



Anchorage Middletown Fire & EMS

FIRE MARSHAL'S OFFICE
Community Risk Reduction

108 Urton Lane
Louisville, KY 40223
(502) 813-4806
RiskReduction@AMFEMS.ORG



Construction Fire Safety Requirements

The following guidelines are excerpted from the 2018 KY Building Code, based on the 2015 IBC; 2015 International Fire Code; NFPA 241, 2013 edition; NFPA 51B, 2019 edition; and Chapter 94 & 156, Louisville Metro Ordinance. Compliance with these guidelines does not exempt any entity from required compliance with the entirety of the above codes, or any other applicable code.

OWNER / CONTRACTOR RESPONSIBILITY

- The owner / contractor shall designate a person as the Fire Safety Program Manager who shall be responsible for the fire prevention program through completion of the project
- The Fire Safety Manager will develop a pre-fire safety plan in cooperation with the Anchorage Middletown Fire Prevention Division.
- The Fire Safety Manager will be responsible for training on-site personnel in the use of fire equipment and making sure all fire protection equipment is properly maintained
- The Fire Safety Manager shall schedule a fire watch during and after any hot work is performed

Please review this document and sign below. By signing this document the applicant agrees to comply with the attached guidelines and the entirety of the above listed codes during construction at the project site listed.

Applicant Name: _____ Title: _____

Signature: _____ Date: _____

Project: _____

Address: _____

Designated Fire Safety Manager: _____

GENERAL PRECAUTIONS

- ***WASTE DISPOSAL***
 - Combustible debris shall not be accumulated within buildings.
 - Combustible debris, rubbish and waste material shall be removed from buildings at the end of each work shift.
 - Materials susceptible of spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.
- ***SMOKING***
 - Shall be prohibited except in designated areas with approved ashtrays.
 - "No Smoking" signs shall be posted on each floor.
- ***COOKING***
 - Cooking with open flame devices or hot plates is prohibited inside the structure.

FIRE EXTINGUISHERS

- At least one fire extinguisher (minimum size "2A:10BC"), shall be provided as follows:
 - Each stairway on all floor levels where combustible materials have accumulated.
 - In every storage or construction shed or trailer.
 - Additional extinguishers shall be provided for storage of flammable/combustible liquids or gases.

TEMPORARY HEATING

- Temporary heating devices shall be listed and operated in accordance with their listing.
- LP-gas heaters shall be located at least 6 feet from any LP cylinder (except for integral heater/cylinder units).
- Blower type and radiant type heaters shall not be directed at any LP cylinder within 20 feet.
- Clearance from combustibles shall be maintained in accordance with manufacturer requirements.
 - Frequent checks shall be conducted to ensure proper clearance is maintained.
- LP gas cylinders must be secured and protected from damage at all times.

FLAMMABLE AND COMBUSTIBLE LIQUIDS

- Storage is allowed in approved DOT containers or in listed flammable liquid storage cabinets.
- Sources of ignition and smoking are prohibited in flammable and combustible liquid storage areas. "No Smoking" signs shall be posted.
- Storage areas shall be maintained clear of combustible materials and vegetation.

MEANS OF EGRESS

- Where a building has been constructed to a height greater than 50 feet, or four stories (and in buildings undergoing alterations that or higher than 50 feet or 4 stories), at least one temporary lighted stairway shall be provided unless one or more of the permanent stairways are erected as the construction progresses.
- Required means of egress shall be maintained during construction, demolition, remodeling or additions to any buildings.
- Temporary floor signs shall be provided in any stairway connecting 3 or more floors, indicating the floor number, roof access, and direction to exits.

CUTTING AND WELDING

- Operations shall be done in accordance with the International Fire Code, Chapter 35.
- A fire watch shall be maintained for duration of the work and for 30 minutes after the work is finished.
- For torch applied roofing operations, the fire watch must be maintained for 2 hours after work completion.

FIRE DEPARTMENT FEATURES

- *FIREFIGHTING WATER SUPPLY* - Must be established around and on site prior to combustible materials arriving on the site.
- *VEHICLE ACCESS FOR FIREFIGHTING* - Shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet of temporary or permanent fire department connections.
- *STANDPIPES* - In buildings required to have standpipes, not less than one standpipe shall be provided for use during construction. A temporary or permanent standpipe is required when the building reaches 40 feet in height. The standpipe will be extended floor by floor as the building's height increases. The standpipe will be provided with Fire Department approved hose connections at each level adjacent to usable stairs. A hose connection shall be within one floor of the highest point of construction having secured decking or flooring.
- *SPRINKLERS/FIRE ALARM* - The building cannot be occupied until the fire sprinkler system and/or the fire alarm system has been tested and certified.



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KNOX BOX REQUIREMENTS

Anchorage Middletown Fire requires Knox Boxes *to access buildings and/or properties where access to or within a structure or area is difficult because of security. (NFPA 1 Uniform Fire Code 10.12.1)*. Knox Boxes are also required for those properties that meet *any* the following requirements:

1. Occupancies Requiring Knox Boxes

- A. Any new construction that includes a sprinkler system, fire alarm system, or includes an elevator.
- B. Any building/occupancy that we respond to due to numerous false and/or nuisance alarms. The Uniform Fire Code (NFPA 1) allows the AHJ (Authority Having Jurisdiction) to require an access security box.
- C. Gates that are electronic or chain locked.



- Primary Electronic opening Gate Entry System is required to be a **SOS Siren Operated Sensor Emergency Vehicle Access** System; allowing a 911 emergency access solution that triggers residential or commercial gates to open within 3 seconds of detecting a "Yelp" siren. These systems (e.g., **SOS-12**) offer adjustable sensitivity, 12-24VAC/DC compatibility, and are designed for high-security, fast-access environments.



- In addition to the C2E, a **"Knox Switch"** is to be installed as the secondary access system.



- Non-Electronic access gates that are secured by a chain and a lock, **MUST** also have a **"Knox Lock"** installed on the chain to allow for emergency fire and EMS access.



