to Center.
3. High Temperature Heads are to be Field Located Where Required.
4. All Heads, Pipes and Hangers are to be installed per NFPA #13.
5. Hangers are to be U.L.C. Listed and F.M. Approved.
6. SPRINKLERS c/w HEAD GUARDS TO BE INSTALLED UNDER ALL OBSTRUCTIONS OVER 48" WIDE.
7. OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

Symbols

Symbol	Description
HR	Hydraulic Reference Points
[+∞]	Elev. Below Top of Steel
[+∞]	Elev. Above Finished Floor
+ (TOS 28-11)	Elev. of Top of Steel
	Ceiling Mount
	Denotes Hanger Location
	Rise up or down
FT/HT	INTERMEDIATE/HIGH TEMPERATURE
	WIRE GUARD

Symbol	Description	Total
	1/2" 165°F QR VIKING VK490 RESD. WHITE CONCEALED SIDEWALL K=5.8	221
	1/2" 155°F QR VIKING VK484 RESD. WHITE CONCEALED PENDENT K=4.9	176
	1/2" 200°F QR VIKING VK484 RESD. WHITE CONCEALED PENDENT K=4.9	84
	1/2" 155°F QR WHITE CONCEALED PENDENT K=5.6	70
	1/2" 155°F QR BRASS UPRIGHT K=5.6	1
	FIRE HOSE CABINET – 100 FT OF 1½" LINED HOSE C/W COMBINATION FOG NOZZLE	9

Contract No. 2019-251
Drawn By: E.N.
Scale: 1/8"=1'-0"
Date: July, 2019
Approval By: A. NOVOSSELOV P. Eng.

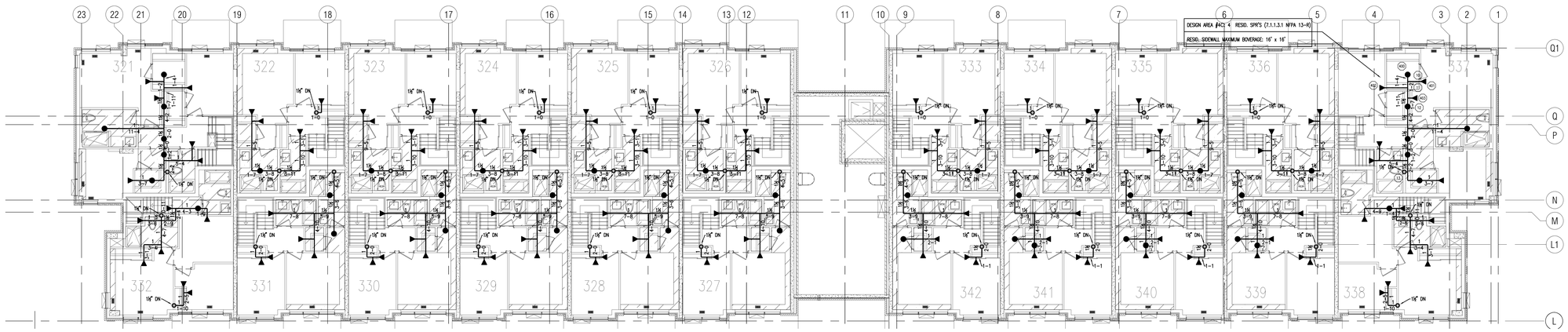
Revisions:	Date:
Issued for Tender	Aug.01/19
Issued for Permit & Tender	Sep.18/19
Re-Issued for Permit & Tender	Sep.21/20
Issued for Permit	Mar.03/21
2. Revised as per SI A01	Jun.07/21
3. Revised as per SI A03	Jul.17/21
4. Revised as City Comments	Jun.28/22

Elite Sprinkler Inc.
Automatic Fire Protection Sprinkler System Design
22 McDonald Crescent, Stratford, Ontario, L5Z 4N7
T: 905-868-1178
www.elitesprinkler.ca

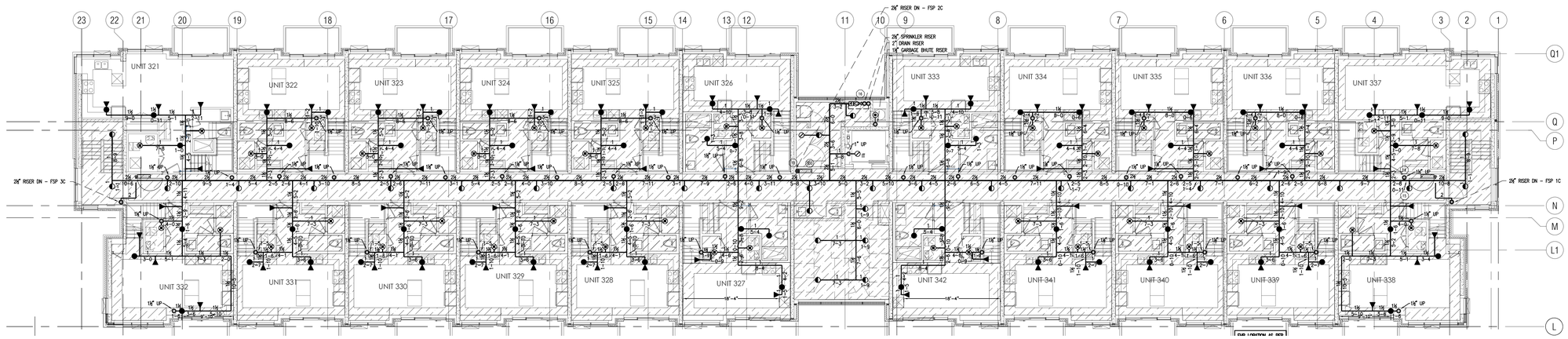
Contractor:
STARFIRE systems
401 Edgeley Boulevard, Unit # 10, Vaughan, ON L4K 4G2
T: 905.326.6433 • F: 905.326.6813

Job:
ROYAL PINE
ATTMAR + PALLESCHI DRIVE
BRAMPTON, ON

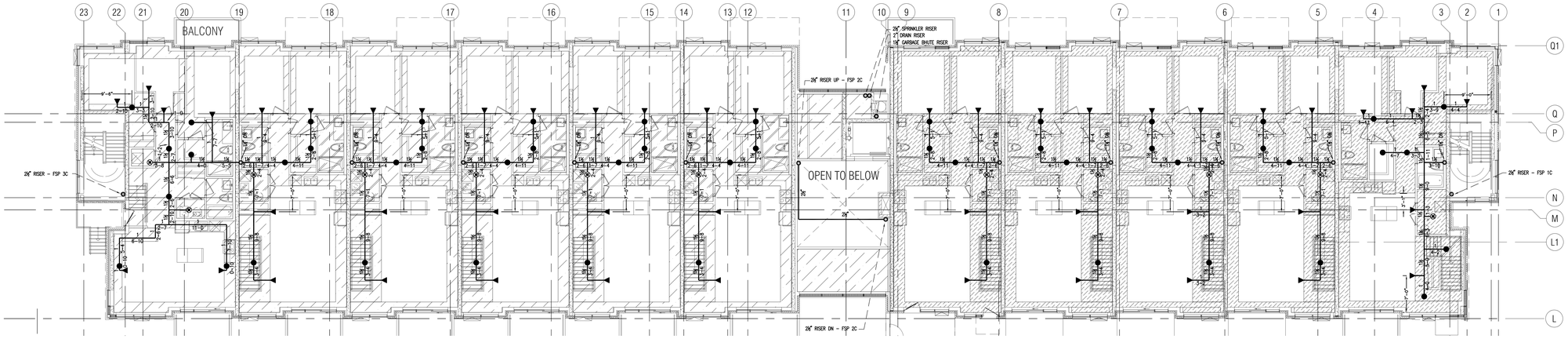
Drawing Title
BUILDING B



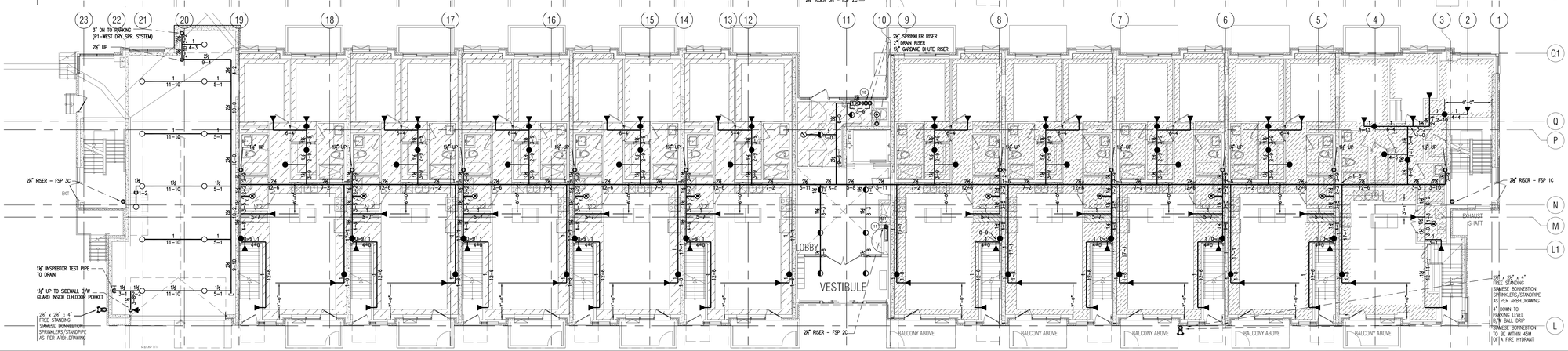
4TH FLOOR



3RD FLOOR



2ND FLOOR



1ST FLOOR

DESIGN AREA #4C:
DESIGNED FOR RESIDENTIAL SPRINKLERS AS PER NFPA 13R SECTION 7.1.1.3.1 (2016 ED.).
– DESIGN AREA TO INCLUDE THE FOUR ADJACENT SPRINKLERS THAT PRODUCE THE GREATEST HYDRAULIC DEMAND

MATERIAL NOTES	
PIPING MATERIAL:	MAINS – SCH. 40, 10 BLACK STEEL PIPE LINES – SCH. 40, 10 BLACK STEEL PIPE LINES – CPVC IN RESIDENTIAL UNITS (ONLY)
FITTING MATERIAL:	MAINS – CUL LISTED GROOVED FITTINGS LINES – CUL LISTED GROOVED FITTINGS
HANGER MATERIAL:	MAINS – AS PER NFPA 13 REQUIREMENTS LINES – AS PER NFPA 13 REQUIREMENTS
DESIGN:	SPRINKLER SYSTEM – NFPA 13R (2016)

General Notes

1. All Pipe Locations are to be Field Measured Prior to Fabrication and Installation by Sprinkler Contractor.
2. All Dimensions Shown are Center to Center.
3. High Temperature Heads are to be Field Located Where Required.
4. All Heads, Pipes and Hangers are to be Installed per NFPA #13.
5. Hangers are to be U.L.C. Listed and F.M. Approved.
6. SPRINKLERS c/w HEAD GUARDS TO BE INSTALLED UNDER ALL OBSTRUCTIONS OVER 48" WIDE.
7. OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

Symbols

Symbol	Description	Symbol	Description	Total
⊕	Hydraulic Reference Points	◀	1/2" 165°F QR VIKING M480 RESD. WHITE CONCEALED SIDEWALL K=5.8	319
[⊷ ⊷]	Elev. Below Top of Steel	●	1/2" 155°F QR VIKING VK484 RESD. WHITE CONCEALED PENDENT K=4.9	220
[⊷⊷]	Elev. Above Finished Floor	⊗	1/2" 200°F QR VIKING VK484 RESD. WHITE CONCEALED PENDENT K=4.9	76
⊷ (TYP)	Elev. of Top of Steel	◑	1/2" 155°F QR WHITE CONCEALED PENDENT K=5.6	46
⊷	Ceiling Height	⊘	1/2" 155°F QR BRASS UPRIGHT K=5.8	8
⊷	Denotes Hanger Location	○	1/2" 155°F SR BRASS UPRIGHT K=5.8	12
⊙	Rise up or down	◀	3/4" 155°F SR SW-20 SIDEWALL K=11.2	1
Π/HT	INTERMEDIATE/HIGH TEMPERATURE	▬	FIRE HOSE CABINET – 100 FT OF 1½" LINED HOSE C/W COMBINATION FOG NOZZLE	5
⊂⊃	WIRE GUARD			

LICENSED PROFESSIONAL ENGINEER
A. NOVOSSELOV
100033941
PROVINCE OF ONTARIO

Contract No.	2019-251
Drawn By:	E.N.
Scale:	1/8"=1'-0"
Date:	July, 2019
Approved By:	A. NOVOSSELOV P. Eng.

Revisions:	Date:
Issued for Tender	Aug.01/19
Issued for Permit & Tender	Sep.18/19
Re-Issued for Permit & Tender	Sep.21/20
1. Revised as per Addendum #6	Jan.21/21
Issued for Permit	Mar.03/21
2. Revised as per SI A01	Jun.07/21
3. Revised as per SI A03	Jul.17/21
4. Revised as City Comments	Jan.28/22

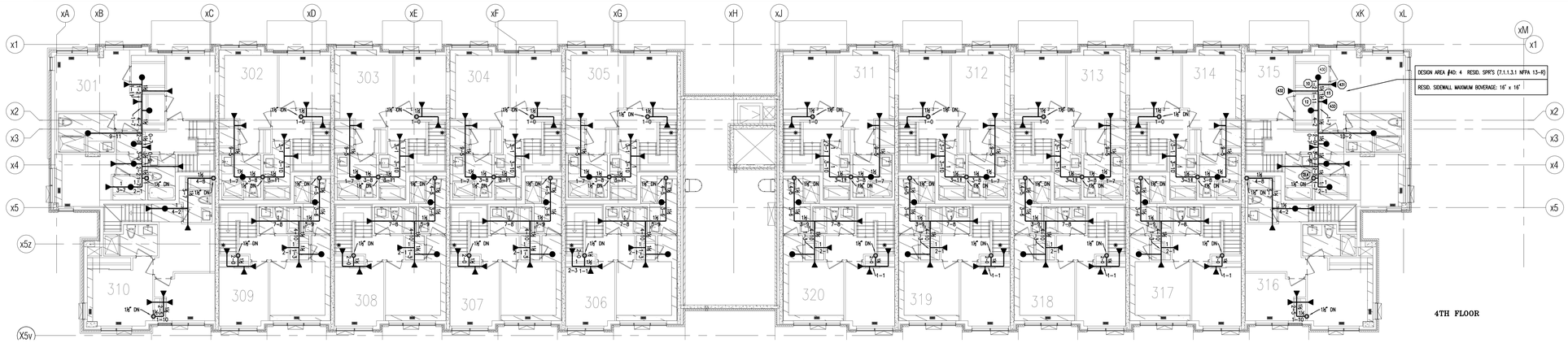
Elite Sprinkler Inc.
Industry Fire Protection Sprinkler Design
32 McDonnell Crescent, Bradford, Ontario, L3Z 0S7
T: 905-868-1178
www.elitesprinkler.ca

Contractor:
STAR FIRE systems
801 Edgeley Boulevard, Unit 9 & 10, Vaughan, ON L4K 4G2
T: 905.326.6400 • F: 905.326.6813

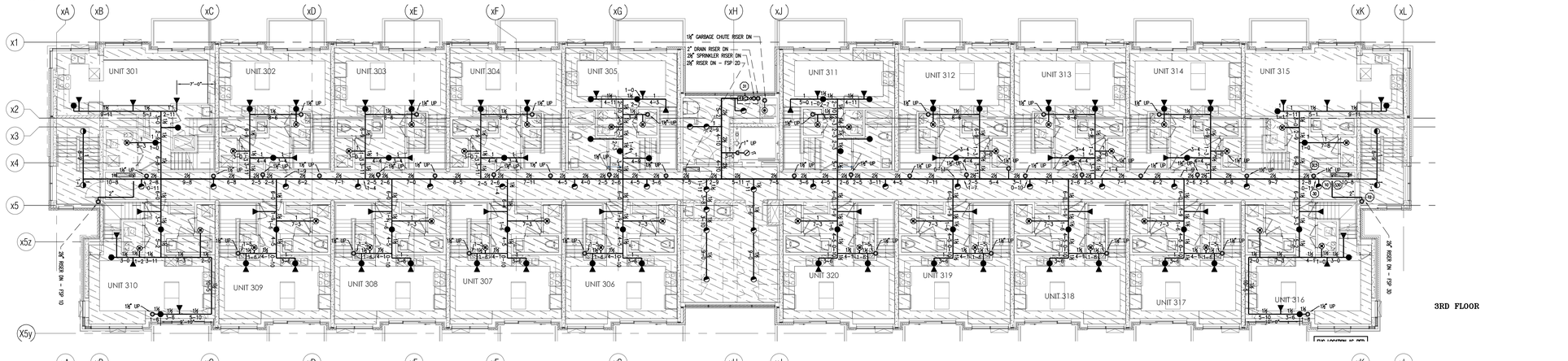
Job:
ROYAL PINE
ATTMAR + PALLESCHI DRIVE
BRAMPTON, ON

Drawing Title
BUILDING C

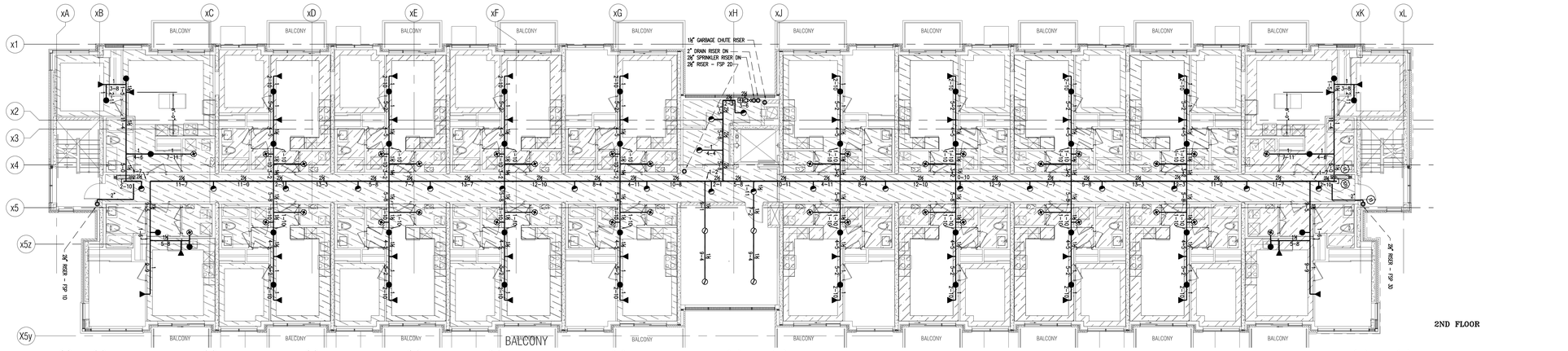
SHEET 5 of 7



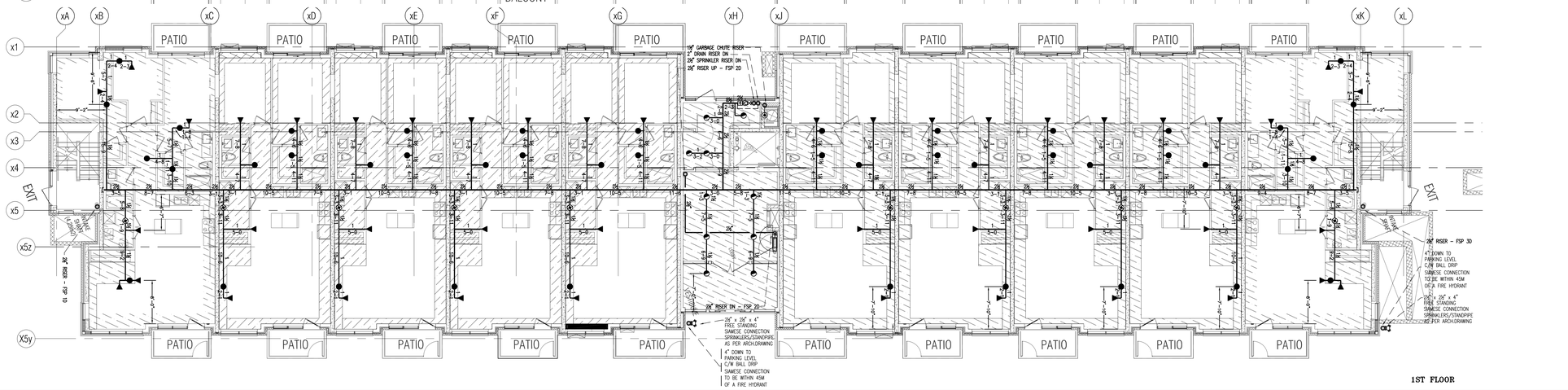
4TH FLOOR



3RD FLOOR



2ND FLOOR



1ST FLOOR

DESIGN AREA #4D:

DESIGNED FOR RESIDENTIAL SPRINKLERS AS PER NFPA 13R SECTION 7.1.1.3.1 (2016 Ed.).
- DESIGN AREA TO INCLUDE THE FOUR ADJACENT SPRINKLERS THAT PRODUCE THE GREATEST HYDRAULIC DEMAND

MATERIAL NOTES	
PIPING MATERIAL:	MAINS – SCH. 40, 10 BLACK STEEL PIPE LINES – SCH. 40, 10 BLACK STEEL PIPE LINES – CPVC IN RESIDENTIAL UNITS (ONLY)
FITTING MATERIAL:	MAINS – CUL LISTED GROOVED FITTINGS LINES – CUL LISTED GROOVED FITTINGS
HANGER MATERIAL:	MAINS – AS PER NFPA 13 REQUIREMENTS LINES – AS PER NFPA 13 REQUIREMENTS
DESIGN:	SPRINKLER SYSTEM – NFPA 13R (2016)

General Notes

1. All Pipe Locations are to be Field Measured Prior to Fabrication and Installation by Sprinkler Contractor.
2. All Dimensions Shown are Center to Center.
3. High Temperature Heads are to be Field Located Where Required.
4. All Heads, Pipes and Hangers are to be Installed per NFPA #13.
5. Hangers are to be U.L.C. Listed and F.M. Approved.
6. SPRINKLERS c/w HEAD GUARDS TO BE INSTALLED UNDER ALL OBSTRUCTIONS OVER 48" WIDE.
7. OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

Symbols

Symbol	Description
HR	Hydraulic Reference Points
[<+>]	Elev. Below Top of Steel
[+•+]	Elev. Above Finished Floor
+ (105 29-11)	Elev. of Top of Steel
<ED>	Ceiling Height
—/—	Denotes Hanger Location
○	Rise up or down
IT/HT	INTERMEDIATE/HIGH TEMPERATURE
C	WIRE GUARD

Symbol	Description	Total
◀	1/2" 165°F QR VIKING W4RD RESID. WHITE CONCEALED SIDEWALL K=5.8	264
●	1/2" 155°F QR VIKING VK494 RESID. WHITE CONCEALED PENDENT K=4.9	195
⊗	1/2" 200°F QR VIKING VK494 RESID. WHITE CONCEALED PENDENT K=4.9	85
◑	1/2" 155°F QR WHITE CONCEALED PENDENT K=5.8	61
⊘	1/2" 155°F QR BRASS UPRIGHT K=5.8	5
▬	FIRE HOSE CABINET – 100 FT OF 1½" LINED HOSE C/W COMBINATION FOG NOZZLE	6

Contract No.	2019-251
Drawn By:	E.N.
Scale:	1/8"=1'-0"
Date:	July, 2019
Approval By:	A. NOVOSSELOV P. Eng.

Revisions:	Date:
Issued for Tender	Aug.01/19
Issued for Permit & Tender	Sep.18/19
Re-Issued for Permit & Tender	Sep.21/20
Issued for Permit	Mar.03/21
2. Revised as per SI A01	Jun.07/21
3. Revised as per SI A03	Jul.17/21
4. Revised as City Comments	Jan.28/22

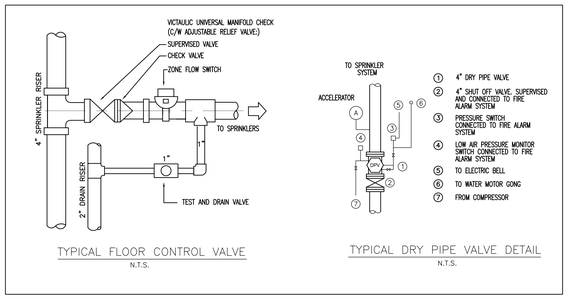
Elite Sprinkler Inc.
Automatic Fire Protection Sprinkler System Design
72 McDonnell Crescent, Bradford, Ontario, L3Z 4S7
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www.elitesprinkler.ca

Contractor:
STAR FIRE systems
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Job:
ROYAL PINE
ATTMAR + PALLESCHI DRIVE
BRAMPTON, ON

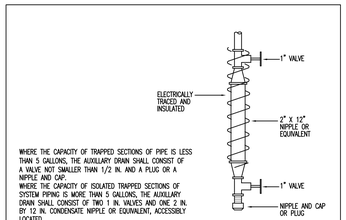
Drawing Title
BUILDING D

SHEET 6 of 7



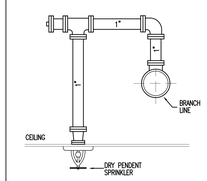
TYPICAL FLOOR CONTROL VALVE
N.T.S.

TYPICAL DRY PIPE VALVE DETAIL
N.T.S.



WHERE THE CAPACITY OF TRAPPED SECTIONS OF PIPE IS LESS THAN 5 GALLONS, THE AUXILLARY DRAIN SHALL CONSIST OF A VALVE NOT SMALLER THAN 1/2 IN. AND A PLUG OR A NIPPLE AND CAP.
WHERE THE CAPACITY OF ISOLATED TRAPPED SECTIONS OF SYSTEM PIPING IS MORE THAN 5 GALLONS, THE AUXILLARY DRAIN SHALL CONSIST OF TWO 1 IN. VALVES AND ONE 2 IN. BY 12 IN. CONDENSATE NIPPLE OR EQUIVALENT, ACCESSIBLY LOCATED.

DRUM DRIP DETAIL
N.T.S.



DRY PENDENT SPRINKLER
N.T.S.

SPRINKLER CONTRACTOR TO INCLUDE FOR AN ADDITIONAL:
- 10 DRUM DRIPS.
- 40 SPRINKLERS

SPRINKLER PROTECTION NOT REQUIRED IN EVERY ROOM ON TOP FLOOR, IF ROOF ASSEMBLY IS THE FIRE-RESISTANCE RATING AS PER OBC 3.2.5.13(6), 3.2.2.17

NOTE: LISTED ELECTRICAL TRACING TO BE USED AND CONNECTED TO FIRE ALARM SYSTEM (TYP.)

ALL WET PIPING IN UNHEATED AREAS TO BE ELECTRICALLY TRACED AND INSULATED

OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

ALL PIPING IN THE CORRIDOR (INCLUDING FEEDS INTO RESIDENTIAL UNITS) SHALL BE STEEL TYPE.

INSTALL ALL SPRINKLERS WITH GUARDS IN LOCKERS, STORAGE ROOMS, MECHANICAL/ELECTRICAL ROOMS, SERVICE CORRIDORS

EXACT LOCATION AND ELEVATION OF SPRINKLER/STANDPIPE LINES OR MAINS TO BE DETERMINED BY SPRINKLER CONTRACTOR TO SUIT SITE CONDITIONS.
PROVIDE CANDLE STICKS IF REQUIRED FOR THE INSTALLATION OF SPRINKLERS.

EXTRA SPRINKLERS ARE REQUIRED DUE TO ADDITIONAL OBSTRUCTIONS (BEAMS, DUCTS, MECH.PIPING, ETC.)

FIRE EXTINGUISHER IN PARKING (TYPICAL):
MODEL ABC-20GWMD,
FIRE EXTINGUISHER 20 lbs.,

FIRE EXTINGUISHER ON THE FLOOR (TYPICAL):
MODEL ABC-05GWMD,
FIRE EXTINGUISHER 5 lbs.,

OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

ALL GLASS BULB TYPE SPRINKLERS TO BE OF RECENT ISSUE. MANUFACTURE DATE OF AT LEAST YEAR 2016.

ANY FIRE STOPPING, ACOUSTIC SEALANT AND MATERIALS USED IN THIS PROJECT WHICH COME IN CONTACT WITH CPVC SPRINKLER PIPING IS TO BE COMPATIBLE WITH CPVC PIPING

IF CPVC PIPE IS USED, CONTRACTOR TO PROVIDE "EXPANSION OFFSET" ON STRAIGHT RUNS EXCEEDING 100 FT IN LENGTH.

IF SPRINKLER CONTRACTOR USES PLASTIC PIPING THEN THE FOLLOWING IS APPLICABLE.

O.B.C. SECTION 3.2.5.14 COMBUSTIBLE SPRINKLER PIPING

(1) COMBUSTIBLE SPRINKLER PIPING SHALL BE USED ONLY FOR WET SYSTEMS IN RESIDENTIAL OCCUPANCIES AND OTHER LIGHT HAZARD OCCUPANCIES. (SEE APPENDIX A)

(2) COMBUSTIBLE SPRINKLER PIPING SHALL MEET THE REQUIREMENTS OF ULC/ORD-199P-M, "COMBUSTIBLE PIPING FOR SPRINKLER SYSTEMS".

(3) COMBUSTIBLE SPRINKLER PIPING SHALL BE SEPARATED FROM THE AREA SERVED BY THE SPRINKLER SYSTEM AND FROM ANY OTHER FIRE COMPARTMENT BY CEILINGS, WALLS, OR SOFFITS CONSISTING AS A MINIMUM,
(A) LATH AND PLASTER,
(B) GYPSUM BOARD NOT LESS THAN 9.5 MM (3/8 IN) THICK
(C) PLYWOOD NOT LESS THAT 13 MM (1/2 IN) THICK OR
(D) A SUSPENDED MEMBRANE CEILING WITH
(i) STEEL SUSPENSION GRID, AND
(ii) LAY-IN PANELS OR TILES HAVING A MASS NOT LESS THAN 1.7 KG/SQUARE METRE (0.35 LB/SQUARE FOOT)

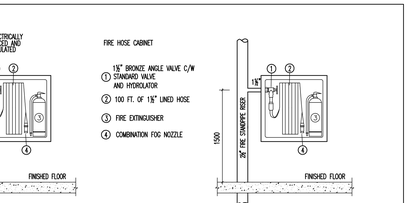
(4) IF COMBUSTIBLE SPRINKLER PIPING IS LOCATED ABOVE A CEILING, AN OPENING THROUGH THE CEILING THAT IS NOT PROTECTED IN CONFORMANCE WITH SENTENCE (3) SHALL BE LOCATED SO THAT THE DISTANCE BETWEEN THE EDGE OF THE OPENING AND THE NEAREST SPRINKLER IS NOT MORE THAN 300 MM (11 3/4").

(5) THE PROTECTION REQUIRED BY SENTENCES (3) AND (4) IS PERMITTED TO BE WAIVED WHERE COMBUSTIBLE SPRINKLER PIPING HAS BEEN TESTED IN CONFORMANCE WITH ULC/ORD-C199P-M, "COMBUSTIBLE PIPING FOR SPRINKLER SYSTEMS", AND HAS BEEN SHOWN TO MEET THE REQUIREMENTS IN THAT DOCUMENT WITHOUT ADDITIONAL PROTECTION.

WHEN MAXIMUM PRESSURES EXCEED 100 PSI FOR BRANCH LINES ABOVE A CEILING SUPPLYING PENDENT SPRINKLERS BELOW A CEILING

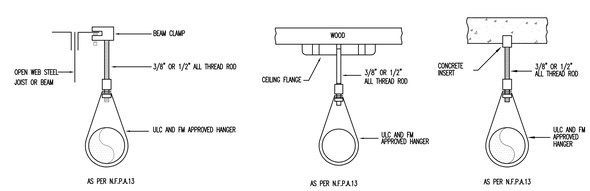
1.) THE HANGER ASSEMBLY SUPPORTING THE PIPE SUPPLYING AN END SPRINKLER IN THE PENDANT POSITION SHALL BE OF A TYPE THAT PREVENTS UPWARD MOVEMENT OF THE PIPE. THE UNSUPPORTED LENGTH BETWEEN THE END SPRINKLER IN A PENDENT POSITION (OR A DROP NIPPLE) AND THE LAST HANGER ON THE BRANCH LINE SHALL NOT BE GREATER THAN 12" FOR STEEL PIPE OR 6" FOR COPPER PIPE.

2.) THE CUMULATIVE HORIZONTAL LENGTH OF AN UNSUPPORTED ARMOVER TO A SPRINKLER OR SPRINKLER DROP SHALL NOT EXCEED 12" FOR STEEL PIPE OR 6" FOR COPPER PIPE. THE HANGER CLOSEST TO THE SPRINKLER SHALL BE OF A TYPE THAT PREVENTS UPWARD MOVEMENT OF THE PIPING.



FIRE HOSE CABINET DETAIL/ N.T.S.
(FOR UNHEATED AREA)

FIRE HOSE CABINET DETAIL/ N.T.S.
(FOR HEATED AREA)



HANGER DETAILS/ N.T.S.

Table 6.4.6.3.7.2(a) Positioning of Sprinklers to Avoid Obstructions (Residential Sidewall Sprinklers)

Distance from Sidewall Sprinkler to Side of Obstruction (A)	Maximum Allowable Distance of Deflector above Bottom of Obstruction (in.) (B)
Less than 8 ft	Not Allowed
8 ft to less than 10 ft	1
10 ft to less than 11 ft	2
11 ft to less than 12 ft	3
12 ft to less than 13 ft	4
13 ft to less than 14 ft	6
14 ft to less than 15 ft	7
15 ft to less than 16 ft	9
16 ft to less than 17 ft	11
17 ft or greater	14

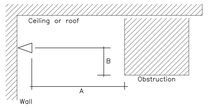


FIGURE 6.4.6.3.7.2(a) Positioning of Sprinklers to Avoid Obstructions (Residential Sidewall Sprinklers)

Table 6.4.6.3.7.2(b) Positioning of Sprinklers to Avoid Obstructions Along the Wall (Residential Sidewall Sprinklers)

Distance from Sidewall Sprinkler to Side of Obstruction (A)	Maximum Allowable Distance of Deflector above Bottom of Obstruction (in.) (B)
Less than 1 ft 6 in.	0
1 ft 6 in to less than 3 ft	1
3 ft to less than 4 ft	3
4 ft to less than 4 ft 6 in	5
4ft 6 in to less than 6 ft	7
6 ft to less than 6 ft 6 in	9
6 ft 6 in to less than 7 ft	11
7 ft to less than 7 ft 6 in	14

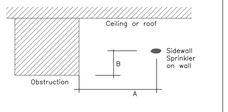
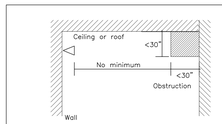


FIGURE 6.4.6.3.7.2(b) Positioning of Sprinklers to Avoid Obstructions Along Wall (Residential Sidewall Sprinklers)



NFPA-13R (2016) 6.4.6.3.7.2(c)

SPRINKLERS SHALL NOT BE REQUIRED IN ATTICS, PENTHOUSE EQUIPMENT ROOMS, ELEVATOR MACHINE ROOMS, CONCEALED SPACES DEDICATED EXCLUSIVELY TO AND CONTAINING ONLY DWELLING UNIT VENTILATION EQUIPMENT, CRAWL SPACES, FLOOR/CEILING SPACES, ELEVATOR SHAFTS WHERE THE ELEVATOR INSTALLATION COMPLIES WITH ANSI A17.1, SAFETY CODE FOR ELEVATORS AND ESCALATORS, AND OTHER CONCEALED SPACES THAT ARE NOT INTENDED FOR LIVING PURPOSES OR STORAGE AND DO NOT CONTAIN FUEL-FIRED EQUIPMENT (6.6.6 NFPA13R-2016)

SHADOW AREAS, SHADOW AREAS SHALL BE PERMITTED IN THE PROTECTION AREA OF A SPRINKLER AS LONG AS THE CUMULATIVE DRY AREAS DO NOT EXCEED 15 SQUIT PER SPRINKLER (6.4.6.3.3.1 NFPA13R-2016)

EXCEPT WHERE SPECIFIED IN 6.6.6, SPRINKLERS SHALL NOT BE REQUIRED IN CLOSETS CLOSETS, LINEN CLOSETS, AND PANTRIES WITHIN DWELLING UNITS THAT MEET ALL OF THE FOLLOWING CONDITIONS:
(1) THE AREA OF THE SPACE DOES NOT EXCEED 24 SQUIT.
(2) THE WALLS AND CEILINGS ARE SURFACED WITH NONCOMBUSTIBLE OR LIMITED-COMBUSTIBLE MATERIALS (6.6.3 NFPA13R-2016)

SPRINKLERS SHALL NOT BE REQUIRED IN BATHROOMS WHERE THE BATHROOM AREA DOES NOT EXCEED 55 SQUIT (6.6.2 NFPA13R-2016)

SPRINKLERS SHALL NOT BE REQUIRED IN CLOSETS (REGARDLESS OF SIZE) ON EXTERIOR BALCONIES AND EXTERIOR BREEZEWAYS/CORRIDORS, REGARDLESS OF SIZE, AS LONG AS THE CLOSET DOES NOT HAVE DOORS OR UNPROTECTED PENETRATIONS DIRECTLY INTO THE DWELLING UNIT (6.6.7 NFPA13R-2016)

PENDENT SPRINKLERS SHALL BE LOCATED AT LEAST 3 FT FROM OBSTRUCTIONS SUCH AS CEILING FANS AND LIGHT FIXTURES (6.4.6.3.4.1); SIDEWALL SPRINKLERS SHALL BE LOCATED AT LEAST 5 FT FROM OBSTRUCTIONS SUCH AS CEILING FANS AND LIGHT FIXTURES UNLESS THE REQUIREMENTS (6.4.6.3.5.1) OR UNLESS THE OBSTRUCTION RULES ARE APPLY.

ALL SIDEWALL HEADS TO BE POSITIONED 4" TO 6" FROM CEILING

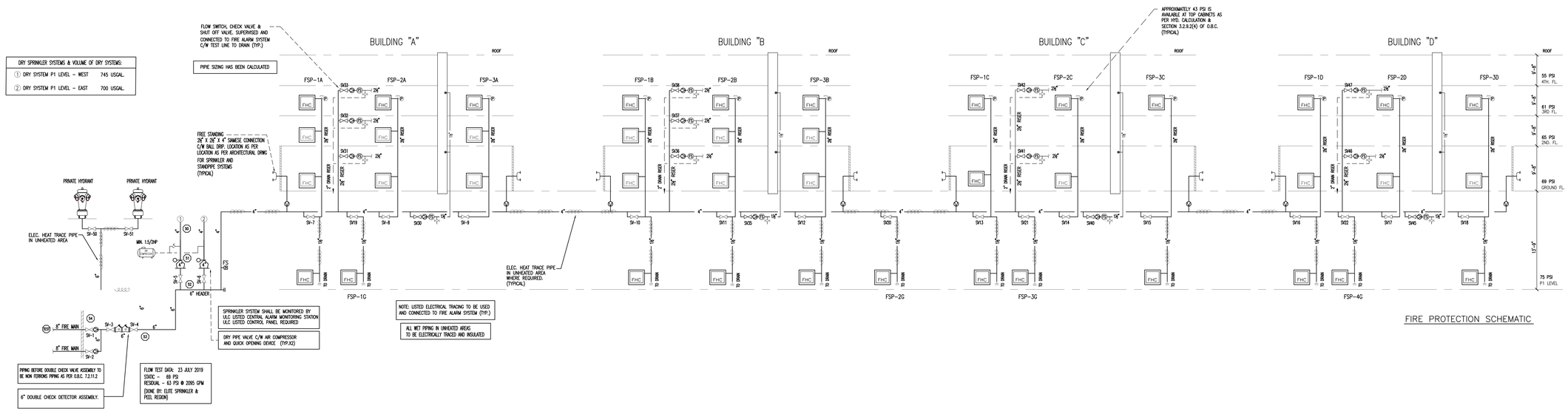
MINIMUM DISTANCE FROM EDGE OF HEAT SOURCE TO RESIDENTIAL SPRINKLERS. (ORDINARY TEMPERATURE):
1. 24 INCHES FROM HOT AIR DIFFUSER EDGE.
2. 18 INCHES FROM KITCHEN RANGE.

THE SPRINKLER IS REQUIRED WHERE THE FOLLOWING POCKET RULES ARE NOT ACHIEVED (NFPA-13R (2016) 6.2.3.5.2.2):
1. THE TOTAL VOLUME OF THE UNPROTECTED CEILING POCKET DOES NOT EXCEED 100 CU.FT.
2. THE DEPTH OF THE UNPROTECTED CEILING POCKET DOES NOT EXCEED 12 IN.
3. THE ENTIRE FLOOR OF THE UNPROTECTED CEILING POCKET IS PROTECTED BY THE SPRINKLERS AT THE LOWER CEILING ELEVATION.
4. THE INTERIOR FINISH OF THE UNPROTECTED CEILING POCKET IS NONCOMBUSTIBLE OR LIMITED COMBUSTIBLE CONSTRUCTION.

