



PROJECT FALCON

NFPA 72-2022 FIRE ALARM ENGINEERING REPORT · PRELIMINARY

9/16/2026

Project	Project No.	Designer	AHJ	Location	System	Basis of Design
Test Project	T01-001	Steve Ávila Van der Hansz	NYFD	New York	Addressable	Notifier · INSPIRE Series (INS-4 / INS-8 / INS-16)

DEVICE SCHEDULE

DEVICE	CODE	QTY
Fire Alarm Control Panel (FACP)	FACP	1
Network Gateway	GATEWAY	1
Manual Pull Station	PULL	4
Smoke Detector	SMOKE	26
Horn Strobe	STROBE	6
Strobe	STROBEONLY	1
Total Devices		39

CIRCUIT & NAC VOLTAGE-DROP SCHEDULE

CIRCUIT	TYPE	CLASS	LENGTH	DEV	ALARM	AWG	V-DROP	EOL V	STATUS
SLC 1	SLC	B	439 ft	24	2 mA	18 AWG	0 V	24 V	PASS
NAC 1	NAC	B	246 ft	8	458 mA	18 AWG	0.21 V	20.2 V	PASS

Method: distributed-load drop — each span carries only the current of the appliances beyond it; NAC extenders (RNAC) re-source their downstream branch at full output and are checked against their own output rating. Strobe current follows the candela setting for the selected manufacturer. $V_{EOL} = V_{source} - (2 \times \sum L_{span} \times R_{AWG} \times I_{span})$; passes when $V_{EOL} \geq$ appliance listed minimum. Class A uses full loop length. Source = nominal $\times$ 0.85 (= 20.4 V under load), appliance min = 16 V, current safety factor = 1. Per NFPA 72 §10.6.10 + appliance UL listing.

MATERIAL TAKEOFF — RACEWAY & CONDUCTOR

CIRCUIT	TYPE	CLASS	RACEWAY FT	COND.	CONDUCTOR FT	EMT SIZE
SLC 1	SLC	B	439	18 AWG	878	1/2"
NAC 1	NAC	B	246	18 AWG	492	1/2"

Measured raceway (EMT) run	685 ft
Conductor (2 per raceway)	1370 ft
Order quantity, EMT (+10% allowance)	754 ft
Order quantity, conductor (+10% allowance)	1507 ft

Raceway is the measured routed path, counted once per run; Class A doubles it for the separate return route. Conductor = raceway $\times$ conductors per raceway. EMT trade size per NEC Chapter 9 (Table 4 raceway area, Table 5 conductor area, Table 1 fill: 53% one conductor, 31% two, 40% over two), based on THHN. Quantities are measured from the calibrated drawing, not estimated — verify against field conditions before ordering.

SECONDARY POWER (BATTERY) — NFPA 72 ANNEX B

FACP — Main Panel

ITEM	QTY	STANDBY MA	ALARM MA
FACP (small, <100 pts)	1	200.0	500.0
Manual Pull Station	4	1.2	0.0

ITEM	QTY	STANDBY MA	ALARM MA
Network Gateway	1	120.0	120.0
Smoke Detector (Addressable)	26	7.8	26.0
Strobe 24V (60cd)	3	0.0	474.0
Strobe 24V (cd not set)	4	0.0	600.0
Standby load (24 h × 329.0 mA)			7.896 Ah
Alarm load (5 min × 1720.0 mA)			0.1433 Ah
Subtotal			8.039 Ah
Required (+20% aging derate, §10.6.7)			9.647 Ah
Recommended battery		2 × 12 V — 12 Ah (24 V series)	

Sealed lead-acid; 24 h standby then 5 min alarm; ×1.20 safety/aging margin per NFPA 72 §10.6.7.2.1.

SPACING & COVERAGE — NFPA 72 COMPLIANCE CHECK

Ceiling height: 9 ft · Compliance score: 100% · 0 fail / 3 warning(s)

PASS	1 (26.5x37.1 ft): 4 smoke detector(s), meets 2 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	2 (11.1x15.2 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	3 (10.6x14.4 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	6 (13.1x21.6 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	7 (12.5x21.3 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	8 (30.3x15.6 ft): 3 smoke detector(s), meets 2 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	9 (12.3x11.8 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	12 (12.5x21.5 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	13 (12.9x21.5 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	14 (24x18.6 ft): 4 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	16 (90.2x5.2 ft): 4 smoke detector(s), meets 4 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	17 (11.7x10.3 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
PASS	4 (6.1x11.4 ft): 1 smoke detector(s), meets 1 at 30 ft	NFPA 72 §17.7.3.2.3
WARN	11 of 13 area(s) have no visual notification (strobe) — verify per occupancy.	NFPA 72 §18.5.3
WARN	6 device(s) are not on an initiating circuit, so they have no loop address and print as “L?-D---”. Wire them to an SLC to address them.	NFPA 72 §23.4
WARN	4 notification appliance(s) sit outside every room zone — their candela cannot be sized from the drawing, so a conservative current is used. Draw a zone around them, or set the candela on each appliance.	NFPA 72 §18.5.5.5
WARN	Audibility (dBA), strobe candela vs room size, and beam / sloped-ceiling reductions require engineer review. This is a standing note — re-running the check will not clear it; accept it to record that the review was done.	NFPA 72 §18.4 / §18.5.5

Spacing checks use placed-device geometry at the drawing scale; smooth-ceiling smoke max 30 ft, heat per Table 17.6.3.5.1 at 9 ft ceiling. Coverage gaps flag mapped rooms with no detection. Audibility and beam/sloped-ceiling reductions require engineer review.

STROBE CANDELA SCHEDULE — NFPA 72 §18.5.5.5 (NOTIFIER · INSPIRE SERIES (INS-4 / INS-8 / INS-16))

ROOM	SIZE	REQUIRED (NFPA)	NOTIFIER SETTING	NAC CURRENT
1	26.5×37.1 ft	60 cd	75 cd	158 mA
2	11.1×15.2 ft	15 cd	15 cd	66 mA
3	10.6×14.4 ft	15 cd	15 cd	66 mA
6	13.1×21.6 ft	30 cd	30 cd	94 mA
7	12.5×21.3 ft	30 cd	30 cd	94 mA
8	30.3×15.6 ft	60 cd	75 cd	158 mA
9	12.3×11.8 ft	15 cd	15 cd	66 mA
12	12.5×21.5 ft	30 cd	30 cd	94 mA
13	12.9×21.5 ft	30 cd	30 cd	94 mA
14	24×18.6 ft	30 cd	30 cd	94 mA
16	90.2×5.2 ft	>70 ft	Multiple appliances required — engineer layout	
17	11.7×10.3 ft	15 cd	15 cd	66 mA
4	6.1×11.4 ft	15 cd	15 cd	66 mA

Wall-mounted, one appliance per room (Table 18.5.5.5.1(a)); required candela set by the longest room dimension, rounded up to the nearest available Notifier candela setting. Ceiling-mounted, multi-appliance, and corridor layouts per §18.5.5.5.2–.7. Currents are representative — verify against Notifier cut sheets.

Disclaimer: Preliminary engineering aid generated from the current design using the stated parameters and conservative defaults. Assists design QA; it is NOT a stamped, code-complete compliance certification. Audibility, occupancy/coverage requirements, ceiling-construction spacing reductions, and local AHJ amendments require review by a licensed fire protection engineer. Verify all values against device cut-sheets and the AHJ before submittal.