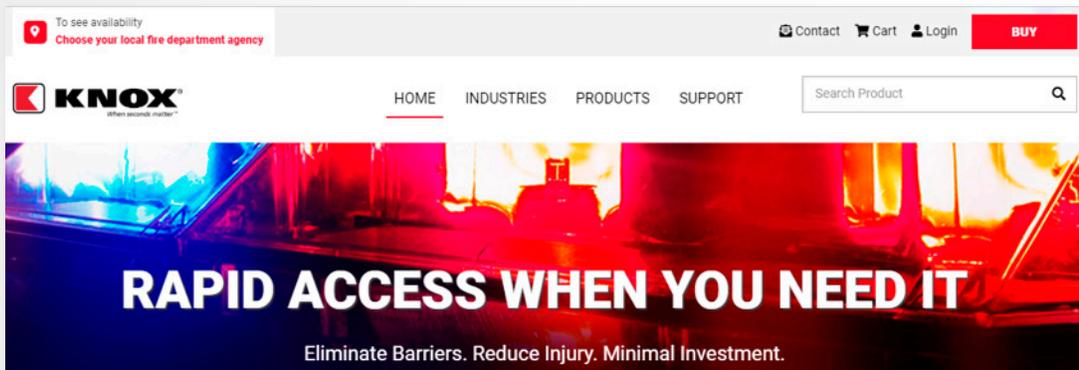
Photo: this is the only way the Knox Lock should be used. Both locks are "Links" in the chain!

To order a Knox Box, go to www.knoxbox.com and click the "Buy" button at top of screen. In the fire department field enter: "Anchorage Middletown Fire Dept". Make sure to select the option addressed in Louisville KY.

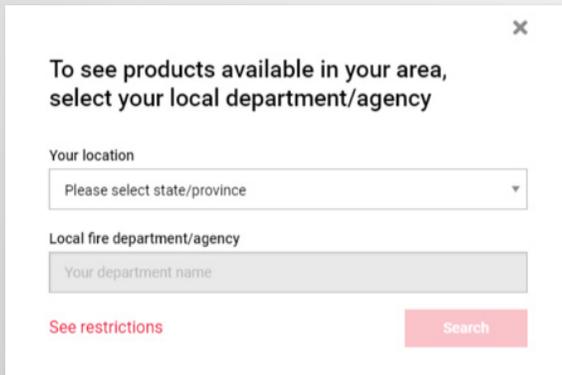
Once you have submitted your request, the Fire Marshal's office will receive a confirmation email and will approve the purchase.

Email RiskRedution@AMFEMS.org for any questions on location or when ready to place keys into box.

1 To purchase a product, click the red **BUY** button located at the top right of the page.

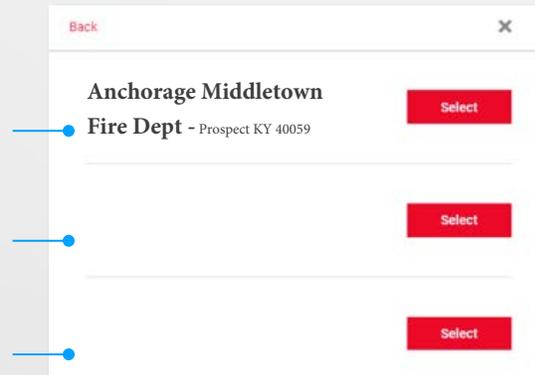


2 To view products available in the area where you're installing the Knox product, select the **State/Province** and **type in your local fire department or responding agency**. Then, click on the Search button.

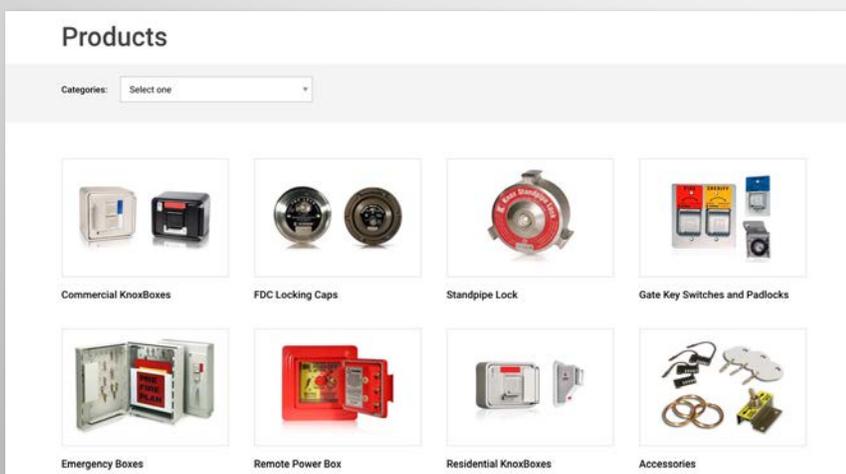


3 A list of fire departments will appear. **Select** your responding fire department or public agency.

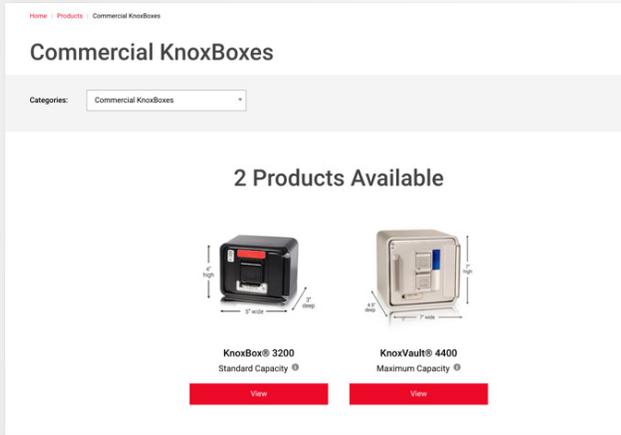
NOTE: For duplicate fire department names, pay closer attention to the last line of each fire department listing, which may indicate specific access programs that have specific products available for that particular program.



4 Once the selection has been made, you will be routed to the product category page. Product categories displayed may differ depending on your fire department.

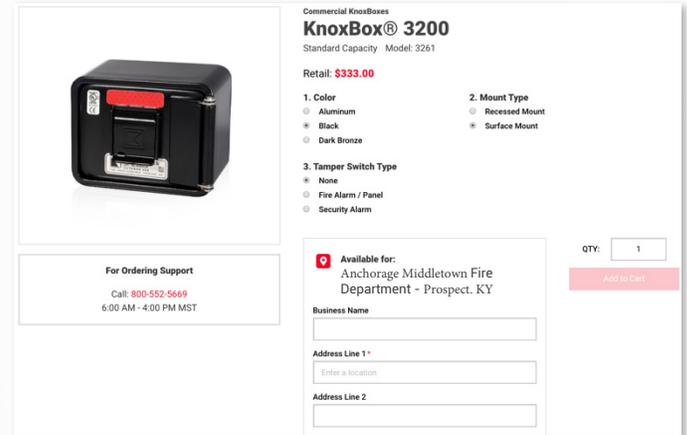


5 To view products, click on a product category which will take you to the corresponding product page. Under the first section of the page, the system will indicate whether or not the product is available in the responding jurisdiction that you have selected. If the product is available, you will be able to view and configure the product.