COORDINATE SPRINKLER LOCATIONS WITH RESPECT TO SURFACE MOUNTED LIGHT FIXTURES AND MANTAIN MINIMUM CLEARANCE AS REQUIRED BY NFPA#13/13R (OBSTRUCTION RULES)

	FIRE PROTECTION SYSTEM SUPERVISED VALVES SCHEDULE	
ZONE	DESCRIPTION	LOCATION
SV- 1	INCOMING WATER ISOLATION	METER ROOM
SV- 2	INCOMING WATER ISOLATION	METER ROOM
SV- 3	INLET DOUBLE CHECK VALVE ASSEMBLY ISOLATION	METER ROOM
SV- 4	OUTLET DOUBLE CHECK VALVE ASSEMBLY ISOLATION	METER ROOM
SV- 5	P-1 LEVEL WEST U/G GARAGE DRY SPRINKLERS	METER ROOM
SV- 6	P-1 LEVEL EAST U/G GARAGE DRY SPRINKLERS	METER ROOM
SV- 7	ISOLATION FSP-1A BUILDING A	PARKING GARAGE
SV- 8	ISOLATION FSP-2A BUILDING A	PARKING GARAGE
SV- 9	ISOLATION FSP-3A BUILDING A	PARKING GARAGE
SV-10	ISOLATION FSP-1B BUILDING B	PARKING GARAGE
SV-11	ISOLATION FSP-2B BUILDING B	PARKING GARAGE
SV-12	ISOLATION FSP-3B BUILDING B	PARKING GARAGE
SV-13	ISOLATION FSP-1C BUILDING C	PARKING GARAGE
SV-14	ISOLATION FSP-2C BUILDING C	PARKING GARAGE
SV-15	ISOLATION FSP-3C BUILDING C	PARKING GARAGE
SV-16	ISOLATION FSP-1D BUILDING D	PARKING GARAGE
SV-17	ISOLATION FSP-2D BUILDING D	PARKING GARAGE
SV-18	ISOLATION FSP-3D BUILDING D	PARKING GARAGE
SV-19	ISOLATION FSP-1G PARKING GARAGE	PARKING GARAGE
SV-20	ISOLATION FSP-2G PARKING GARAGE	PARKING GARAGE
SV-21	ISOLATION FSP-3G PARKING GARAGE	PARKING GARAGE
SV-22	ISOLATION FSP-4G PARKING GARAGE	PARKING GARAGE
SV-23-29	SPARE	–
SV-30	BUILDING "D" GARBAGE CHUTE SYSTEM ISOLATION	PARKING GARAGE
SV-31	BUILDING "D" GROUND FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "D" 1ST FLOOR
SV-32	BUILDING "D" 2ND FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "D" 2ND FLOOR
SV-33	BUILDING "D" 3RD FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "D" 3RD FLOOR
SV-34	SPARE	–
SV-35	BUILDING "C" GARBAGE CHUTE SYSTEM ISOLATION	PARKING GARAGE
SV-36	BUILDING "C" GROUND FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "C" 1ST FLOOR
SV-37	BUILDING "C" 2ND FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "C" 2ND FLOOR
SV-38	BUILDING "C" 3RD FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "C" 3RD FLOOR
SV-39	SPARE	–
SV-40	BUILDING "B" GARBAGE CHUTE SYSTEM ISOLATION	PARKING GARAGE
SV-41	BUILDING "B GROUND FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "B" 1ST FLOOR
SV-42	BUILDING "B" 3RD FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "B" 3RD FLOOR
SV-43-44	SPARE	–
SV-45	BUILDING "A" GARBAGE CHUTE SYSTEM ISOLATION	PARKING GARAGE
SV-46	BUILDING "A GROUND FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "A" 1ST FLOOR
SV-47	BUILDING "A" 3RD FLOOR SPRINKLER SYSTEM ISOLATION	BUILDING "A 3RD FLOOR
SV-48-49	SPARE	–
SV-50	PRIVATE HYDRANT ISOLATION	METER ROOM
SV-51	PRIVATE HYDRANT ISOLATION	METER ROOM

DRY SPRINKLER SYSTEMS & VOLUME OF DRY SYSTEMS:	
① DRY SYSTEM P1 LEVEL – WEST	745 USGAL.
② DRY SYSTEM P1 LEVEL – EAST	700 USGAL.



FIRE PROTECTION SCHEMATIC

MATERIAL NOTES	
PIPING MATERIAL:	MAINS – SCH. 40, 10 BLACK STEEL PIPE LINES – SCH. 40, 10 BLACK STEEL PIPE LINES – CPVC IN RESIDENTIAL UNITS (ONLY)
FITTING MATERIAL:	MAINS – CUL LISTED GROOVED FITTINGS LINES – CUL LISTED GROOVED FITTINGS
HANGER MATERIAL:	MAINS – AS PER NFPA 13 REQUIREMENTS LINES – AS PER NFPA 13 REQUIREMENTS
DESIGN:	SPRINKLER SYSTEM – NFPA 13 (2016)

General Notes

1. All Pipe Locations are to be Field Measured Prior to Fabrication and Installation by Sprinkler Contractor.
2. All Dimensions Shown are Center to Center.
3. High Temperature Heads are to be Field Located Where Required.
4. All Heads, Pipes and Hangers are to be Installed per NFPA #13.
5. Hangers are to be U.L.C. Listed and F.M. Approved.
6. SPRINKLERS c/w HEAD GUARDS TO BE INSTALLED UNDER ALL OBSTRUCTIONS OVER 48" WIDE.
7. OWNER (OR OTHERS) TO PROVIDE ADEQUATE HEAT IN ALL AREAS OF BUILDING SUBJECT TO FREEZING THAT ARE PROTECTED BY A WET TYPE SPRINKLER SYSTEM.

Symbol	Description
HP	Hydraulic Reference Points
E=■ ■E	Elev. Below Top of Steel
E+E	Elev. Above Finished Floor
E (TOS E+11)	Elev. of Top of Steel
CEP	Ceiling Height
—•—	Denotes Hanger Location
⊙	Rise up or down
IT/HT	INTERMEDIATE/HIGH TEMPERATURE
G	WIRE GUARD

Symbol	Description	Total

Contract No.	2019-251
Drawn By:	E.N.
Scale:	1/8"=1'-0"
Date:	July, 2019
Approval By:	A. NOVOSSELOV P. Eng.

Revisions:	Date:
Issued for Tender	Aug.01/19
Issued for Permit & Tender	Sep.18/19
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2. Revised as per SI A01	Jun.07/21
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Elite Sprinkler Inc.
Authorized Fire Protection Sprinkler System Design
22 McDonnell Crescent, Bradford, Ontario, L3Z 0S7
T: 905-869-1378
www.elitesprinkler.ca

Contractor:
STAR FIRE systems
601 Edgeley Boulevard, Unit 9 & 10, Vaughan, ON. L4K 4G2
T: 905.326.6455 • F: 905.326.6815

Job:
ROYAL PINE
ATTMAR + PALLESCHI DRIVE
BRAMPTON, ON

Drawing Title
FIRE PROTECTION SCHEMATIC & DETAILS

SHEET 7 of 7



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	1
Contract	:	2019-251
Data File	:	251-1.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 1
Remote area location: Parking West
Occupancy classification: Ordinary Hazard Gr.1
Density: 0.15 - Gpm/SqFt
Area of application: 1950 - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Standard response
No. of sprinklers calculated: 5
In-rack demand: 0 - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 573.6 - GPM @ 51.26 - Psi
Type of system: DRY
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)

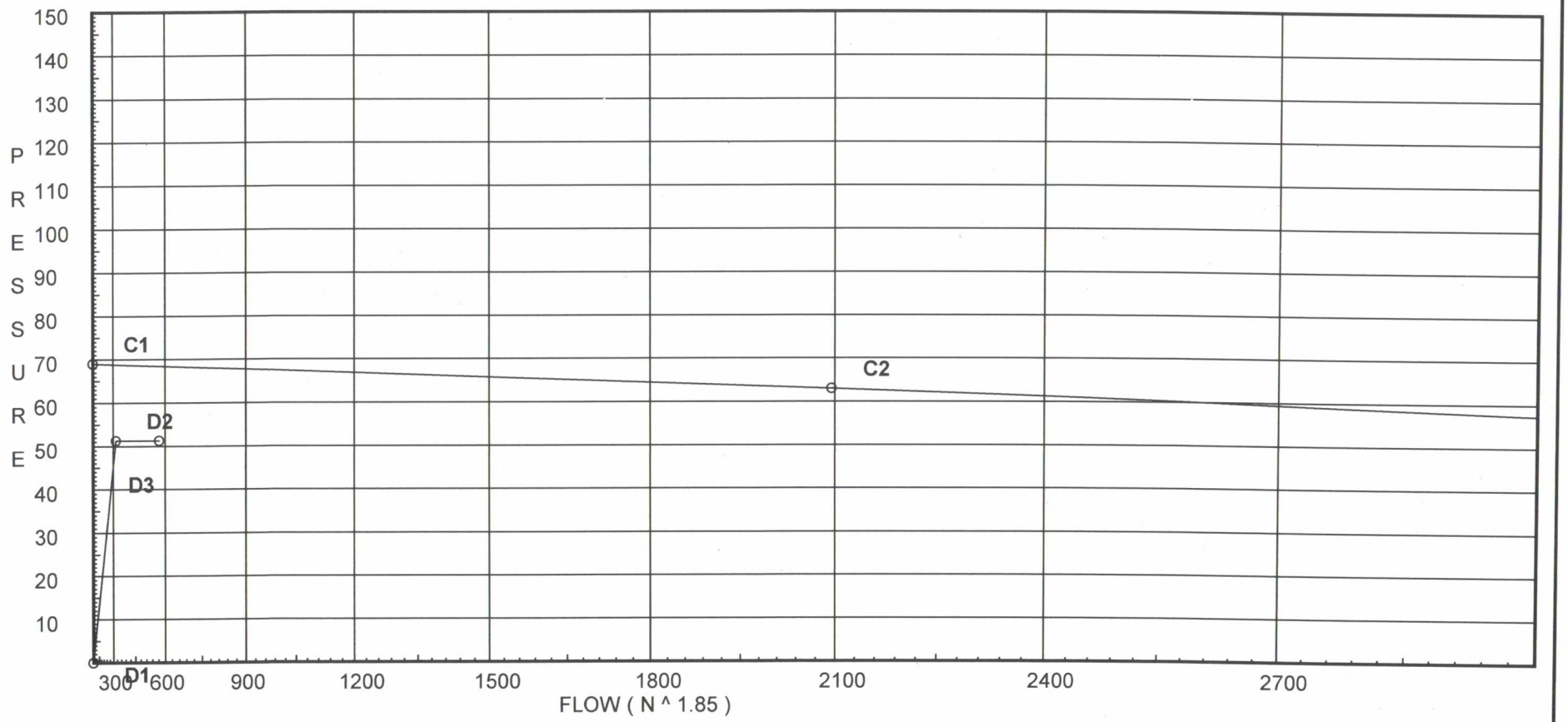
Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:

D1 - Elevation	:
D2 - System Flow	: 323.609
D2 - System Pressure	: 51.266
Hose (Demand)	: 250
D3 - System Demand	: 573.609
Safety Margin	: 17.188



Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Date

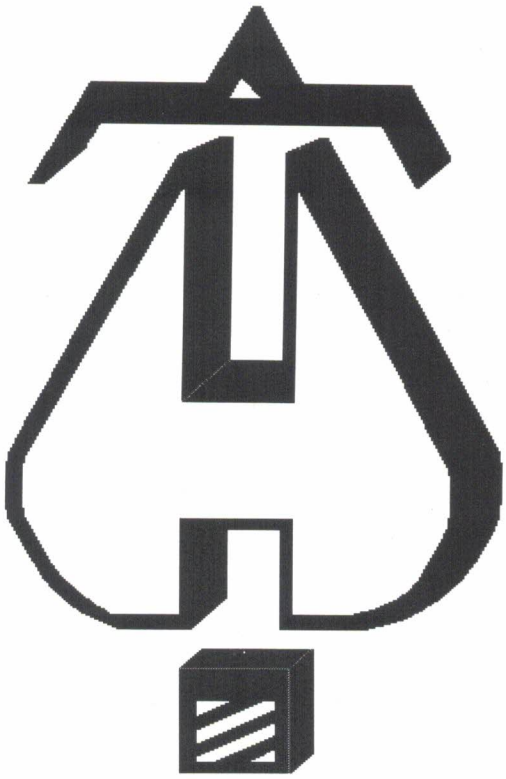
Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
100	60.49	1.682		0.0	20.000	18.666		K Factor = 14.00
to		100.0		0.0	0.0	0.0		
101	60.49	0.1417		0.0	20.000	2.834		Vel = 8.73
101	64.91	1.682	T	7.065	11.080	21.500		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
10	125.4	0.5461		0.0	18.146	9.909		Vel = 18.11
	0.0							
	125.40					31.409		K Factor = 22.38
102	60.05	1.682		0.0	20.000	18.400		K Factor = 14.00
to		100.0		0.0	0.0	0.0		
103	60.05	0.1398		0.0	20.000	2.797		Vel = 8.67
103	64.46	1.682	T	7.065	11.080	21.197		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
11	124.51	0.5389		0.0	18.146	9.779		Vel = 17.98
	0.0							
	124.51					30.976		K Factor = 22.37
104	73.70	1.682	T	7.065	8.920	27.710		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
11	73.7	0.2043		0.0	15.986	3.266		Vel = 10.64
	0.0							
	73.70					30.976		K Factor = 13.24
10	-47.32	3.26		0.0	11.250	31.409		
to		100.0		0.0	0.0	0.0		
12	-47.32	-0.0036		0.0	11.250	-0.040		Vel = 1.82
12	-150.89	3.26		0.0	7.750	31.369		
to		100.0		0.0	0.0	0.0		
11	-198.21	-0.0507		0.0	7.750	-0.393		Vel = 7.62
	0.0							
	-198.21					30.976		K Factor = -35.61
12	150.89	3.26	2E	13.428	132.250	31.369		
to		100.0	T	14.388	27.816	0.0		
13	150.89	0.0306		0.0	160.066	4.904		Vel = 5.80
	0.0							
	150.89					36.273		K Factor = 25.05
10	172.72	3.26		0.0	33.000	31.409		
to		100.0		0.0	0.0	0.0		
14	172.72	0.0393		0.0	33.000	1.298		Vel = 6.64
14	0.0	3.26	T	14.388	203.000	32.707		
to		100.0	E	6.714	21.101	0.0		
15	172.72	0.0393		0.0	224.101	8.817		Vel = 6.64
	0.0							
	172.72					41.524		K Factor = 26.80
13	150.89	3.26	E	6.714	164.670	36.273		
to		100.0		0.0	6.714	0.0		
15	150.89	0.0306		0.0	171.384	5.251		Vel = 5.80
15	172.72	4.26	3E	28.192	63.500	41.524		
to		100.0		0.0	28.192	0.0		
50	323.61	0.0342		0.0	91.692	3.132		Vel = 7.28

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Date

Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
50	0.0	4.26		0.0	4.000	44.656		
to		100.0		0.0	0.0	0.0		
51	323.61	0.0340		0.0	4.000	0.136		Vel = 7.28
51	0.0	4.26	B	15.8	5.000	44.792		
to		120.0	T	26.334	69.785	0.0		
52	323.61	0.0244	Dvc	27.651	74.785	1.823		Vel = 7.28
52	100.00	6.357	2E	35.205	16.000	46.615		Qa = 100
to		120.0		0.0	35.205	0.0		
53	423.61	0.0057		0.0	51.205	0.293		Vel = 4.28
53	0.0	6.357	4E	70.411	5.000	46.908		
to		120.0		0.0	17.603	4.000		* * Fixed Loss = 4
54	423.61	0.0057		0.0	22.603	0.129		Vel = 4.28
54	0.0	7.98	G	6.041	150.000	51.037		
to		150.0	E	27.183	33.222	0.0		
TEST	423.61	0.0012		0.0	183.222	0.229		Vel = 2.72
	150.00							Qa = 150.00
	573.61					51.266		K Factor = 80.11



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE, BRAMPTON
System	:	2
Contract	:	2019-251
Data File	:	251-2.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE, BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 2
Remote area location: Parking West
Occupancy classification: Ordinary Hazard Gr.1
Density: 0.15 - Gpm/SqFt
Area of application: 1950 - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Standard response
No. of sprinklers calculated: 5
In-rack demand: 0 - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 570.8 - GPM @ 57.45 - Psi
Type of system: DRY
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23,2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

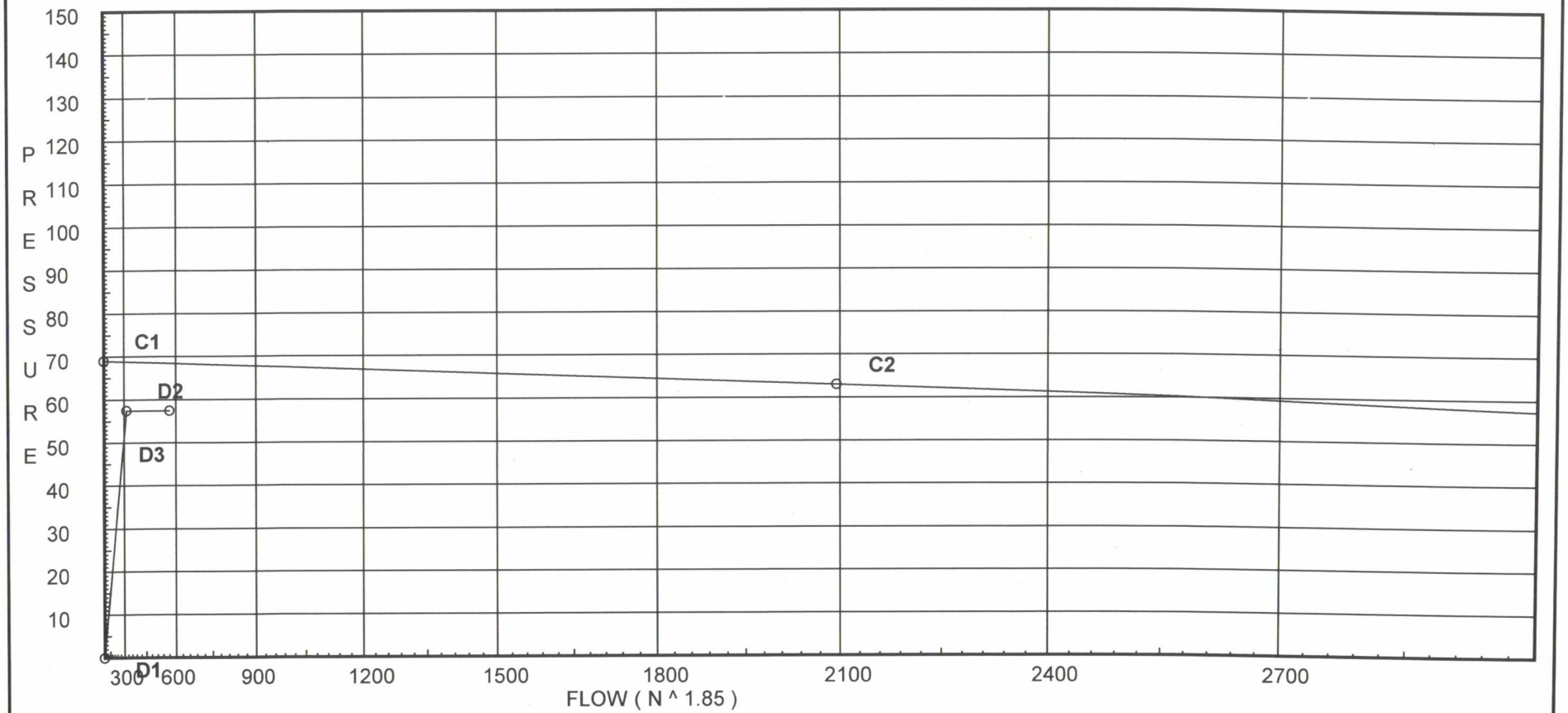
Elite Sprinkler Inc.
ROYAL PINE

Page 2
Date

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:

D1 - Elevation	:
D2 - System Flow	: 320.85
D2 - System Pressure	: 57.458
Hose (Demand)	: 250
D3 - System Demand	: 570.85
Safety Margin	: 11.001



Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

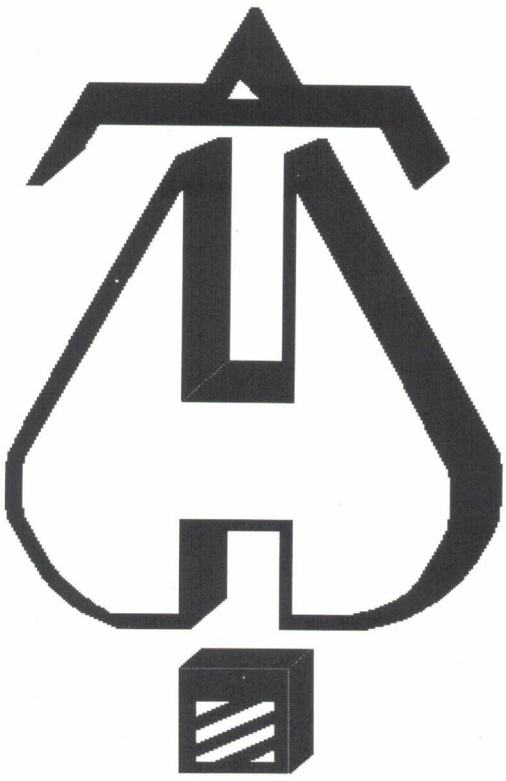
Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
200	60.05	1.682		0.0	20.000	18.400		K Factor = 14.00
to		100.0		0.0	0.0	0.0		
201	60.05	0.1398		0.0	20.000	2.797		Vel = 8.67
201	64.46	1.682	T	7.065	6.670	21.197		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
20	124.51	0.5389		0.0	13.736	7.402		Vel = 17.98
	0.0							
	124.51					28.599		K Factor = 23.28
202	61.05	1.682		0.0	20.000	19.018		K Factor = 14.00
to		100.0		0.0	0.0	0.0		
203	61.05	0.1442		0.0	20.000	2.884		Vel = 8.82
203	65.52	1.682	T	7.065	6.670	21.902		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
21	126.57	0.5555		0.0	13.736	7.630		Vel = 18.28
	0.0							
	126.57					29.532		K Factor = 23.29
204	69.77	1.682	T	7.065	13.330	24.835		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
20	69.77	0.1845		0.0	20.396	3.764		Vel = 10.07
20	124.51	3.26		0.0	19.080	28.599		
to		100.0		0.0	0.0	0.0		
21	194.28	0.0489		0.0	19.080	0.933		Vel = 7.47
21	126.57	3.26	T	14.388	52.750	29.532		
to		100.0		0.0	14.387	0.0		
14	320.85	0.1237		0.0	67.137	8.306		Vel = 12.33
	0.0							
	320.85					37.838		K Factor = 52.16
10	137.30	3.26		0.0	11.250	38.687		
to		100.0		0.0	0.0	0.0		
11	137.3	0.0258		0.0	11.250	0.290		Vel = 5.28
11	0.0	3.26		0.0	7.750	38.977		
to		100.0		0.0	0.0	0.0		
12	137.3	0.0257		0.0	7.750	0.199		Vel = 5.28
12	0.0	3.26	2E	13.428	132.250	39.176		
to		100.0	T	14.388	27.816	0.0		
13	137.3	0.0257		0.0	160.066	4.119		Vel = 5.28
	0.0							
	137.30					43.295		K Factor = 20.87
10	-137.30	3.26		0.0	33.000	38.687		
to		100.0		0.0	0.0	0.0		
14	-137.3	-0.0257		0.0	33.000	-0.849		Vel = 5.28
14	320.85	3.26	T	14.388	203.000	37.838		
to		100.0	E	6.714	21.101	0.0		
15	183.55	0.0440		0.0	224.101	9.867		Vel = 7.06
	0.0							
	183.55					47.705		K Factor = 26.57
13	137.30	3.26	E	6.714	164.670	43.295		
to		100.0		0.0	6.714	0.0		
15	137.3	0.0257		0.0	171.384	4.410		Vel = 5.28

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Date

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
15	183.55	4.26	3E	28.192	63.500	47.705		
to		100.0		0.0	28.192	0.0		
50	320.85	0.0336		0.0	91.692	3.082		Vel = 7.22
50	0.0	4.26		0.0	4.000	50.787		
to		100.0		0.0	0.0	0.0		
51	320.85	0.0338		0.0	4.000	0.135		Vel = 7.22
51	0.0	4.26	B	15.8	5.000	50.922		
to		120.0	T	26.334	69.785	0.0		
52	320.85	0.0240	Dvc	27.651	74.785	1.794		Vel = 7.22
52	100.00	6.357	3E	52.808	16.000	52.716		Qa = 100
to		120.0		0.0	52.808	0.0		
53	420.85	0.0056		0.0	68.808	0.388		Vel = 4.25
53	0.0	6.357	4E	70.411	5.000	53.104		
to		120.0		0.0	17.603	4.000		* * Fixed Loss = 4
54	420.85	0.0057		0.0	22.603	0.128		Vel = 4.25
54	0.0	7.98	G	6.041	150.000	57.232		
to		150.0	E	27.183	33.222	0.0		
TEST	420.85	0.0012		0.0	183.222	0.226		Vel = 2.70
	150.00							Qa = 150.00
	570.85					57.458		K Factor = 75.31



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE, BRAMPTON
System	:	3
Contract	:	2019-251
Data File	:	251-3.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE, BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 3
Remote area location: Parking East
Occupancy classification: Ordinary Hazard Gr.1
Density: 0.15 - Gpm/SqFt
Area of application: 1950 - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Standard response
No. of sprinklers calculated: 5
In-rack demand: 0 - GPM
Hose streams: 250 - GPM
Total water required (including hose streams): 574.5 - GPM @ 55.04 - Psi
Type of system: DRY
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23,2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)

Water Supply Curve C

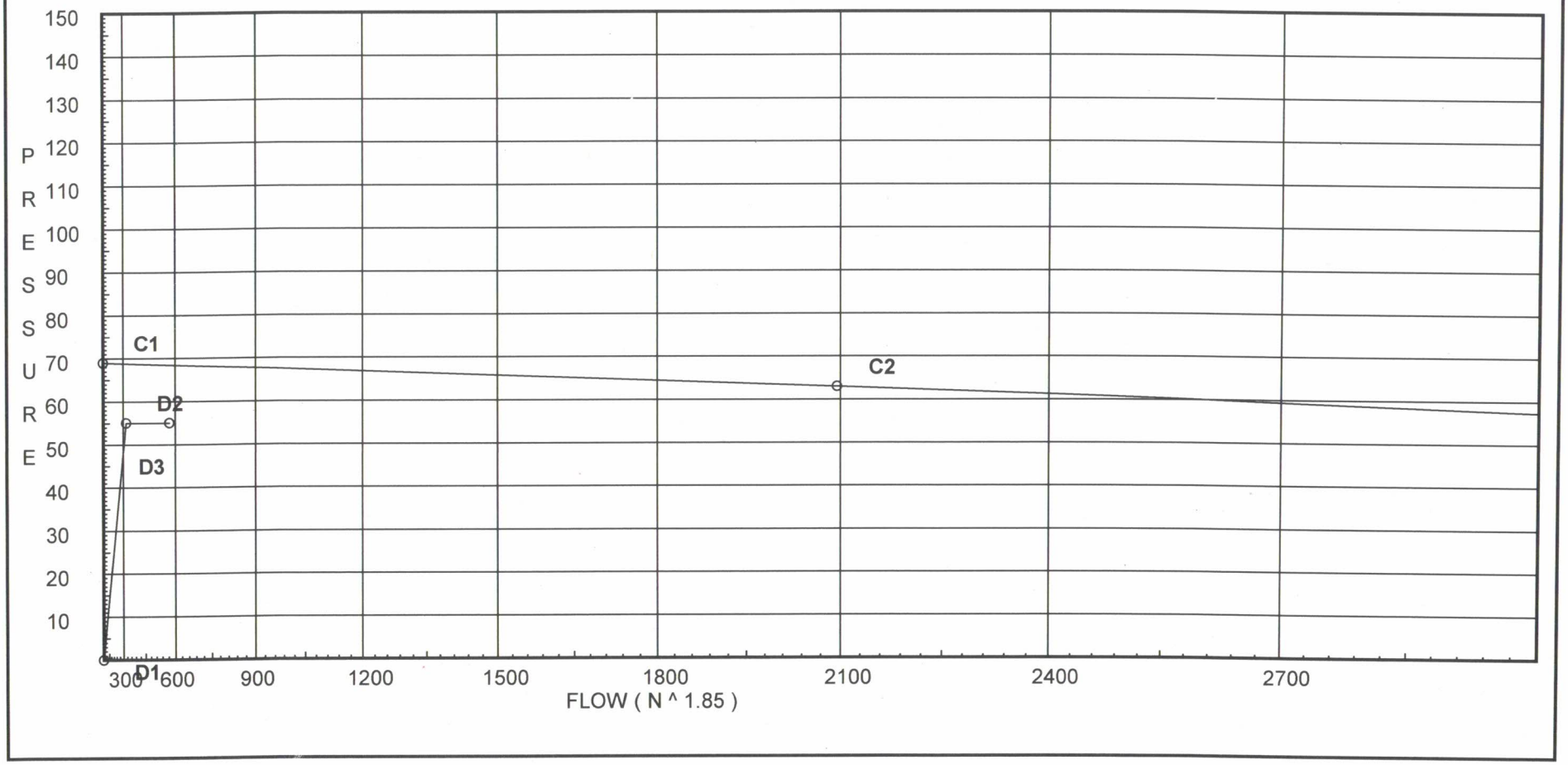
Elite Sprinkler Inc.
ROYAL PINE

Date

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:

D1 - Elevation	:
D2 - System Flow	: 324.553
D2 - System Pressure	: 55.043
Hose (Demand)	: 250
D3 - System Demand	: 574.553
Safety Margin	: 13.409



Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Date

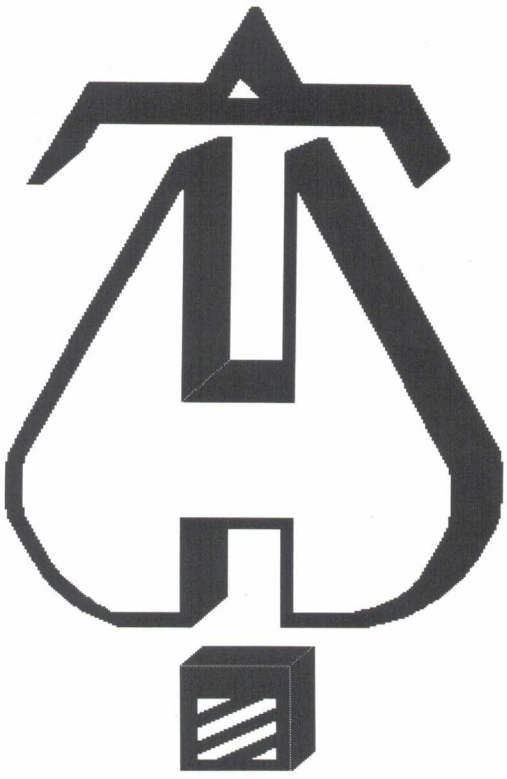
Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
300	60.05	1.682		0.0	20.000	18.400		K Factor = 14.00
to		100.0		0.0	0.0	0.0		
301	60.05	0.1398		0.0	20.000	2.797		Vel = 8.67
301	64.46	1.682	T	7.065	10.920	21.197		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
10	124.51	0.5389		0.0	17.986	9.692		Vel = 17.98
	0.0							
	124.51					30.889		K Factor = 22.40
302	61.01	1.682		0.0	20.000	18.993		K Factor = 14.00
to		100.0		0.0	0.0	0.0		
303	61.01	0.1440		0.0	20.000	2.880		Vel = 8.81
303	65.48	1.682	T	7.065	10.920	21.873		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
11	126.49	0.5548		0.0	17.986	9.979		Vel = 18.26
	0.0							
	126.49					31.852		K Factor = 22.41
304	73.55	1.682	T	7.065	9.080	27.603		K Factor = 14.00
to		100.0		0.0	7.066	0.0		
10	73.55	0.2035		0.0	16.146	3.286		Vel = 10.62
10	124.51	3.26		0.0	19.000	30.889		
to		100.0		0.0	0.0	0.0		
11	198.06	0.0507		0.0	19.000	0.963		Vel = 7.61
11	126.49	3.26		0.0	29.500	31.852		
to		100.0		0.0	0.0	0.0		
12	324.55	0.1264		0.0	29.500	3.728		Vel = 12.47
12	-162.93	3.26	2T	28.775	188.670	35.580		
to		100.0		0.0	28.775	0.0		
13	161.62	0.0348		0.0	217.445	7.565		Vel = 6.21
13	0.0	3.26		0.0	107.000	43.145		
to		100.0		0.0	0.0	0.0		
15	161.62	0.0348		0.0	107.000	3.723		Vel = 6.21
	0.0							
	161.62					46.868		K Factor = 23.61
12	162.94	3.26	2E	13.428	306.170	35.580		
to		100.0		0.0	13.429	0.0		
15	162.94	0.0353		0.0	319.599	11.288		Vel = 6.26
15	161.61	4.26	T	18.795	17.000	46.868		
to		100.0	E	9.397	28.192	0.0		
50	324.55	0.0343		0.0	45.192	1.552		Vel = 7.31
50	0.0	4.26		0.0	4.000	48.420		
to		100.0		0.0	0.0	0.0		
51	324.55	0.0342		0.0	4.000	0.137		Vel = 7.31
51	0.0	4.26	B	15.8	5.000	48.557		
to		120.0	T	26.334	69.785	0.0		
52	324.55	0.0245	Dvc	27.651	74.785	1.833		Vel = 7.31
52	100.00	6.357	2E	35.205	16.000	50.390		Qa = 100
to		120.0		0.0	35.205	0.0		
53	424.55	0.0057		0.0	51.205	0.294		Vel = 4.29

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Date

Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
53	0.0	6.357	4E	70.411	5.000	50.684		
to		120.0		0.0	17.603	4.000		* * Fixed Loss = 4
54	424.55	0.0057		0.0	22.603	0.129		Vel = 4.29
54	0.0	7.98	G	6.041	150.000	54.813		
to		150.0	E	27.183	33.222	0.0		
TEST	424.55	0.0013		0.0	183.222	0.230		Vel = 2.72
	150.00							Qa = 150.00
	574.55					55.043		K Factor = 77.44



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	4A
Contract	:	2019-251
Data File	:	251-4A.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 4A
Remote area location: Block A. 4th Floor. Unit 375
Occupancy classification: Residential-NFPA13R
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Residential
No. of sprinklers calculated: 4
In-rack demand: 0 - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 170.15 - GPM @ 50.83 - Psi
Type of system: WET
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)

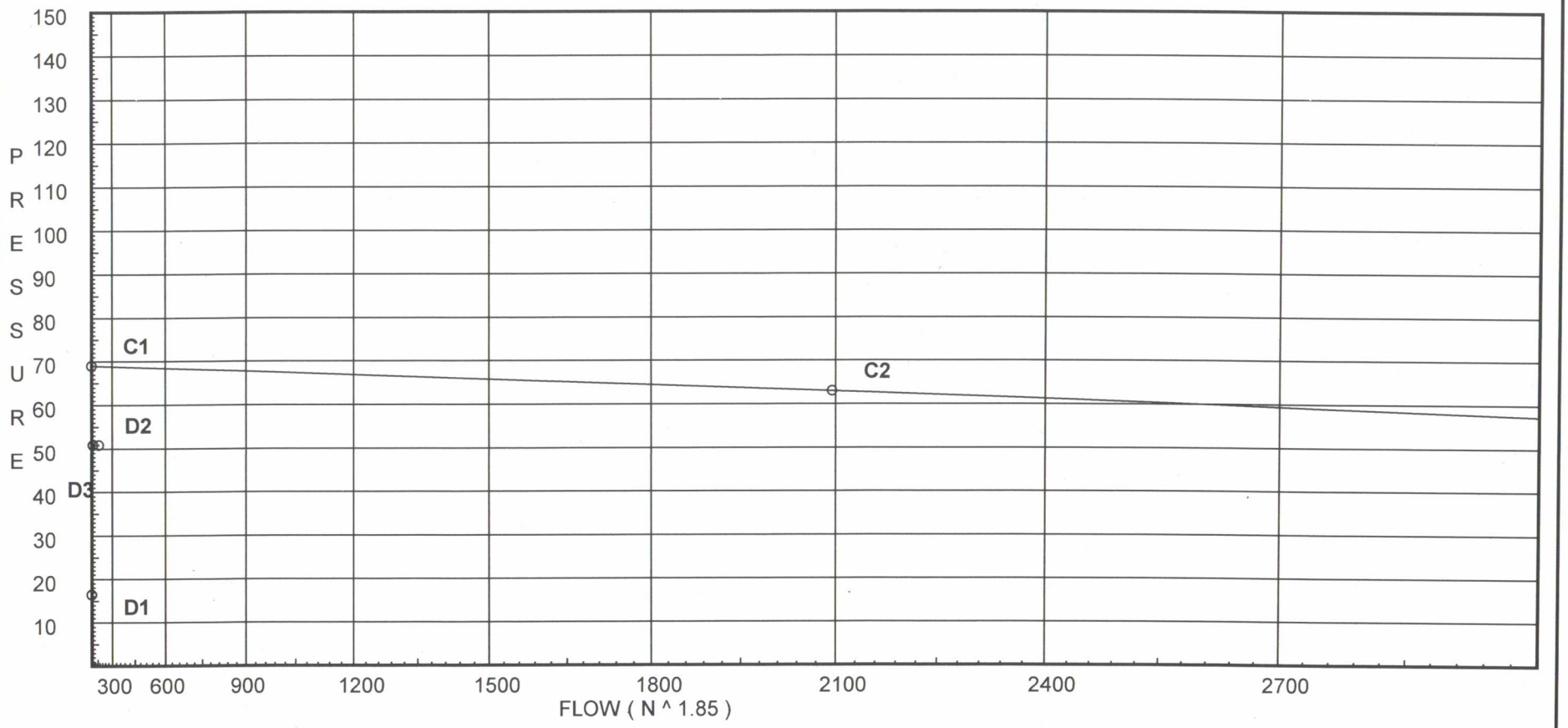
Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

Date

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:
- D1 - Elevation : 16.458
- D2 - System Flow : 70.153
- D2 - System Pressure : 50.832
- Hose (Demand) : 100
- D3 - System Demand : 170.153
- Safety Margin : 18.110



Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Date

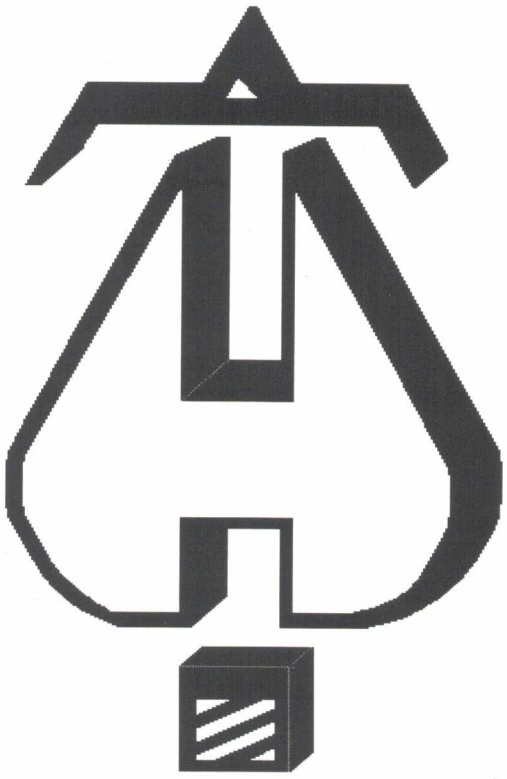
Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
420	15.85	1.101		0.0	1.000	10.467		K Factor = 4.90
to		150.0		0.0	0.0	0.0		
10	15.85	0.0440		0.0	1.000	0.044		Vel = 5.34
	0.0							
	15.85					10.511		K Factor = 4.89
421	18.19	1.101	T	9.563	2.333	9.832		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
10	18.19	0.0571		0.0	11.895	0.679		Vel = 6.13
	0.0							
	18.19					10.511		K Factor = 5.61
422	18.11	1.101	T	9.563	4.417	9.754		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
11	18.11	0.0567		0.0	13.979	0.792		Vel = 6.10
	0.0							
	18.11					10.546		K Factor = 5.58
423	18.00	1.101	T	9.563	9.000	9.631		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
12	18.0	0.0560		0.0	18.562	1.040		Vel = 6.07
	0.0							
	18.00					10.671		K Factor = 5.51
10	34.04	1.598		0.0	1.167	10.511		
to		150.0		0.0	0.0	0.0		
11	34.04	0.0300		0.0	1.167	0.035		Vel = 5.45
11	18.11	1.598		0.0	1.917	10.546		
to		150.0		0.0	0.0	0.0		
12	52.15	0.0652		0.0	1.917	0.125		Vel = 8.34
12	18.00	1.598	E	5.828	14.833	10.671		
to		150.0	T	11.656	17.484	0.0		
AL4	70.15	0.1130		0.0	32.317	3.652		Vel = 11.22
AL4	0.0	1.598	E	5.828	9.000	14.323		
to		150.0		0.0	5.828	3.898		
AL3	70.15	0.1130		0.0	14.828	1.676		Vel = 11.22
AL3	0.0	1.682	T	9.9	0.750	19.897		
to		120.0		0.0	9.900	0.0		
30	70.15	0.1331		0.0	10.650	1.417		Vel = 10.13
30	0.0	2.635	T	16.474	130.250	21.314		
to		120.0	2E	16.474	61.778	3.000		* * Fixed Loss = 3
31	70.15	0.0150	B	9.61	192.028	2.871		Vel = 4.13
			S	19.22				
			Fsp	0.0				
	0.0							
	70.15					27.185		K Factor = 13.45
31	70.15	2.635	E	8.237	29.000	27.185		
to		120.0		0.0	8.237	12.560		
AR1	70.15	0.0149		0.0	37.237	0.556		Vel = 4.13
AR1	0.0	4.26	2T	52.668	35.750	40.301		
to		120.0	E	13.167	65.835	0.0		
A1	70.15	0.0014		0.0	101.585	0.147		Vel = 1.58