6 To view the product, click on the **View** button which will take you to the configuration tool. Here you will be able to configure the product.

Please note: Accessories do not have a configuration tool.



7 Start configuring your product:

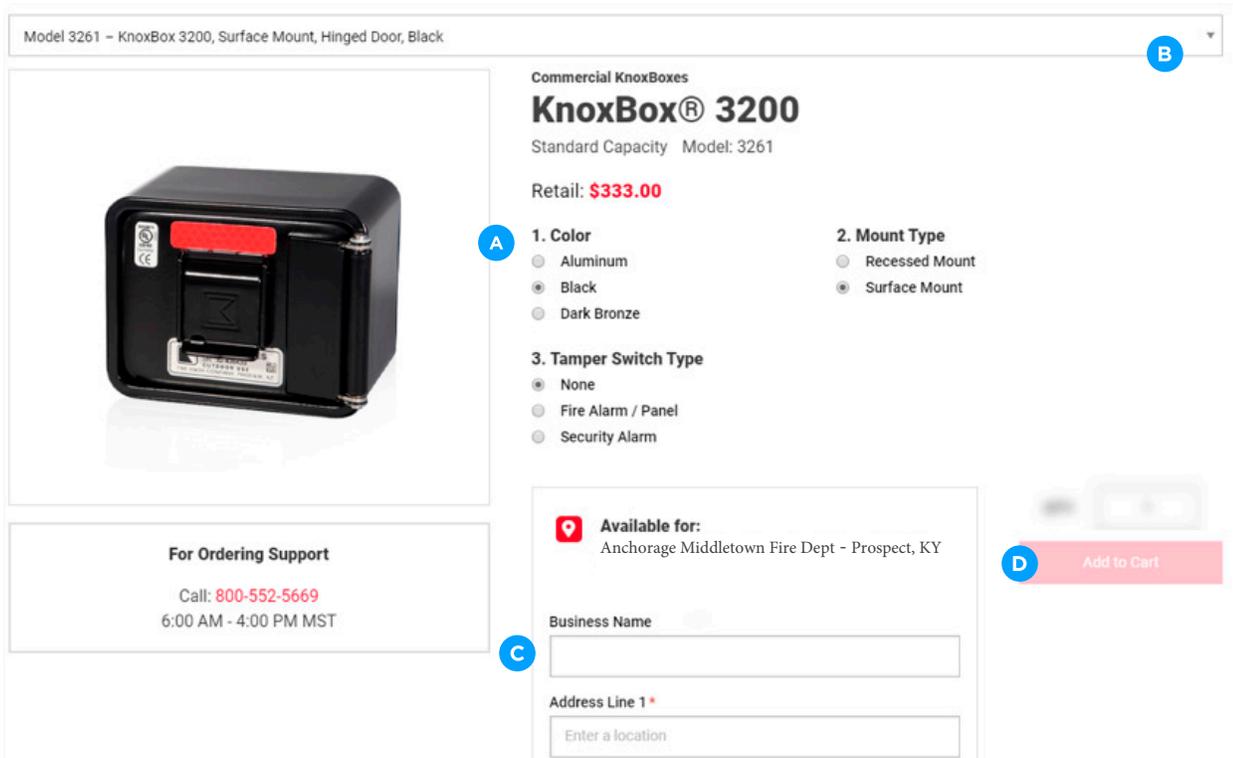
a. Customize your product by selecting the various attributes **(A)**.

If you know the specific model number that want to purchase, you can bypass the attribute selection by using the drop-down menu **(B)** to select the exact product.

b. Once you've selected or configured the product, enter the installation address **(C)** for this item and click **Submit**.

- You will be asked to confirm that you have selected the correct Fire Department (the Fire Department is listed above the Business Name field).
- Note:** If you need more than one of any item, each item requires an installation address. Note: Some items may not require an installation address.

c. Click the **Add to Cart** button **(D)**.



- 8 To continue the process, you will be asked to log in. If you are a new customer, complete the fields in the New Customer area.

Login

Returning Customer

Email Address

Please enter a user name

Password:

Stay signed in on this computer

[Sign in](#)

[Forgot Password?](#)

New Customer

First name: *

Last name: *

Email: *

Confirm Email Address *

Phone Number: *

Company: *

Password: *

Password strength: 🔒

Confirm password: *

I agree to the [Terms and Conditions](#).

[Register](#)

- 9 Once you have logged on or created a new account, you will be returned to the Shopping Cart. To add more products, click **Continue Shopping** or if you're done adding products, click on **Checkout**.

Shopping Cart

Product	Units	Price	Total
<p>Model 4401 – KnoxVault 4400, Surface Mount, Single Lock, Black Model: 4401 Installing to: Knox Company, 1601 W Deer Valley Rd Phoenix, AZ, United States 85027</p>	<input type="text" value="1"/> Delete	<input type="text" value="539.00"/> Update	\$539.00
<p>Model 3111 – Knox FDC Lock with Swivel-Guard, 2.5-inch, 3.068 X 7.5 TPI Model: 3111 Installing to: Knox Company, 1601 W Deer Valley Rd Phoenix, AZ, United States 85027</p>	<input type="text" value="2"/> Delete	<input type="text" value="249.00"/> Update	\$498.00
<p>Model 1433 – Knox Elevator Box with FD Banner, Aluminum Model: 1433 Installing to: Knox Company, 1601 W Deer Valley Rd Phoenix, AZ, United States 85027</p>	<input type="text" value="1"/> Delete	<input type="text" value="376.00"/> Update	\$376.00

9 Approving Department/Agency:
 Anchorage Middletown Fire Department - Prospect, KY

Sub-total	\$1,413.00
Shipping	Calculated during checkout
Tax	Calculated during checkout
Total	Calculated during checkout

[Continue Shopping](#)
[Checkout](#)

For Ordering Support
 Call: 800-552-5669
 6:00 AM - 4:00 PM MST

10 During Checkout:

a. Enter or confirm your Billing Address.

Select a billing address from your address book or enter a new address

ADD NEW ADDRESS

First Name *

Last Name *

Email *

ttrinh@knoxbox.com

For a residential address, please check here

Company *

Knox Company

Address *

Address 2

City *

State/Province *

ALABAMA

Country *

United States

Postal Code *

Phone *

Ship to a different address

Continue

Back to Shopping Cart

b. If the shipping address is different from the billing address, select the 'Ship to a different address' check box:

Phone *

Ship to a different address

c. Click on the **Submit** button to proceed to the Shipping Method screen.

d. Choose your Shipping Method and click on the **Continue** button to proceed to the Payment screen.

e. Enter your Payment Information and click on the **Continue** button to proceed.

f. Confirm your order or make changes to it.

g. To complete your order, you MUST click the **Complete Order** button to complete your purchase.

Note: If your fire department needs to approve your purchase, your credit card or purchase order will not be charged until the department has approved your order.

Approving Department/Agency:
Anchorage Middletown Fire Department - Prospect, KY

Approval Required Before Purchase

Please note: The total amount is only an estimate. The Department has up to 30 days to review your order. The total amount may change if the price, freight and/or tax fee change(s) during the review timeline. An invoice with the updated amount will be emailed to you when the products ship.

Sub-total	\$333.00
Shipping	\$29.00
Tax	\$31.13
Total	\$393.13

I understand that approval from my local fire department/agency is required before purchase is complete.

Once approval is provided my credit card will be charged and my order will be filled.

Complete Order

Back



Anchorage Middletown Fire & EMS

Community Risk Reduction Division

www.amfireandems.org

Captain James Hundley
Acting Fire Marshal
502-813-4807
jhundley@amfems.org

NFPA Firefighter Safety Building Marking System (FFSBMS)

See reverse side for example.

Zone 1 – Construction Type

- FR – Fire Resistive Construction
- NC – Noncombustible Construction
- ORD – Ordinary Construction
- HT – Heavy Timber
- C – Combustible Construction

Zone 2 – Automatic Fire Sprinkler and Standpipe

- A – Automatic fire sprinkler system installed throughout
- P – Partial Automatic Sprinkler system or other suppression system
- S – Standpipe system installed
- N – None

Zone 3 – Occupancy/Life Safety Issues

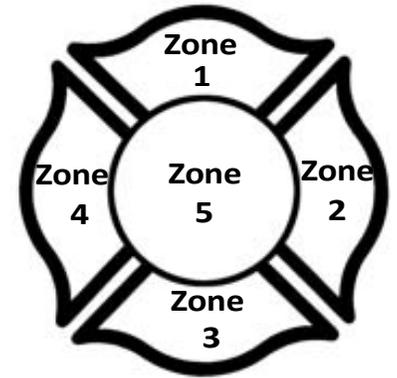
- L – Business, Industrial, Mercantile, Residential and Storage Occupancies
- M – Ambulatory Care, Assembly, Educational, and Daycare Occupancies
- H – Detention or Correction Facilities, Healthcare, and Board and Care Facilities

Zone 4 – Hazard of Contents

- L – Low Hazard “Low Combustibility”
- M – Moderate Hazard “Likely to burn/moderate rapidity” considerable volume of smoke
- H – High Hazard likely to burn with Extreme rapidity or explosions is likely

Zone 5 – Special Designations

- HM – Not defining exactly what is in the facility
- TR – Wood Truss Roof
- TF – Wood Truss Floor
- POOL – Swimming Pool/Chemicals



NFPA Firefighter Safety Building Marking System (FFSBMS)

The following are the requirements for the Firefighter Safety Building Marking System that are installed in the Anchorage Middletown Fire Protection District. Marking systems should be installed on all commercial properties designated by the Fire Marshall and meet the guideline outlined by NFPA and the Anchorage Middletown Community Risk Reduction Division. The marking system provides firefighters with information about the building, it's construction and contents.

Sign should be posted clearly visible upon approach of the structure, 6 to 8 feet off the ground or near the Knox Box (see example below)





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Final Inspection for Opening (C.O.) Checklist

This checklist is a guide to help you for opening inspection by the Fire Marshal. It is not to be confused with what may be required by the Building Inspector for KY, Building Code compliance. This is generalized and may not be all inclusive.

These items are required to be complete **before** you may open.

General:

- Address numbers posted and visible
- Approved FD Key Safe mounted in the proper location
(key safe available to order on line at [click here](#))
- Emergency lights and exit signs tested
- Fire extinguishers provided and properly mounted
- Firefighter Building Marking System(FFBMS) sign mounted in approved location
(FFBMS sign information to be obtained from the Fire Marshal)
- Occupancy capacity sign provided by Fire Marshal posted (certain assembly types only)
- Floor and Stairwell ID at each floor level inside the stairwell
- Fire Lanes properly marked with signage on site

Fire Suppression and Alarm System:

- Fire Inspector witnessed Fire Alarm System Test. Certification papers provided to the Fire Marshal's office upon completion of successful test. (if equipped)
- Fire Alarm control panel sign (FACP) & Sprinkler Riser control room sign posted on door (as applicable)
- Fire Inspector witnessed Fire Sprinkler Test. Certification papers provided to the Fire Marshal's office upon completion of a successful test. (if equipped)
- Fire Inspector witnessed Commercial Hood Suppression Test. Certification papers provided to the Fire Marshal's office upon completion of a successful test. (if equipped)
- 5" Stortz FDC with 30 degree turn down provided with required FDC signage
- BDA report indicates all areas pass radio frequency requirements (as applicable).



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- Alternate FDC if approved for NFPA 13R systems or systems with less than a 3" riser
 1. 2.5" LFD thread FDC provided
 2. FDC sign posted
- Fire Inspector witnessed Fire Standpipe Test. Certification papers provided to the Fire Marshal's office upon completion of a successful test. (if equipped)
 1. 5" Stortz FDC with 30 degree turn down provided
- Fire Inspector witnessed Commercial Hood System Test. Certification papers provided to the Fire Marshal's office upon completion of a successful test. (if equipped)
- Any outstanding Fire Department Fees have been received

Captain James Hundley
Deputy Fire Marshal
jhundley@amfems.org
Office 502-813-4807

Gary Muller
Fire Inspector III
gmuller@amfems.org
502-996-9342

Contractors Name: _____

Contractors Signature: _____

Date: _____



EMERGENCY RESPONDER RADIO COVERAGE (ERRC)

BDA Systems

April 2019





DURING AN EMERGENCY, RELIABLE COMMUNICATION IS CRITICAL.