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							
	70.15					40.448		K Factor = 11.03
A1	10.35	4.26		0.0	119.917	40.448		
to		120.0		0.0	0.0	0.0		
A3	10.35	0.0		0.0	119.917	0.005		Vel = 0.23
A3	0.0	4.26	E	13.167	99.167	40.453		
to		120.0	T	26.334	39.501	0.0		
21	10.35	0.0		0.0	138.668	0.005		Vel = 0.23
21	0.0	4.26		0.0	102.917	40.458		
to		120.0		0.0	0.0	0.0		
D1	10.35	0.0		0.0	102.917	0.005		Vel = 0.23
D1	0.0	4.26	F	5.267	80.083	40.463		
to		120.0		0.0	5.267	0.0		
D3	10.35	0.0		0.0	85.350	0.003		Vel = 0.23
D3	0.0	4.26		0.0	41.750	40.466		
to		120.0		0.0	0.0	0.0		
B3	10.35	0.0		0.0	41.750	0.002		Vel = 0.23
B3	0.0	4.26	T	26.334	187.000	40.468		
to		120.0	E	13.167	39.501	0.0		
20	10.35	0.0		0.0	226.501	0.010		Vel = 0.23
20	0.0	4.26		0.0	14.500	40.478		
to		120.0		0.0	0.0	0.0		
17	10.35	0.0		0.0	14.500	0.0		Vel = 0.23
17	0.0	4.26	T	26.334	118.333	40.478		
to		120.0		0.0	26.334	0.0		
B1	10.35	0.0		0.0	144.667	0.006		Vel = 0.23
B1	0.0	4.26	E	13.167	237.750	40.484		
to		120.0	T	26.334	39.501	0.0		
22	10.35	0.0		0.0	277.251	0.012		Vel = 0.23
	0.0							
	10.35					40.496		K Factor = 1.63
A1	59.81	4.26	T	26.334	18.500	40.448		
to		120.0		0.0	26.334	0.0		
22	59.81	0.0011		0.0	44.834	0.048		Vel = 1.35
22	10.34	4.26	T	18.795	32.830	40.496		
to		100.0	2E	18.795	37.590	0.0		
50	70.15	0.0020		0.0	70.420	0.142		Vel = 1.58
50	0.0	4.26	B	15.8	9.000	40.638		
to		120.0	T	26.334	42.134	0.0		
52	70.15	0.0014		0.0	51.134	0.074		Vel = 1.58
52	100.00	6.357	2E	35.205	16.000	40.712		Qa = 100
to		120.0		0.0	35.205	0.0		
53	170.15	0.0011		0.0	51.205	0.054		Vel = 1.72
53	0.0	6.357	10E	176.027	5.000	40.766		
to		120.0		0.0	17.603	10.000		* * Fixed Loss = 10
54	170.15	0.0011		0.0	22.603	0.024		Vel = 1.72
54	0.0	7.98	G	6.041	150.000	50.790		
to		150.0	E	27.183	33.222	0.0		
TEST	170.15	0.0002		0.0	183.222	0.042		Vel = 1.09

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

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									
	170.15					50.832		K Factor = 23.87		



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	4B
Contract	:	2019-251
Data File	:	251-4B.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 4B
Remote area location: Block B. 4th Floor. Unit 355
Occupancy classification: Residential-NFPA13R
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Residential
No. of sprinklers calculated: 4
In-rack demand: 0 - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 169.20 - GPM @ 51.09 - Psi
Type of system: WET
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)

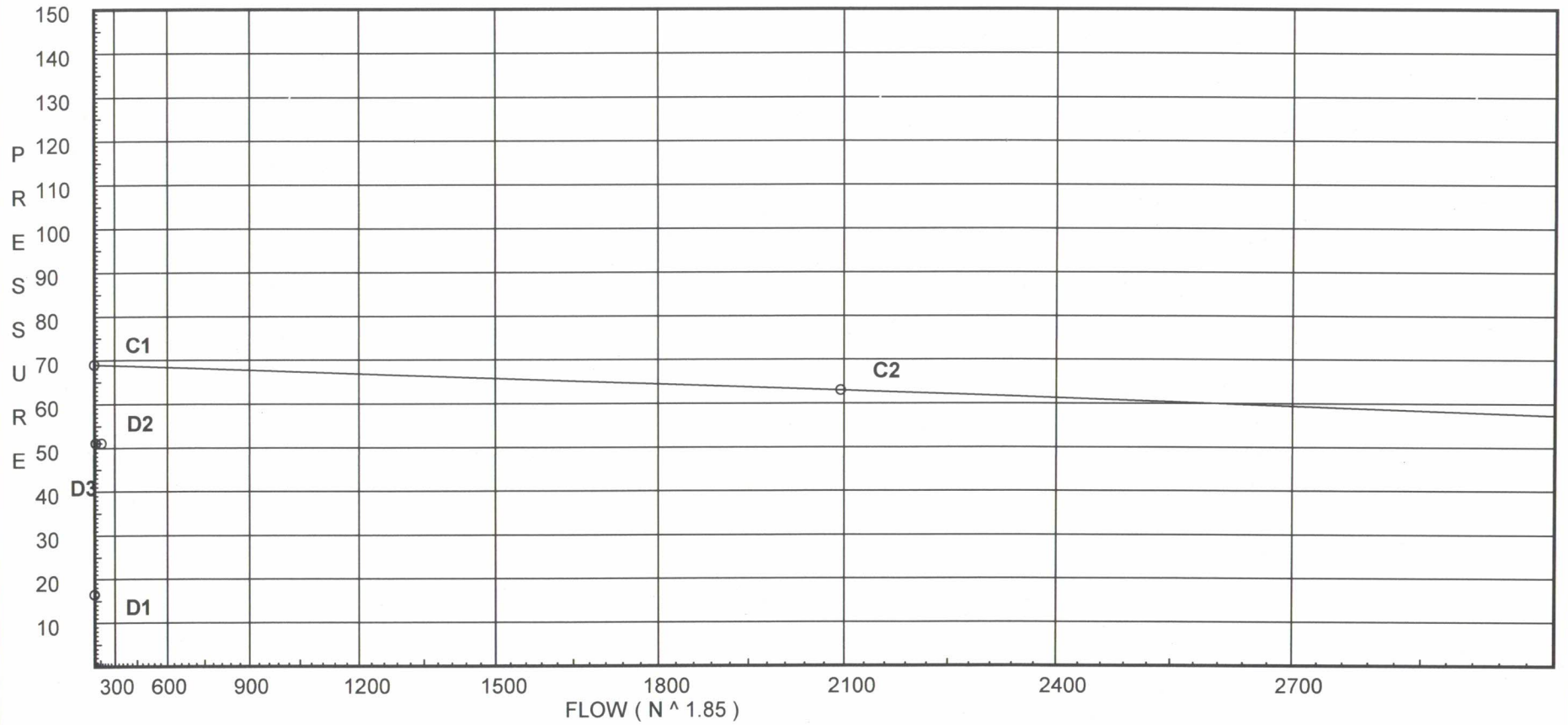
Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

Date

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:
- D1 - Elevation : 16.458
- D2 - System Flow : 69.206
- D2 - System Pressure : 51.091
- Hose (Demand) : 100
- D3 - System Demand : 169.206
- Safety Margin : 17.852



Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Date

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
410	18.00	1.101	E	3.825	2.417	9.631		K Factor = 5.80
to		150.0		0.0	3.825	0.0		
10	18.0	0.0561		0.0	6.242	0.350		Vel = 6.07
	0.0							
	18.00					9.981		K Factor = 5.70
411	33.49	1.598		0.0	2.917	9.992		K Factor = 4.90
to		150.0		0.0	0.0	0.0		
11	33.49	0.0288		0.0	2.917	0.084		Vel = 5.36
	0.0							
	33.49					10.076		K Factor = 10.55
412	17.71	1.101	T	9.563	4.333	9.321		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
11	17.71	0.0543		0.0	13.895	0.755		Vel = 5.97
	0.0							
	17.71					10.076		K Factor = 5.58
413	18.01	1.101	T	9.563	0.750	9.640		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
12	18.01	0.0561		0.0	10.312	0.578		Vel = 6.07
	0.0							
	18.01					10.218		K Factor = 5.63
10	18.00	1.598		0.0	1.250	9.981		
to		150.0		0.0	0.0	0.0		
411	18.0	0.0088		0.0	1.250	0.011		Vel = 2.88
	0.0							
	18.00					9.992		K Factor = 5.69
11	51.20	1.598		0.0	2.250	10.076		
to		150.0		0.0	0.0	0.0		
12	51.2	0.0631		0.0	2.250	0.142		Vel = 8.19
12	18.01	1.598	2E	11.656	15.250	10.218		
to		150.0		0.0	11.656	0.0		
BL4	69.21	0.1102		0.0	26.906	2.966		Vel = 11.07
BL4	0.0	1.598	E	5.828	9.000	13.184		
to		150.0		0.0	5.828	3.898		
BL3	69.21	0.1102		0.0	14.828	1.634		Vel = 11.07
BL3	0.0	1.682	2T	19.799	3.500	18.716		
to		120.0		0.0	19.799	0.0		
30	69.21	0.1297		0.0	23.299	3.023		Vel = 9.99
30	0.0	2.635	T	16.474	110.000	21.739		
to		120.0	2E	16.474	61.778	3.000		* * Fixed Loss = 3
31	69.21	0.0146	B	9.61	171.778	2.504		Vel = 4.07
			S	19.22				
			Fsp	0.0				
31	0.0	2.635	E	8.237	29.000	27.243		
to		120.0		0.0	8.237	12.560		
BR1	69.21	0.0146		0.0	37.237	0.543		Vel = 4.07
BR1	0.0	4.26	3E	39.501	109.500	40.346		
to		120.0	T	26.334	65.835	0.0		
B1	69.21	0.0014		0.0	175.335	0.246		Vel = 1.56

Final Calculations - Hazen-Williams

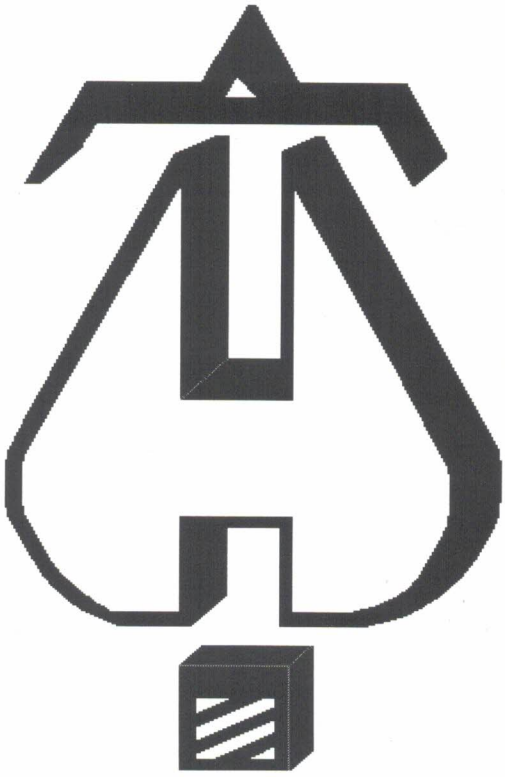
Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
B1	-46.49	4.26	E	13.167	118.333	40.592		
to		120.0		0.0	13.167	0.0		
17	22.72	0.0002		0.0	131.500	0.024		Vel = 0.51
	0.0							
	22.72					40.616		K Factor = 3.57
17	22.72	4.26		0.0	14.500	40.616		
to		120.0		0.0	0.0	0.0		
20	22.72	0.0001		0.0	14.500	0.002		Vel = 0.51
20	0.0	4.26	E	13.167	187.000	40.618		
to		120.0	T	26.334	39.501	0.0		
B3	22.72	0.0002		0.0	226.501	0.041		Vel = 0.51
B3	0.0	4.26		0.0	41.750	40.659		
to		120.0		0.0	0.0	0.0		
D3	22.72	0.0002		0.0	41.750	0.007		Vel = 0.51
D3	0.0	4.26	F	5.267	86.083	40.666		
to		120.0		0.0	5.267	0.0		
D1	22.72	0.0002		0.0	91.350	0.017		Vel = 0.51
D1	0.0	4.26	T	26.334	102.917	40.683		
to		120.0		0.0	26.334	0.0		
21	22.72	0.0002		0.0	129.251	0.023		Vel = 0.51
21	0.0	4.26	F	5.267	99.167	40.706		
to		120.0	E	13.167	18.434	0.0		
A3	22.72	0.0002		0.0	117.601	0.021		Vel = 0.51
A3	0.0	4.26	T	26.334	119.917	40.727		
to		120.0		0.0	26.334	0.0		
A1	22.72	0.0002		0.0	146.251	0.026		Vel = 0.51
A1	0.0	4.26	T	26.334	18.500	40.753		
to		120.0		0.0	26.334	0.0		
22	22.72	0.0002		0.0	44.834	0.008		Vel = 0.51
	0.0							
	22.72					40.761		K Factor = 3.56
B1	46.49	4.26	E	13.167	237.750	40.592		
to		120.0		0.0	13.167	0.0		
22	46.49	0.0007		0.0	250.917	0.169		Vel = 1.05
22	22.72	4.26	T	18.795	32.830	40.761		
to		100.0	2E	18.795	37.590	0.0		
50	69.21	0.0020		0.0	70.420	0.139		Vel = 1.56
50	0.0	4.26	B	15.8	9.000	40.900		
to		120.0	T	26.334	42.134	0.0		
52	69.21	0.0014		0.0	51.134	0.072		Vel = 1.56
52	100.00	6.357	2E	35.205	16.000	40.972		Qa = 100
to		120.0		0.0	35.205	0.0		
53	169.21	0.0010		0.0	51.205	0.053		Vel = 1.71
53	0.0	6.357	10E	176.027	5.000	41.025		
to		120.0		0.0	17.603	10.000		* * Fixed Loss = 10
54	169.21	0.0011		0.0	22.603	0.024		Vel = 1.71
54	0.0	7.98	G	6.041	150.000	51.049		
to		150.0	E	27.183	33.222	0.0		
TEST	169.21	0.0002		0.0	183.222	0.042		Vel = 1.09

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv. Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
	0.0 169.21				51.091		K Factor = 23.67		



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	4C
Contract	:	2019-251
Data File	:	251-4C.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 4C
Remote area location: Block C 4th Floor Unit 337
Occupancy classification: Residential-NFPA13R
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Residential
No. of sprinklers calculated: 4
In-rack demand: 0 - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 170.235 - GPM @ 51.31 - Psi
Type of system: WET
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)

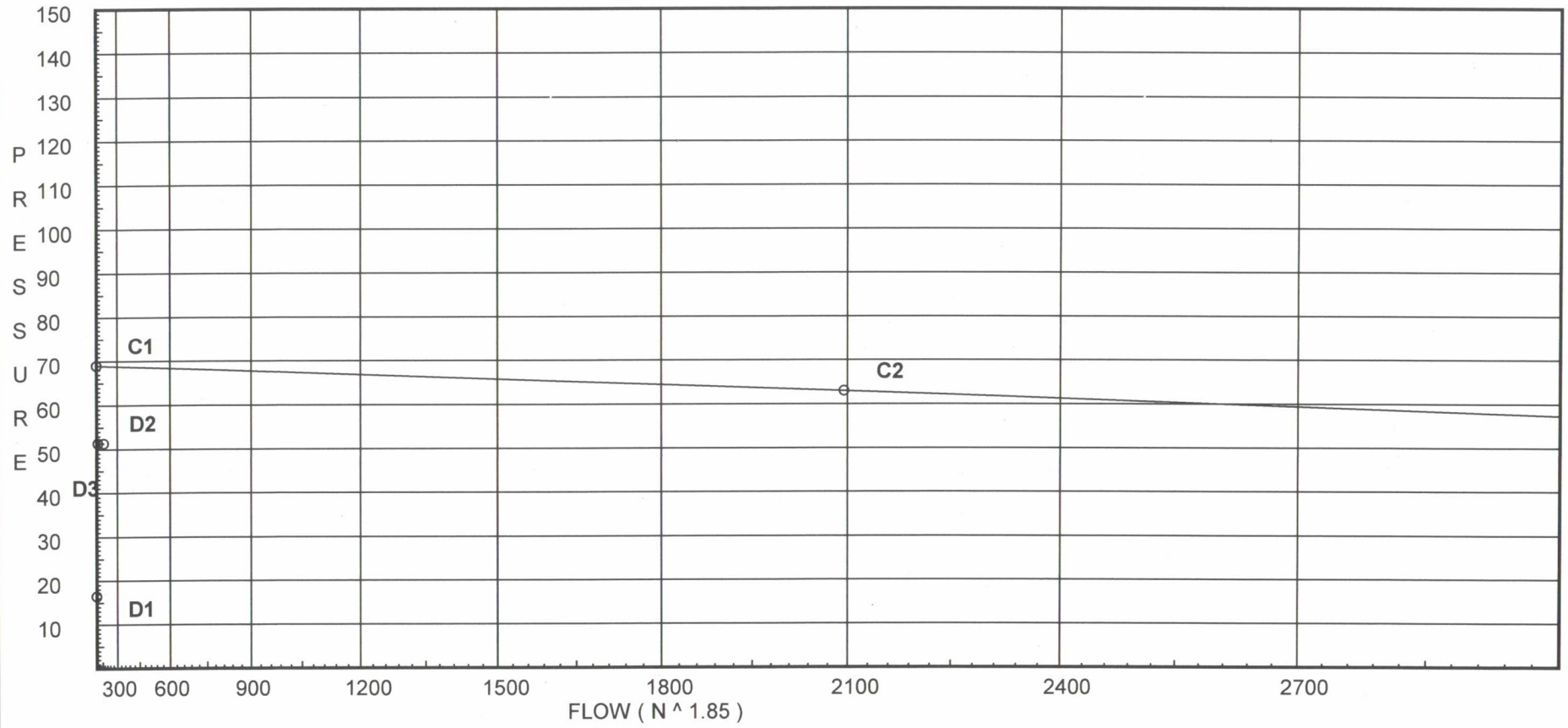
Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

Date

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:
- D1 - Elevation : 16.458
- D2 - System Flow : 70.235
- D2 - System Pressure : 51.316
- Hose (Demand) : 100
- D3 - System Demand : 170.235
- Safety Margin : 17.626



Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Date

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
400	15.69	1.101		0.0	1.330	10.249		K Factor = 4.90
to		150.0		0.0	0.0	0.0		
10	15.69	0.0436		0.0	1.330	0.058		Vel = 5.29
	0.0							
	15.69					10.307		K Factor = 4.89
401	18.00	1.101	T	9.563	2.500	9.631		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
10	18.0	0.0560		0.0	12.062	0.676		Vel = 6.07
	0.0							
	18.00					10.307		K Factor = 5.61
402	18.09	1.101	T	9.563	4.440	9.725		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
11	18.09	0.0565		0.0	14.002	0.791		Vel = 6.10
	0.0							
	18.09					10.516		K Factor = 5.58
403	18.46	1.101	T	9.563	0.830	10.131		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
12	18.46	0.0587		0.0	10.392	0.610		Vel = 6.22
	0.0							
	18.46					10.741		K Factor = 5.63
10	33.69	1.101		0.0	1.170	10.307		
to		150.0		0.0	0.0	0.0		
11	33.69	0.1786		0.0	1.170	0.209		Vel = 11.35
11	18.08	1.598		0.0	3.500	10.516		
to		150.0		0.0	0.0	0.0		
12	51.77	0.0643		0.0	3.500	0.225		Vel = 8.28
12	18.47	1.598	T	11.656	14.670	10.741		
to		150.0	E	5.828	17.484	0.0		
13	70.24	0.1133		0.0	32.154	3.642		Vel = 11.24
13	0.0	1.598	E	5.828	9.000	14.383		
to		150.0		0.0	5.828	3.898		
14	70.24	0.1132		0.0	14.828	1.679		Vel = 11.24
14	0.0	1.682	T	9.9	1.000	19.960		
to		120.0		0.0	9.900	0.0		
15	70.24	0.1334		0.0	10.900	1.454		Vel = 10.14
15	0.0	2.635	T	16.474	130.250	21.414		
to		120.0	2E	16.474	61.778	3.000		* * Fixed Loss = 3
16	70.24	0.0150	B	9.61	192.028	2.877		Vel = 4.13
			S	19.22				
			Fsp	0.0				
16	0.0	2.635	T	16.474	19.340	27.291		
to		120.0		0.0	16.474	8.372		
18	70.24	0.0150		0.0	35.814	0.536		Vel = 4.13
18	0.0	2.635	E	8.237	9.670	36.199		
to		120.0		0.0	8.237	4.188		
19	70.24	0.0150		0.0	17.907	0.269		Vel = 4.13
19	0.0	4.26	E	13.167	31.830	40.656		
to		120.0	T	26.334	39.501	0.0		
20	70.24	0.0014		0.0	71.331	0.102		Vel = 1.58

Final Calculations - Hazen-Williams

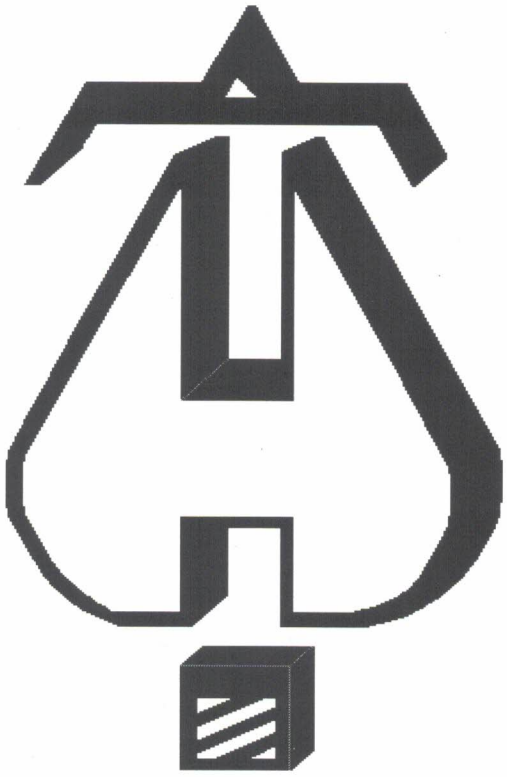
Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
20	-29.03	4.26		0.0	14.500	40.758		
to		120.0		0.0	0.0	0.0		
17	41.21	0.0006		0.0	14.500	0.008		Vel = 0.93
	0.0							
	41.21					40.766		K Factor = 6.45
20	29.03	4.26	2E	26.334	187.000	40.758		
to		120.0		0.0	26.334	0.0		
B3	29.03	0.0003		0.0	213.334	0.061		Vel = 0.65
B3	0.0	4.26		0.0	41.750	40.819		
to		120.0		0.0	0.0	0.0		
D3	29.03	0.0003		0.0	41.750	0.011		Vel = 0.65
D3	0.0	4.26	F	5.267	86.000	40.830		
to		120.0		0.0	5.267	0.0		
D1	29.03	0.0003		0.0	91.267	0.026		Vel = 0.65
D1	0.0	4.26	T	26.334	102.917	40.856		
to		120.0		0.0	26.334	0.0		
21	29.03	0.0003		0.0	129.251	0.036		Vel = 0.65
21	0.0	4.26	F	5.267	99.167	40.892		
to		120.0	E	13.167	18.434	0.0		
A3	29.03	0.0003		0.0	117.601	0.034		Vel = 0.65
A3	0.0	4.26	T	26.334	119.917	40.926		
to		120.0		0.0	26.334	0.0		
A1	29.03	0.0003		0.0	146.251	0.041		Vel = 0.65
A1	0.0	4.26	T	26.334	18.500	40.967		
to		120.0		0.0	26.334	0.0		
22	29.03	0.0003		0.0	44.834	0.012		Vel = 0.65
	0.0							
	29.03					40.979		K Factor = 4.53
17	41.21	4.26	T	26.334	118.333	40.766		
to		120.0		0.0	26.334	0.0		
B1	41.21	0.0005		0.0	144.667	0.078		Vel = 0.93
B1	0.0	4.26	E	13.167	237.750	40.844		
to		120.0		0.0	13.167	0.0		
22	41.21	0.0005		0.0	250.917	0.135		Vel = 0.93
22	29.03	4.26	T	18.795	32.830	40.979		
to		100.0	2E	18.795	37.590	0.0		
50	70.24	0.0020		0.0	70.420	0.143		Vel = 1.58
50	0.0	4.26	B	15.8	9.000	41.122		
to		120.0	T	26.334	42.134	0.0		
52	70.24	0.0014		0.0	51.134	0.074		Vel = 1.58
52	100.00	6.357	2E	35.205	16.000	41.196		Qa = 100
to		120.0		0.0	35.205	0.0		
53	170.24	0.0011		0.0	51.205	0.054		Vel = 1.72
53	0.0	6.357	10E	176.027	5.000	41.250		
to		120.0		0.0	17.603	10.000		* * Fixed Loss = 10
54	170.24	0.0011		0.0	22.603	0.024		Vel = 1.72
54	0.0	7.98	G	6.041	150.000	51.274		
to		150.0	E	27.183	33.222	0.0		
TEST	170.24	0.0002		0.0	183.222	0.042		Vel = 1.09

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

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									
	170.24					51.316		K Factor = 23.76		



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	4D
Contract	:	2019-251
Data File	:	251-4D.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 4D
Remote area location: Block D. 4th Floor. Unit 315
Occupancy classification: Residential-NFPA13R
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Residential
No. of sprinklers calculated: 4
In-rack demand: 0 - GPM
Hose streams: 100 - GPM
Total water required (including hose streams): 169.993 - GPM @ 50.71 - Psi
Type of system: WET
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)

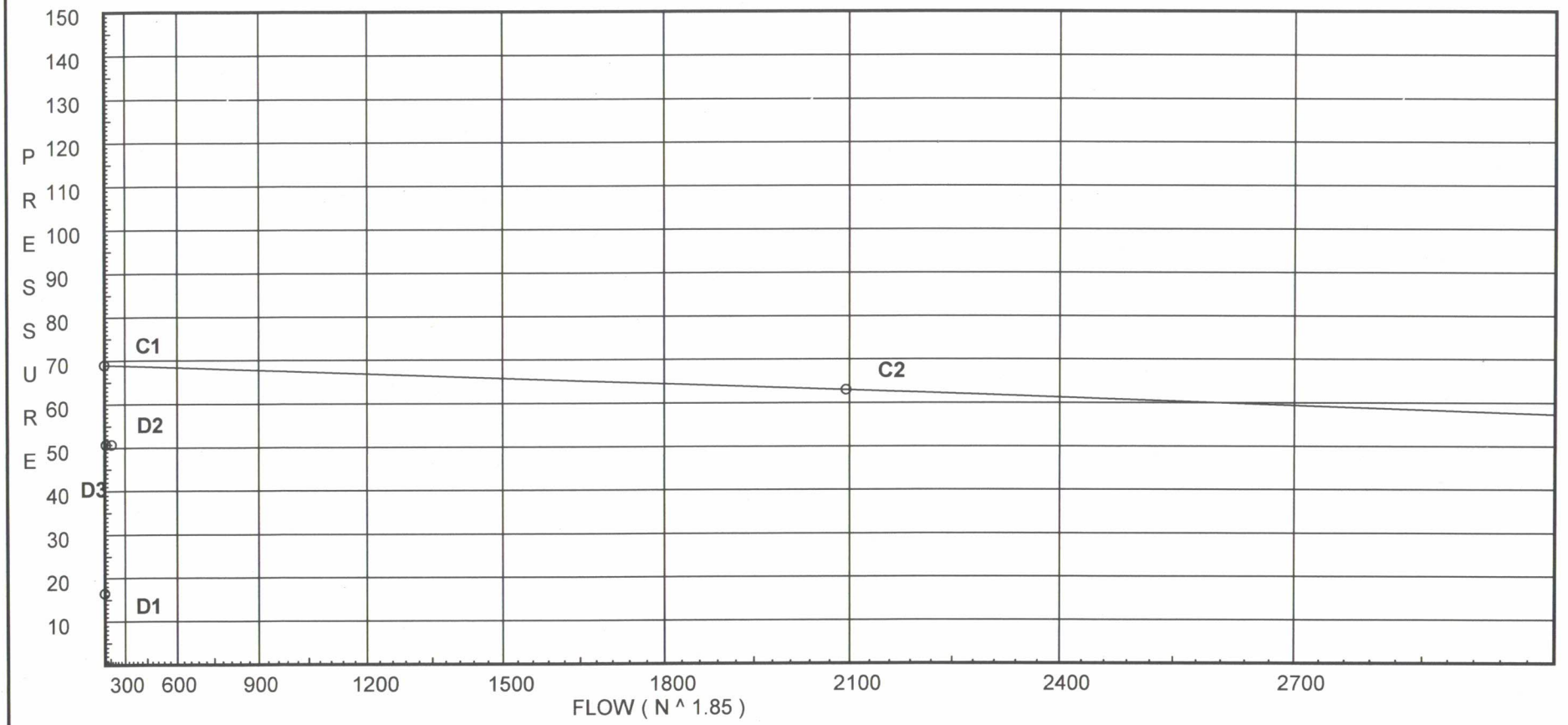
Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

Date

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:
- D1 - Elevation : 16.458
- D2 - System Flow : 69.993
- D2 - System Pressure : 50.715
- Hose (Demand) : 100
- D3 - System Demand : 169.993
- Safety Margin : 18.227

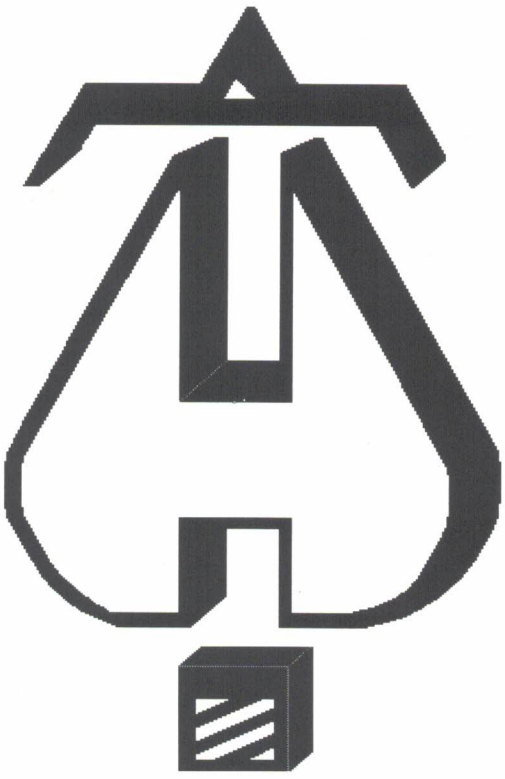


Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
430	15.68	1.101		0.0	1.333	10.235		K Factor = 4.90
to		150.0		0.0	0.0	0.0		
10	15.68	0.0435		0.0	1.333	0.058		Vel = 5.28
	0.0							
	15.68					10.293		K Factor = 4.89
431	18.00	1.101	T	9.563	2.250	9.631		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
10	18.0	0.0560		0.0	11.812	0.662		Vel = 6.07
	0.0							
	18.00					10.293		K Factor = 5.61
432	18.10	1.101	T	9.563	0.750	9.743		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
11	18.1	0.0566		0.0	10.312	0.584		Vel = 6.10
	0.0							
	18.10					10.327		K Factor = 5.63
433	18.21	1.101	T	9.563	0.750	9.860		K Factor = 5.80
to		150.0		0.0	9.562	0.0		
12	18.21	0.0572		0.0	10.312	0.590		Vel = 6.14
	0.0							
	18.21					10.450		K Factor = 5.63
10	33.68	1.598		0.0	1.167	10.293		
to		150.0		0.0	0.0	0.0		
11	33.68	0.0291		0.0	1.167	0.034		Vel = 5.39
11	18.10	1.598		0.0	1.917	10.327		
to		150.0		0.0	0.0	0.0		
12	51.78	0.0642		0.0	1.917	0.123		Vel = 8.28
12	18.21	1.598	T	11.656	14.833	10.450		
to		150.0	E	5.828	17.484	0.0		
DL4	69.99	0.1125		0.0	32.317	3.637		Vel = 11.20
DL4	0.0	1.598	E	5.828	9.000	14.087		
to		150.0		0.0	5.828	3.898		
DL3	69.99	0.1126		0.0	14.828	1.669		Vel = 11.20
DL3	0.0	1.682	T	9.9	0.750	19.654		
to		120.0		0.0	9.900	0.0		
30	69.99	0.1325		0.0	10.650	1.411		Vel = 10.11
30	0.0	2.635	T	16.474	129.250	21.065		
to		120.0	2E	16.474	61.778	3.000		* * Fixed Loss = 3
31	69.99	0.0149	B	9.61	191.028	2.844		Vel = 4.12
			S	19.22				
			Fsp	0.0				
31	0.0	2.635	E	8.237	29.000	26.909		
to		120.0		0.0	8.237	12.560		
DR1	69.99	0.0149		0.0	37.237	0.554		Vel = 4.12
DR1	0.0	4.26	2E	26.334	39.250	40.023		
to		120.0	T	26.334	52.668	0.0		
D1	69.99	0.0014		0.0	91.918	0.132		Vel = 1.58
D1	-29.77	4.26	T	26.334	102.917	40.155		
to		120.0		0.0	26.334	0.0		
21	40.22	0.0005		0.0	129.251	0.066		Vel = 0.91

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
21	0.0	4.26	F	5.267	99.167	40.221		
to		120.0	E	13.167	18.434	0.0		
A3	40.22	0.0005		0.0	117.601	0.061		Vel = 0.91
A3	0.0	4.26	T	26.334	119.917	40.282		
to		120.0		0.0	26.334	0.0		
A1	40.22	0.0005		0.0	146.251	0.075		Vel = 0.91
A1	0.0	4.26	T	26.334	18.500	40.357		
to		120.0		0.0	26.334	0.0		
22	40.22	0.0005		0.0	44.834	0.023		Vel = 0.91
	0.0							
	40.22					40.380		K Factor = 6.33
D1	29.77	4.26	E	13.167	86.000	40.155		
to		120.0		0.0	13.167	0.0		
D3	29.77	0.0003		0.0	99.167	0.029		Vel = 0.67
D3	0.0	4.26		0.0	41.750	40.184		
to		120.0		0.0	0.0	0.0		
B3	29.77	0.0003		0.0	41.750	0.012		Vel = 0.67
B3	0.0	4.26	2E	26.334	187.000	40.196		
to		120.0		0.0	26.334	0.0		
20	29.77	0.0003		0.0	213.334	0.063		Vel = 0.67
20	0.0	4.26		0.0	14.500	40.259		
to		120.0		0.0	0.0	0.0		
17	29.77	0.0003		0.0	14.500	0.005		Vel = 0.67
17	0.0	4.26	T	26.334	118.333	40.264		
to		120.0		0.0	26.334	0.0		
B1	29.77	0.0003		0.0	144.667	0.042		Vel = 0.67
B1	0.0	4.26	E	13.167	237.750	40.306		
to		120.0		0.0	13.167	0.0		
22	29.77	0.0003		0.0	250.917	0.074		Vel = 0.67
22	40.22	4.26	T	18.795	32.830	40.380		
to		100.0	2E	18.795	37.590	0.0		
50	69.99	0.0020		0.0	70.420	0.142		Vel = 1.58
50	0.0	4.26	B	15.8	9.000	40.522		
to		120.0	T	26.334	42.134	0.0		
52	69.99	0.0014		0.0	51.134	0.073		Vel = 1.58
52	100.00	6.357	2E	35.205	16.000	40.595		Qa = 100
to		120.0		0.0	35.205	0.0		
53	169.99	0.0011		0.0	51.205	0.054		Vel = 1.72
53	0.0	6.357	10E	176.027	5.000	40.649		
to		120.0		0.0	17.603	10.000		* * Fixed Loss = 10
54	169.99	0.0011		0.0	22.603	0.024		Vel = 1.72
54	0.0	7.98	G	6.041	150.000	50.673		
to		150.0	E	27.183	33.222	0.0		
TEST	169.99	0.0002		0.0	183.222	0.042		Vel = 1.09
	0.0							
	169.99					50.715		K Factor = 23.87



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	5A
Contract	:	2019-251
Data File	:	251-5A.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 5A
Remote area location: 3rd & 2nd. Floors-FSP-3A Building A
Occupancy classification: Standpipe System
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Standpipe System
No. of sprinklers calculated: 2FHC
In-rack demand: 0 - GPM
Hose streams: - GPM
Total water required (including hose streams): 100 - GPM @ 68.539 - Psi
Type of system: WET
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)
OBC 2012 Section 3.2.9.2(4)

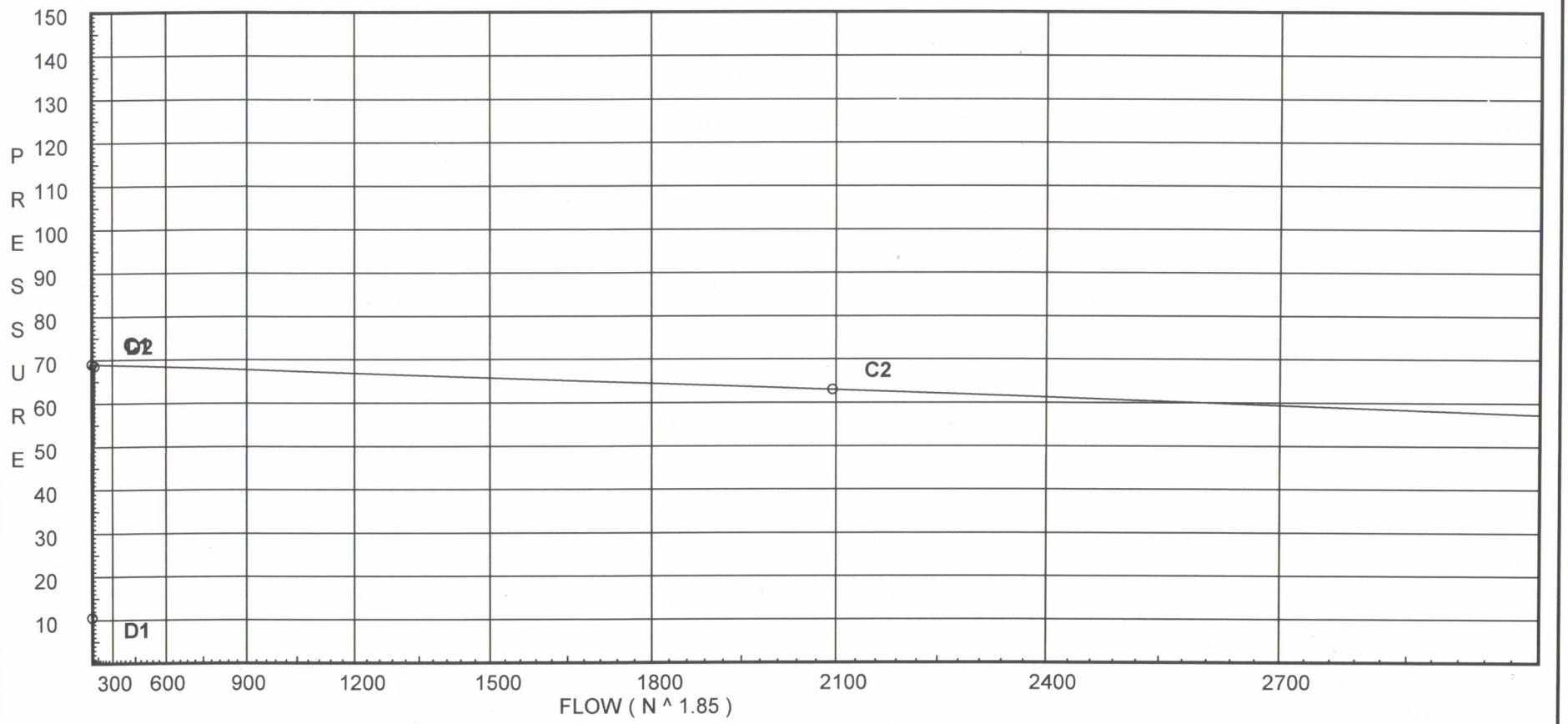
Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

Date

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:
- D1 - Elevation : 10.537
- D2 - System Flow : 100
- D2 - System Pressure : 68.539
- Hose (Demand) : _____
- D3 - System Demand : 100
- Safety Margin : 0.440