Staying informed with clear radio transmissions between first responders will **help prevent further injuries and save more lives**

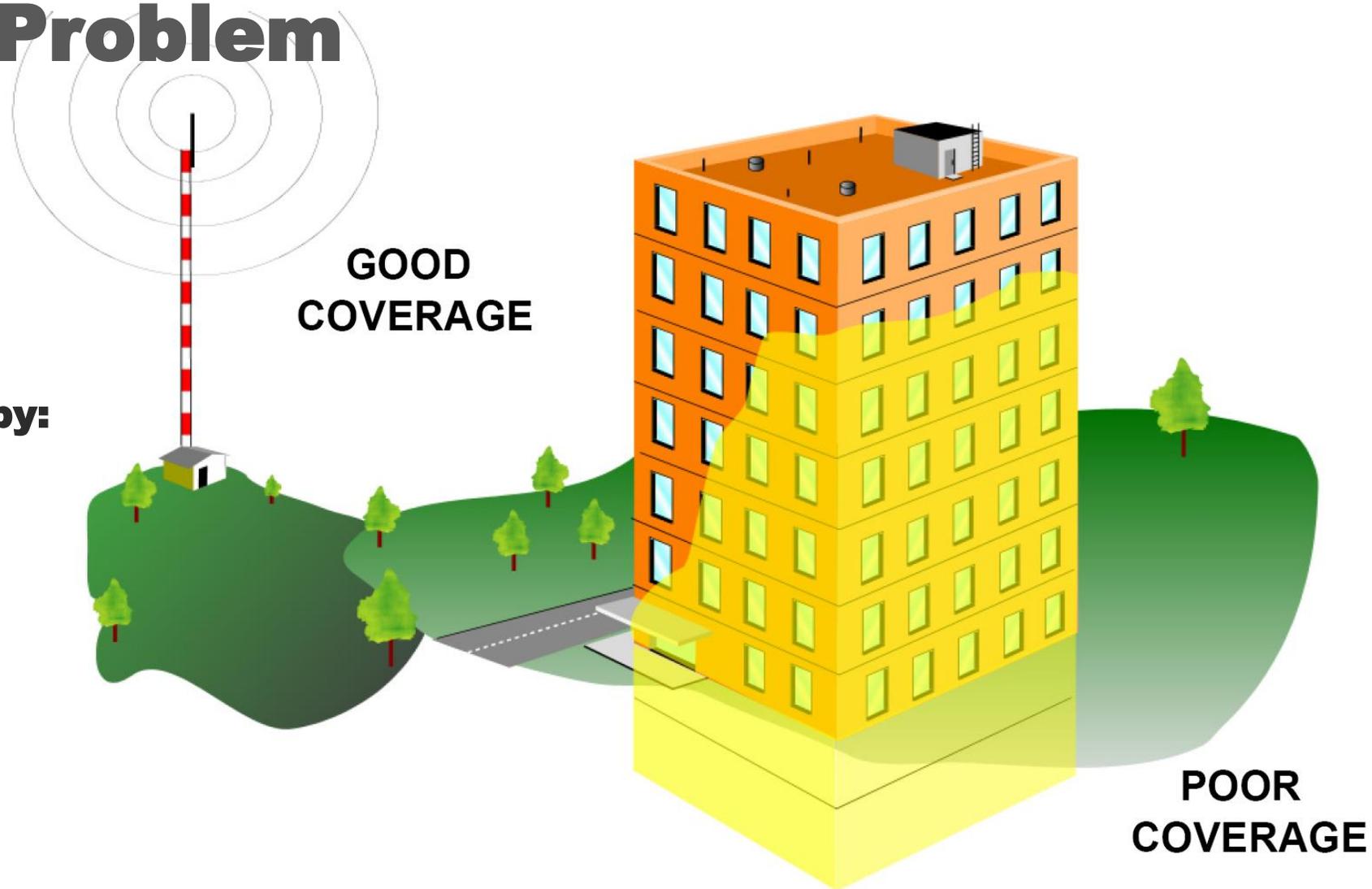


The Coverage Problem

In-building radio signal degradation

Radio signals are attenuated by:

- Concrete, Metal and other building materials
- Low-E Glass
- Below-Ground Structures
- Other obstructions
- RF Interference



The consequence:

Poor in-building radio signal coverage and “dead spots”.
Emergency responders lose communications

What is a BDA System?

BDA – Bi-Directional Amplification system is used to enhance in-building radio frequency signal coverage

- Radio Frequency (RF) Amplifier that amplifies/boosts
 - Signals in 2 directions
- Also known as a signal booster
- Can also be UDA
 - Uni-Directional Amplifier
 - Signals in 1 direction

Distributed Antenna System (DAS)

- An active device (BDA/Signal Booster) and an antenna distribution
 - Provides coverage where it needs to be within a structure



BDA is a LIFE SAFETY SYSTEM

- Supervised by building's fire alarm system
- Typically purchased with Fire Alarm
 - Installed and tested by qualified, factory certified technicians
 - Inspected by AHJ
- Code Driven Requirement
- AHJ Specifications
 - AHJ/Jurisdictions have different frequency requirements

How important are BDAs to Public Safety?

Source: IAFC Survey 2017

% of Buildings with Poor Radio Frequency Coverage



Do you have a method to track these buildings?
Yes 38%, No 62%

Have You Experienced a Communications Failure within a building during an emergency incident?

56%

- Last 6 months **31%**
- Last Year **16%**
- Last 2 Years **9%**

Level of Expertise with BDA/ERRCS Systems



How Important is Reliable In-Building Communication Coverage of PS LRM during emergencies?