Final Calculations - Hazen-Williams

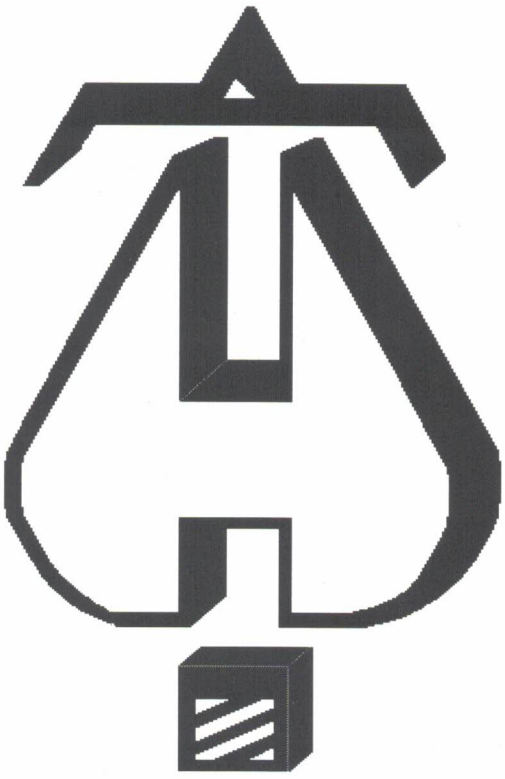
Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
520	50.00	1.61	T	8.0	20.000	43.000		Qa = 50.00
to		120.0		0.0	8.000	0.013		
10	50.0	0.0880		0.0	28.000	2.464		Vel = 7.88
	0.0							
	50.00					45.477		K Factor = 7.41
521	50.00	1.61	T	8.0	20.000	47.299		Qa = 50.00
to		120.0		0.0	8.000	0.0		
11	50.0	0.0880		0.0	28.000	2.465		Vel = 7.88
	0.0							
	50.00					49.764		K Factor = 7.09
10	50.00	2.157	4E	24.613	18.333	45.477		
to		120.0		0.0	24.613	-0.013		
12	50.0	0.0212		0.0	42.946	0.910		Vel = 4.39
	0.0							
	50.00					46.374		K Factor = 7.34
11	50.00	2.157	4E	24.613	18.333	49.764		
to		120.0		0.0	24.613	0.0		
13	50.0	0.0212		0.0	42.946	0.909		Vel = 4.39
	0.0							
	50.00					50.673		K Factor = 7.02
12	50.00	2.635		0.0	9.750	46.374		
to		120.0		0.0	0.0	4.221		
13	50.0	0.0080		0.0	9.750	0.078		Vel = 2.94
13	50.00	2.635	E	8.237	14.583	50.673		
to		120.0		0.0	8.237	6.316		
A3A	100.0	0.0288		0.0	22.820	0.657		Vel = 5.88
A3A	0.0	4.26	T	26.334	11.333	57.646		
to		120.0	B	15.8	42.134	0.0		
A3	100.0	0.0028		0.0	53.467	0.149		Vel = 2.25
A3	-71.25	4.26	F	5.267	99.167	57.795		
to		120.0	T	26.334	31.601	0.0		
21	28.75	0.0003		0.0	130.768	0.036		Vel = 0.65
21	0.0	4.26		0.0	102.917	57.831		
to		120.0		0.0	0.0	0.0		
D1	28.75	0.0003		0.0	102.917	0.028		Vel = 0.65
D1	0.0	4.26	E	13.167	86.000	57.859		
to		120.0		0.0	13.167	0.0		
D3	28.75	0.0003		0.0	99.167	0.028		Vel = 0.65
D3	0.0	4.26	T	26.334	41.750	57.887		
to		120.0		0.0	26.334	0.0		
B3	28.75	0.0003		0.0	68.084	0.019		Vel = 0.65
B3	0.0	4.26	2E	26.334	187.000	57.906		
to		120.0		0.0	26.334	0.0		
20	28.75	0.0003		0.0	213.334	0.059		Vel = 0.65
20	0.0	4.26		0.0	14.333	57.965		
to		120.0		0.0	0.0	0.0		
17	28.75	0.0002		0.0	14.333	0.003		Vel = 0.65
17	0.0	4.26	T	26.334	118.333	57.968		
to		120.0		0.0	26.334	0.0		
B1	28.75	0.0003		0.0	144.667	0.040		Vel = 0.65

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
B1	0.0	4.26	E	13.167	237.750	58.008		
to		120.0		0.0	13.167	0.0		
22	28.75	0.0003		0.0	250.917	0.070		Vel = 0.65
	0.0							
	28.75					58.078		K Factor = 3.77
A3	71.25	4.26	T	26.334	119.917	57.795		
to		120.0		0.0	26.334	0.0		
A1	71.25	0.0015		0.0	146.251	0.217		Vel = 1.60
A1	0.0	4.26	T	26.334	18.500	58.012		
to		120.0		0.0	26.334	0.0		
22	71.25	0.0015		0.0	44.834	0.066		Vel = 1.60
22	28.75	4.26	T	18.795	32.830	58.078		
to		100.0	2E	18.795	37.590	0.0		
50	100.0	0.0039		0.0	70.420	0.274		Vel = 2.25
50	0.0	4.26	B	15.8	9.000	58.352		
to		120.0	T	26.334	42.134	0.0		
52	100.0	0.0028		0.0	51.134	0.142		Vel = 2.25
52	0.0	6.357	2E	35.205	16.000	58.494		
to		120.0		0.0	35.205	0.0		
53	100.0	0.0004		0.0	51.205	0.020		Vel = 1.01
53	0.0	6.357	10E	176.027	5.000	58.514		
to		120.0		0.0	17.603	10.000		* * Fixed Loss = 10
54	100.0	0.0004		0.0	22.603	0.009		Vel = 1.01
54	0.0	7.98	G	6.041	150.000	68.523		
to		150.0	E	27.183	33.222	0.0		
TEST	100.0	0.0001		0.0	183.222	0.016		Vel = 0.64
	0.0							
	100.00					68.539		K Factor = 12.08



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	5B
Contract	:	2019-251
Data File	:	251-5B.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 5B
Remote area location: 3rd & 2nd. Floors - FSP-3B Building B
Occupancy classification: Standpipe System
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Standpipe System
No. of sprinklers calculated: 2FHC
In-rack demand: 0 - GPM
Hose streams: - GPM
Total water required (including hose streams): 100 - GPM @ 68.78 - Psi
Type of system: WET
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

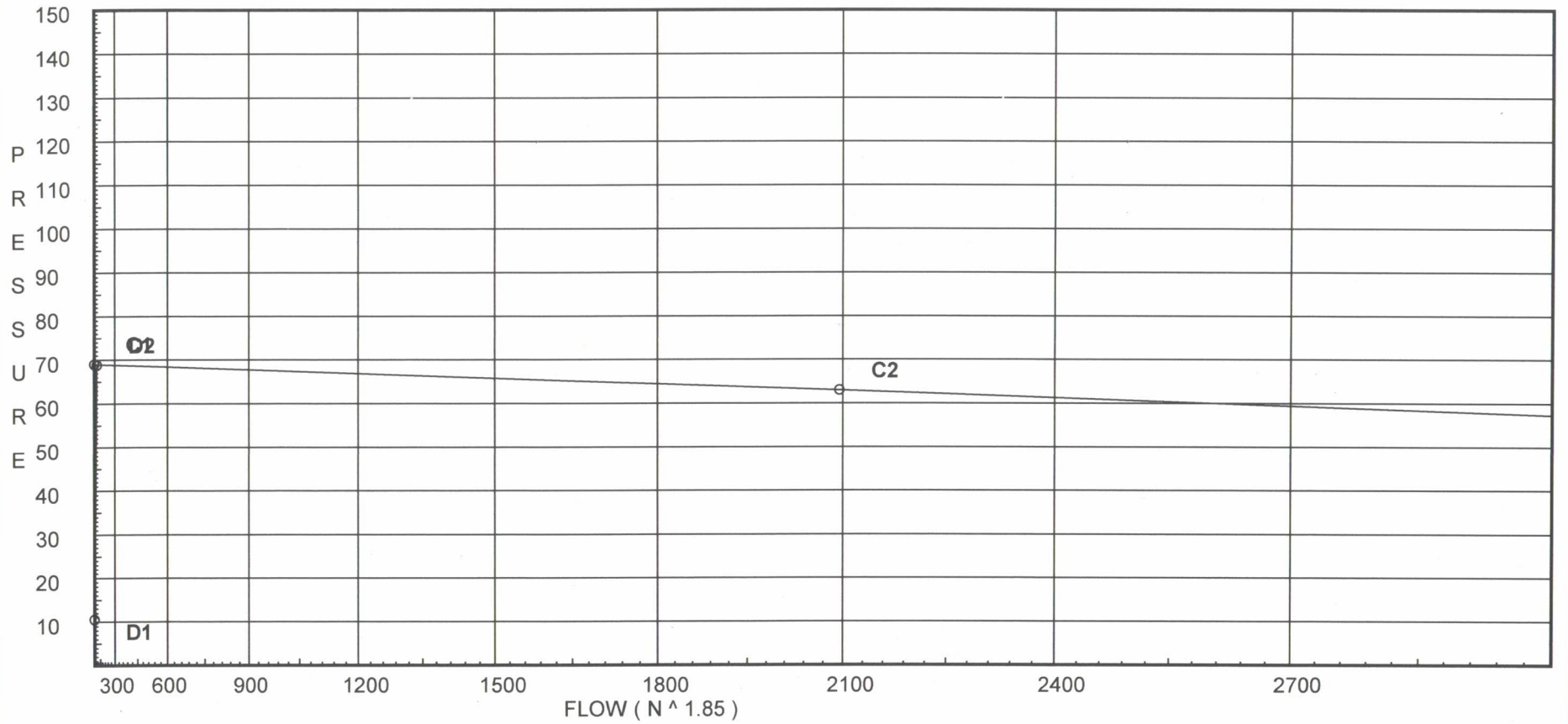
Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)
OBC 2012 Section 3.2.9.2(4)

Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:
- D1 - Elevation : 10.537
- D2 - System Flow : 100
- D2 - System Pressure : 68.784
- Hose (Demand) : _____
- D3 - System Demand : 100
- Safety Margin : 0.194



Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

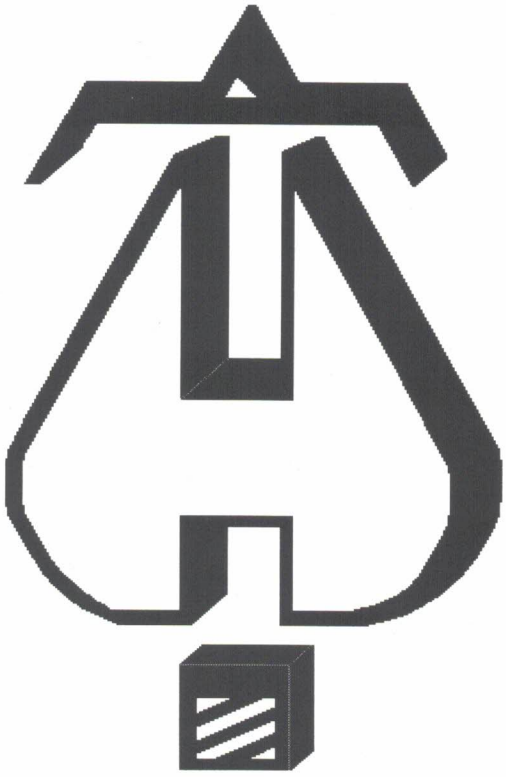
Date

Hyd. Ref. Point	Qa / Qt	Dia. "C" / Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
510	50.00	1.61	T	8.0	20.000	43.000		Qa = 50.00
to		120.0		0.0	8.000	0.013		
10	50.0	0.0880		0.0	28.000	2.464		Vel = 7.88
	0.0							
	50.00					45.477		K Factor = 7.41
511	50.00	1.61	T	8.0	20.000	47.299		Qa = 50.00
to		120.0		0.0	8.000	0.0		
11	50.0	0.0880		0.0	28.000	2.465		Vel = 7.88
	0.0							
	50.00					49.764		K Factor = 7.09
10	50.00	2.157	4E	24.613	18.333	45.477		
to		120.0		0.0	24.613	-0.013		
12	50.0	0.0212		0.0	42.946	0.910		Vel = 4.39
	0.0							
	50.00					46.374		K Factor = 7.34
11	50.00	2.157	4E	24.613	18.333	49.764		
to		120.0		0.0	24.613	0.0		
13	50.0	0.0212		0.0	42.946	0.909		Vel = 4.39
	0.0							
	50.00					50.673		K Factor = 7.02
12	50.00	2.635		0.0	9.750	46.374		
to		120.0		0.0	0.0	4.221		
13	50.0	0.0080		0.0	9.750	0.078		Vel = 2.94
13	50.00	2.635	E	8.237	14.583	50.673		
to		120.0		0.0	8.237	6.316		
B3B	100.0	0.0288		0.0	22.820	0.657		Vel = 5.88
B3B	0.0	4.26	E	13.167	39.000	57.646		
to		120.0	T	26.334	39.501	0.0		
B3	100.0	0.0028		0.0	78.501	0.218		Vel = 2.25
B3	-51.19	4.26	2E	26.334	187.000	57.864		
to		120.0		0.0	26.334	0.0		
20	48.81	0.0007		0.0	213.334	0.157		Vel = 1.10
20	0.0	4.26		0.0	14.500	58.021		
to		120.0		0.0	0.0	0.0		
17	48.81	0.0008		0.0	14.500	0.011		Vel = 1.10
	0.0							
	48.81					58.032		K Factor = 6.41
B3	51.19	4.26		0.0	41.750	57.864		
to		120.0		0.0	0.0	0.0		
D3	51.19	0.0008		0.0	41.750	0.034		Vel = 1.15
D3	0.0	4.26	F	5.267	86.000	57.898		
to		120.0		0.0	5.267	0.0		
D1	51.19	0.0008		0.0	91.267	0.073		Vel = 1.15
D1	0.0	4.26	T	26.334	102.917	57.971		
to		120.0		0.0	26.334	0.0		
21	51.19	0.0008		0.0	129.251	0.104		Vel = 1.15
21	0.0	4.26	F	5.267	99.167	58.075		
to		120.0	E	13.167	18.434	0.0		
A3	51.19	0.0008		0.0	117.601	0.095		Vel = 1.15

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
A3	0.0	4.26	T	26.334	119.917	58.170		
to		120.0		0.0	26.334	0.0		
A1	51.19	0.0008		0.0	146.251	0.117		Vel = 1.15
A1	0.0	4.26	T	26.334	18.500	58.287		
to		120.0		0.0	26.334	0.0		
22	51.19	0.0008		0.0	44.834	0.036		Vel = 1.15
	0.0							
	51.19					58.323		K Factor = 6.70
17	48.81	4.26	T	26.334	118.333	58.032		
to		120.0		0.0	26.334	0.0		
B1	48.81	0.0007		0.0	144.667	0.106		Vel = 1.10
B1	0.0	4.26	E	13.167	237.750	58.138		
to		120.0		0.0	13.167	0.0		
22	48.81	0.0007		0.0	250.917	0.185		Vel = 1.10
22	51.19	4.26	T	18.795	32.830	58.323		
to		100.0	2E	18.795	37.590	0.0		
50	100.0	0.0039		0.0	70.420	0.274		Vel = 2.25
50	0.0	4.26	B	15.8	9.000	58.597		
to		120.0	T	26.334	42.134	0.0		
52	100.0	0.0028		0.0	51.134	0.142		Vel = 2.25
52	0.0	6.357	2E	35.205	16.000	58.739		
to		120.0		0.0	35.205	0.0		
53	100.0	0.0004		0.0	51.205	0.020		Vel = 1.01
53	0.0	6.357	10E	176.027	5.000	58.759		
to		120.0		0.0	17.603	10.000		* * Fixed Loss = 10
54	100.0	0.0004		0.0	22.603	0.009		Vel = 1.01
54	0.0	7.98	G	6.041	150.000	68.768		
to		150.0	E	27.183	33.222	0.0		
TEST	100.0	0.0001		0.0	183.222	0.016		Vel = 0.64
	0.0							
	100.00					68.784		K Factor = 12.06



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	5C
Contract	:	2019-251
Data File	:	251-5C.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 5C
Remote area location: 3rd & Gr. Floors - FSP 2C Building C
Occupancy classification: Standpipe System
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Standpipe System
No. of sprinklers calculated: 2FHC
In-rack demand: 0 - GPM
Hose streams: - GPM
Total water required (including hose streams): 100 - GPM @ 68.033 - Psi
Type of system: WET
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)
OBC 2012 Section 3.2.9.2(4)

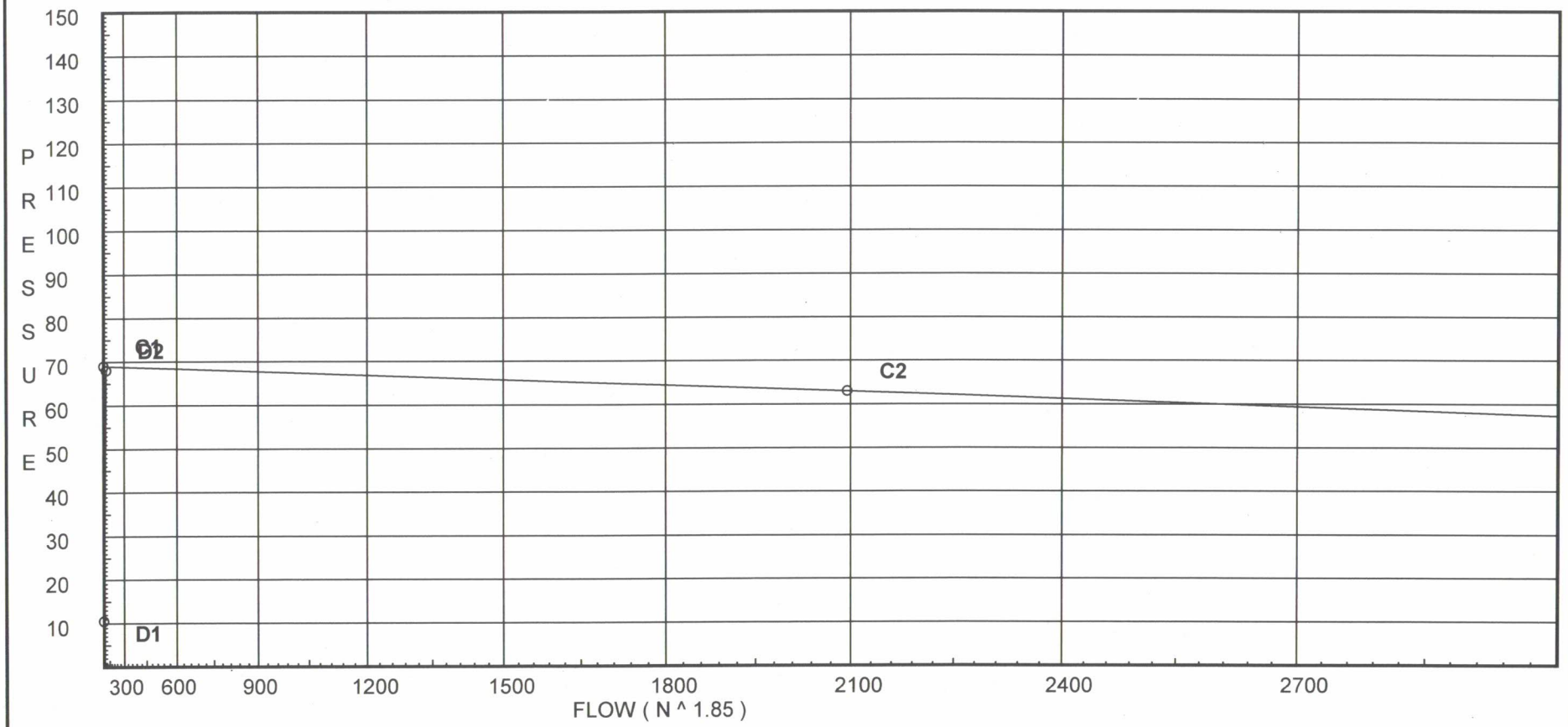
Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

Date

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:
- D1 - Elevation : 10.537
- D2 - System Flow : 100
- D2 - System Pressure : 68.033
- Hose (Demand) : _____
- D3 - System Demand : 100
- Safety Margin : 0.946



Final Calculations - Hazen-Williams

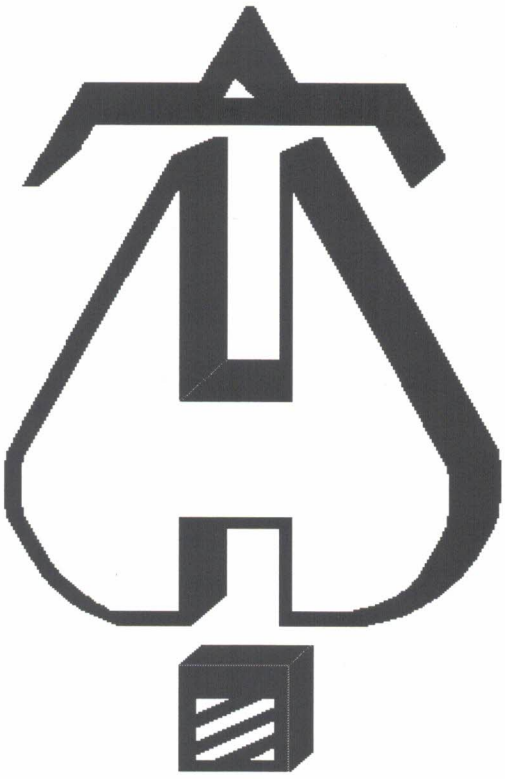
Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa / Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
500	50.00	1.61	T	8.0	20.000	43.000		Qa = 50.00
to		120.0		0.0	8.000	0.0		
10	50.0	0.0880		0.0	28.000	2.464		Vel = 7.88
	0.0							
	50.00					45.464		K Factor = 7.42
501	50.00	1.61	T	8.0	20.000	51.941		Qa = 50.00
to		120.0		0.0	8.000	0.0		
11	50.0	0.0880		0.0	28.000	2.465		Vel = 7.88
	0.0							
	50.00					54.406		K Factor = 6.78
10	50.00	2.635	3E	24.711	46.580	45.464		
to		120.0		0.0	24.711	8.372		
11	50.0	0.0080		0.0	71.291	0.570		Vel = 2.94
11	50.00	2.635	E	8.237	6.000	54.406		
to		120.0		0.0	8.237	2.166		
12	100.0	0.0287		0.0	14.237	0.409		Vel = 5.88
12	0.0	4.26	T	26.334	6.670	56.981		
to		120.0	E	13.167	55.301	0.0		
17	100.0	0.0028	B	15.8	61.971	0.172		Vel = 2.25
	0.0							
	100.00					57.153		K Factor = 13.23
20	-40.62	4.26		0.0	14.500	57.161		
to		120.0		0.0	0.0	0.0		
17	-40.62	-0.0006		0.0	14.500	-0.008		Vel = 0.91
	0.0							
	-40.62					57.153		K Factor = -5.37
20	40.62	4.26	2E	26.334	187.000	57.161		
to		120.0		0.0	26.334	0.0		
B3	40.62	0.0005		0.0	213.334	0.112		Vel = 0.91
B3	0.0	4.26		0.0	41.750	57.273		
to		120.0		0.0	0.0	0.0		
D3	40.62	0.0005		0.0	41.750	0.021		Vel = 0.91
D3	0.0	4.26	F	5.267	86.000	57.294		
to		120.0		0.0	5.267	0.0		
D1	40.62	0.0005		0.0	91.267	0.048		Vel = 0.91
D1	0.0	4.26	T	26.334	102.917	57.342		
to		120.0		0.0	26.334	0.0		
21	40.62	0.0005		0.0	129.251	0.068		Vel = 0.91
21	0.0	4.26	F	5.267	99.167	57.410		
to		120.0	E	13.167	18.434	0.0		
A3	40.62	0.0005		0.0	117.601	0.062		Vel = 0.91
A3	0.0	4.26	T	26.334	119.917	57.472		
to		120.0		0.0	26.334	0.0		
A1	40.62	0.0005		0.0	146.251	0.076		Vel = 0.91
A1	0.0	4.26	T	26.334	18.500	57.548		
to		120.0		0.0	26.334	0.0		
22	40.62	0.0005		0.0	44.834	0.024		Vel = 0.91
	0.0							

Final Calculations - Hazen-Williams

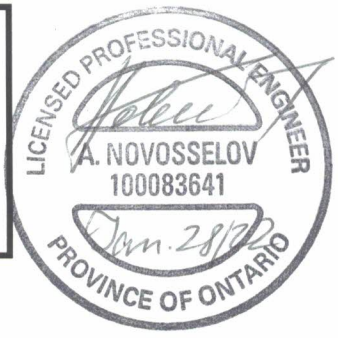
Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
	40.62					57.572		K Factor = 5.35
17	59.38	4.26	T	26.334	118.333	57.153		
to		120.0		0.0	26.334	0.0		
B1	59.38	0.0011		0.0	144.667	0.153		Vel = 1.34
B1	0.0	4.26	E	13.167	237.750	57.306		
to		120.0		0.0	13.167	0.0		
22	59.38	0.0011		0.0	250.917	0.266		Vel = 1.34
22	40.62	4.26	T	18.795	32.830	57.572		
to		100.0	2E	18.795	37.590	0.0		
50	100.0	0.0039		0.0	70.420	0.274		Vel = 2.25
50	0.0	4.26	B	15.8	9.000	57.846		
to		120.0	T	26.334	42.134	0.0		
52	100.0	0.0028		0.0	51.134	0.142		Vel = 2.25
52	0.0	6.357	2E	35.205	16.000	57.988		
to		120.0		0.0	35.205	0.0		
53	100.0	0.0004		0.0	51.205	0.020		Vel = 1.01
53	0.0	6.357	10E	176.027	5.000	58.008		
to		120.0		0.0	17.603	10.000		* * Fixed Loss = 10
54	100.0	0.0004		0.0	22.603	0.009		Vel = 1.01
54	0.0	7.98	G	6.041	150.000	68.017		
to		150.0	E	27.183	33.222	0.0		
TEST	100.0	0.0001		0.0	183.222	0.016		Vel = 0.64
	0.0							
	100.00					68.033		K Factor = 12.12



. . . Fire Protection by Computer Design

Elite Sprinkler Inc.
22 McDonnell Cres.
Bradford, ON.
L3Z 0S7
(905) 505-1370



Job Name	:	ROYAL PINE
Building	:	
Location	:	ATTMAR + PALLESCHI DRIVE BRAMPTON
System	:	5D
Contract	:	2019-251
Data File	:	251-5D.WXF

HYDRAULIC CALCULATIONS
for

Project name: ROYAL PINE
Location: ATTMAR + PALLESCHI DRIVE BRAMPTON
Drawing no:
Date: Sep.2019

Design

Remote area number: 5D
Remote area location: 3rd & 2nd Floors - FSP 3D Building D
Occupancy classification: Standpipe System
Density: - Gpm/SqFt
Area of application: - SqFt
Coverage per sprinkler: var. - SqFt
Type of sprinklers calculated: Standpipe System
No. of sprinklers calculated: 2FHC
In-rack demand: 0 - GPM
Hose streams: - GPM
Total water required (including hose streams): 100 - GPM @ 68.127 - Psi
Type of system: WET
Volume of dry or preaction system: 0 - Gal

Water supply information

Date: Jul.23 2019
Location: at site
Source: Elite Sprinkler & Peel Region

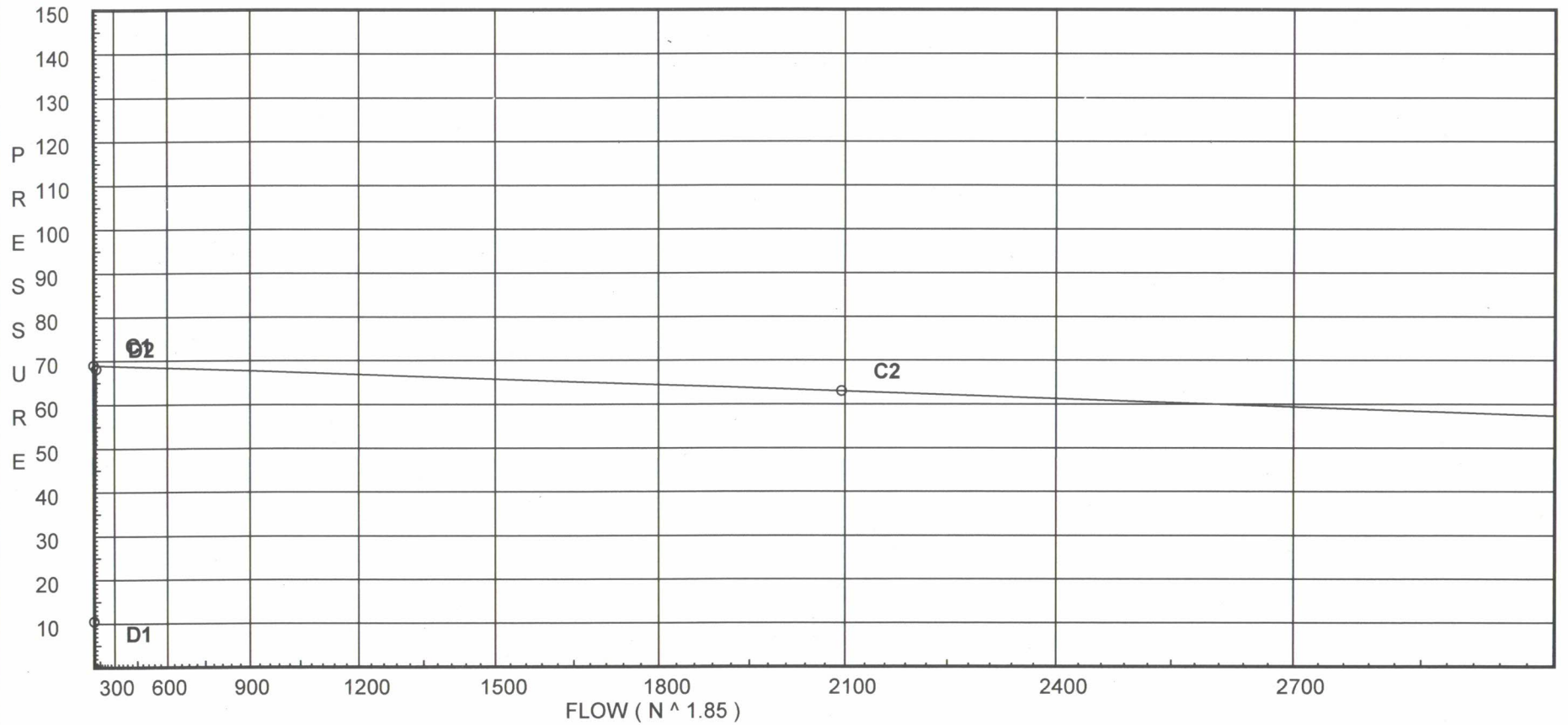
Name of contractor:
Address:
Phone number:
Name of designer: EN
Authority having jurisdiction: Brampton
Notes: (Include peaking information or gridded systems here.)
OBC 2012 Section 3.2.9.2(4)

Water Supply Curve C

Elite Sprinkler Inc.
ROYAL PINE

City Water Supply:
- C1 - Static Pressure : 69
- C2 - Residual Pressure: 63
- C2 - Residual Flow : 2095

Demand:
- D1 - Elevation : 10.539
- D2 - System Flow : 100
- D2 - System Pressure : 68.127
- Hose (Demand) : _____
- D3 - System Demand : 100
- Safety Margin : 0.852



Final Calculations - Hazen-Williams

Elite Sprinkler Inc. Page 3
ROYAL PINE Date

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
530	50.00	1.61	T	8.0	20.000	42.000		Qa = 50.00
to		120.0		0.0	8.000	0.0		
10	50.0	0.0880		0.0	28.000	2.464		Vel = 7.88
	0.0							
	50.00					44.464		K Factor = 7.50
531	50.00	1.61	T	8.0	20.000	46.301		Qa = 50.00
to		120.0		0.0	8.000	0.0		
11	50.0	0.0880		0.0	28.000	2.464		Vel = 7.88
	0.0							
	50.00					48.765		K Factor = 7.16
10	50.00	2.157	4E	24.613	18.500	44.464		
to		120.0		0.0	24.613	0.0		
12	50.0	0.0212		0.0	43.113	0.913		Vel = 4.39
	0.0							
	50.00					45.377		K Factor = 7.42
11	50.00	2.157	4E	24.613	18.500	48.765		
to		120.0		0.0	24.613	0.0		
13	50.0	0.0212		0.0	43.113	0.913		Vel = 4.39
	0.0							
	50.00					49.678		K Factor = 7.09
12	50.00	2.635		0.0	9.750	45.377		
to		120.0		0.0	0.0	4.223		
13	50.0	0.0080		0.0	9.750	0.078		Vel = 2.94
13	50.00	2.635	E	8.237	14.583	49.678		
to		120.0		0.0	8.237	6.316		
D3D	100.0	0.0288		0.0	22.820	0.657		Vel = 5.88
D3D	0.0	4.26	2E	26.334	126.333	56.651		
to		120.0	F	5.267	73.735	0.0		
D3	100.0	0.0028	T	26.334	200.068	0.555		Vel = 2.25
			B	15.8				
D3	-53.35	4.26		0.0	41.750	57.206		
to		120.0		0.0	0.0	0.0		
B3	46.65	0.0007		0.0	41.750	0.029		Vel = 1.05
B3	0.0	4.26	T	26.334	187.000	57.235		
to		120.0	E	13.167	39.501	0.0		
20	46.65	0.0007		0.0	226.501	0.153		Vel = 1.05
20	0.0	4.26		0.0	14.500	57.388		
to		120.0		0.0	0.0	0.0		
17	46.65	0.0007		0.0	14.500	0.010		Vel = 1.05
17	0.0	4.26	T	26.334	118.333	57.398		
to		120.0		0.0	26.334	0.0		
B1	46.65	0.0007		0.0	144.667	0.098		Vel = 1.05
B1	0.0	4.26	E	13.167	237.750	57.496		
to		120.0		0.0	13.167	0.0		
22	46.65	0.0007		0.0	250.917	0.170		Vel = 1.05
	0.0							
	46.65					57.666		K Factor = 6.14
D3	53.35	4.26	F	5.267	86.000	57.206		
to		120.0		0.0	5.267	0.0		
D1	53.35	0.0009		0.0	91.267	0.080		Vel = 1.20

Final Calculations - Hazen-Williams

Elite Sprinkler Inc.
ROYAL PINE

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
D1	0.0	4.26	T	26.334	102.917	57.286		
to		120.0		0.0	26.334	0.0		
21	53.35	0.0009		0.0	129.251	0.112		Vel = 1.20
21	0.0	4.26	F	5.267	99.167	57.398		
to		120.0	E	13.167	18.434	0.0		
A3	53.35	0.0009		0.0	117.601	0.102		Vel = 1.20
A3	0.0	4.26	T	26.334	119.917	57.500		
to		120.0		0.0	26.334	0.0		
A1	53.35	0.0009		0.0	146.251	0.127		Vel = 1.20
A1	0.0	4.26	T	26.334	18.500	57.627		
to		120.0		0.0	26.334	0.0		
22	53.35	0.0009		0.0	44.834	0.039		Vel = 1.20
22	46.65	4.26	T	18.795	32.830	57.666		
to		100.0	2E	18.795	37.590	0.0		
50	100.0	0.0039		0.0	70.420	0.274		Vel = 2.25
50	0.0	4.26	B	15.8	9.000	57.940		
to		120.0	T	26.334	42.134	0.0		
52	100.0	0.0028		0.0	51.134	0.142		Vel = 2.25
52	0.0	6.357	2E	35.205	16.000	58.082		
to		120.0		0.0	35.205	0.0		
53	100.0	0.0004		0.0	51.205	0.020		Vel = 1.01
53	0.0	6.357	10E	176.027	5.000	58.102		
to		120.0		0.0	17.603	10.000		* * Fixed Loss = 10
54	100.0	0.0004		0.0	22.603	0.009		Vel = 1.01
54	0.0	7.98	G	6.041	150.000	68.111		
to		150.0	E	27.183	33.222	0.0		
TEST	100.0	0.0001		0.0	183.222	0.016		Vel = 0.64
	0.0							
	100.00					68.127		K Factor = 12.12

FLOWER CITY BRAMPTON.CA

Building Division
8850 McLaughlin Rd.
Brampton
building.inquiries@brampton.ca
Fax. (905) 874-2499

COMMITMENT TO PROVIDE GENERAL REVIEW

Pursuant to OBC DIVISION C - Part 1 Subsection 1.2.2.

PROJECT INFORMATION

PROJECT DESCRIPTION	CLAIREVILLE STACKED TOWNS. (207 SUITES.)
PROJECT LOCATION	65-95 ATTMAR DRIVE # Street Unit/Suite
PROPERTY OWNER	Name: FORESTSIDE ESTATES INC. O/A ROYAL PINE HOMES. Address: 3550 LANGSTAFF ROAD. SUITE 200, VAUGHAN. L4L 9G3 # Street Unit/Suite City e-mail address: VINCE @ ROYALPINEHOMES. COM If the Owner is a corporation provide the authorized corporate contact name and contact information: Name: LAND SOLUTIONS ONTARIO-MELISSA FASULLO Address: 3550 LANGSTAFF ROAD # Street Unit/Suite City e-mail address: melissa@landsolutionson.com Telephone: 647898-2190

COMMITMENT TO PROVIDE GENERAL REVIEW

Consultant Name: A.NOVOSSELOV

Company: ELITE SPRINKLER INC.

Address: 22 McDONNELL CRES. BRADFORD L3Z 0S7

Street Unit/suite City Postal Code

e-mail address: elitecanada@hotmail.com Telephone : (905) 505-1370 Fax: ( )

1. The undersigned architect or professional engineer warrants that I have been retained by the Owner and/or authorized agent named on this document to provide general review of the construction of the building referenced to determine whether the construction is in general conformity with the plans and other documents that form the basis for the issuance of a building permit, in accordance with the performance standards of the Ontario Association of Architects (OAA) and/or Professional Engineers of Ontario (PEO);
2. All general review reports by the architect or professional engineer will be forwarded promptly to the attention of the applicable Inspector at: inspections.scheduling@brampton.ca
3. Should I cease to provide general review for any reason during construction, the Chief Building Official will be notified in writing immediately.

Professional Discipline

☐ ARCHITECTURAL ☐ STRUCTURAL ☐ MECHANICAL HVAC ☐ MECHANICAL PLUMBING
☐ MECHANICAL- CIVIL ☐ ELECTRICAL ☐ SITE SERVICES ☒ OTHER (SPECIFY): SPRINKLERS

DESCRIBE THE SCOPE OF WORK FOR WHICH GENERAL REVIEW IS BEING PROVIDED

Signature: _____ Date: 01 (mth) 28 (day) 2022 (year)

Print Name: A.NOVOSSELOV

FOR OFFICE USE ONLY

PERMIT APPLICATION # _____

Review By: (Bldg) _____ BCIN# _____ Date: _____ mth day year

(Plmbg) _____ _____ _____ mth day year

(HVAC) _____ _____ _____ mth day year

Model 350ADA

Double Check Detector Assembly

Application

Designed for installation on water lines in fire protection systems to protect against both backsiphonage and backpressure of polluted water into the potable water supply. Model 350ADA shall provide protection where a potential health hazard does not exist. Incorporates metered by-pass to detect leaks and unauthorized water use.

Standards Compliance (Horizontal & Vertical)

- ASSE® Listed 1048
- AWWA Compliant C510 (with gates only), and C550
- CSA® Certified B64.5
- UL® Classified
- C-UL® Classified
- FM® Approved
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California
- NYC MEA 221-04M-2 (2 1/2" - 8")
- Meets the requirements of NSF/ANSI 61*

*(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

By-Pass Backflow Assembly 3/4" Model 950XLD

Materials

Main valve body	Ductile Iron ASTM A 536
Access covers	Ductile Iron ASTM A 536
Coatings	NSF Approved electrostatic epoxy finish
Internals	Stainless steel, 300 Series NORYL™
Fasteners & Springs	Stainless Steel, 300 Series
Elastomers	EPDM (FDA approved) Buna Nitrile (FDA approved)
Polymers	NORYL™

Features

Sizes: 2 1/2"*, 3"* , 4", 6", 8", 10"		
Maximum working water pressure		175 PSI
Maximum working water temperature		140°F
Hydrostatic test pressure		350 PSI
End connections	(Grooved for steel pipe)	AWWA C606
	(Flanged bolt pattern)	ASME B16.42 Class 150

*2 1/2" & 3" sizes use 4" body & reducer couplings

Dimensions & Weights (do not include pkg.)

MODEL 350ADA SIZE		WEIGHT									
		LESS SHUTOFF VALVES		OSY GATE VALVES FLANGED		OSY GATE VALVES GROOVED		BUTTERFLY VALVES FLANGED		BUTTERFLY VALVES GROOVED	
in.	mm	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.	kg
2 1/2	65	105	48	192	87	184	83	157	71	147	67
3	80	104	47	210	95	200	91	162	73	148	67
4	100	91	41	230	104	204	93	147	66	139	63
6	150	141	64	362	164	332	151	246	111	215	98
8	200	302	137	762	346	738	335	491	223	445	202
10	250	355	161	1024	464	902	409	628	285	570	259



(with OS&Y gates)

LEAD FREE

NSF/ANSI 61



(with BG valves)

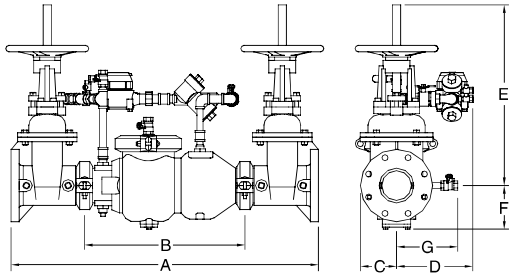
Options

(Suffixes can be combined)

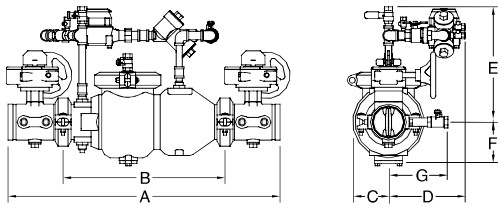
- ☐ - with flanged end OS & Y gate valves (standard)
- ☐ L - less shut-off valves (grooved body connections)
- ☐ LM - less water meter
- ☐ RM - with remote reading meter
- ☐ - with gallon meter (standard)
- ☐ CFM - with cu ft meter
- ☐ CMM - with cu meter meter
- ☐ G - with grooved end connections
- ☐ FG - with flanged inlet connection and grooved outlet connection
- ☐ PI - with Post Indicator Gate Valves
- ☐ BG - with grooved end butterfly valves with integral supervisory switches
- ☐ BF - with flanged end butterfly valves with integral supervisory switches

Accessories

- ☐ Repair kit (rubber only)
- ☐ Thermal expansion tank (Model XT)
- ☐ OS & Y Gate valve tamper switch (OSY-40)



MODEL 350ADA with OS&Y option



MODEL 350ADA with BG option

MODEL 350ADA SIZE		DIMENSION (approximate)																			
		A		A WITH BUTTERFLY VALVES		B LESS GATE VALVES		C		D		E OS&Y OPEN		E OS&Y CLOSED		E WITH BUTTERFLY VALVES		F		G	
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
2 1/2	65	35 1/8	892	32 1/8	816	20 1/8	511	4 1/2	114	9	229	17 3/4	451	15 3/8	391	17	432	6	152	7 1/4	184
3	80	36 1/8	918	33	838	20 1/8	511	4 1/2	114	9	229	20 1/4	514	17	432	17	432	6	152	7 1/4	184
4	100	38 1/4	972	33 1/4	845	19 7/8	505	4 1/2	114	9	229	22 1/2	572	18 1/4	464	17	432	6	152	8	203
6	150	47 1/4	1200	40 1/4	1022	25 7/8	657	5 1/2	140	10 1/2	267	30 1/2	775	24 1/4	616	17 1/2	445	7	178	10	254
8	200	62	1575	55	1397	38 1/2	978	10	254	12	305	37	940	28 1/2	724	16 15/16	430	8 1/2	216	11	279
10	250	64 5/8	1641	59	1499	38 1/2	978	10	254	12	305	45 5/8	1159	34 3/4	883	16 15/16	430	81/2	216	12	305

Attention: Model 350ADA (grooved body) and Model 350DA (flange body) have different lay lengths.

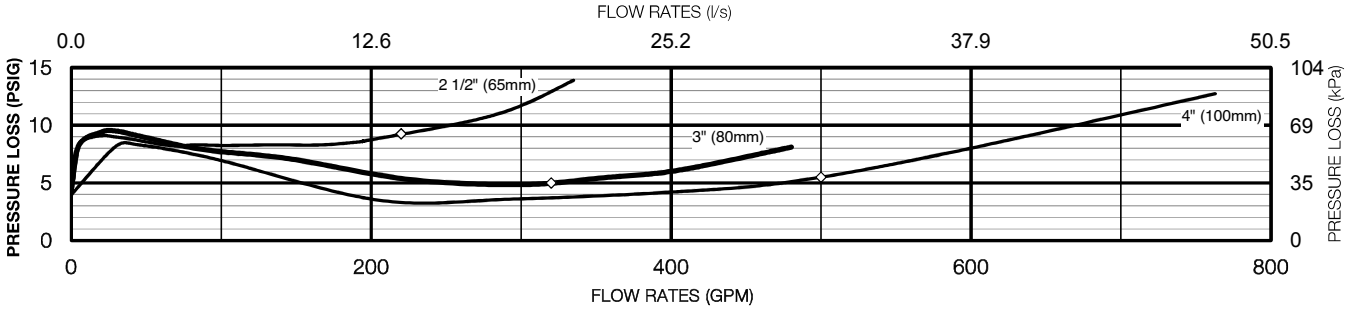
Zurn Industries, LLC | Wilkins
1747 Commerce Way, Paso Robles, CA U.S.A. 93446 Ph. 855-663-9876, Fax 805-238-5766
In Canada | **Zurn Industries Limited**
3544 Nashua Drive, Mississauga, Ontario L4V 1L2 Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

Rev. J
Date: 6/19
Document No. BF-350ADA
Patent No. 5, 913, 331
Product No. Model 350ADA

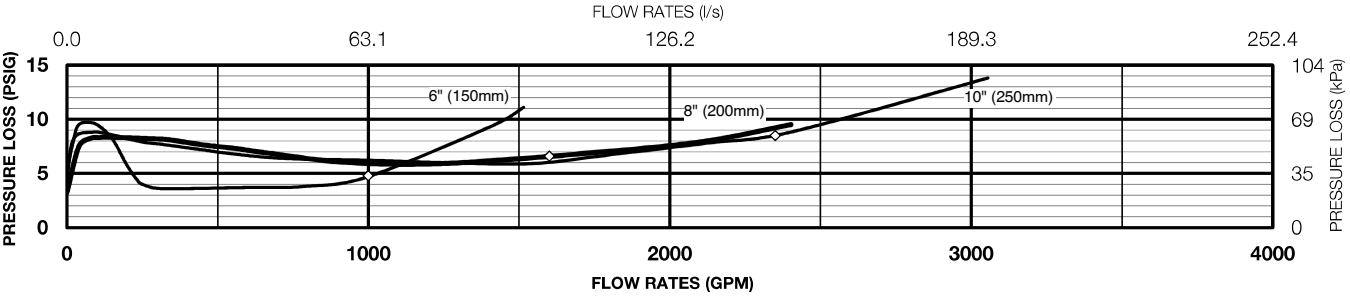
Flow Characteristics

◇ Rated Flow (established by approval agencies)

MODEL 350ADA 2 1/2", 3" & 4" (STANDARD & METRIC)



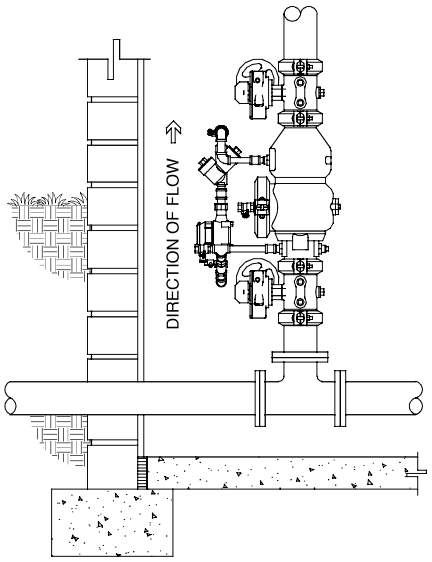
MODEL 350ADA 6", 8" & 10" (STANDARD & METRIC)



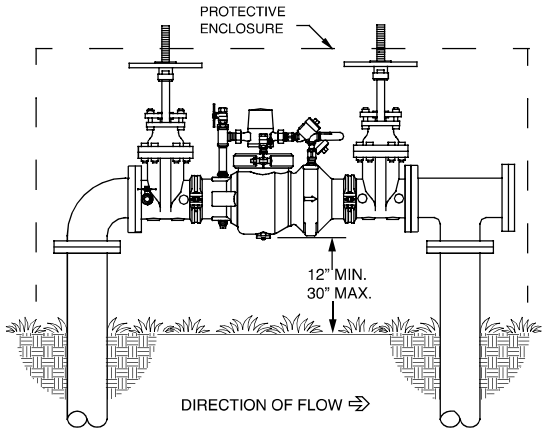
Typical Installation

Local codes shall govern installation requirements. Unless otherwise specified, the assembly shall be mounted at a minimum of 12" (305mm) and a maximum of 30" (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.

Capacity thru Schedule 40 Pipe (GPM)				
Pipe size	**5 ft/sec**	**7.5 ft/sec**	**10ft/sec**	**15 ft/sec**
2 1/2"	75	112	149	224
3"	115	173	230	346
4"	198	298	397	595
6"	450	675	900	1351
8"	780	1169	1559	2339
10"	1229	1843	2458	3687
12"	1763	2644	3525	5288



MODEL 350ADABG (Vertical Installation)



MODEL 350ADA (Outdoor Installation)

Specifications

The Double Check Detector Backflow Prevention Assembly shall be certified to NSF/ANSI 61, ASSE® Listed 1048, and supplied with full port gate valves. The main body and access cover shall be epoxy coated ductile iron (ASTM A 536), the seat ring and check valve shall be Noryl™ (NSF Listed), the stem shall be stainless steel (ASTM A 276) and the seat disc elastomers shall be EPDM. The first and second check valves shall be accessible for maintenance without removing the device from the line. The Double Check Detector Backflow Prevention Assembly shall be a ZURN WILKINS Model 350ADA.

Zurn Industries, LLC | Wilkins
1747 Commerce Way, Paso Robles, CA U.S.A. 93446 Ph. 855-663-9876, Fax 805-238-5766
In Canada | **Zurn Industries Limited**
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www.zurn.com

Series RFII — 5.6 K-factor "Royal Flush II" Concealed Pendent Sprinklers Quick & Standard Response, Standard Coverage

General Description

The TYCO Series RFII 5.6 K-factor, "Royal Flush II" Concealed Pendent Sprinklers Quick Response (3-mm bulb) and Standard Response (5-mm bulb), are decorative sprinklers featuring a flat cover plate designed to conceal the sprinkler. These sprinklers are optimal for architecturally sensitive areas such as hotel lobbies, office buildings, churches, and restaurants.

Each sprinkler includes a Cover Plate/Retainer Assembly and a Sprinkler/Support Cup Assembly. The separable, two-piece assembly design provides the following benefits:

- Allows installation of the sprinklers and pressure testing of the fire protection system prior to installation of a suspended ceiling or application of the finish coating to a fixed ceiling.
- Permits the removal of suspended ceiling panels for access to building service equipment without having to first shut down the fire protection system and remove sprinklers.
- Provides for 1/2 in. (12,7 mm) of vertical adjustment to allow a measure of flexibility in determining the length of fixed piping to cut for the sprinkler drops.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

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

The Series RFII Sprinklers are shipped with a Disposable Protective Cap. The Protective Cap is temporarily removed during installation and replaced to help protect the sprinkler during ceiling installation or finish. The tip of the Protective Cap can be used to mark the center of the ceiling hole into plaster board or ceiling tiles by gently pushing the ceiling product against the Protective Cap. When ceiling installation is complete, the Protective Cap is removed and the Cover Plate/Retainer Assembly is installed.

As an option, the Series RFII Standard Response (5-mm bulb) "Royal Flush II" Concealed Pendent Sprinklers can be fitted with a silicone Air and Dust Seal. See Figure 5. The Air and Dust Seal is intended for sensitive areas where it is desirable to prevent air and dust from the area above the ceiling to pass through the cover plate.

NOTICE

The Series RFII Concealed Pendent Sprinklers described herein must be installed and maintained in compliance with this document and with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

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

Sprinkler Identification Number (SIN)

TY3531 — 3 mm bulb
TY3551 — 5 mm bulb



Technical Data

Sprinkler Approvals
Approvals apply only to the service conditions indicated in the Design Criteria section.

- TY3531 (3 mm Bulb) is UL Listed, C-UL Listed and NYC Approved (MEA 353-01-E) as Quick Response.
- TY3531 (3 mm Bulb) is VdS Approved (Certificate No. G4090007).
- TY3531 (3 mm Bulb) is FM and LPCB Approved (Ref. No. 094a/10) as Standard Response.

  Note: *FM and LPCB do not approve concealed sprinklers for quick response.*

- TY3551 (5 mm Bulb) is UL Listed, C-UL Listed, FM Approved, LPCB Approved (Ref. No. 094a/9), and NYC Approved (MEA 353-01-E) as Standard Response.

Approvals for Air and Dust Seal
UL and C-UL Listed for use with the RFII Standard Response Concealed Sprinkler (TY3551)

Maximum Working Pressure
Maximum 250 psi (17,3 bar) by UL, C-UL, and NYC

Maximum 175 psi (12,1 bar) by FM, VdS, and LPCB

Temperature Rating
155°F (68°C) Sprinkler with 139°F (59°C) Cover Plate

200°F (93°C) Sprinkler with 165°F (74°C) Cover Plate

Discharge Coefficient
K= 5.6 GPM/psi$^{1/2}$ (80,6 LPM/bar$^{1/2}$)

Adjustment
1/2 in. (12,7 mm)

Finishes
See the Ordering Procedure section.

Physical Characteristics

Frame	Bronze
Support Cup	Plated Steel
Guide Pins	Stainless Steel
Deflector	Bronze
Compression Screw	Brass
Bulb	Glass
Cap	Bronze or Copper
Sealing Assembly	Beryllium Nickel w/TEFLON
Cover Plate	Brass
Retainer	Brass
Ejection Spring	Stainless Steel

Design Criteria

The TYCO Series RFII 5.6 K-factor, "Royal Flush II" Concealed Pendent Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency; for example, UL Listing is based on NFPA 13 and VdS Approval is based on the CEA 4001.

For more information on LPCB and VdS Approvals, contact Johnson Controls at the following office:

Enschede, Netherlands
Telephone: 31-53-428-4444
Fax: 31-53-428-3377

The Series RFII Concealed Pendent Sprinklers are only listed and approved with the Series RFII Concealed Cover Plates having a factory applied finish.

NOTICE

Do not use the Series RFII in applications where the air pressure above the ceiling is greater than that below. Down drafts through the Sprinkler/Support Cup Assembly can delay sprinkler operation in a fire situation.

Operation

When exposed to heat from a fire, the Cover Plate, normally soldered to the Retainer at three points, falls away to expose the Sprinkler/Support Cup Assembly.

The Deflector — supported by the Guide Pins — then drops down to its operational position.

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

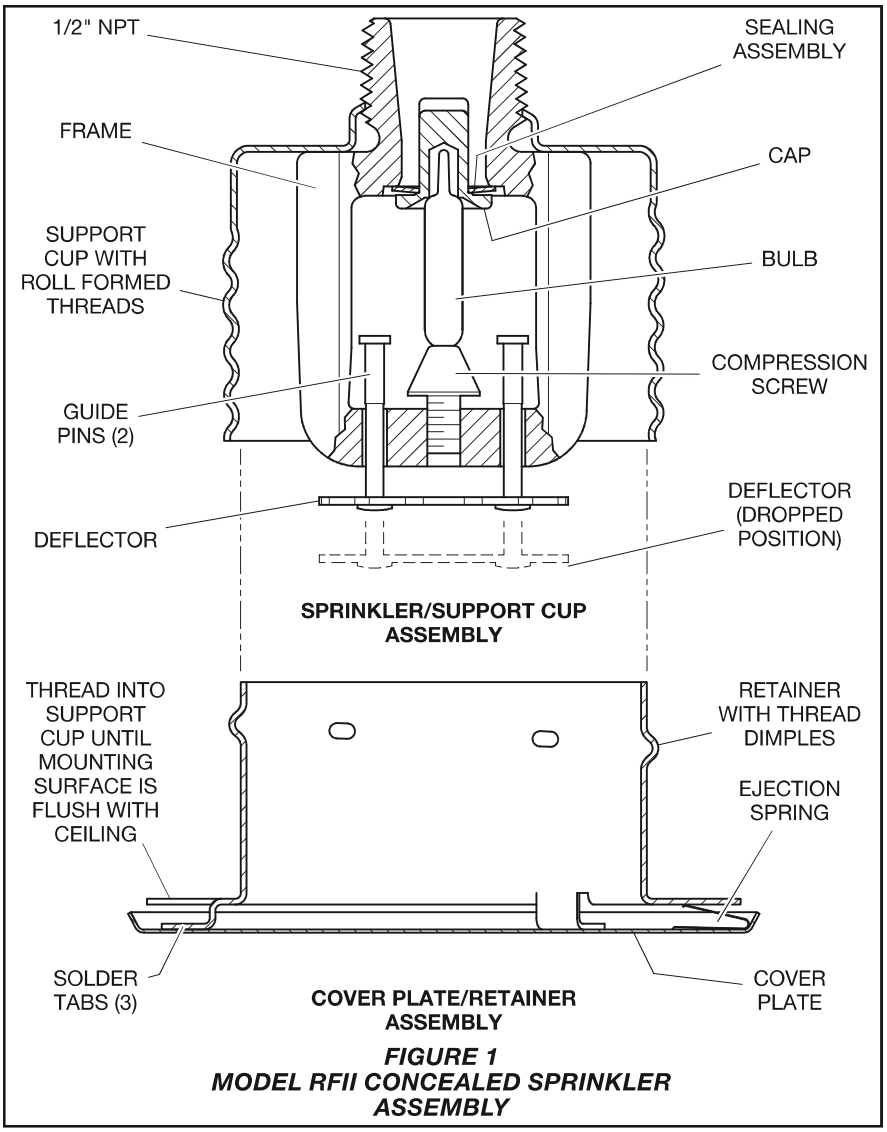


FIGURE 1
MODEL RFII CONCEALED SPRINKLER ASSEMBLY

Installation

The TYCO Series RFII 5.6 K-factor, "Royal Flush II" Concealed Pendent Sprinklers must be installed in accordance with this section.

General Instructions
Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 155°F (68°C) and 3/32 in. (2,4 mm) for the 200°F (93°C) temperature ratings.

A leak-tight 1/2 in. NPT sprinkler joint should be obtained by applying a minimum to maximum torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). Higher levels of torque can distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in the Sprinkler by under- or over-tightening the Sprinkler/Support Cup Assembly. Re-adjust the position of the sprinkler fitting to suit.

Step 1. Install the sprinkler only in the pendent position with the center-line of the sprinkler perpendicular to the mounting surface.

Step 2. Remove the Protective Cap.

Step 3. With pipe thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 4. Wrench-tighten the sprinkler using only the RFII Sprinkler Wrench. See Figure 3. Apply the RFII Sprinkler Wrench to the Sprinkler as shown in Figure 3.

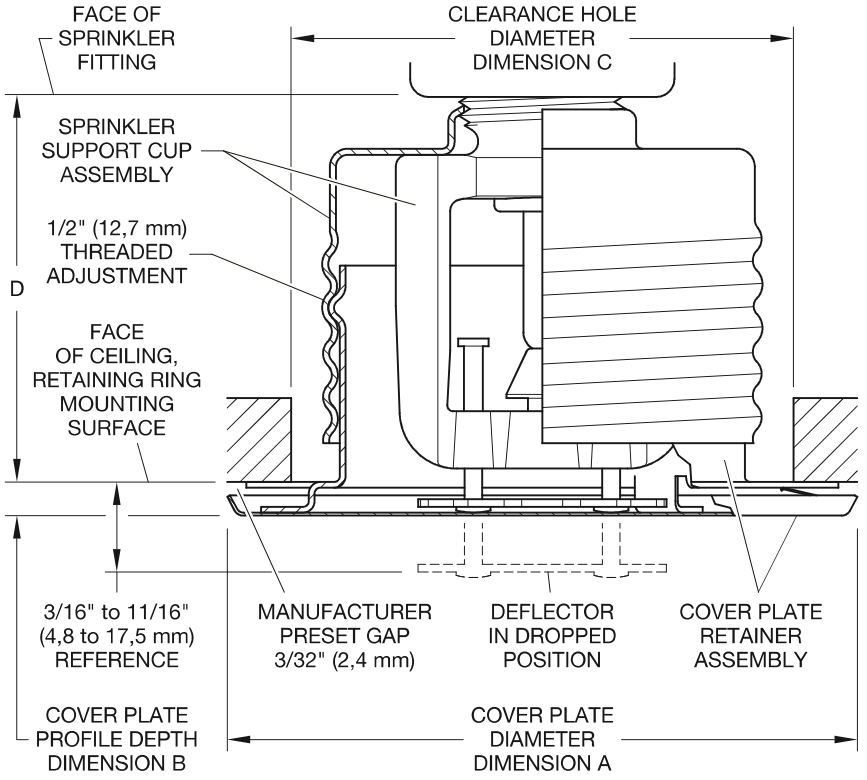


FIGURE 2
SERIES CONCEALED SPRINKLER INSTALLATION DIMENSIONS

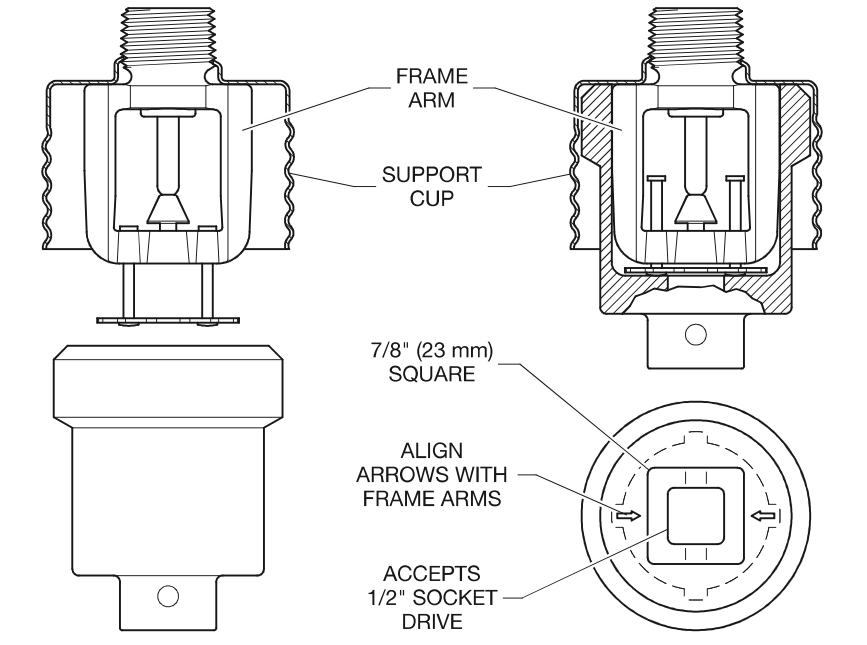


FIGURE 3
RFII SPRINKLER WRENCH

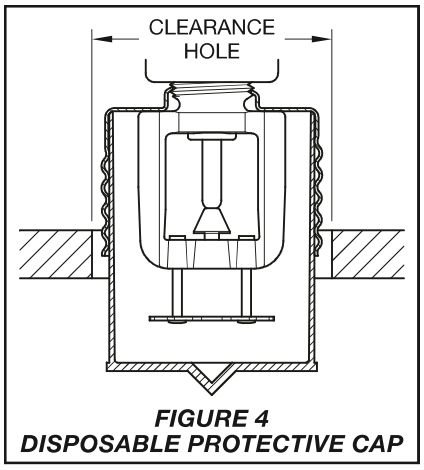


FIGURE 4
DISPOSABLE PROTECTIVE CAP

Step 5. Replace the Protective Cap by pushing it upwards until it bottoms out against the Support Cup. See Figure 4. The Protective Cap helps prevent damage to the Deflector and Arms during ceiling installation and/or finish. You can also use the Protective Cap to locate the center of the clearance hole by gently pushing the ceiling material up against the center point of the Protective Cap.

NOTICE

As long as the Protective Cap remains in place, the system is considered "Out of Service".

Step 6. After the ceiling has been completed with the 2-1/2 in. (63,5 mm) diameter clearance hole and in preparation for installing the Cover Plate/Retainer Assembly, remove and discard the Protective Cap. Verify that the Deflector moves up and down freely.

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

Step 7. When installing an Air and Dust Seal, see Figure 5; otherwise, proceed to Step 8. To attach the Air and Dust Seal, verify the angle of the outside edge of the seal is oriented according to Figure 5. Start the edge of the Retainer in the grooved slot of the Air and Dust Seal and continue around the retainer until the entire Air and Dust Seal is engaged.

Step 8. Screw on the Cover Plate/Retainer Assembly until the Retainer, shown in Figure 2, or the Air and Dust Seal, shown in Figure 5, contacts the ceiling. Do not continue to screw on the Cover Plate/Retainer Assembly so that it lifts a ceiling panel out of its normal position. If you cannot engage the Cover Plate/Retainer Assembly with the Support Cup or you cannot engage the Cover Plate/Retainer Assembly sufficiently to contact the ceiling, you must reposition the Sprinkler Fitting.

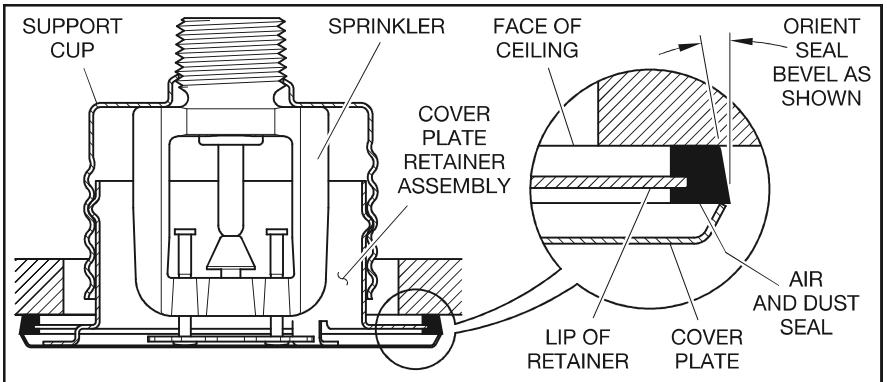


FIGURE 5
OPTIONAL AIR AND DUST SEAL FOR SERIES RFII (TY3551)

Care and Maintenance

The TYCO Series RFII 5.6 K-factor, "Royal Flush II" Concealed Pendent Sprinklers must be maintained and serviced in accordance with this section.

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

Absence of the Cover Plate/Retainer Assembly can delay sprinkler operation in a fire situation.

When properly installed, there is a nominal 3/32 in. (2,4 mm) air gap between the lip of the Cover Plate and the ceiling, as shown in Figure 2.

This air gap is necessary for proper operation of the sprinkler. If the ceiling requires repainting after sprinkler installation, ensure that the new paint does not seal off any of the air gap.

Do not pull the Cover Plate relative to the Enclosure. Separation may result.

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

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

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

Exercise care to avoid damage to sprinklers before, during, and after installation. Replace sprinklers damaged by dropping, striking, wrench twisting, wrench slipping, or the like. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. See the Installation section.

If you must remove a sprinkler, do not reinstall it or a replacement without reinstalling the Cover Plate/Retainer Assembly. If a Cover Plate/Retainer Assembly becomes dislodged during service, replace it immediately.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the NATIONAL FIRE PROTECTION ASSOCIATION, for example, NFPA 25, in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or sprinkler manufacturer regarding any questions.

Automatic sprinkler systems should be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national code.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

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

Sprinkler/Support Cup Assembly
Specify: Series RFII (specify SIN), K=5.6, "Royal Flush II" Pendent Sprinklers (specify) temperature rating, P/N* (specify):

	155°F (68°C)	200°F (93°C)
TY3531	51-792-1-155	51-792-1-200
TY3551	51-790-1-155	51-790-1-200

* Use Suffix "I" for ISO 7-1 connection; for example, 51-792-1-155-I

Separately Ordered Cover Plate/ Retainer Assembly:
Specify: (temperature rating from below) Series RFII Concealed Cover Plate with (finish), P/N (specify).

	139°F (59°C)(a)	165°F (74°C)(b)
Grey White (RAL9002)	56-792-0-135	56-792-0-165
Brass	56-792-1-135	56-792-1-165
Pure White (c) (RAL9010)	56-792-3-135	56-792-3-165
Signal White (RAL9003)	56-792-4-135	56-792-4-165
Jet Black (RAL9005)	56-792-6-135	59-792-6-165
Brushed Chrome	56-792-8-135	56-792-8-165
Chrome	56-792-9-135	56-792-9-165
Custom	56-792-X-135	56-792-X-165

(a) For use with 155°F (68°C) sprinklers.
(b) For use with 200°F (93°C) sprinklers.
(c) Eastern Hemisphere sales only.

Sprinkler Wrench
Specify: RFII Sprinkler Wrench, P/N 56-000-1-075

Air and Dust Seal
Specify: Air and Dust Seal, P/N 56-908-1-001

1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700

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TEFLON is a registered trademark of DuPont

Johnson Controls

Series TY-FRB – 2.8, 4.2, 5.6, and 8.0 K-Factor Upright, Pendent, and Recessed Pendent Sprinklers Quick Response, Standard Coverage

General Description

The TYCO Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent Sprinklers described in herein are quick response, standard coverage, decorative 3 mm glass bulb-type spray sprinklers. They are designed for use in light or ordinary hazard, commercial occupancies such as banks, hotels, and shopping malls.

The TY-FRB Recessed Pendent Sprinkler, where applicable, is intended for use in areas with a finished ceiling. This recessed pendent sprinkler uses one of the following Recessed Escutcheons:

- A two-piece Style 10 (1/2 in. NPT) or Style 40 (3/4 in. NPT) Recessed Escutcheon with 1/2 in. (12,7 mm) of recessed adjustment or up to 3/4 in. (19,1 mm) of total adjustment from the flush pendent position.
- A two-piece Style 20 (1/2 in. NPT) or Style 30 (3/4 in. NPT) Recessed Escutcheon with 1/4 in. (6,4 mm) of recessed adjustment or up to 1/2 in. (12,7 mm) of total adjustment from the flush pendent position.

The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut.

Corrosion-resistant coatings, where applicable, are utilized to extend the life of copper alloy sprinklers beyond what would be obtained when exposed to corrosive atmospheres. Although corrosion-resistant coated sprinklers have passed the standard corrosion tests of the applicable approval agencies, the testing is not representative of all possible corrosive atmospheres. Consequently, it is recommended that the end user be consulted with respect to the suitability of these coatings for any given corrosive environment. The effects of ambient temperature, concentration of chemicals, and gas/chemical velocity, should be considered, as a minimum, along with the corrosive nature of the chemical to which the sprinklers will be exposed.

An intermediate level version of the Series TY-FRB Pendent Sprinklers is detailed in Technical Data Sheet TFP356. Sprinkler Guards are detailed in Technical Data Sheet TFP780.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

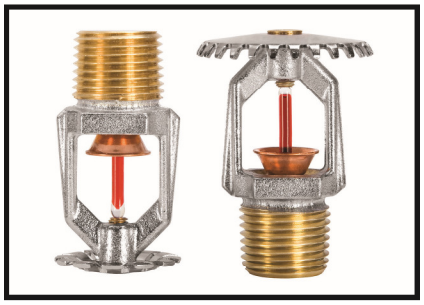
Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail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

NOTICE

The Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent Sprinklers described herein must be installed and maintained in compliance with this document and with the applicable standards of the National Fire Protection Association (NFPA), in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

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

NFPA 13 prohibits installation of 1/2 in. NPT sprinklers with K-factors greater than 5.6 in new construction. They are intended for retrofit in existing sprinkler systems only.





Sprinkler Identification Number (SIN)

TY1131 . . . Upright 2.8K, 1/2 in. NPT
TY1231 . . Pendent 2.8K, 1/2 in. NPT
TY2131 . . . Upright 4.2K, 1/2 in. NPT
TY2231 . . Pendent 4.2K, 1/2 in. NPT
TY3131 . . . Upright 5.6K, 1/2 in. NPT
TY3231 . . Pendent 5.6K, 1/2 in. NPT
TY4131 . . . Upright 8.0K, 3/4 in. NPT
TY4231 . . Pendent 8.0K, 3/4 in. NPT
TY4831 . . . Upright 8.0K, 1/2 in. NPT
TY4931 . . Pendent 8.0K, 1/2 in. NPT

Technical Data

Approvals
UL and C-UL Listed
FM, LPCB, and NYC Approved

Refer to Table A and B for complete approval information including corrosion-resistant status.

Maximum Working Pressure
Refer to Table C

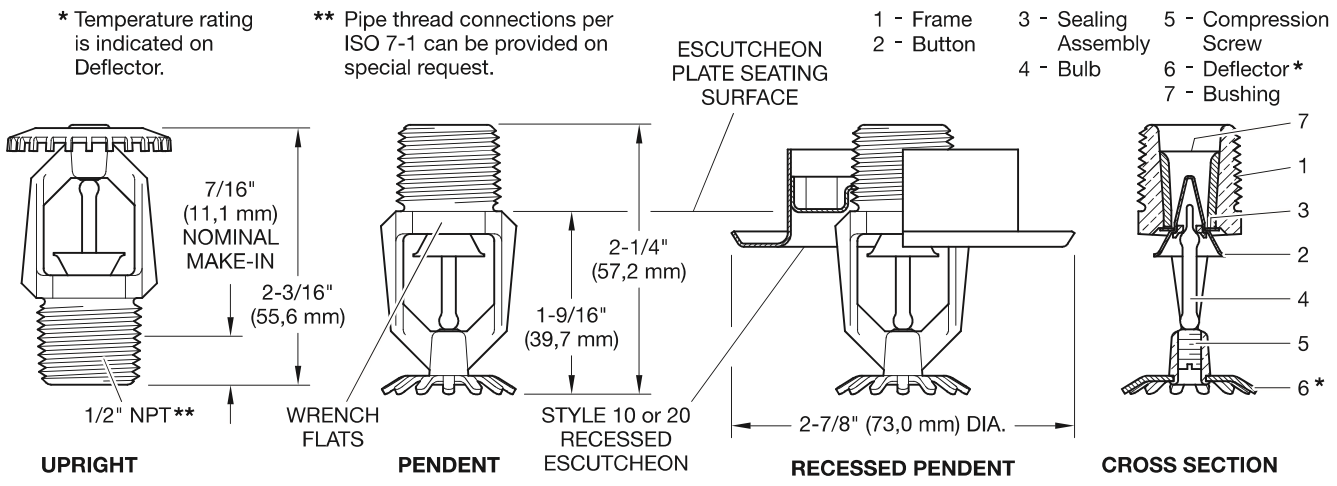


FIGURE 1
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY1131) AND PENDENT (TY1231) SPRINKLERS
2.8 K-FACTOR, 1/2 IN. NPT

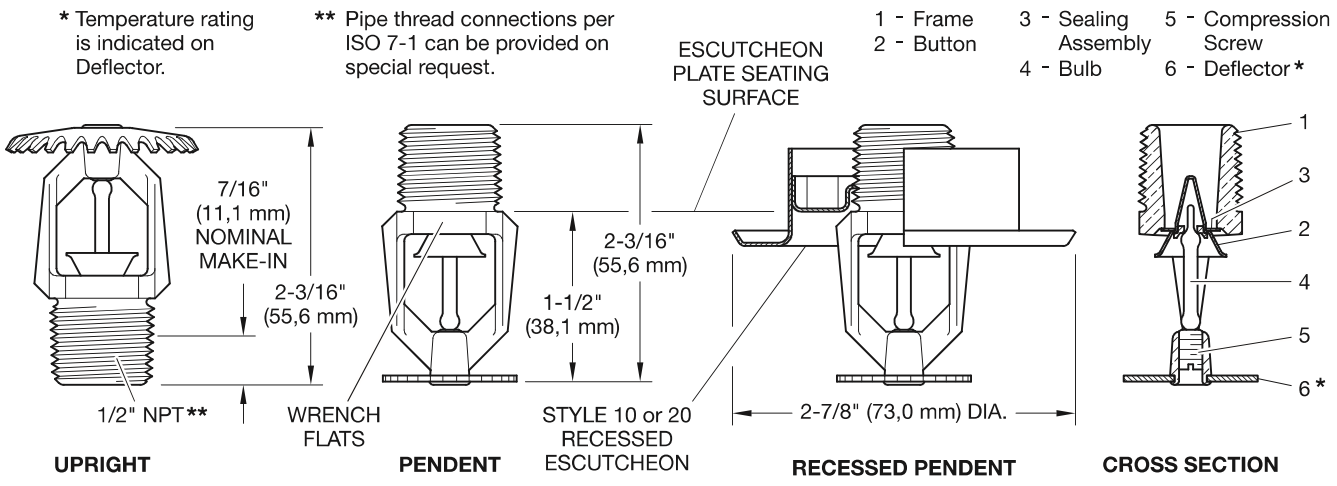


FIGURE 2
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY2131) AND PENDENT (TY2231) SPRINKLERS
4.2 K-FACTOR, 1/2 IN. NPT

Discharge Coefficient
K=2.8 GPM/psi½ (40,3 LPM/bar½)
K=4.2 GPM/psi½ (60,5 LPM/bar½)
K=5.6 GPM/psi½ (80,6 LPM/bar½)
K=8.0 GPM/psi½ (115,2 LPM/bar½)

Temperature Rating
Refer to Table A and B

Finishes
Sprinkler: Refer to Table D

Recessed Escutcheon: Signal or Pure White, Grey Aluminum, Jet Black, Chrome Plated, or Natural Brass

Physical Characteristics
Frame . . . . . Bronze
Button . . . . . Brass/Copper
Sealing Assembly . . Beryllium Nickel w/TEFLON
Bulb . . . . . Glass
Compression Screw . . . . . Bronze
Deflector . . . . . Copper/Bronze
Bushing (K=2.8) . . . . . Bronze

Poly-Stainless
Physical Characteristics
Frame . . . . . Bronze
Button . . . . . L316 Stainless Steel*
Bulb . . . . . Glass
Compression Screw . . . . . L316 Stainless Steel*
Deflector . . . . . Copper/Bronze
Sealing Assembly . Gold Plated Beryllium Nickel w/TEFLON

*Type L316 stainless steel (UNS 31603) per ASTM A479/479M or BS EN 1008 WN1.4404.

Operation

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

Design Criteria

The TYCO Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency, such as UL Listing based on the requirements of NFPA 13 and FM Approval based on the requirements of the FM Global Loss Prevention Data Sheets. Use only the style 10, 20, 30, or 40 Recessed Escutcheon, as applicable, for recessed pendent installations.

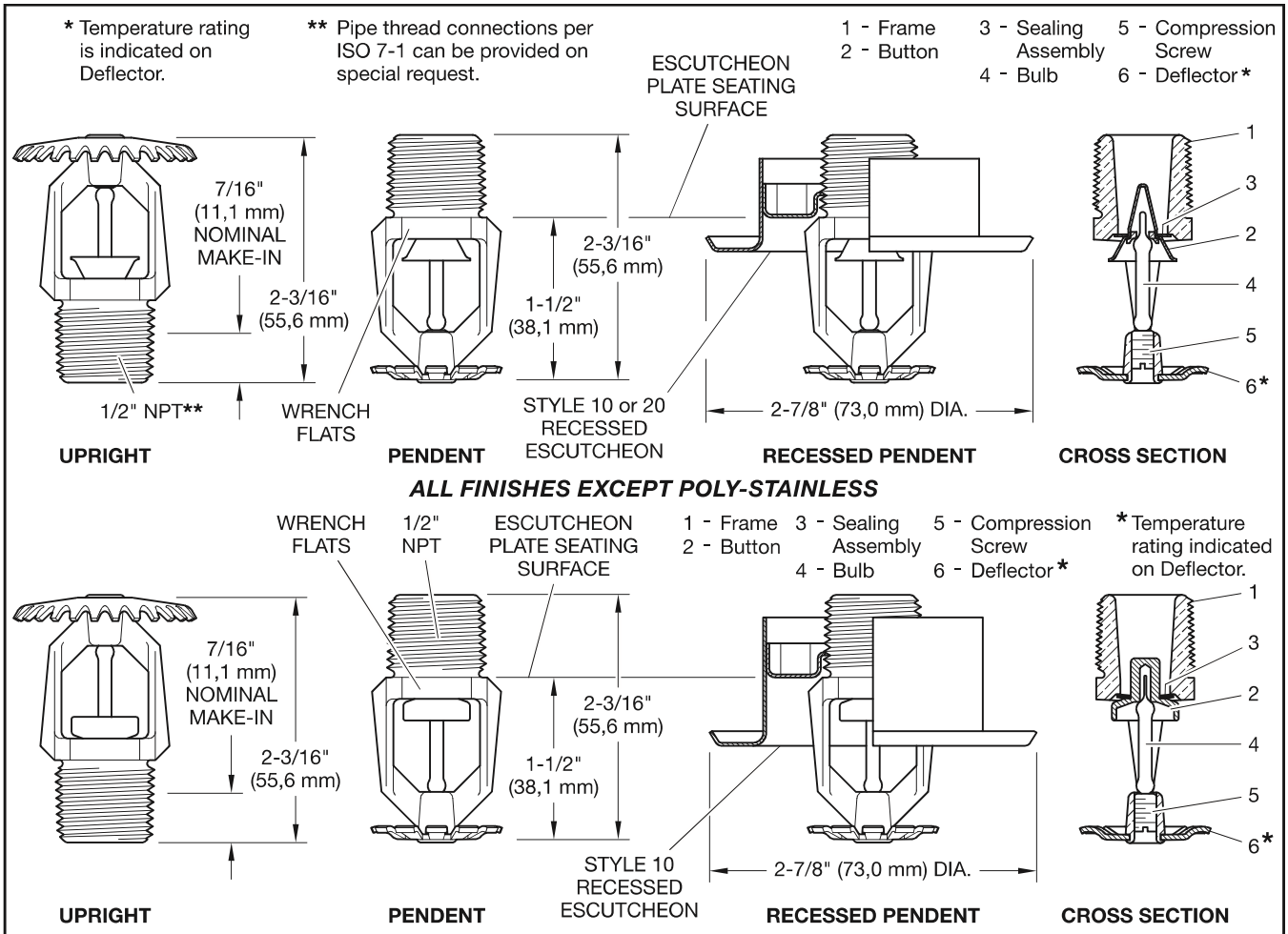


FIGURE 3
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY3131) AND PENDENT (TY3231) SPRINKLERS
5.6 K-FACTOR, 1/2 IN. NPT

Installation

The TYCO Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent Sprinklers must be installed in accordance with this section.