94%

Critical **79%**
Frequently Important **15%**

Code Requirements



Fire Code Terminology – **Commonly Used**

- **Emergency Radio Communication Enhancement Systems - ERCES**
- In-Building Emergency Responder Radio Systems - IBERRS
- In-building public safety radio signal booster - IBPSRSB
- In-building radio system -IBRS
- In building emergency communication radio enhancement systems – IBECRES
- **In-building emergency responder radio enhancement system – IBERRES**
- In-Building Public Safety Communication Systems - IBPSCS

- **Auxiliary Radio Communication | ARC System (in New York City & Long Island)**

- **Public safety signal booster – PSSB**
- Public safety in-building communications systems - PSIBCS
- Public safety bi directional amplifier –PSBDA
- Public safety radio enhancement system – PSRES

- **Emergency radio coverage system - ERCS**
- Emergency Communications Radio System – ECRS
- **Emergency responder radio coverage systems – ERRCS**

- Signal booster system – SBS
- Distributed antenna system –DAS
- 2-way radio communication enhancement systems – RCES



Code-Driven Requirement

IBC 2015 - Section 916, NFPA 1 Section 11-10

- Refers to IFC section 510 or the state recognized fire code

IFC Section 510 Emergency Responder Radio Coverage

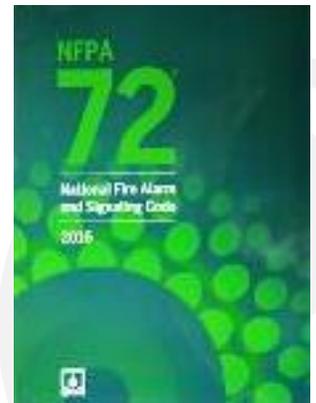
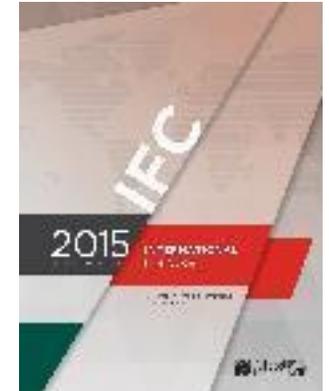
- First appeared in the appendix of the 2009 IFC; the provision was moved to the body of the code in 2012.
- Section 1103.2 specifies the requirements for emergency responder radio coverage in existing buildings.

NFPA 72 National Fire Alarm and Signaling Code

- 2010 / 2013 Edition, section 24.5.2
- The 2016 edition of NFPA 72 relocated the requirements to NFPA 1221
- 2016 & 2019 Editions of NFPA 1221, Emergency Service Communications Systems, Section 9.6

Code Adoption

- At present 28 states (including D.C.) are requiring BDA Systems.
- There are 34 States that have adopted IFC; 4 more IBC; 9 more NFPA 1/101.



ERCES / BDA System Codes & Standards

Code Requirements	NFPA*		IFC	
	<u>NFPA 72 - 2013</u>	<u>NFPA 1221 - 2016</u>	<u>IFC 510 - 2015</u>	<u>IFC 510 - 2018</u>
In-Building Solution Required	Section 24.5.2	Section 9.6	Section 510.1	Section 510.1
Level 1, Level 2 or Level 3 Pathway Survivability	2 Hour for Riser Coaxial Cable Section 24.3.6.8.1	2-Hour for Riser Coaxial Cable Section 9.6.2.1.1	Not Addressed in Section 510. Referenced in 24.3.6.8.1 of NFPA 72-2013	Yes, Section 510.4.2. Reference to NFPA 1221
Plenum Rated Coaxial Cable Required	Yes, Riser & Feeder Coaxial Cable Section 24.3.6.8.1.1	Yes, Riser & Feeder Coaxial Cable Section 9.6.2.1.1.1	Not Addressed in Section 510. Referenced in 24.3.6.8.1.1 of NFPA 72-2013	Yes, Section 510.4.2. Reference to NFPA 1221
Lightning Protection Required	Not addressed in Section 24.5.2	Yes, In accordance with NFPA 780 Section 9.6.3	Not Specifically Addressed in Section 510	Yes, Section 510.4.2 Per NFPA 780 as Referenced in NFPA 1221
Isolation of Donor Antenna Required	Yes, 15 dB Section 24.5.2.3.3	Yes, 20 dB Section 9.6.9	Not Specifically Addressed in Section 510	Yes, 20 dB - Section 510.4.2.4 (4)
Secondary Power Source	12 Hours Section 24.5.2.5.5.2	12 Hours Section 9.6.12.2	24 Hours - Section 510.4.2.3	12 Hours - Section 510.4.2.3 or 2-Hours Battery with Emergency Generator
Signal Strength & Area Coverage Required	-95 dBm - Section 24.5.2.3 90% General - Section 24.5.2.2.2 99% Critical - Section 24.5.2.2.1	DAQ 3.0 - Section 9.6.8 90% General - Section 9.6.7.5 99% Critical - Section 9.6.7.4	-95 dBm - Section 510.4.1 95% General - Section 510.4.1 99% Critical - Not Specifically Addressed in Section 510	DAQ 3.0 - Section 510.4.1.1 95% General - Section 510.4.1 99% Critical - Section 510.4.2 Reference to NFPA 1221
Monitoring By Fire Alarm Required	Yes - Section 24.5.2.6	Yes - Section 9.6.13	Yes - Section 24.5.2.6 NFPA 72 -2013	Yes - Section 9.6.13 NFPA 1221-2016
Cabinets for Equipment & Battery Backup Required	Yes, NEMA 4/NEMA 4X - Section 24.5.2.5.2	Yes, NEMA 4/NEMA 4X - Section 9.6.11.2	Yes, NEMA 4 - Section 510.4.2.4 (1) & (2)	Yes, NEMA 4/NEMA 3R - Section 510.4.2.4 (1) & (2)
Monitor Antenna Malfunction Required	Yes, Donor Antenna - Section 24.5.2.6(2)(a)	Yes, Donor Antenna - Section 9.6.13.1(2)(a)	Yes, Section 24.5.2.6(2)(a) NFPA 72-2013	Yes, Donor Antenna - Section 510.4.2.5
System Acceptance/Testing	Section 24.5.2.1.2	Section 9.6.4, 11.3.9 & 11.3.9.1	Section 510.5.3	Section 510.5.3

***NFPA 1 Section 11.10: In all new and existing buildings, minimum radio signal strength for fire department communications shall be maintained at a level determined by the AHJ. Where required by the AHJ, two-way radio communication enhancement systems shall comply with NFPA 1221.**

IFC Building Requirements

IFC Rule

- All newly constructed buildings, shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building.