General Instructions
Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) and 3/32 in. (2,4 mm) for the 286°F (141°C) temperature ratings. A leak-tight 1/2 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). A leak tight 3/4 in. NPT sprinkler joint should be obtained with a torque of 10 to 20 lb-ft (13,4 to 26,8 N·m). Higher levels of torque can distort the sprinkler inlet and cause leakage or impairment of the sprinkler. Do not attempt to compensate for insufficient adjustment in the escutcheon plate by under- or over-tightening the sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Series TY-FRB Upright and Pendent Sprinklers
The Series TY-FRB Upright and Pendent Sprinklers must be installed in accordance with the following instructions:

Step 1. Install pendent sprinklers in the pendent position. Install upright sprinklers in the upright position.

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

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (Ref. Figure 14). With reference to Figure 1 to Figure 5, apply the W-Type 6 Sprinkler Wrench to the sprinkler wrench flats.

Series TY-FRB Recessed Pendent Sprinklers
The Series TY-FRB Recessed Pendent Sprinklers must be installed in accordance with the following instructions:

Step 1. After installing the Style 10, 20, 30, or 40 Mounting Plate, as applicable, over the sprinkler threads and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 2. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (Ref. Figure 15). With reference to Figure 1 to 4, apply the W-Type 7 Recessed Sprinkler Wrench to the sprinkler wrench flats.

Step 3. After the ceiling is installed or the finish coat is applied, slide on the Style 10, 20, 30, or 40 Closure over the Series TY-FRB Recessed Pendent Sprinkler and push the Closure over the Mounting Plate until its flange comes in contact with the ceiling.

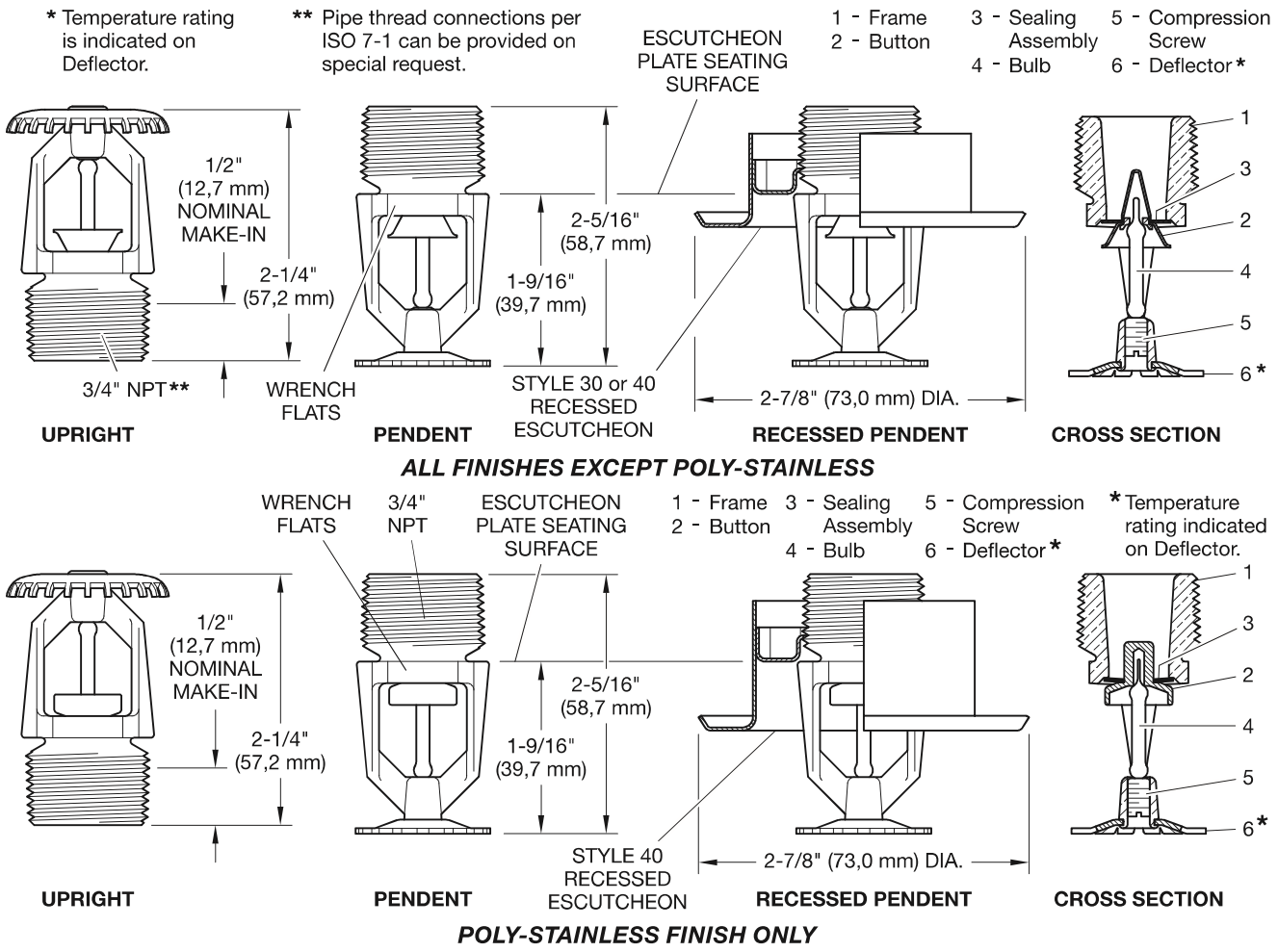


FIGURE 4
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY4131) AND PENDENT (TY4231) SPRINKLERS
8.0 K-FACTOR, 3/4 IN. NPT

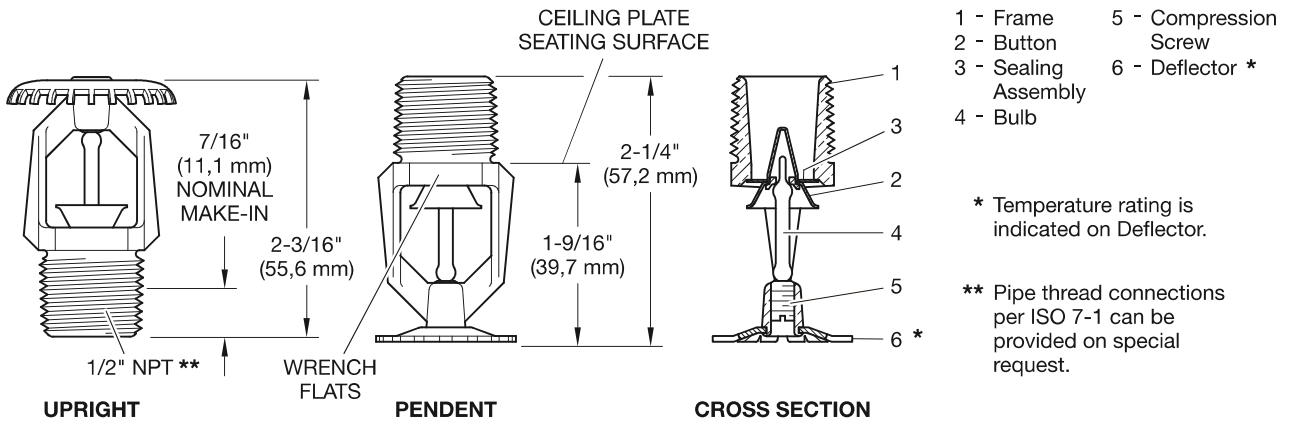


FIGURE 5
QUICK RESPONSE SERIES TY-FRB UPRIGHT (TY4831) AND PENDENT (TY4931) SPRINKLERS
8.0 K-FACTOR, 1/2 IN. NPT

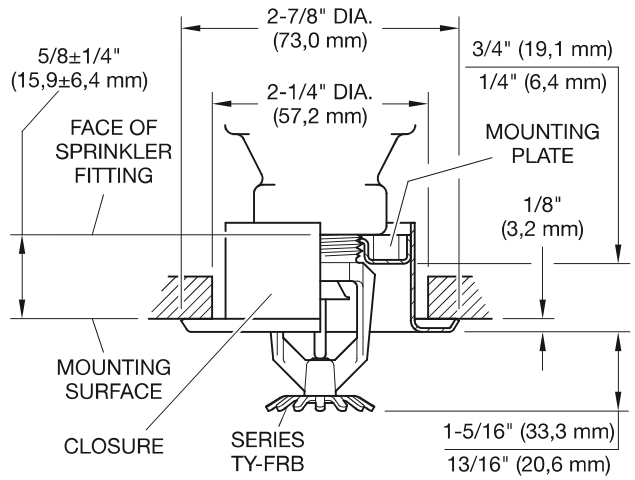


FIGURE 6
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
2.8 K-FACTOR, 1/2 IN. NPT

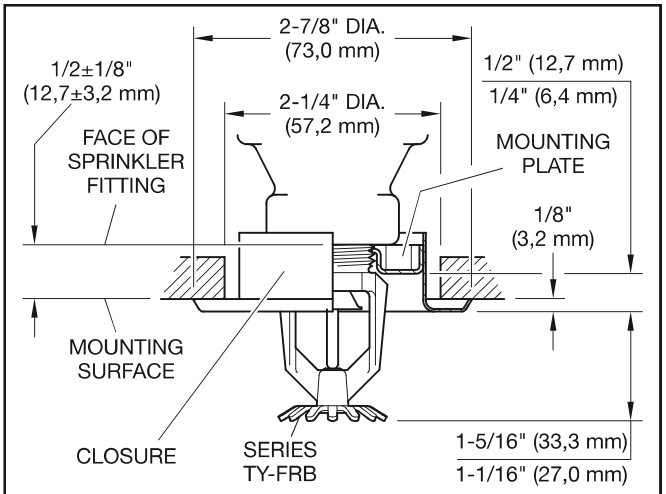


FIGURE 7
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
2.8 K-FACTOR, 1/2 IN. NPT

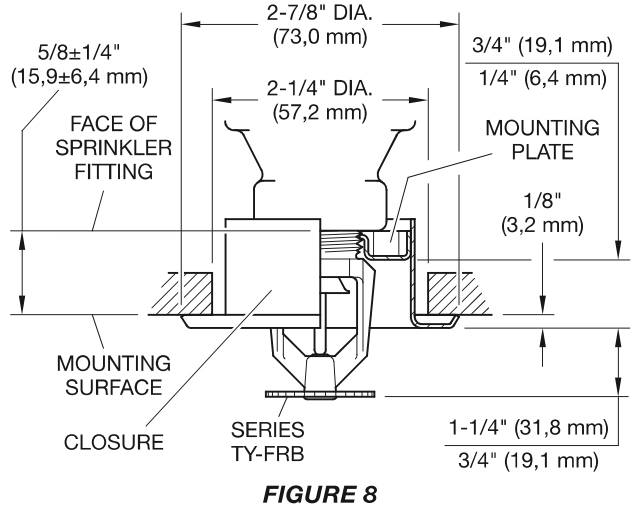


FIGURE 8
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
4.2 K-FACTOR, 1/2 IN. NPT

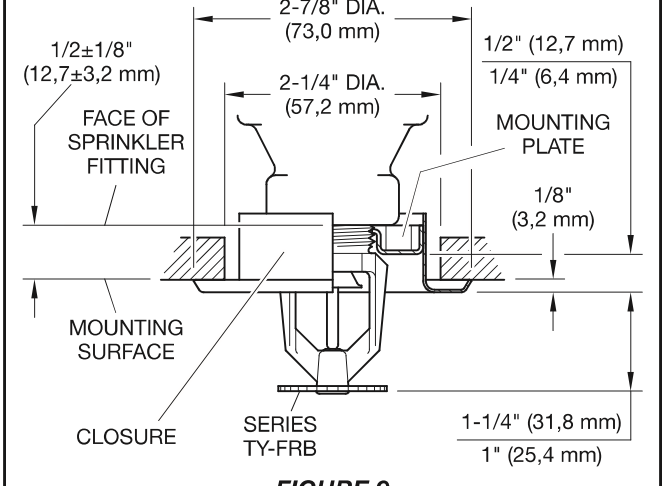


FIGURE 9
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
4.2 K-FACTOR, 1/2 IN. NPT

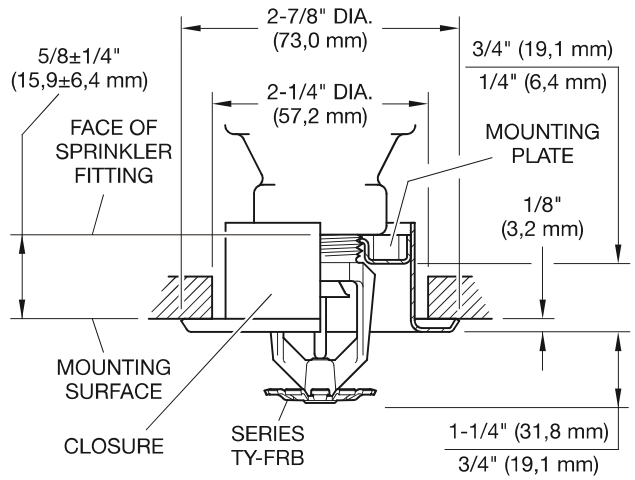


FIGURE 10
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 10 RECESSED ESCUTCHEON
5.6 K-FACTOR, 1/2 IN. NPT

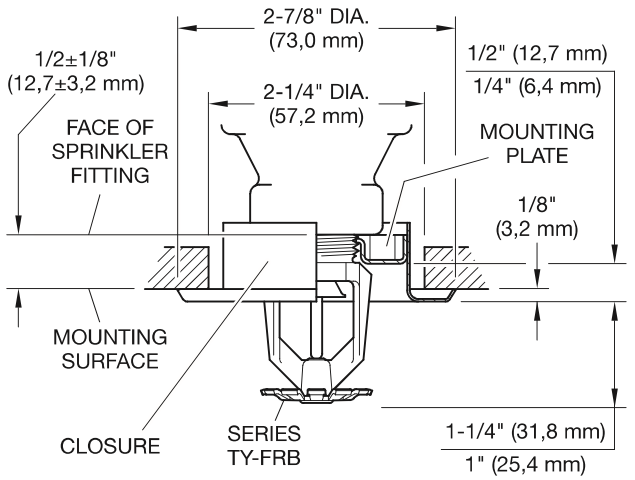


FIGURE 11
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 20 RECESSED ESCUTCHEON
5.6 K-FACTOR, 1/2 IN. NPT

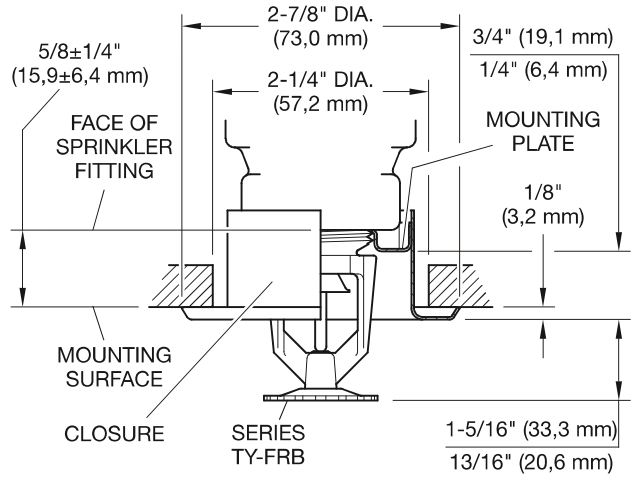


FIGURE 12
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 3/4 INCH TOTAL ADJUSTMENT
STYLE 40 RECESSED ESCUTCHEON
8.0 K-FACTOR, 3/4 IN. NPT

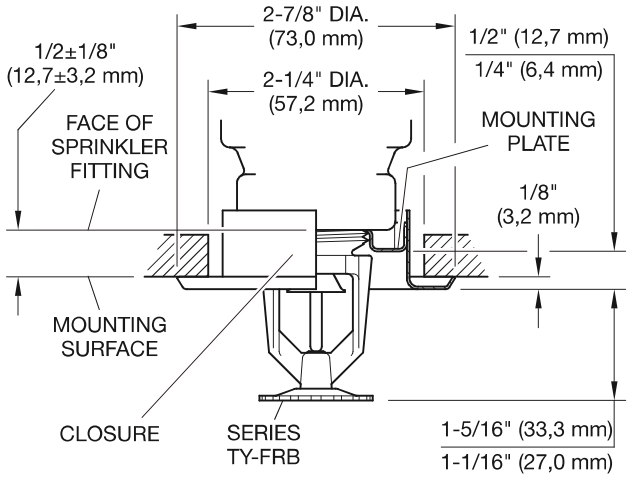


FIGURE 13
SERIES TY-FRB RECESSED PENDENT
WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT
STYLE 30 RECESSED ESCUTCHEON
8.0 K-FACTOR, 3/4 IN. NPT

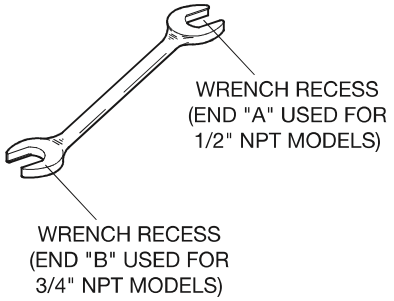


FIGURE 14
W-TYPE 6 SPRINKLER
WRENCH

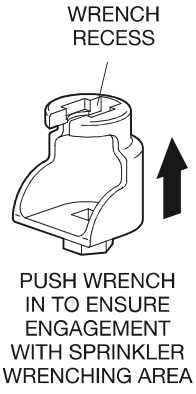


FIGURE 15
W-TYPE 7 RECESSED
SPRINKLER WRENCH

K-Factor	Type	Temperature	Sprinkler Finish[5]			
			Bulb Liquid Color	Natural Brass	Chrome Plated	Polyester[c]
2.8 1/2 in. NPT	Pendent (TY1231) and Upright (TY1131)	135°F (57°C)	Orange	1, 2, 3, 4		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	Recessed Pendent (TY1231)[a] Figure 6	135°F (57°C)	Orange	1, 2, 4		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
	Recessed Pendent (TY1231)[b] Figure 7	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
4.2 1/2 in. NPT	Pendent (TY2231) and Upright (TY2131)	135°F (57°C)	Orange	1, 2		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
	Recessed Pendent (TY2231)[a] Figure 8	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
	Recessed Pendent (TY2231)[b] Figure 9	135°F (57°C)	Orange			
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			

NOTES
a. Installed with Style 10 (1/2 in. NPT) or Style 40 (3/4 in. NPT) 3/4 in. Total Adjustment Recessed Escutcheon, as applicable.
b. Installed with Style 20 (1/2 in. NPT) or Style 30 (3/4 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon, as applicable.
c. Frame and Deflector only.
1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the City of New York under MEA 354-01-E.
5. Where Polyester Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed, the sprinklers are UL and C-UL Listed as corrosion-resistant sprinklers.

TABLE A
LABORATORY LISTINGS AND APPROVALS FOR
2.8 AND 4.2 K-FACTOR SPRINKLERS

			Sprinkler Finish[8]					
K-Factor	**Type**	**Temperature**	**Bulb Liquid Color**	**Natural Brass**	**Chrome Plated**	**Polyester[c]**	**Poly-Stainless[c]**	**Lead Coated**
5.6 1/2 in. NPT	**Pendent (TY3231) and Upright (TY3131)**	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6, 7			1, 2	1, 2, 3, 5
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Recessed Pendent (TY3231)[a] Figure 10	135°F (57°C)	Orange	1, 2, 4, 5			1, 2	N/A[d]
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Recessed Pendent (TY3231)[b] Figure 11	135°F (57°C)	Orange	1, 2, 3, 4, 5			N/A	N/A
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
8.0 3/4 in. NPT	**Pendent (TY4231) and Upright (TY4131)**	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6, 7			1, 2	1, 2, 5
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Recessed Pendent (TY4231)[a] Figure 12	135°F (57°C)	Orange	1, 2, 5			1, 2	N/A
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
	Recessed Pendent (TY4231)[b] Figure 13	135°F (57°C)	Orange	1, 2, 3, 5			N/A	N/A
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					
8.0 1/2 in. NPT	**Pendent (TY4931) and Upright (TY4831)**	135°F (57°C)	Orange	1, 2, 4, 5, 6			N/A	1, 2, 5
		155°F (68°C)	Red					
		175°F (79°C)	Yellow					
		200°F (93°C)	Green					
		286°F (141°C)	Blue					

NOTES
a. Installed with Style 10 (1/2 in. NPT) or Style 40 (3/4 in. NPT) 3/4 in. Total Adjustment Recessed Escutcheon, as applicable.
b. Installed with Style 20 (1/2 in. NPT) or Style 30 (3/4 in. NPT) 1/2 in. Total Adjustment Recessed Escutcheon, as applicable.
c. Frame and Deflector only.
d. Not Available (N/A)
1. Listed by Underwriters Laboratories, Inc., (UL) as Quick Response Sprinklers.
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL) as Quick Response Sprinklers.
3. Approved by Factory Mutual Research Corporation (FM) as Quick Response Sprinklers.
4. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 007k/04) as Quick Response Sprinklers. However, LPCB does not rate the thermal sensitivity of recessed sprinklers.
5. Approved by the City of New York under MEA 354-01-E.
6. VdS Approved (For details, contact Johnson Controls, Enschede, Netherlands, Tel. 31-53-428-4444/Fax 31-53-428-3377.)
7. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/06) as Quick Response Sprinklers.
8. Where Polyester Coated and Lead-Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers. Where Lead-Coated Sprinklers are noted to be FM Approved, the sprinklers are FM Approved as a Corrosion-Resistant Sprinklers.

TABLE B
LABORATORY LISTINGS AND APPROVALS FOR
5.6 AND 8.0 K-FACTOR SPRINKLERS

K-Factor	Type	Sprinkler Finish			
		Natural Brass	Chrome Plated	Polyester	Lead Coated
2.8 1/2 in. NPT	Pendent (TY1231) and Upright (TY1131)	175 psi (12,1 bar)			N/A[2]
	Recessed Pendent (TY1231)				
4.2 1/2 in. NPT	Pendent (TY2231) and Upright (TY2131)	175 psi (12,1 bar)			N/A
	Recessed Pendent (TY2231)				
5.6 1/2 in. NPT	Pendent (TY3231) and Upright (TY3131)	250 psi (17,2 bar) or 175 psi (12,1 bar)[1]			
	Recessed Pendent (TY3231)				
8.0 3/4 in. NPT	Pendent (TY4231) and Upright (TY4131)	175 psi (12,1 bar)			175 psi (12,1 bar)
	Recessed Pendent(TY4231)				N/A
8.0 1/2 in. NPT	Pendent (TY4931) and Upright (TY4831)	175 psi (12,1 bar)			175 psi (12,1 bar)

NOTES
1. The maximum working pressure of 250 psi (17,2 bar) only applies to the Listing by Underwriters Laboratories Inc. (UL); the Listing by Underwriters Laboratories, Inc. for use in Canada (C-UL); and, the Approval by the City of New York.
2. Not applicable (N/A).

TABLE C
MAXIMUM WORKING PRESSURE

Care and Maintenance

The TYCO Series TY-FRB 2.8, 4.2, 5.6, and 8.0 K-factor Upright, Pendent, and Recessed Pendent Sprinklers must be maintained and serviced in accordance with this section. Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the affected fire protection systems from the proper authorities and notify all personnel who may be affected by this action.

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, can delay sprinkler operation in a fire situation.

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

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

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

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

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

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

Initial and frequent visual inspections of random samples are recommended for corrosion-resistant sprinklers to verify the integrity of the corrosion-resistant material of construction. Thereafter, annual inspections per NFPA 25 should suffice.Inspections of corrosion-resistant sprinklers are recommended at close range, instead of from the floor level per NFPA. Inspection at close range can better determine the exact sprinkler condition and the long-term integrity of the corrosion-resistant material, which can be affected by the corrosive conditions present.

P/N 57 – XXX – X – XXX

		SIN
330	2.8K UPRIGHT (1/2 in. NPT)	TY1131
331	2.8K PENDENT (1/2 in. NPT)	TY1231
340	4.2K UPRIGHT (1/2 in. NPT)	TY2131
341	4.2K PENDENT (1/2 in. NPT)	TY2231
370	5.6K UPRIGHT (1/2 in. NPT)	TY3131
371	5.6K PENDENT (1/2 in. NPT)	TY3231
390	8.0K UPRIGHT (3/4 in. NPT)	TY4131
391	8.0K PENDENT (3/4 in. NPT)	TY4231
360	8.0K UPRIGHT (1/2 in. NPT)	TY4831
361	8.0K PENDENT (1/2 in. NPT)	TY4931

	SPRINKLER FINISH
1	NATURAL BRASS
2	POLY-STAINLESS GREY ALUMINUM (RAL9007)[1] POLYESTER
3	PURE WHITE POLYESTER (RAL9010)[2]
4	SIGNAL WHITE POLYESTER (RAL9003)
5	JET BLACK POLYESTER (RAL9005)[3]
7	LEAD COATED
9	CHROME PLATED

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

NOTES
1. Available only on TY3131, TY3231, TY4131, and TY4231
2. Eastern Hemisphere sales only.
3. Available in only 2.8K, 4.2K, and 8.0K, 155°F (68°C) and 200°F (93°C); requires longer lead time to manufacture.

TABLE D
SERIES TY-FRB PENDENT AND UPRIGHT SPRINKLERS
PART NUMBER SELECTION

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler Assemblies with NPT Thread Connections
Specify: Series TY-FRB (Specify SIN), (specify K-factor), (specify Pendent or Upright) Sprinkler (specify) temperature rating, (specify) finish or coating, P/N (specify from Table D)

Recessed Escutcheon
Specify: Style (10, 20, 30, or 40) Recessed Escutcheon with (specify*) finish, P/N (specify*)

* Refer to Technical Data Sheet TFP770

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

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

1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700

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Johnson Controls

Series TY-B, 5.6 K-factor Upright, Pendent, and Recessed Pendent Sprinklers Standard Response, Standard Coverage

General Description

The TYCO Series TY-B, 5.6 K-factor, Upright (TY315) and Pendent (TY325) Sprinklers described in this data sheet are standard response, standard coverage, decorative 5 mm glass bulb type spray sprinklers designed for use in light, ordinary, or extra hazard, commercial occupancies such as banks, hotels, shopping malls, factories, refineries, and chemical plants.

The recessed version of the Series TY-B Pendent Sprinkler, where applicable, is intended for use in areas with a finished ceiling. This recessed pendent sprinkler uses one of the following:

- A two-piece Style 15 Recessed Escutcheon with recessed adjustment up to 5/8 in. (15,9 mm) from the flush pendent position.
- A two-piece Style 20 Recessed Escutcheon with recessed adjustment up to 1/2 in. (12,7 mm) from the flush pendent position.

The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut.

Intermediate level versions of Series TY-B Sprinklers are described in Technical Data Sheet TFP352. Sprinkler guards and shields are described in Technical Data Sheet TFP780.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

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

NOTICE

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

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Sprinkler Identification Numbers (SINs)

TY315 . . . . Upright 5.6K, 1/2 in. NPT
TY325 . . . .Pendent 5.6K, 1/2 in. NPT

Technical Data

Approvals
Refer to Table A

Maximum Working Pressure
175 psi (12.1 bar)
250 psi (17.2 bar)*

* The maximum working pressure of 250 psi (17.2 bar) only applies to the listing by Underwriters Laboratories, Inc. (UL).

Discharge Coefficient
K = 5.6 GPM/psi$^{1/2}$ (80,6 LPM/bar$^{1/2}$)

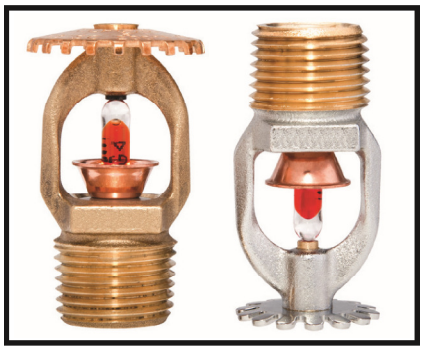
Temperature Ratings
Refer to Table A

Finishes
Sprinkler: Refer to Table B

Recessed Escutcheon: White Coated, Black Coated, Chrome Plated, or Brass Plated

Physical Characteristics

Frame	Bronze
Button	Brass/Copper
Sealing Assembly	Stainless Steel w/TEFLON
Bulb	Glass
Compression Screw	Bronze
Deflector	Bronze





Operation

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

Design Criteria

The TYCO Series TY-B, 5.6 K-factor, Upright (TY315) and Pendent (TY325) Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (e.g., UL Listing is based on the requirements of NFPA 13, and FM Approval is based on the requirements of the FM Loss Prevention Data Sheets). Only the Style 15 or Style 20 Recessed Escutcheon, as applicable, is to be used for recessed pendent installations.

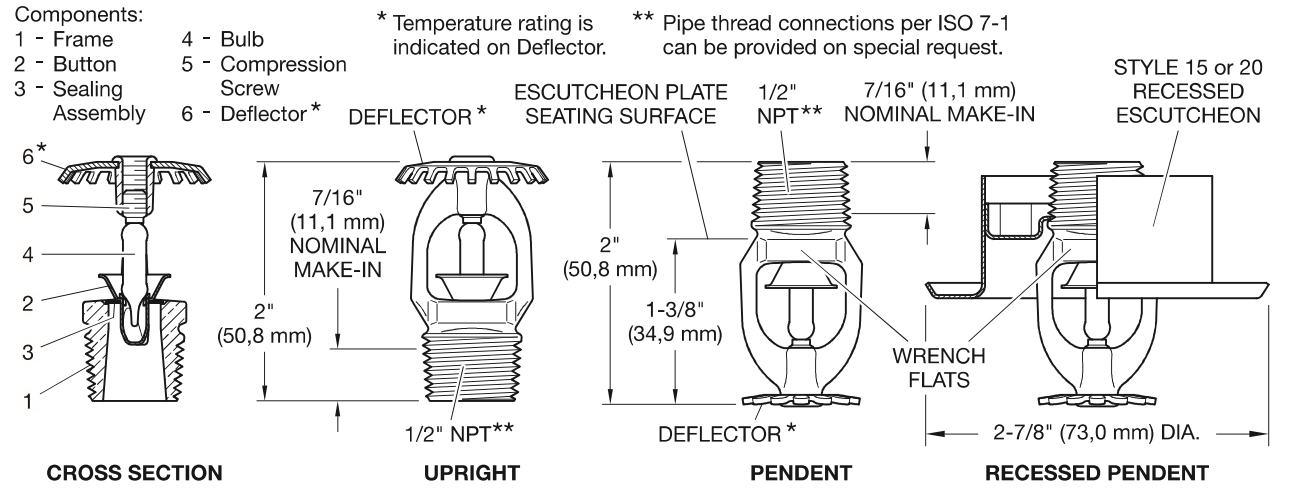


FIGURE 1
SERIES TY-B UPRIGHT (TY315) AND PENDENT (TY325) SPRINKLERS
5.6 K-FACTOR, 1/2 INCH NPT, STANDARD RESPONSE

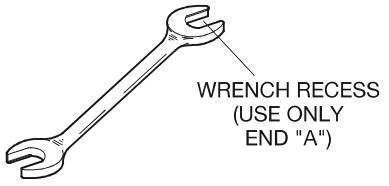


FIGURE 2
W-TYPE 6
SPRINKLER WRENCH

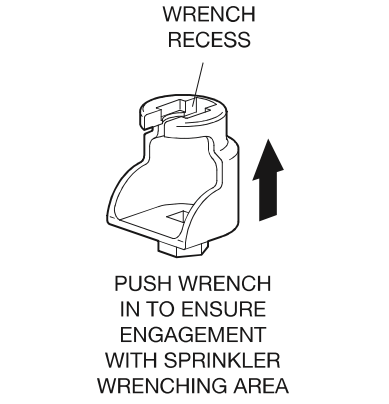


FIGURE 3
W-TYPE 7 RECESSED
SPRINKLER WRENCH

Installation

The TYCO Series TY-B, 5.6 K-factor, Upright (TY315) and Pendent (TY325) Sprinklers must be installed in accordance with this section.

General Instructions
Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) to 3/32 in. (2,4 mm) for the 360°F (182°C) temperature ratings.

A leak-tight 1/2 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). Higher levels of torque may distort the sprinkler inlet and cause leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in the escutcheon plate by under- or over-tightening the sprinkler. Readjust the position of the sprinkler fitting to suit.

Upright and Pendent Sprinklers
The Series TY-B Upright and Pendent Sprinklers must be installed in accordance with the following instructions.

Step 1. Install pendent sprinklers in the pendent position; install upright sprinklers in the upright position.

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

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 6 Sprinkler Wrench (Figure 2). With reference to Figure 1, apply the W-Type 6 Sprinkler Wrench to the wrench flats. Torque sprinklers 7 to 14 lb-ft (9,5 to 19,0 N·m).

Recessed Pendent Sprinklers
The Series TY-B Recessed Pendent Sprinklers must be installed in accordance with the following instructions.

Step A. After installing the Style 15 or Style 20 Mounting Plate, as applicable, over the sprinkler threads and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step B. Tighten the sprinkler into the sprinkler fitting using only the W-Type 7 Recessed Sprinkler Wrench (Figure 3). With reference to Figure 1, apply the W-Type 7 Recessed Sprinkler Wrench to the sprinkler wrench flats. Torque sprinklers 7 to 14 lb-ft (9,5 to 19,0 N·m).

Step C. After the ceiling is installed or the finish coat is applied, slide on the Style 15 or Style 20 Closure over the Series TY-B Sprinkler and push the Closure over the Mounting Plate until its flange contacts the ceiling.

Care and Maintenance

The TYCO Series TY-B, 5.6 K-factor, Upright (TY315) and Pendent (TY325) Sprinklers must be maintained and serviced in accordance with this section.

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

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, can delay sprinkler operation in a fire situation.

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

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

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

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

Thereafter, annual inspections per NFPA 25 are required; however, instead of inspecting from the floor level, a random sampling of close-up visual inspections should be made.

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

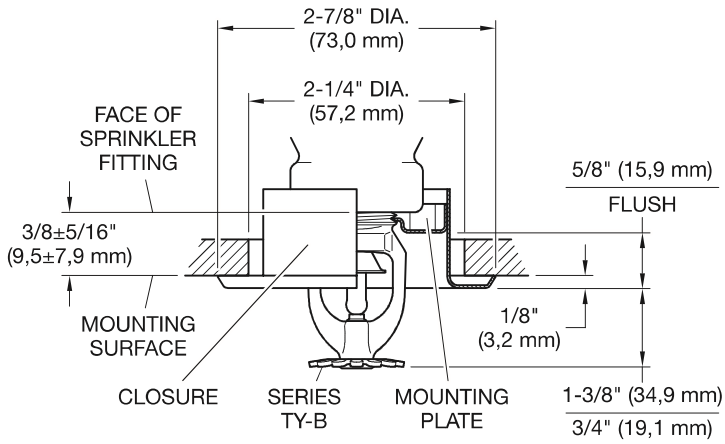


FIGURE 4
SERIES TY-B RECESSED PENDENT SPRINKLER ASSEMBLY (TY325) WITH TWO-PIECE 5/8 INCH TOTAL ADJUSTMENT STYLE 15 RECESSED ESCUTCHEON

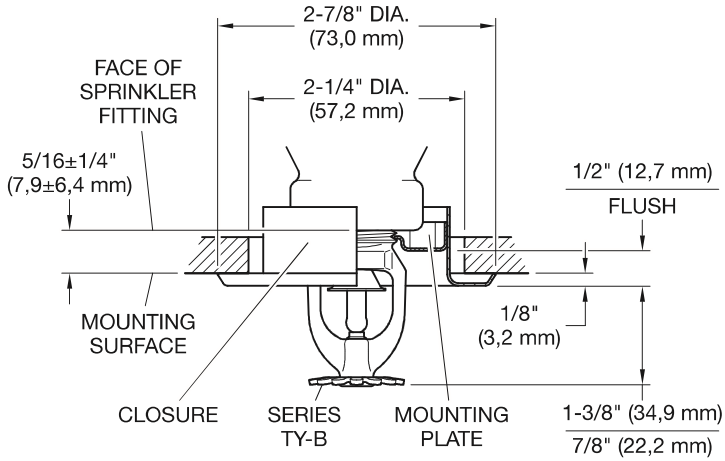


FIGURE 5
SERIES TY-B RECESSED PENDENT SPRINKLER ASSEMBLY (TY325) WITH TWO-PIECE 1/2 INCH TOTAL ADJUSTMENT STYLE 20 RECESSED ESCUTCHEON

Automatic sprinklers are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler Assemblies with NPT Thread Connections
Specify: Series TY-B Upright or Pendent (specify) Sprinkler, SIN (specify), K=5.6, Standard Response, (specify) temperature rating, (specify) finish, P/N (specify, refer to Table B)

Recessed Escutcheon
Specify: Style 15 Recessed Escutcheon with (specify*) finish, P/N (specify*)

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

* Refer to Technical Data Sheet TFP770

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

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

K	SPRINKLER TYPE	TEMPERATURE RATING	BULB LIQUID COLOR	SPRINKLER FINISH (7)		
				NATURAL BRASS	CHROME PLATED	POLYESTER**
5.6 1/2 in. NPT	UPRIGHT (TY315) and PENDENT (TY325) Figure 1	135°F (57°C)	Orange	1, 2, 3, 4, 5, 6,		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue			
		360°F (182°C)	Mauve			
	RECESSED PENDENT (TY325)* Figures 4 and 5	135°F (57°C)	Orange	1, 2, 3, 4,		
		155°F (68°C)	Red			
		175°F (79°C)	Yellow			
		200°F (93°C)	Green			
		286°F (141°C)	Blue	1, 2		

Notes:
1. Listed by Underwriters Laboratories, Inc. (UL)
2. Listed by Underwriters Laboratories, Inc. for use in Canada (C-UL)
3. Approved by FM Global (FM Approvals)
4. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 007k/03)
5. VdS Approved (For details contact Johnson Controls, Enschede, Netherlands, Tel. 31-53-428-4444 / Fax 31-53-428-3377)
6. Approved by the Loss Prevention Certification Board (LPCB Ref. No. 094a/05)
7. Where Polyester Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion-Resistant Sprinklers.

* Installed with Style 15 (1/2 in. NPT) 5/8 in. Total Adjustment Recessed Escutcheon, as applicable
** Frame and deflector only
N/A – Not Applicable

TABLE A
SERIES TY-B UPRIGHT AND PENDENT SPRINKLERS
LABORATORY LISTINGS AND APPROVALS

P/N* 77 – XXX – X – XXX

		SIN
570	5.6K UPRIGHT (1/2 in. NPT)	TY315
571	5.6K PENDENT (1/2 in. NPT)	TY325

	SPRINKLER FINISH
1	NATURAL BRASS
3	PURE WHITE (RAL9010)** POLYESTER
4	SIGNAL WHITE (RAL9003) POLYESTER
5	JET BLACK (RAL9005) POLYSTER
9	CHROME PLATED

	TEMPERATURE RATINGS
135	135°F (57°C)
155	155°F (68°C)
175	175°F (79°C)
200	200°F (93°C)
286	286°F (141°C)
360	360°F (182°C)
000	OPEN***

* Use suffix "I" for ISO 7-1 connection; for example, 77-570-4-175-I
** Eastern Hemisphere sales only
*** OPEN indicates sprinkler assembly without Glass Bulb, Button, and Sealing Assembly

TABLE B
SERIES TY-B UPRIGHT AND PENDENT SPRINKLERS
PART NUMBER SELECTION

1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700

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Johnson Controls

Series EC-11 and EC-14 Sprinklers, 11.2 K and 14.0 K Upright and Pendent Extended Coverage Light and Ordinary Hazard

General Description

TYCO Series EC-11 and EC-14 Extended Coverage Upright and Pendent Sprinklers are decorative glass-bulb sprinklers designed for use in light or ordinary hazard occupancies. They are intended for use in automatic sprinkler systems designed in accordance with standard installation rules, such as NFPA 13, for a maximum coverage area of 400 ft^2 (37,2 m^2) as compared to the maximum coverage area of 130 ft^2 (12,1 m^2) for standard coverage sprinklers used in ordinary hazard occupancies, Series EC-11 and EC-14 Extended Coverage Sprinklers feature a UL and C-UL Listing that permits their use with unobstructed or non-combustible obstructed ceiling construction as defined and permitted by NFPA 13, as well as a specific application listing for use under concrete tees.

Series EC-11 and EC-14 Extended Coverage Sprinklers have been fire tested to compare their performance to that of standard coverage spray sprinklers. These tests have shown that the protection provided is equal to or more effective than standard coverage spray sprinklers.