Current NFPA and IFC Codes

Conditions	NFPA 1221 Section 9.6 – 2016 edition	IFC 510 – 2015 edition (2018 ed. avail. Oct 2017)
Antenna Malfunction	Applicable – System & BDA	Not specifically – AHJ may require
Signal Booster Failure	Yes	Yes
Low Battery 70%	Yes	Not specifically – AHJ may require
Loss of Normal A.C.	Yes	Yes
Failure of Battery Charger	Yes	Not specifically – AHJ may require
Backup Duration	12 Hours	24 Hours* (12 hours 2018 IFC)
Signal Coverage	>=95 dBm (DAQ3.0 2016 edition) / 90% / 99%	>=95 dBm (DAQ3.0) / 95%
Monitoring / Maintenance	Yes	Yes
Battery Backup Cabinets	NEMA4	NEMA4 (NEMA3R 2018 IFC)

IFC Building Requirements

- **510.2 Emergency responder radio coverage in existing buildings.** Existing buildings shall be provided with *approved* radio coverage for emergency responders as required in Chapter 11.
- Chapter 11:
- **1103.2 Emergency responder radio coverage in existing buildings.** Existing buildings that do not have *approved* radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building, shall be equipped with such coverage according to one of the following:
 - Whenever an existing wired communication system cannot be repaired or is being replaced, or where not *approved* in accordance with Section 510.1, Exception 1.
 - Within a time frame established by the adopting authority.
- **Exception:** Where it is determined by the *fire code official* that the radio coverage system is not needed.

IFC 510 Coverage Requirements

510.4.1 Radio signal strength.

- The building shall be considered to have acceptable emergency responder radio coverage when signal strength measurements in 95 percent of all areas on each floor of the building meet the signal strength requirements in Sections 510.4.1.1 and 510.4.1.2.

510.4.1.1 Minimum signal strength into the building.

- A minimum signal strength of -95 dBm shall be receivable within the building.

510.4.1.2 Minimum signal strength out of the building.

- A minimum signal strength of -95 dBm shall be received by the agency's radio system when transmitted from within the building.



NFPA Coverage Requirements

- Critical Area Coverage – 99% (NFPA 1221 9.6.7.4) coverage required in Critical areas:
 - Emergency Command Center(s)
 - Fire Pump Room(s)
 - Exit Stairs
 - Exit Passageways
 - Elevator Lobbies
 - Standpipe Cabinets
 - Sprinkler Sectional
 - Valve Locations
- General Area Coverage – General building areas should have (90% NFPA 1221 9.6.7.5) and (95% “all floors of the building,” IFC 510.5.3, DRAFT 2018 edition) coverage

NFPA Requirements

Signal Booster Components

- Boosters should have FCC certification prior to installations.

Analog and digital communications

- All signal boosters shall be compatible with both analog and digital communications simultaneously at the time of installation

Component Enclosures

- All signal booster and components shall be contained in NEMA-4 or 4X type enclosure(s)

Donor Antenna Isolation

- Isolation shall be maintained between the donor antenna and all inside antennae. A signal generator is recommended to test for Isolation.

Dedicated Monitoring / Annunciator Panel

A dedicated monitoring panel shall be provided within the emergency command center to annunciate the status of any signal booster(s). The monitoring panel shall provide visual and labeled indication of the following for each signal booster:

- Normal AC power
- Signal booster trouble
- Loss of normal AC power
- Failure of battery charger
- Low-battery capacity
- Antenna failure



RESPONSIBILITY



- As required by the building code
- As requested and specified by the AHJ

- Property Owners are Responsible for:
 - Maintenance
 - Surveys
 - Upgrades





City of Phoenix
 FIRE DEPARTMENT
 FIRE PREVENTION DIVISION

**PHOENIX
 FIRE
 DEPARTMENT**

Policy 510 – Emergency Responder Radio Coverage

SUBJECT: Emergency Responder Radio Coverage	EFFECTIVE DATE: January, 2019
REFERENCES: 2018 International Fire Code with Phoenix Amendments NFPA 1221 (2016)	SUPERSEDES: New
	REVIEW DATE: January, 2022
NOTICE: Policies are established by the Phoenix Fire Prevention Code, Section 104.1	APPROVED:  John Mertens, Fire Marshal



Phoenix Fire Code (PFC)

- First Responders must be able to maintain communication throughout a building in an emergency situation.
- A minimum radio signal strength for emergency responder communications shall be provided and maintained.
- Section 510 of the **PFC requires that new and existing buildings** be provided with Emergency Responder Radio Coverage Systems (ERRCS) designed to provide radio coverage in areas of buildings and structures where signal strength does not meet the minimum criteria due to building construction features and/or location.
- When **in-building radio signal strength fails** to meet the minimum requirements of the Phoenix Fire Code (PFC), **ERRCS shall be provided**. These systems are also referred to as Bi-Directional Amplifier (BDA) and Distributed Antenna Systems (DAS)

Phoenix Fire Code (PFC)

- This policy applies to all new and existing buildings that meet any of the following conditions:
 - There are more than 3 stories above grade plane (as defined by building code, section 201)
 - The total building area is greater than 50,000 square feet
 - Any building with a basement or underground level/level(s)
 - Where required by the fire code official and radio coverage signal strength levels do not meet the minimum levels set forth in PFC section 510
 - ***The city of Phoenix recommends providing a ERRCS backbone for new buildings for which this policy applies