Corrosion-resistant coatings, where applicable, help extend the life of copper alloy sprinklers beyond that which occurs when exposed to corrosive atmospheres. Although corrosion-resistant coated sprinklers passed standard corrosion tests of the applicable approval agencies, this testing is not representative of all possible corrosive atmospheres. Consequently, it is recommended that the end user be consulted with respect to the suitability of these corrosion-resistant coatings for any given corrosive environment. The effects of ambient temperature, concentration of chemicals, and gas/chemical velocity should be considered, along with the corrosive nature of the chemical to which the sprinklers will be exposed.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

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

NOTICE

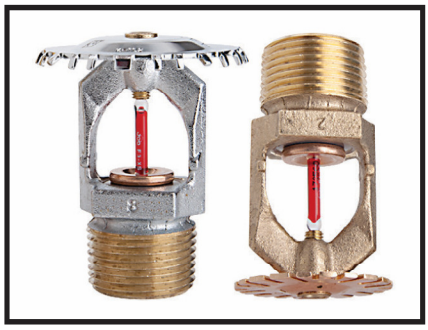
Series EC-11 and EC-14 Extended Coverage Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the NFPA, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Sprinkler Identification Numbers

TY5137 . . . . . Upright, 11.2K
TY5237 . . . . . .Pendent, 11.2K
TY6137 . . . . . Upright, 14.0K
TY6237 . . . . . Pendent, 14.0K

TY5137 is a re-designation for C5137, G1894, and S2510
TY5237 is a re-designation for C5237, G1893, and S2511
TY6137 is a re-designation for C6137, G1896, and S2610
TY6237 is a re-designation for C6237, G1895, and S2611





Technical Data

Approvals

TYCO Series EC-11 and EC-14 Extended Coverage Upright and Pendent Sprinklers are UL and C-UL Listed. Refer to Table A for complete sprinkler approval information including corrosion-resistant status. The approvals apply to the service conditions indicated in the Design Criteria section.

Series EC-11 and EC-14 Extended Coverage Sprinklers are FM Approved. Refer to Table A for complete sprinkler approval information including corrosion-resistant status. The approvals apply to the service conditions indicated in the Design Criteria section.

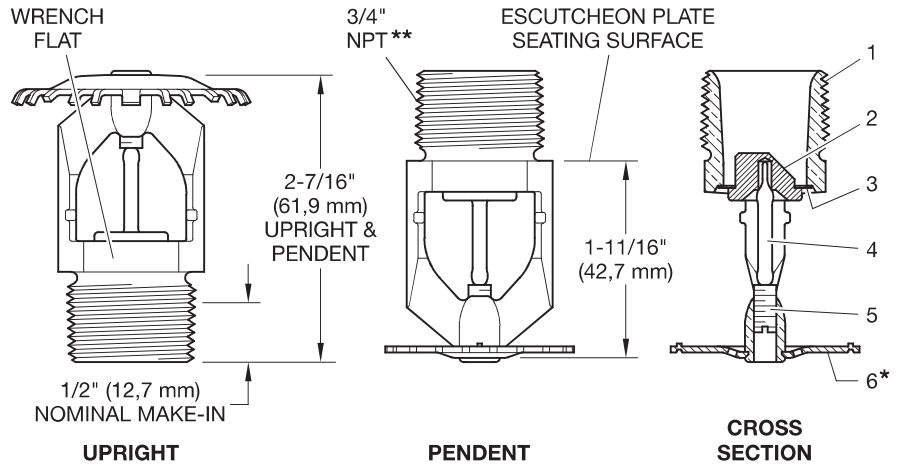


FIGURE 1
SERIES EC-11 AND EC-14 EXTENDED COVERAGE SPRINKLERS
11.2 K-FACTOR UPRIGHT (TY5137) AND PENDENT (TY5237)
14.0 K-FACTOR UPRIGHT (TY6137) AND PENDENT (TY6237)
ASSEMBLY

The Style 60 Two-Piece Flush Escutcheon (Figure 4) is UL Listed for use with the Series EC-11 and EC-14 Pendent Sprinklers.

Maximum Working Pressure
175 psi (12,1 bar)

Pipe Thread Connection
3/4 in. NPT

Discharge Coefficients
K = 11.2 GPM/psi½ (161,3 LPM/bar½)
K = 14.0 GPM/psi½ (201,6 LPM/bar½)

Temperature Ratings
Refer to Table A

Finish
Sprinkler:
Refer to Table A

Recessed or Flush Escutcheon: White-Coated, Chrome-Plated, and Brass-Plated

Physical Characteristics

Frame	Bronze
Button	Bronze
Sealing Assembly	Beryllium Nickel w/TEFLON
Bulb	Glass (3 mm)
Compression Screw	Bronze
Deflector	Brass

Operation

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, which- then allows the sprinkler to activate and flow water.

Design Criteria

TYCO Series EC-11 and EC-14 Extended Coverage Upright and Pendent Sprinklers must only be installed in accordance with the applicable UL and C-UL Listing or FM Approval requirements as indicated below. Only Style 30 or 40 Recessed Escutcheons are to be used for recessed installation, as applicable. Refer to Tables A, B, and C, for more information.

UL and C-UL Listing Requirements

1. Series EC-11 and EC-14 Extended Coverage Sprinklers may be used for the coverage areas shown in Table D, based on maintaining the minimum specified flow rate as a function of coverage area and hazard group for all sprinklers in the design area.
2. Series EC-11 and EC-14 Extended Coverage Sprinklers are permitted to be used with unobstructed or non-combustible obstructed ceiling construction as defined and permitted by NFPA 13; for example:
   - Unobstructed, combustible or noncombustible, ceiling construction with a deflector to ceiling/roof deck distance of 1 to 12 in. (25 to 300 mm).
   - Obstructed, non-combustible, ceiling construction with a deflector location below structural members of 1 to 6 in. (25 to 150 mm) and a maximum deflector to ceiling/roof deck distance of 22 in. (550 mm).
3. Series EC-11 and EC-14 Extended Coverage Sprinklers, specifically tested and listed for non-combustible obstructed construction, are permitted to be used within trusses or bar joists having non-combustible web members greater than 1 in. (25.4 mm) when applying the 4 times obstruction criteria rule defined under “Obstructions to Sprinkler Discharge Pattern Development”.
4. To prevent cold soldering, the minimum allowable spacing between Series EC-11 and EC-14 Extended Coverage Sprinklers is 8 ft (2,4 m) for upright sprinklers and 9 ft (2,7 m) for pendent sprinklers.
5. Series EC-11 and EC-14 Extended Coverage Sprinklers are to be installed in accordance with all other requirements of NFPA 13 for extended coverage upright and pendent sprinklers; For example, obstructions to sprinkler discharge, obstructions to sprinkler pattern development, obstructions to prevent sprinkler discharge from reaching hazard and clearance to storage.

Hazard	Type	Temperature	Bulb Liquid	Sprinkler Finish (See Note 5)			
				Natural Brass	Chrome Plated	Polyester*	Lead Coated
Light **Table B describes UL and C-UL Sensitivity Rating** **Table C describes FM Sensitivity Rating**	Upright K=11.2 (TY5137) Pendent K=11.2 (TY5237) K=14.0 (TY6237)	135°F (57°C)	Orange	1, 2, 3**, 4			
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green	1, 2, 4			1, 2, 4
		286°F (141°C)	Blue				
	Recessed Pendent K=11.2 (TY5237) K=14.0 (TY6237) With Style 30 Escutcheon	135°F (57°C)	Orange	1, 2, 3, 4			N/A
		155°F (68°C)	Red				
		175°F (79°C)	Yellow	1, 2, 4			
		200°F (93°C)	Green				
		286°F (141°C)	Blue				
Ordinary **Table B describes UL and C-UL Sensitivity Rating** **Table C describes FM Sensitivity Rating**	Upright K=11.2 (TY5137) K=14.0 (TY6137) Pendent K=11.2 (TY5237) K=14.0 (TY6237)	135°F (57°C)	Orange	1, 2, 3, 4			1, 2, 3, 4
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				1, 2, 4
		200°F (93°C)	Green				
		286°F (141°C)	Blue				
	Recessed Pendent K=11.2 (TY5237) K=14.0 (TY6237) With Style 30 or 40 Escutcheon	135°F (57°C)	Orange	1, 2, 4			N/A
		155°F (68°C)	Red				
		175°F (79°C)	Yellow				
		200°F (93°C)	Green				

NOTES
1. Listed by Underwriters Laboratories, Inc. (UL)
2. Listed by Underwriters Laboratories, Inc., for use in Canada (C-UL)
3. Approved by Factory Mutual Research Corporation (FM)
4. Approved by the City of New York under MEA 177-03-E
5. Where Polyester Coated or Lead Coated Sprinklers are noted to be UL and C-UL Listed, the sprinklers are UL and C-UL Listed as Corrosion Resistant Sprinklers

N/A = Not Available
* Frame and Deflector only
** Pendent only

TABLE A
LABORATORY LISTINGS AND APPROVALS

Area ft x ft	Style	Light Hazard					Ordinary Hazard				
		135°F (57°C)	155°F (68°C)	175°F (79°C)	200°F (93°C)	286°F (141°C)	135°F (57°C)	155°F (68°C)	175°F (79°C)	200°F (93°C)	286°F (141°C)
14 x 14	Upright or Pendent	-	-	-	-	-	QR	QR	QR	QR	QR
	Style 30 Recessed	-	-	-	-	-	QR	QR	QR	QR	QR
	Style 40 Recessed	-	-	-	-	-	QR	QR	QR	QR	QR
16 x 16	Upright or Pendent	QR*	QR*	QR*	QR*	QR*	SR	SR	SR	SR	SR
	Style 30 Recessed	QR*	QR*	QR*	QR*	QR*	SR	SR	SR	SR	SR
	Style 40 Recessed	N/A	N/A	N/A	N/A	N/A	SR	SR	SR	SR	SR
18 x 18	Upright or Pendent	QR*	QR*	QR*	QR*	QR*	SR	SR	SR	SR	SR
	Style 30 Recessed	QR*	QR*	QR*	QR*	QR*	SR	SR	SR	SR	SR
	Style 40 Recessed	N/A	N/A	N/A	N/A	N/A	SR	SR	SR	SR	SR
20 x 20	Upright or Pendent	QR*	QR*	QR*	SR*	SR*	SR	SR	SR	SR	SR
	Style 30 Recessed	QR*	QR*	QR*	SR*	SR*	SR	SR	SR	SR	SR
	Style 40 Recessed	N/A	N/A	N/A	N/A	N/A	SR	SR	SR	SR	SR

NOTES
- QR = Quick Response
- SR = Standard Response
- N/A = Not Applicable

* Does not apply to Upright K=14.0

TABLE B
SENSITIVITY RATING FOR UL AND C-UL LISTING OF SERIES EC-11 OR EC-14 SPRINKLERS
(REFER TO TABLE D FOR PERMITTED K-FACTOR/AREA COMBINATIONS)

HC-1								
Linear Spacing ft		Area Spacing ft		Ceiling Height ft	Ceiling Type	K-factor	Style	Response
Min	Max	Min	Max					
10	20	100	400	Up to 30	Noncombustible Unobstructed, Noncombustible Obstructed, or Combustible Unobstructed	11.2 EC 14.0 EC	Pendent or Upright	Quick
10	20	100	400	Up to 30	Noncombustible Unobstructed, Noncombustible Obstructed, or Combustible Unobstructed	11.2 EC 14.0 EC	Pendent Recessed Style 30	
10	20	100	400	Up to 30	Combustible Obstructed	11.2 EC 14.0 EC	Pendent or Upright	
10	20	100	400	Up to 30	Combustible Obstructed	11.2 EC 14.0 EC	Pendent Recessed Style 30	
10	20	100	400	Over 30 and up to 45	Noncombustible Unobstructed	11.2 EC 14.0 EC	Upright	
HC-2								
Linear Spacing ft		Area Spacing ft		Ceiling Height ft	Ceiling Type	K-factor	Style	Response
Min	Max	Min	Max					
10	20	100	400	Up to 30	Noncombustible Unobstructed, Combustible Unobstructed	11.2 EC	Upright	Quick
10	20	100	400	Up to 30		14.0 EC	Pendent or Upright	
10	16	100	256	Over 30 and up to 45		11.2 EC 14.0 EC	Upright	
HC-3								
Linear Spacing ft		Area Spacing ft		Ceiling Height ft	Ceiling Type	K-Factor	Style	Response
Min	Max	Min	Max					
10	16	100	256	Up to 30	Noncombustible Unobstructed, Combustible Unobstructed	11.2 EC	Upright	Quick
10	20	100	400	Up to 30		14.0 EC	Pendent or Upright	
10	16	100	256	Over 30 and up to 45		11.2 EC, 14.0 EC	Upright	

NOTES
- The design for K 11.2 EC (K 160 EC) sprinklers should not include fewer than six sprinklers or have a design pressure of less than 12 psi (0,8 bar); similarly the design for K 14.0 EC (K 200 EC)sprinklers should not include fewer than four sprinklers or have a design pressure of less than 18 psi (1,2 bar).
- For flow criteria, refer to FM Loss Prevention Data Sheet 3-26.
- Refer to FM Loss Prevention Data Sheet 2-0 for permitted K-Factor/Area Combinations.

TABLE C
SENSITIVITY RATING FOR FM APPROVAL OF SERIES EC-11 OR EC-14 SPRINKLERS

UL and C-UL Specific Application Listing Requirements for Installation under Concrete Tees

Series EC-11 and EC-14 Extended Coverage Upright and Pendent Sprinklers (TY5137, TY5237, TY6137 and TY6237) have a UL and C-UL Specific Application Listing for use under concrete tees when installed as follows:

1. Stems of the concrete tee construction must be spaced at less than 7.5 ft (2,3 m) on center but more than 3 ft (0,9 m) on center. The depth of the concrete tees must not exceed 30 in. (762 mm). The maximum permitted concrete tee length is 32 ft (9,8 m). However, where the concrete tee length exceeds 32 ft (9,8 m), non-combustible baffles, equal in height to the depth of the tees, can be installed so that the space between the tees does not exceed 32 ft (9,8 m) in length.
2. The sprinkler deflectors are to be located in a horizontal plane at or above 1 in. (25,4 mm) below the bottom of the concrete tee stems.
3. When the sprinkler deflectors are located higher than a horizontal plane 1 in. (25,4 mm) beneath the bottom of the concrete tee stems, the obstruction to sprinkler discharge criteria requirements of NFPA 13 for extended coverage upright and pendent sprinklers applies.

Description	Area ft x ft	Light Hazard 0.10 GPM/ft²		Group I Ordinary Hazard 0.15 GPM/ft²		Group II Ordinary Hazard 0.20 GPM/ft²	
		GPM	PSI	GPM	PSI	GPM	PSI
TY5137 (K=11.2) Upright	14 x 14	30	7.2	30	7.2	39	12.1
	16 x 16	30	7.2	39	12.1	51	20.7
	18 x 18	33	8.7	49	19.1	65	33.7
	20 x 20	40	12.8	60	28.7	80	51.0
TY5237 (K=11.2) Pendent	14 x 14	30	7.2	30	7.2	39	12.1
	16 x 16	30	7.2	39	12.1	51	20.7
	18 x 18	33	8.7	49	19.1	65	33.7
	20 x 20	40	12.8	60	28.7	80	51.0
TY6137 (K=14.0) Upright	14 x 14	N/A	N/A	39	7.8	51	13.3
	16 x 16	N/A	N/A	39	7.8	51	13.3
	18 x 18	N/A	N/A	49	12.3	65	21.6
	20 x 20	N/A	N/A	60	18.4	80	32.7
TY6237 (K=14.0) Pendent	14 x 14	37	7.0	39	7.8	51	13.3
	16 x 16	37	7.0	39	7.8	51	13.3
	18 x 18	37	7.0	49	12.3	65	21.6
	20 x 20	40	8.2	60	18.4	80	32.7

NOTES
- 1 ft = 0.3048 m
- 1 ft² = 0.093 m²
- 1 GPM = 3.785 LPM
- 1 psi = 0.06895 bar
- 1 GPM/ft² = 40.74 mm/min

TABLE D
FLOW CRITERIA FOR UL AND C-UL LISTING OF SERIES EC-11 AND EC-14 SPRINKLERS

FM Approval Requirements
Series EC-11 and EC-14 Extended Coverage Upright and Pendent Sprinklers are to be installed in accordance with the applicable FM Loss Prevention Data Sheet for limited use in buildings of specific roof construction and for the protection of certain specific ordinary hazard (non-storage and/or non-flammable or combustible liquid) occupancies. Information provided in the FM Loss Prevention Data Sheets relates to, but is not limited to, hydraulic design, ceiling slope, and obstructions, minimum and maximum allowable spacing, and deflector-to-ceiling distance.

These criteria may differ from UL and/or NFPA criteria. Therefore, the designer should review and become familiar with FM requirements before proceeding with design.

Installation

TYCO Series EC-11 and EC-14 Extended Coverage Upright and Pendent Sprinklers must be installed in accordance with this section.

General Instructions
Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm) for the 135°F (57°C) to 3/32 in. (2,4 mm) for the 286°F (141°C) temperature ratings.

A leak-tight 3/4 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 10 to 20 ft-lb (13,4 to 26,8 N·m). Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

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

Step 1. Install the sprinkler with the deflector parallel to the mounting surface. Install pendent sprinklers in the pendent position; install upright sprinklers in the upright position.

Step 2. After installing the Style 30, 40, or 60 mounting plate (or other applicable escutcheon) over the sprinkler pipe threads and with pipe-thread sealant applied to the pipe threads, hand-tighten the sprinkler into the sprinkler fitting.

Step 3. For upright or pendent sprinklers, wrench-tighten using only the W-Type 3 (End A) Sprinkler Wrench. For the pendent sprinkler installed with Style 30, 40, or 60 Escutcheon, wrench-tighten the sprinkler using only the W-Type 22 Sprinkler Wrench.

Apply the wrench recess of the applicable sprinkler wrench (Figure 5 and 6) to the sprinkler wrench flats (Figure 1).

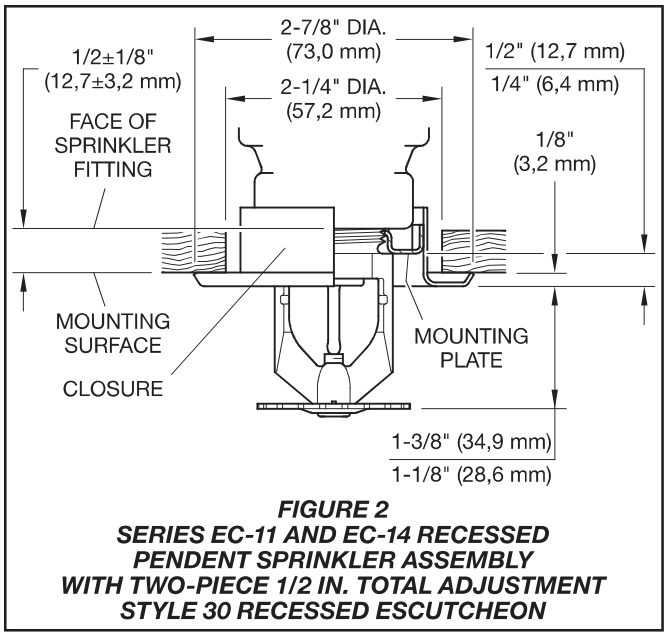


FIGURE 2
SERIES EC-11 AND EC-14 RECESSED PENDENT SPRINKLER ASSEMBLY WITH TWO-PIECE 1/2 IN. TOTAL ADJUSTMENT STYLE 30 RECESSED ESCUTCHEON

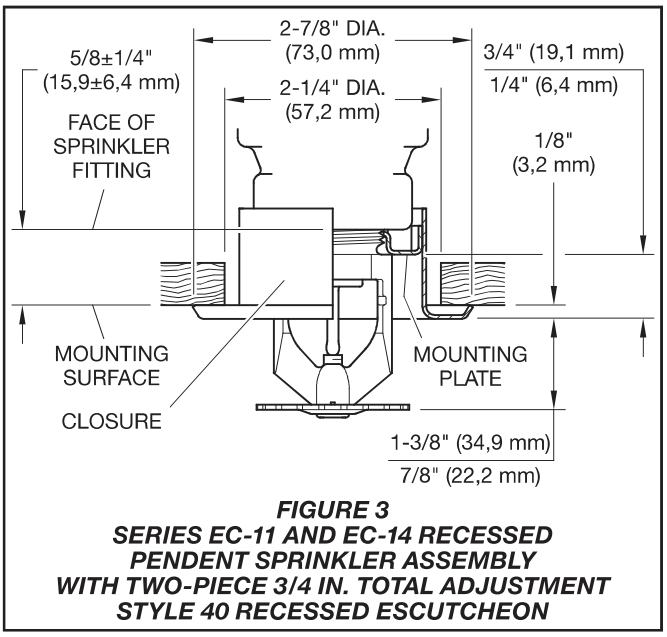


FIGURE 3
SERIES EC-11 AND EC-14 RECESSED PENDENT SPRINKLER ASSEMBLY WITH TWO-PIECE 3/4 IN. TOTAL ADJUSTMENT STYLE 40 RECESSED ESCUTCHEON

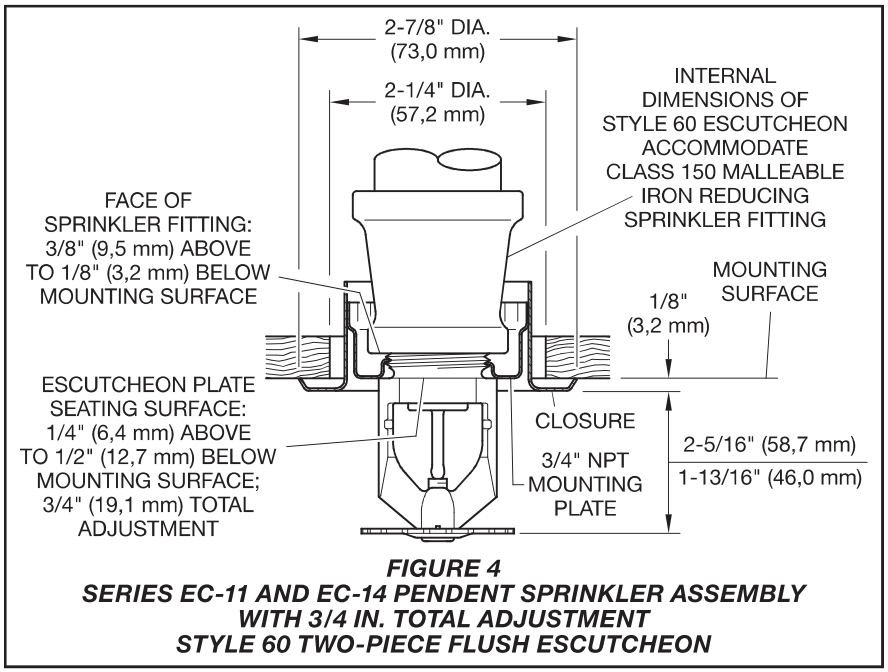


FIGURE 4
SERIES EC-11 AND EC-14 PENDENT SPRINKLER ASSEMBLY WITH 3/4 IN. TOTAL ADJUSTMENT STYLE 60 TWO-PIECE FLUSH ESCUTCHEON

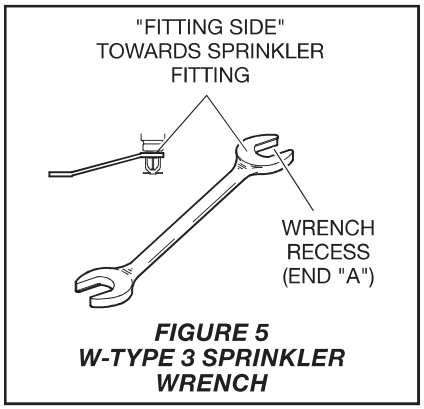


FIGURE 5
W-TYPE 3 SPRINKLER WRENCH

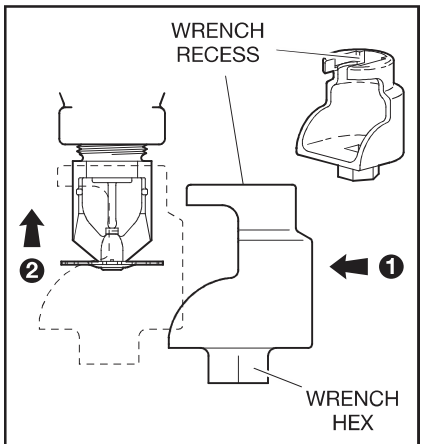


FIGURE 6
W-TYPE 22 RECESSED SPRINKLER WRENCH

P/N 51 – XXX – X – XXX

		SIN
893	11.2K Pendent	TY5237
894	11.2K Upright	TY5137
895	14.0K Pendent	TY6237
896	14.0K Upright	TY6137

	SPRINKLER FINISH[1]
1	NATURAL BRASS
4	SIGNAL WHITE (RAL9003) POLYESTER
5	JET BLACK (RAL9005) POLYESTER
7	LEAD COATED
9	CHROME-PLATED

	TEMPERATURE RATING
135	135°F (57°C)
155	155°F (68°C)
175	175°F (79°C)
200	200°F (93°C)
286	286°F (141°C)
000	OPEN[2]

NOTES:
1. Escutcheon ordered separately.
2. OPEN indicates the sprinkler assembly without glass bulb, button, and sealing assembly.

TABLE E
SERIES EC-11 AND EC-14 UPRIGHT AND PENDENT SPRINKLERS
PART NUMBER SELECTION

Care and Maintenance

TYCO Series EC-11 and EC-14 Extended Coverage Upright and Pendent Sprinklers must be maintained and serviced in accordance with this section.

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

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

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

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

Frequent visual inspections are recommended to be initially performed for corrosion resistant coated sprinklers, after the installation has been completed, to verify the integrity of the corrosion resistant coating. Thereafter, annual inspections per NFPA 25 should suffice; however, instead of inspecting from the floor level, a random sampling of close-up visual inspections should be made, so as to better determine the exact sprinkler condition and the long term integrity of the corrosion resistant coating, as it may be affected by the corrosive conditions present.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards recognized by the Approval agency, such as NFPA 25, in addition to the standards of any authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Number (P/N).

Sprinkler Assemblies with NPT Thread Connections
Specify: Series EC-11 or EC-14 (specify) Sprinkler, SIN (specify), (specify) K-factor, Pendent or Upright (specify) Extended Coverage, (specify) temperature rating, (specify) finish, P/N (from to Table E)

Recessed Escutcheon, Two-Piece
Specify: Style (30 or 40) Two-Piece Recessed Escutcheon with (specify) finish, P/N (specify*)

*Refer to Technical Data Sheet TFP770

Flush Escutcheon, Two-Piece
Specify: Style 60 Two-Piece Flush Escutcheon with (specify) finish, P/N (specify**)

**Refer to Technical Data Sheet TFP778

Sprinkler Wrenches
Specify: W-Type 3 Sprinkler Wrench, P/N 56-895-1-001

Specify: W-Type 22 Recessed Sprinkler Wrench, P/N 56-665-7-001

1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700

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TEFLON is a registered trademark of DuPont

Johnson Controls

Elite Sprinkler Inc.

Automatic Fire Protection Sprinkler System Design

PEO Certificate of Authorization #100172288
22 McDonnell Cres., Bradford, Ontario, L3Z 0S7
T: 905-505-1370
www.elitesprinkler.ca

Date: January 28, 2022

Re: Building A
95 Attmar Drive,
Vaughan, ON.
Permit No. 2021 224373 P02 00

This is clarification letter regarding your comments:

Item 1.
Hydraulic calculations are provided for the most remote unit.

Item 2.
All manufacturer's specifications are attached.

Item 3.
Design areas and ID points are on the drawings

Sincerely,
Andrei Novosselov, P Eng.



Elite Sprinkler Inc.

Automatic Fire Protection Sprinkler System Design

PEO Certificate of Authorization #100172288
22 McDonnell Cres., Bradford, Ontario, L3Z 0S7
T: 905-505-1370
www.elitesprinkler.ca

Date: January 28, 2022

Re: Building B
85 Attmar Drive,
Vaughan, ON.
Permit No. 2021 223726 P02 00

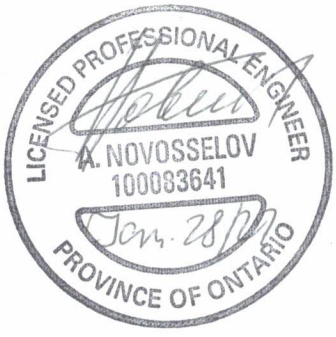
This is clarification letter regarding your comments:

Item 1.
Hydraulic calculations are provided for the most remote unit.

Item 2.
All manufacturer's specifications are attached.

Item 3.
Design areas and ID points are on the drawings

Sincerely,
Andrei Novosselov, P Eng.



Elite Sprinkler Inc.

Automatic Fire Protection Sprinkler System Design

PEO Certificate of Authorization #100172288
22 McDonnell Cres., Bradford, Ontario, L3Z 0S7
T: 905-505-1370
www.elitesprinkler.ca

Date: January 28, 2022

Re: Building C
75 Attmar Drive,
Vaughan, ON.
Permit No. 2021 287295 P02 00

This is clarification letter regarding your comments:

Item 1.
Hydraulic calculations are provided for the most remote unit.

Item 2.
All manufacturer's specifications are attached.

Item 3.
Design areas and ID points are on the drawings

Sincerely,
Andrei Novosselov, P Eng.



Elite Sprinkler Inc.

Automatic Fire Protection Sprinkler System Design

PEO Certificate of Authorization #100172288
22 McDonnell Cres., Bradford, Ontario, L3Z 0S7
T: 905-505-1370
www.elitesprinkler.ca

Date: January 28, 2022

Re: Building D
65 Attmar Drive,
Vaughan, ON.
Permit No. 2021 214385 P02 00

This is clarification letter regarding your comments:

Item 1.
Hydraulic calculations are provided for the most remote unit.

Item 2.
All manufacturer's specifications are attached.

Item 3.
Design areas and ID points are on the drawings

Sincerely,
Andrei Novosselov, P Eng



Model SW-20 and SW-24 — 11.2 K-factor Extended Coverage Ordinary Hazard Horizontal Sidewall Sprinklers (Standard Response)

General Description

The TYCO Model SW-20 and SW-24, 11.2 K-factor, Extended Coverage Ordinary Hazard (ECOH) Horizontal Sidewall Sprinklers, Standard Response are decorative glass bulb sprinklers designed for use in ordinary hazard occupancies per NFPA 13.

The SW-20 provides protection of coverage areas up to 16 ft x 20 ft (320 ft^2), whereas the SW-24 provides protection of coverage areas up to 16 ft x 24 ft (384 ft^2), as compared to standard coverage horizontal sidewall sprinklers having a maximum coverage area of 10 ft x 10 ft (100 ft^2) for ordinary hazard occupancies.

Horizontal sidewall sprinklers are designed for installation along a wall or the side of a beam and are commonly used instead of pendent or upright sprinklers due to aesthetics or building construction considerations, where piping across the ceiling is not desirable.

Corrosion resistant coatings, where applicable, are utilized to extend the life of copper alloy sprinklers beyond that which would otherwise be obtained when exposed to corrosive atmospheres. Although corrosion resistant coated sprinklers have passed the standard corrosion tests of the applicable approval agencies, the testing is not representative of all possible corrosive atmospheres. Consequently, it is recommended that the end user be consulted with respect to the suitability of these corrosion resistant coatings for any given corrosive environment. The effects of ambient temperature, concentration of chemicals, and gas/chemical velocity, should be considered, as a minimum, along with the corrosive nature of the chemical to which the sprinklers will be exposed.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

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

NOTICE

The Model SW-20 and SW-24 Sprinklers described herein must be installed and maintained in compliance with this document and with the applicable standards of the National Fire Protection Association, in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.

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

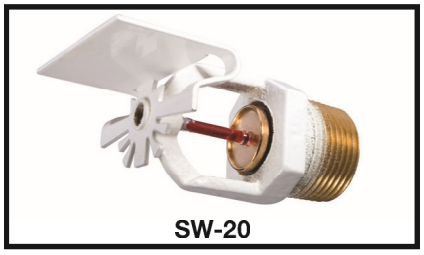
Sprinkler Identification Number (SIN)

TY5332 - SW-20
TY5337 - SW-24
TY5332 is a re-designation for C5332
TY5337 is a re-designation for C5337

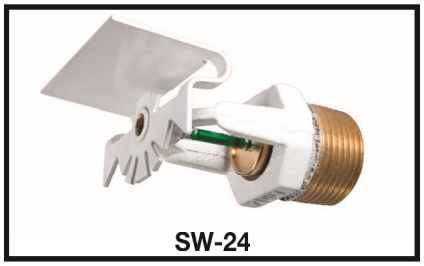
Technical Data

Approvals
UL and C-UL Listed
(Refer to the Design Criteria Section)
Polyester coated sprinklers are UL and C-UL Listed as Corrosion Resistant Sprinklers

NYC under MEA 177-03-E



SW-20



SW-24

Maximum Working Pressure
175 psi (12,1 bar)

Discharge Coefficient
K= 11.2 GPM/$psi^{½}$ (161,3 LPM/$bar^{½}$)

Temperature Rating
SW-20: 155°F (68°C) & 200°F (93°C)
SW-24: 200°F (93°C)

Finishes
Refer to Table B

Physical Characteristics:

Frame	Bronze
Button	Bronze
Sealing Assembly	Beryllium Nickel w/ TEFLON
Bulb	Glass
Compression Screw	Brass
Deflector	Bronze

Components:

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

* Temperature rating is indicated on Deflector.

** Pipe thread connections per ISO 7-1 can be provided on special request.

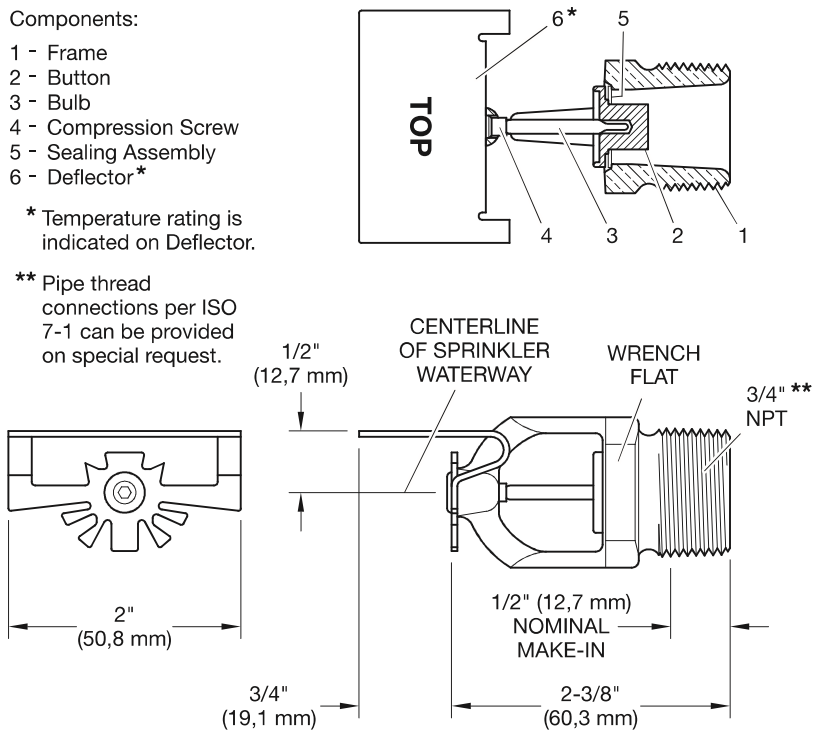


FIGURE 1
MODEL SW-20 (TY5332)
EXTENDED COVERAGE ORDINARY HAZARD
HORIZONTAL SIDEWALL SPRINKLER
11.2 K-FACTOR, 3/4 INCH NPT

Components:

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

* Temperature rating is indicated on Deflector.

** Pipe thread connections per ISO 7-1 can be provided on special request.

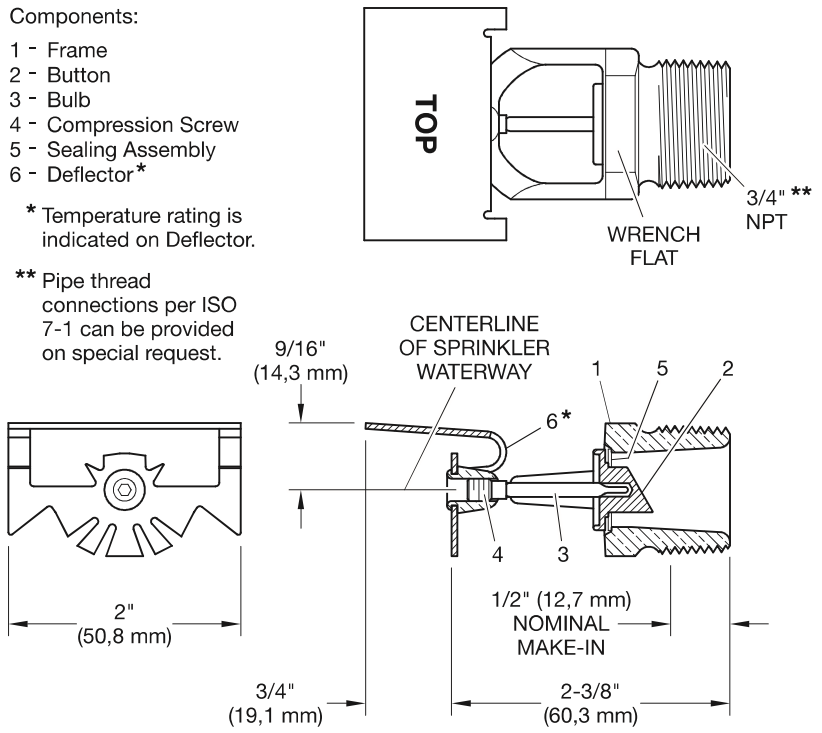


FIGURE 2
MODEL SW-24 (TY5337)
EXTENDED COVERAGE ORDINARY HAZARD
HORIZONTAL SIDEWALL SPRINKLER
11.2 K-FACTOR, 3/4 INCH NPT

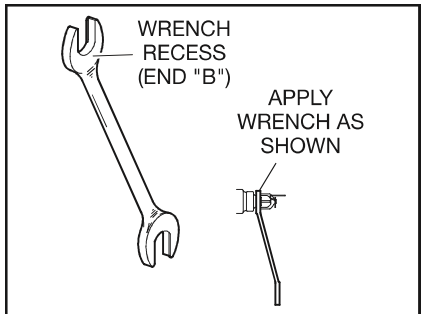


FIGURE 3
W-TYPE 3 SPRINKLER WRENCH

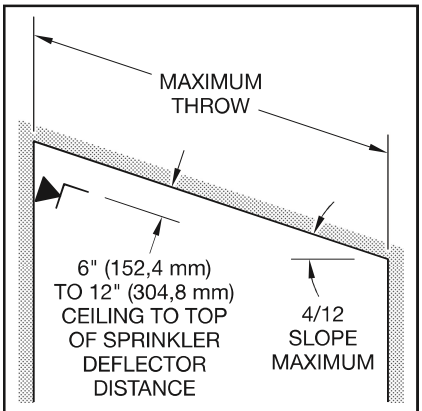


FIGURE 4
SPRINKLER PLACEMENT UNDER SLOPED CEILINGS IN LOADING DOCKS

Operation

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

MODEL SW-20 ECOH HORIZONTAL SIDEWALL SPRINKLER (TY5332) OH Group 1 (0.15 gpm/sq-ft)						
Response Rating	**Coverage Area[1], Ft x Ft (m x m)**	**Minimum Flow[2], GPM (LPM)**	**Minimum Pressure[2], PSI (BAR)**	**Deflector-To-Ceiling Distance[3], In. (mm)**	**Sprinkler Temperature Rating, °F**	**Minimum Spacing[4], Ft (m)**
Standard	16 x 16 (4,9 x 4,9	38 (144)	11.5 (0,79)	6 to 12 (150 to 300)	155, 200	8 (2,4)
Standard	16 x 18 (4,9 x 5,5)	43 (163)	14.7 (1,01)	6 to 12 (150 to 300)	155, 200	8 (2,4)
Standard	16 x 20 (4,9 x 6,1)	48 (182)	18.4 (1,27)	6 to 12 (150 to 300)	155, 200	8 (2,4)

MODEL SW-20 ECOH HORIZONTAL SIDEWALL SPRINKLER (TY5332) OH Group 2 (0.20 gpm/sq.-ft.)						
Response Rating	**Coverage Area[1], Ft x Ft (m x m)**	**Minimum Flow[2], GPM (LPM)**	**Minimum Pressure[2], PSI (BAR)**	**Deflector-To-Ceiling Distance[3], In. (mm)**	**Sprinkler Temperature Rating, °F**	**Minimum Spacing[4], Ft (m)**
Standard	16 x 16 (4,9 x 4,9	51 (193)	20.7 (1,43)	6 to 12 (150 to 300)	155, 200	8 (2,4)
Standard	16 x 18 (4,9 x 5,5)	58 (220)	26.8 (1,85)	6 to 12 (150 to 300)	155, 200	8 (2,4)
Standard	16 x 20 (4,9 x 6,1)	64 (242)	32.7 (2,25)	6 to 12 (150 to 300)	155, 200	8 (2,4)

MODEL SW-24 ECOH HORIZONTAL SIDEWALL SPRINKLER (TY5337) OH Group 1 (0.15 gpm/sq.-ft.)						
Response Rating	**Coverage Area[1], Ft x Ft (m x m)**	**Minimum Flow[2], GPM (LPM)**	**Minimum Pressure[2], PSI (BAR)**	**Deflector-To-Ceiling Distance[3], In. (mm)**	**Sprinkler Temperature Rating, °F**	**Minimum Spacing[4], Ft (m)**
Standard	16 x 22 (4,9 x 6,7)	53 (200)	22.4 (1,54)	6 to 12 (150 to 300)	200	8 (2,4)
Standard	16 x 24 (4,9 x 7,3)	58 (220)	26.8 (1,85)	6 to 12 (150 to 300)	200	8 (2,4)

MODEL SW-24 ECOH HORIZONTAL SIDEWALL SPRINKLER (TY5337) OH Group 2 (0.20 gpm/sq.-ft.)						
Response Rating	**Coverage Area[1], Ft x Ft (m x m)**	**Minimum Flow[2], GPM (LPM)**	**Minimum Pressure[2], PSI (BAR)**	**Deflector-To-Ceiling Distance[3], In. (mm)**	**Sprinkler Temperature Rating, °F**	**Minimum Spacing[4], Ft (m)**
Standard	16 x 22 (4,9 x 6,7)	71 (269)	40.2 (2,77)	6 to 12 (150 to 300)	200	8 (2,4)
Standard	16 x 24 (4,9 x 7,3)	77 (291)	47,3 (3,26)	6 to 12 (150 to 300)	200	8 (2,4)

NOTES
1. Backwall (where sprinkler is located) by sidewall (length of throw).
2. Requirement is based on minimum flow in GPM from each sprinkler. The indicted residual pressures are based on the nominal K-factor.
3. The centerline of the sprinkler waterway is located below the deflector as shown in Figures 1 and 2.
4. Minimum spacing is for lateral distance between sprinklers located along a single wall. Otherwise adjacent sprinklers (i.e., sidewall sprinklers on an adjacent wall, on an opposite wall, or pendent sprinklers) must be located outside of the maximum listed protection area of the extended coverage sidewall sprinkler being utilized.

TABLE A
UL AND C-UL LISTING COVERAGE AND FLOW RATE CRITERIA

Design Criteria

The TYCO Model SW-20 and SW-24, 11.2 K-factor, Extended Coverage Ordinary Hazard (ECOH) Horizontal Sidewall Sprinklers are for use in ordinary hazard occupancies with non-combustible unobstructed construction and with a ceiling slope not exceeding 2 inches per foot (9.2°), using the design criteria provided in Table A, (as well as any additional requirements specified in NFPA 13 for Extended Coverage Sidewall Spray Sprinklers).

A 36 in. (914 mm) clearance must be maintained between the top of the sprinkler deflector and any miscellaneous storage.

The SW-20 and SW-24 may be installed on sloped ceilings in loading docks with a maximum roof slope of 4 in. per foot (18.4°) as shown in Figure 4 and using the design criteria provided in Table A.

The SW-20 and SW-24 can be used only for exposed applications. The SW-20 and SW-24 cannot be recessed.

Installation

The TYCO Model SW-20 and SW-24, 11.2 K-factor, Extended Coverage Ordinary Hazard (ECOH) Horizontal Sidewall Sprinklers must be installed in accordance with this section.

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

A leak tight 1/2 in. NPT sprinkler joint should be obtained with a minimum to maximum torque of 7 to 14 lb-ft (9,5 to 19,0 N·m). Higher levels of torque can distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in the Sprinkler by under- or over-tightening the Sprinkler/Support Cup Assembly. Re-adjust the position of the sprinkler fitting to suit.

Step 1. Horizontal sidewall sprinklers are to be installed with their centerline perpendicular to the back wall and parallel to the ceiling. The word “TOP” on the deflector is to face towards the ceiling.

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

Step 3. Tighten the sprinkler into the sprinkler fitting using only the W-Type 3 (End B) Sprinkler Wrench (Ref. Figure 3). With reference to Figures 1 and 2, the W-Type 3 Sprinkler Wrench is to be applied to the sprinkler wrench flats

Care and Maintenance

The TYCO Model SW-20 and SW-24, 11.2 K-factor, Extended Coverage Ordinary Hazard (ECOH) Horizontal Sidewall Sprinklers must be maintained and serviced in accordance with this section.

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

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

Automatic sprinkler systems should be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national code.

Absence of an escutcheon, which is used to cover a clearance hole, may delay the time to sprinkler operation in a fire situation.

Automatic sprinklers must never be painted, plated, coated or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

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

Frequent visual inspections are recommended to be initially performed for corrosion resistant coated sprinklers, after the installation has been completed, to verify the integrity of the corrosion resistant coating. Thereafter, annual inspections per NFPA 25 should suffice; however, instead of inspecting from the floor level, a random sampling of close-up visual inspections should be made, so as to better determine the exact sprinkler condition and the long term integrity of the corrosion resistant coating as it may be affected by the corrosive conditions present.

P/N 51 – XXX – X – XXX

MODEL		SIN
072	Model SW-20	TY5332
073	Model SW-24	TY5337

SPRINKLER FINISH	
1	Natural Brass
4	Signal White (RAL9003) Polyester
9	Chrome Plated

SPRINKLER TEMPERATURE RATING	
155	155°F (68°C) (SW-20 Only)
200	200°F (93°C) (SW-20 or SW-24)

TABLE B
MODEL SW-20 AND SW-24 ECOH HORIZONTAL SIDEWALL SPRINKLERS WITH 3/4 INCH NPT CONNECTION PART NUMBER SELECTION

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

Contact your local distributor for availability. When placing an order, indicate the full product name and Part Numbers (P/N).

Sprinkler Assemblies with NPT Thread Connections:
Specify: Model (specify) ECOH Horizontal Sidewall Sprinkler, SIN (specify), (specify) temperature rating, (specify) finish, P/N (specify from Table B)

Sprinkler Wrench:
Specify: W-Type 3 Sprinkler Wrench, P/N 56-895-1-001

1400 Pennbrook Parkway, Lansdale, PA 19446 | Telephone +1-215-362-0700

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TEFLON is a registered trademark of DuPont

Johnson Controls

VIKING®

TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK490

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page.

1. DESCRIPTION

Viking Freedom® Residential Concealed Horizontal Sidewall Sprinkler VK490 is a small high-sensitivity solder link and lever residential sprinkler designed for installation on concealed pipe systems, where the appearance of a smooth wall is desired. The sprinkler orifice design, with a K-Factor of 5.8 (83.6 metric*), allows the sprinkler's efficient use of available water supplies for the hydraulically designed fire-protection system. The operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

The sprinkler is hidden from view by a low profile, small diameter cover plate installed flush to the wall. The cover plate is available in several decorative finishes to meet design requirements. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. After the system has been tested and wall finish has been applied, the push-on design of the cover plate assembly allows easy installation of the cover plate with up to 1/4" (6.4 mm) adjustment. Sprinkler VK490 is provided with a pipe guide to properly locate the sprinkler and allow the 1/4" adjustment of the cover plate.



WARNING: Cancer and Reproductive Harm- www.P65Warnings.ca.gov

2. LISTINGS AND APPROVALS

c UL us EU **UL Listed (C-UL-US-EU):** Category VKKW (VK490)

Refer to the Approval Chart and Design Criteria for C-UL-US-EU Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Available since 2016.
Minimum Operating Pressure: Refer to the Approval Chart.
Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).
Thread size: 1/2" (15 mm) NPT
Nominal K-Factor: 5.8 U.S. (83.6 metric*)
* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
Available Cover Plate Horizontal Adjustment: 1/4" (6.4 mm)
Overall Length (Sprinkler Body): 2" (50 mm)
Covered by the following U.S. Patent numbers: 7,854,269; 7,712,218 and 8,960,319
Material Standards:
Sprinkler Body: QM Brass and Brass UNS-C84400
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides withPolytetrafluoroethylene (PTFE) Tape
Seat: Brass UNS-C31400
Deflector Ring: Brass UNS-C23000
Deflector Pins: Stainless Steel UNS-S30200
Halo: Brass UNS-C31400 or Phosphor Bronze UNS-C51000
Flow Shaper: Phosphor Bronze UNS-C51000
Lever Bar Ring: Brass UNS-C31400 or Brass UNS-C84400
Compression Screw: 18-8 Stainless Steel
Fusible Link Assembly: Nickel Alloy and Eutectic Solder
Fusible Link Levers: Stainless Steel UNS-S31600
Guide Pin: Stainless Steel UNS-S43000
Shipping Cap: Polyethylene
Cover Assembly Materials:
Cover Plate Assembly: Copper UNS-C11000 and Brass UNS-C26800
Spring: Beryllium Nickel
Solder: Eutectic
Ordering Information: (Also refer to the current Viking price list.)
Viking Freedom® Residential Concealed HSW Sprinkler VK490 and Cover Plate Assembly must be ordered separately:
Sprinkler: Base Part No. 20409.
Finish Suffix: Brass = A
Temperature Suffixes: 165 °F (74 °C) = C, 205 °F (96 °C) = E

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TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK490

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page.

Cover Plate Assembly: Base Part No. 16207 (3-5/16" diameter)
Specify finish and temperature rating of the cover plate assembly by adding the appropriate suffixes for the finish and the cover temperature rating to the base part number:
Finish Suffixes: White Polyester = M-/W, Chrome = F
Temperature Suffix: 135 °F (57 °C) = A, 165 °F (74 °C) = C
For example, cover 16207 with a White Painted finish and a 135 °F (57 °C) temperature rating = 16207MA/W.
Available Finishes And Temperature Ratings: Refer to Table 1.
Accessories: (Also refer to the Viking website.)
Sprinkler Wrenches:**
A. Heavy Duty Wrench Part No. 16208W/R** (available since 2010)
B. Head Cabinet Wrench Part Number 16267*** (available since 2010)
C. Optional Cover Plate Installer Tool Part No. 14867 (available since 2007)
**Requires a ½" ratchet (not available from Viking).
***Ideal for sprinkler cabinets.
Sprinkler Cabinet: Part No. 01731A (available since 1971)



All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 1: Identification of Custom Paint for Concealed Covers

4. INSTALLATION
Refer to appropriate NFPA Installation Standards.

5. OPERATION
During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches. Continued heating of the exposed sprinkler causes the fusible element to disengage, releasing the sealing assembly. Water flowing through the sprinkler orifice strikes the flow shaper, forming a uniform spray pattern over a specific area of coverage determined by the water supply pressure at the sprinkler to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY
Viking Freedom® Residential Concealed Horizontal Sidewall Sprinkler VK490 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE
For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Temperature Rating of the Cover Assembly (Required)	Cover Plate Base Part Number[3]
Ordinary	165 °F (74 °C)	100 °F (38 °C)	135 °F (57 °C)	16207
Intermediate	205 °F (96 °C)	150 °F (65 °C)	165 °F (74 °C)	16207

Sprinkler Finishes: Brass
Cover Plate Finish: White Polyester, Chrome

Footnotes
1. The sprinkler temperature rating is stamped on the inlet.
2. Based on NFPA-13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.

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Approval Chart

Viking VK490, 5.8 K-Factor Residential Concealed HSW Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the design criteria below. For ceiling types refer to the most current Edition of NFPA 13, 13R or 13D

Sprinkler Base Part Number [1]		SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure			
			Inches	mm	U.S.	metric [2]				
20409		VK490	1/2	15	5.8	83.6	175 psi (12 bar)			
Max. Coverage Area [6] Width X Length Ft. X Ft. (m X m)	Max. Spacing Ft. (m)	All Temperatures		Centerline of Sprinkler to Ceiling	Installation Type	Listings and Approvals [3]			Minimum Spacing Ft. (m)	
		Flow [6] GPM (L/min)	Pressure [6] PSI (bar)			c UL 4 US EU	NYC	NSF		
12 X 12 (3.7 X 3.7)	12 (3.7)	16 (60.6)	7.6 (0.52)	4-3/8 to 6-3/8 inches	Concealed with Cover Plate Assembly	See Footnotes 7 and 8	See Footnote 5	--	8 (2.4)	
14 X 14 (4.3 X 4.3)	14 (4.3)	17 (64.4)	8.6 (0.59)							
16 X 16 (4.9 X 4.9)	16 (4.9)	18 (68.1)	9.6 (0.66)							
16 X 18 (4.9 X 5.5)	16 (4.9)	21 (79.5)	13.1 (0.90)							
16 X 20 (4.9 X 6.1)	16 (4.9)	23 (87.1)	15.7 (1.08)							
16 X 22 (4.9 X 6.7)	16 (4.9)	31 (117.3)	28.6 (1.97)							
18 X 20 (5.5 X 6.1)	18 (5.5)	28 (106.0)	23.3 (1.61)							
12 X 12 (3.7 X 3.7)	12 (3.7)	17 (64.4)	8.6 (0.59)	6-3/8 to 12-3/8 inches						
14 X 14 (4.3 X 4.3)	14 (4.3)	17 (64.4)	8.6 (0.59)							
16 X 16 (4.9 X 4.9)	16 (4.9)	19 (71.9)	10.7 (0.74)							
16 X 18 (4.9 X 5.5)	16 (4.9)	21 (79.5)	13.1 (0.90)							
16 X 20 (4.9 X 6.1)	16 (4.9)	26 (98.4)	20.1 (1.39)							
16 X 22 (4.9 X 6.7)	16 (4.9)	31 (117.3)	28.6 (1.97)							
18 X 20 (5.5 X 6.1)	18 (5.5)	28 (106.0)	23.3 (1.61)							

Footnotes

[1] For complete part number, also refer to current Viking price list schedule.

[2] Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

[3] This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals. Refer also to Design Criteria listed below.

[4] Sprinkler VK490 is Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.

[5] Meets New York City requirements, effective July 1, 2008.

[6] For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum "Flow" and "Pressure" used.

[7] Cover Temperature Ratings are 135 °F (57 °C) and 165 F (74 °C). Cover Part No. 16207 [1].

[8] Accepted Cover Plate Finishes are: White Polyester and Chrome. Other paint colors are available on request with the same listings as the standard finish colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

VIKING®

TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK490

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Visit the Viking website for the latest edition of this technical data page.

DESIGN CRITERIA

(Also refer to the Approval Chart on page 3.)

UL Listing Requirements (C-UL-US-EU):

When using Viking Residential Concealed Horizontal Sidewall Sprinkler VK490 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart on page 3.

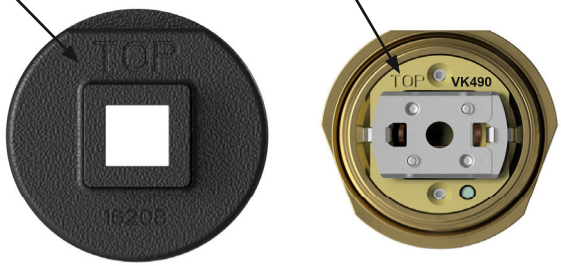
For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the Approval Chart above for NFPA 13D and NFPA 13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13.
- **THE TOP OF THE SPRINKLER BODY AND THE TOP OF THE INSTALLATION WRENCH ARE MARKED "TOP".** Orient the top of the sprinkler element parallel with the ceiling as shown in Figure 3.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080190 and F_080415 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.

The internal design of the sprinkler wrench is shaped to fit over the sprinkler and protective cap to ensure that the top of the wrench will be oriented in the same direction as the top of the sprinkler deflector.



Sprinkler wrench **Sprinkler body**

Orient the sprinkler and wrench as shown then slide the wrench over the sprinkler body and the protective cap.

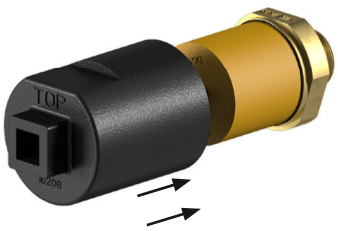


Figure 2: Sprinkler VK490 Installation and Correct Use of Wrench

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TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK490

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
Visit the Viking website for the latest edition of this technical data page.

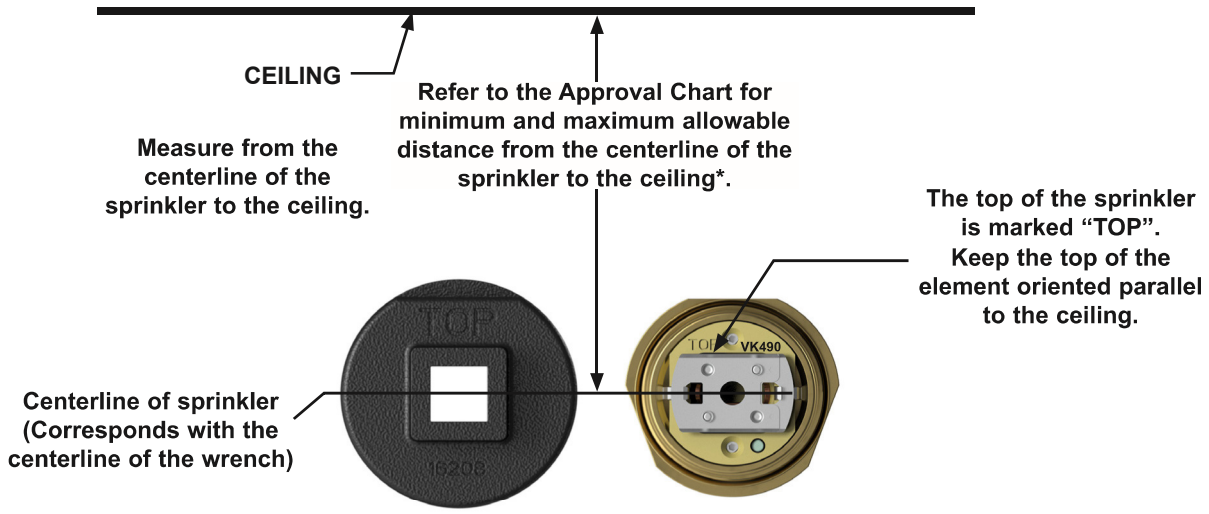


Figure 3: Sprinkler VK490 Correct Deflector Orientation

*Distance from the ceiling affects water supply requirements. Refer to the Approval Chart.

To install the Cover Plate assembly, gently push it onto the sprinkler body with even pressure using the palm of the hand.

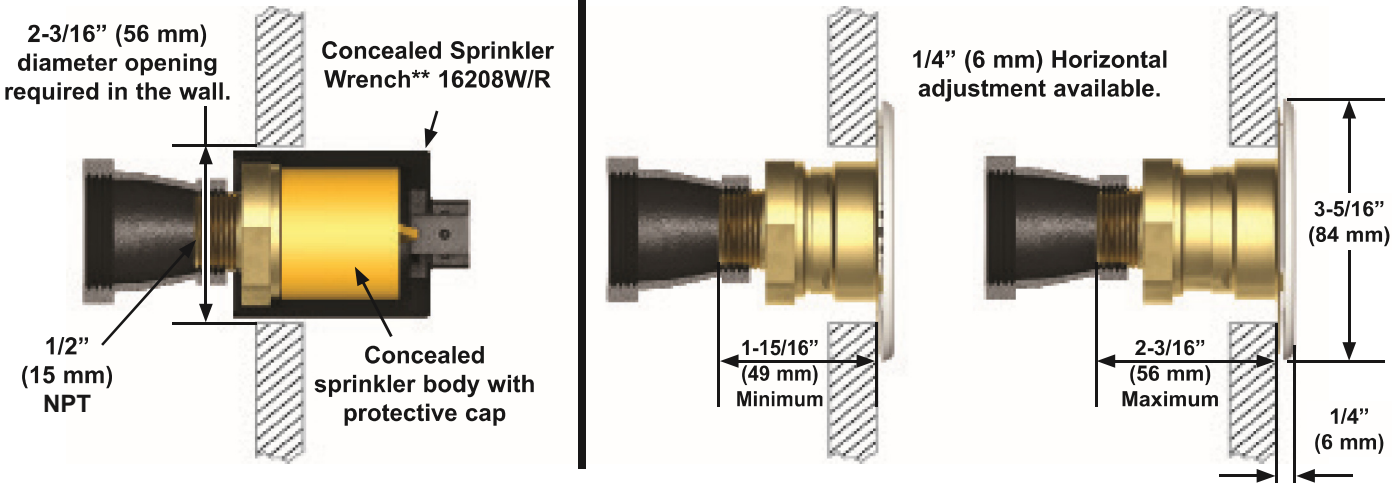
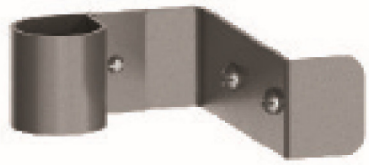
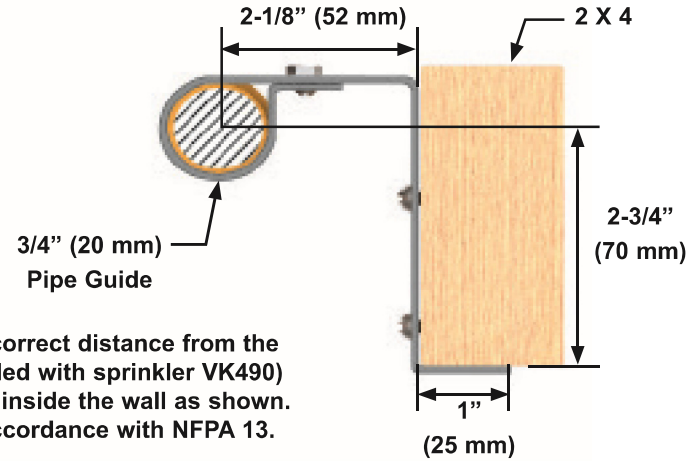


Figure 4: Sprinkler VK490 Dimensions and Cover Installation

** A 1/2" ratchet is required (not available from Viking).

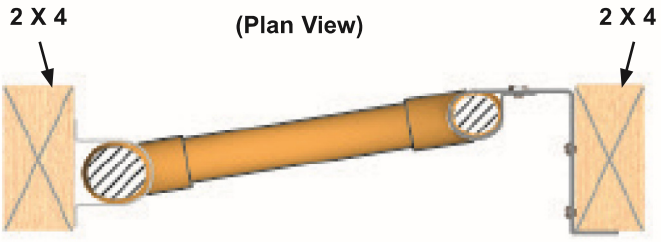
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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NOTE: To ensure that the sprinkler is located the correct distance from the face of the finished wall, use the pipe guide (included with sprinkler VK490) and attached it to the 3/4” CPVC pipe and the 2 X 4 inside the wall as shown. All piping, hangers/bracing must be installed in accordance with NFPA 13.

Figure 5: Sprinkler VK490 Pipe Guide



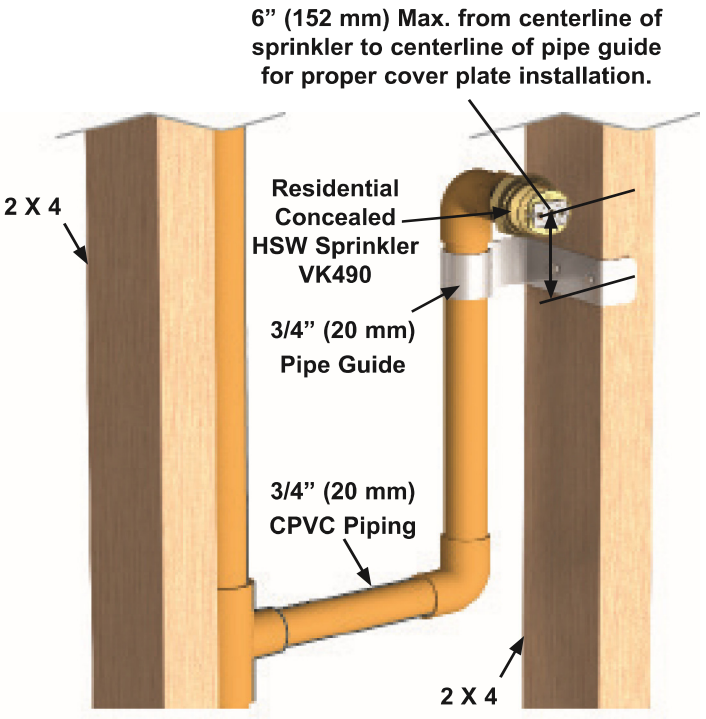


Figure 6: Sprinkler VK490 Pipe Guide Installation Instructions

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FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK490

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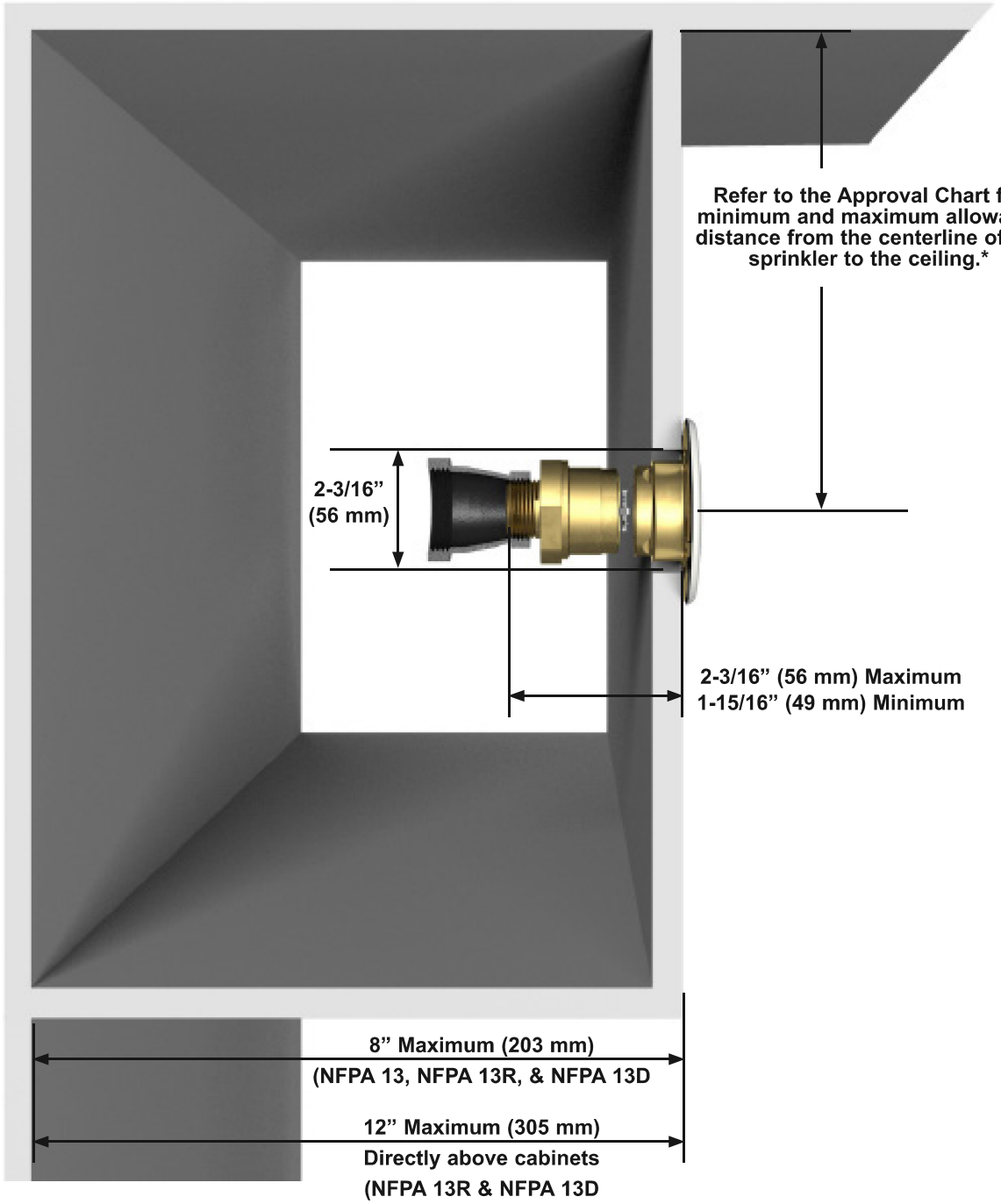


Figure 7: Sprinkler VK490 Installation - Soffit
***Distance from the ceiling affects water supply requirements. Refer to the Approval Chart**

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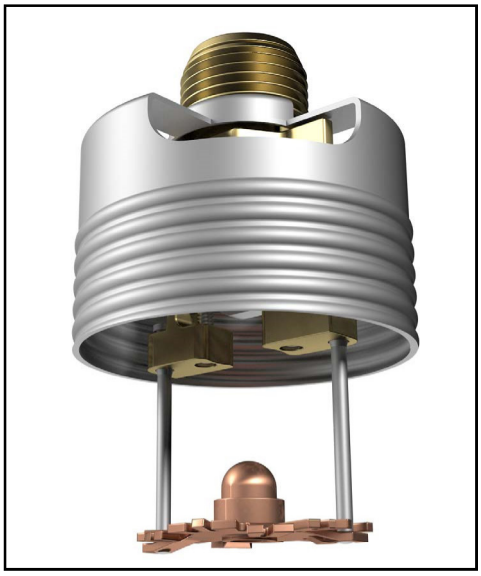
FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK494 (K4.9)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com
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1. DESCRIPTION

Viking Freedom® Residential Concealed Pendent Sprinkler VK494 is a small thermosensitive, glass-bulb residential sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The orifice design, with a K-Factor of 4.9 (70.6 metric*), allows the sprinkler's efficient use of available water supplies for the hydraulically designed fire-protection system. The fast response glass bulb operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile small-diameter cover assembly installed flush to the ceiling. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on", "thread-off" design of the concealed cover plate assembly allows easy installation of the cover plate after the system has been tested and the ceiling finish has been applied, while also providing up to 1/2" (13 mm) of vertical adjustment. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler. The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive atmospheres and is C-UL-US-EU Listed as corrosion resistant as indicated in the Approval Charts. The ENT finish is only available for the sprinkler assembly, the cover plate is not plated.



WARNING: Cancer and Reproductive Harm- www.P65Warnings.ca.gov

2. LISTINGS AND APPROVALS

c UL us EU **UL Listed (C-UL-US-EU):** Category VKKW
Refer to the Approval Charts and Design Criteria on for C-UL-US-EU Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Minimum Operating Pressure: Refer to the Approval Chart.
Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).
Thread size: 1/2" (15 mm) NPT
Nominal K-Factor: 4.9 U.S. (70.6 metric*)
Glass-bulb fluid temperature rated to -65 °F (-55 °C)

* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:
Sprinkler Body: Brass UNS-C84400 or QM Brass
Deflector: Phosphor Bronze UNS-C51000
Deflector Pins: Stainless Steel UNS-S30200
Button: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and SS UNS-S30400
Compression Screw: 18-8 Stainless Steel
Yoke: UNS-S43000 Stainless Steel or Phosphor Bronze UNS-C51000
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate over Zinc Plating
Shipping Cap: Polyethylene

Cover Plate Materials:
Cover Plate Assembly: Copper UNS-C11000 and Brass UNS-C26800 or Stainless Steel UNS-S30400
Spring: Beryllium Nickel
Solder: Eutectic

Ordering Information: (Also refer to the current Viking price list.)
Viking Freedom® Residential Concealed Pendent Sprinkler VK494 and Cover Plate Assembly must be ordered separately:
Sprinkler: Order Sprinkler VK494 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.
Finish Suffix: Brass = A and ENT = JN
Temperature Suffix: 155 °F (68 °C) = B, 200 °F (93 °C) = E
For example, sprinkler VK494 with a Brass finish and a 200 °F (93 °C) temperature rating = Part No. 20759AE.
Standard Cover Plates: Base Part No. 13504 (2-3/4" diameter), Base Part No. 13642 (3-5/16" diameter), or Base Part No. 15394 (square cover plate, 3-5/16")
Stainless Steel Cover Plates (not availble with any finish or paint): Base Part No. 21876 (2-3/4" diameter) or Base Part No. 21875 (3-5/16" diameter).

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TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK494 (K4.9)

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Specify finish and temperature rating of the cover plate assembly by adding the appropriate suffixes for the finish and the cover temperature rating to the base part number:
Finish Suffix: Polished Chrome = F-/B, Bright Brass = B, Antique Brass = B-/A, Brushed Brass = B-/B, Brushed Copper = E-/B, Painted White = M-/W, Painted Ivory = M-/I, Painted Black = M-/B
Temperature Suffix: 135 °F/57 °C = A
For example, cover 13504 with a Polished Chrome finish and a 135 °F/57 °C temperature rating = 13504FA.

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the Viking website.)
Sprinkler Wrenches:**
A. Heavy Duty Part No. 14047W/B** (available since 2006), or
B. Head Cabinet Wrench Part No. 14031*** (available since 2006)
C. Optional Concealed Cover Plate Installer Tool Part No. 14412 (available since 2007)
D. Optional Large Concealed Cover Plate Installer Tool Part No. 14867 (available since 2007)

**Requires a ½" ratchet (not available from Viking). ***Also optional for removal of the protective cap. Ideal for sprinkler cabinets.

Sprinkler Cabinet: Part No. 01731A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches, releasing the deflector. Continued heating of the exposed sprinkler causes the heat-sensitive liquid in the glass bulb to expand, causing the glass to shatter, releasing the yoke and pip cap and sealing spring assembly. . Water flowing through the sprinkler orifice strikes the deflector, forming a uniform spray pattern over a specific area of coverage determined by the water supply pressure at the sprinkler to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinkler Model VK494 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Temperature Rating of the Cover Assembly (Required)[3]	Cover Plate Base Part Number[4]	Large Cover Plate Base Part Number[4]	Square Cover Plate Base Part Number[4]	Bulb Color
Ordinary	155 °F (68 °C)	100 °F (38 °C)	135 °F (57 °C)	13504 or 21876[6]	13642 or 21875[6]	15394	Red
Intermediate	200 °F (93 °C)	150 °F (65 °C)	135 °F (57 °C)	13504 or 21876[6]	13642 or 21875[6]	15394	Green

Sprinkler Finishes: Brass and ENT

Cover Plate Finishes[6]: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black

Corrosion Resistant Coatings[5]: ENT

Footnotes

1. The sprinkler temperature rating is stamped on the deflector.
2. Based on NFPA-13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
3. Maximum ambient temperature for cover assembly is 100 °F (38 °C).
4. Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.
5. The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the ENT coating is applied to all exposed exterior surfaces, including the waterway. For ENT coated sprinklers, the Belleville spring is exposed.
6. Stainless Steel versions are not available with any finishes or paint.

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Approval Chart
Viking VK494, 4.9 K-Factor Residential Concealed Pendent Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the design criteria. For Ceiling types refer to current editions of NFPA 13, 13R or 13D

Sprinkler Base Part Number [1]	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure
		Inches	mm	U.S.	metric [2]	
20759	VK494	1/2	15	4.9	70.6	175 psi (12 bar)

Max. Coverage Area [6] W X L Ft. X Ft. (m X m)	Flow GPM (LPM)	Pressure PSI (bar)	Deflector to Ceiling	Installation Type	Listings and Approvals[3,5]	Minimum Spacing Ft. (m)
	155 °F (68 °C), 200 °F (93 °C) Temperature Rated Sprinklers				c UL us [4] EU	
12 X 12 (3.7 X 3.7)	13 (49.2)	7.0 (0.48)	Refer to Figure 2	Concealed with Cover Plate Assembly. See Footnote 8.	See Footnotes 7,9, 10, & 11	8 (2.4)
14 X 14 (4.3 X 4.3)	13 (49.2)	7.0 (0.48)				
16 X 16 (4.9 X 4.9)	13 (49.2)	7.0 (0.48)				
18 X 18 (5.5 X 5.5)	17 (64.4)	12.0 (0.83)				
20 X 20 (6.1 X 6.1)	20 (75.7)	16.7 (1.15)				

Footnotes

1. Part number shown is the base part number. For complete part number, refer to current Viking price schedule.
2. Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
3. This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals. Refer also to Design Criteria.
4. Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.
5. Meets New York City requirements, effective July 1, 2008.
6. For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum "Flow" and "Pressure" used.
7. Cover Temperature Rating is 135 °F (57 °C). Cover Part No. 13504[1], 13642[1] (large diameter), or 15394[1] (square cover plate).
8. Other paint colors are available on request with the same listings as the standard finish colors. Stainless Steel cover plates are not available with any finishes or paint. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 3.
9. Accepted Cover Plate Finishes are: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black [8].
10. C-UL-US-EU Listed as corrosion resistant - Electroless Nickel PTFE (ENT)
11. Stainless Steel Cover plate temperature rating is 135 °F (57 °C). Stainless Steel Cover Part Numbers: 21876[1] and 21875[1] (large diameter).

VIKING®	TECHNICAL DATA	FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK494 (K4.9)

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DESIGN CRITERIA

(Also refer to the Approval Chart on page 3.)

UL Listing Requirements (C-UL-US-EU):

When using Viking Residential Concealed Pendent Sprinkler VK494 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart.

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

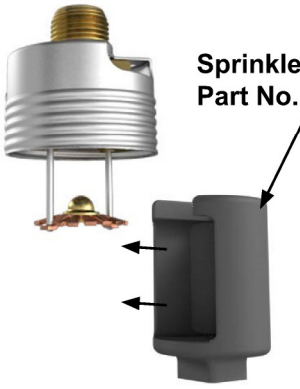
- The flow rates given in the Approval Chart for NFPA 13D and NFPA 13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

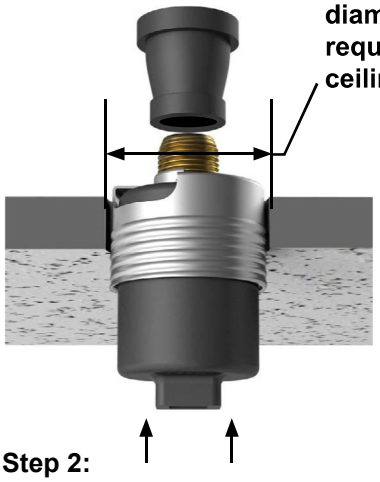
IMPORTANT: Always refer to Bulletin Form No. F_080415 - Best Practices for Residential Sprinkler Handling and Installation. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.

Sprinkler and Adapter Assembly

- **Protective cap removed**
- **Use wrench 14047W/B****



Step 1:
Carefully slide the wrench sideways around the deflector and pins



Step 2:
Carefully press the wrench upward and turn slightly to ensure engagement with the sprinkler wrench flats.

NEVER install the sprinkler by applying the installation wrench across the frame arms. DO NOT overtighten. Use only the designated sprinkler wrenches, Viking Part Numbers 14047W/B or 14031**. A leak tight seal should be achieved by turning the sprinkler clockwise 1 to 1-1/2 turns beyond finger tight.**

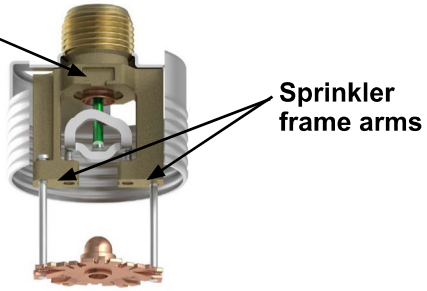
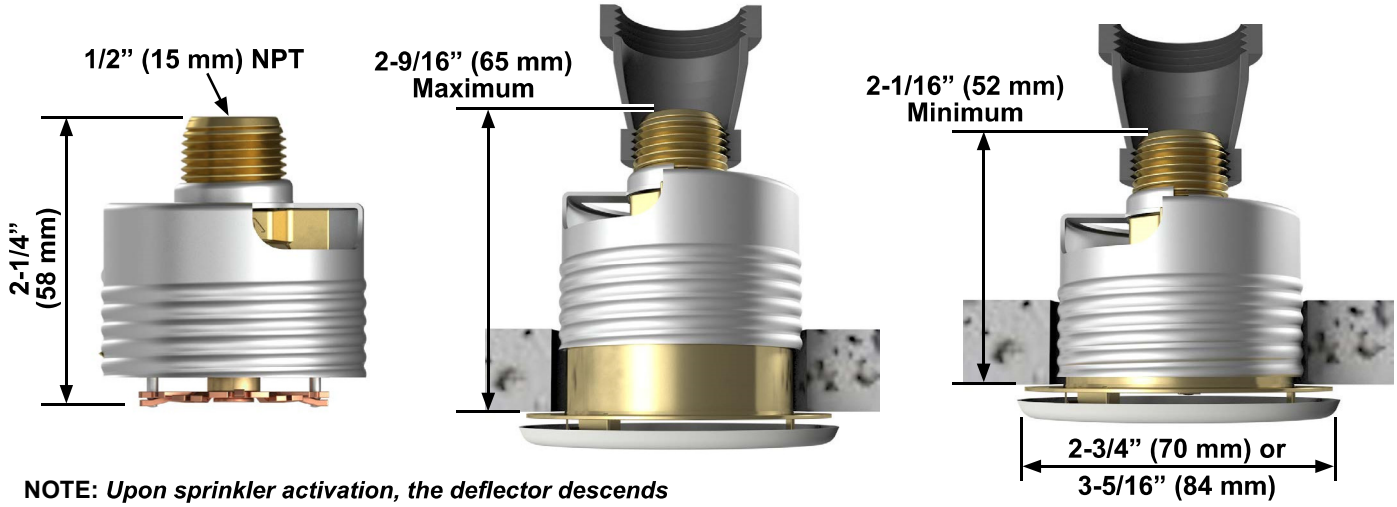


Figure 1: Sprinkler Installation and Proper Wrench Usage
**** A 1/2" ratchet is required (Not available from Viking)**

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK494 (K4.9)

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NOTE: *Upon sprinkler activation, the deflector descends to approximately 13/16" (21 mm) below the sprinkler body.*

Figure 2: Sprinkler Dimensions and Cover Installation



All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates the custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 3: Identification of Custom Paint for Concealed Covers



Figure 4: Square Cover Assembly 15394