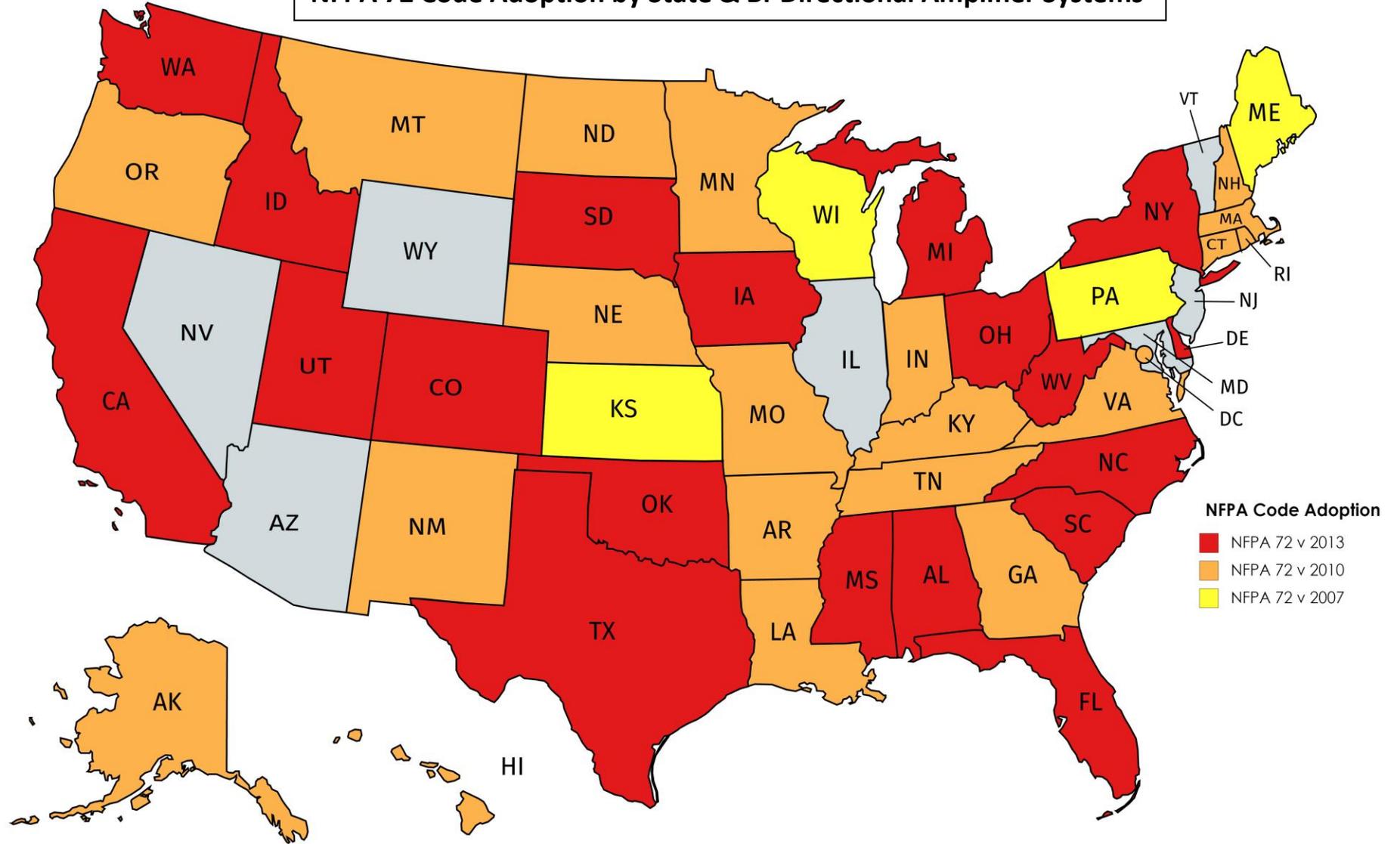
Phoenix Fire Code (PFC)

- **Testing** for radio coverage compliance shall be **conducted after the completion of the building envelope**; this includes, but is not limited to all doors, windows, interior walls, and exterior openings. In buildings with significant internal signal impairments such as rack storage, wire mesh security screens or other interior or exterior features, all internal construction shall be completed prior to compliance testing.

Is BDA Enforceable?

Depends on whether it is required by Building Code or by AHJ OR by city ordinance

NFPA 72 Code Adoption by State & Bi-Directional Amplifier Systems



UL-2524



What is the UL2524 Product Standard?

- “The UL 2524 Creates a Product Performance Standard that allows manufacturers to design and list BDA systems to”
- “UL2524 Assures AHJs, A&Es, Building Owners & Occupants that Honeywell’s BDA Systems Perform the First Time and Every Time—exactly as prescribed in IFC 510.5.3 and NFPA 1221.”



Brand New Product Standard for ERCES/BDA Systems

- Covers products used for 2-way ERCES/BDA systems installed in a location to improve wireless communication at that location.
- Current UL ensures 100% compliance to:
 - basic installation & operation safety (UL60950),
 - the installation specifications prescribed in NFPA 1221 2016 section 9.6, and
 - performance to the standards defined in IFC 510.5.3 2018, including section 1103.2 for existing buildings

BDA System Components



BDA System Components – 1 of 5



- Donor Antenna
 - Installed on the Roof of the building
 - Pointing to the public safety radio repeater site
 - High gain, high directivity
 - Does not need line of sight



- Coaxial Cable
 - Typically Plenum Rated, 1/2" diameter
 - Low insertion loss is required
 - We now use red cable
 - Some AHJs have special labeling requirements

BDA System Components – 2 of 5

- Signal Splitters and Couplers

- Used for signal distribution
- Come in different coupling values



- RF Connectors

- Installed using specialized tool
- Easily done by a trained technician



- DAS Antennas

- Fiberglass “stick” antennas have the best performance
- Other antennas, such as low-profile are available
- Various mounting options are available



BDA System Components – 3 of 5

- **Battery Backup**

- All RSI signal boosters come with a fully integrated
- battery charger and battery diagnostics functions.
- OEM Battery backup enclosure is provided
- with the BDA
- Easy to install, designed to fit below the BDA



- **Annunciator Panel**

- Dedicated monitoring panel is required
- Specified in NFPA-72 and 1221
- Independent from fire alarm system
- Powered by the BDA power supply and battery
- OEM panel included with the BDA
- Easy installation on a standard 2-gang electrical box



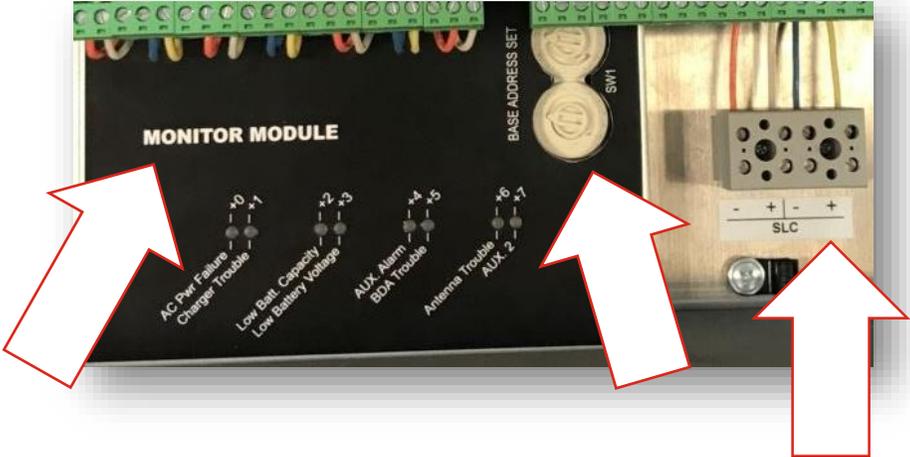
BDA System Components – 4 of 5

- Fire Alarm Panel Connection

- BDAs must be monitored by the building’s Fire Alarm System

- Supervisory signals normally include:

- Donor antenna malfunction
- BDA Failure
- Low Battery Capacity
- Loss of normal AC Power
- Failure of a Battery Charger



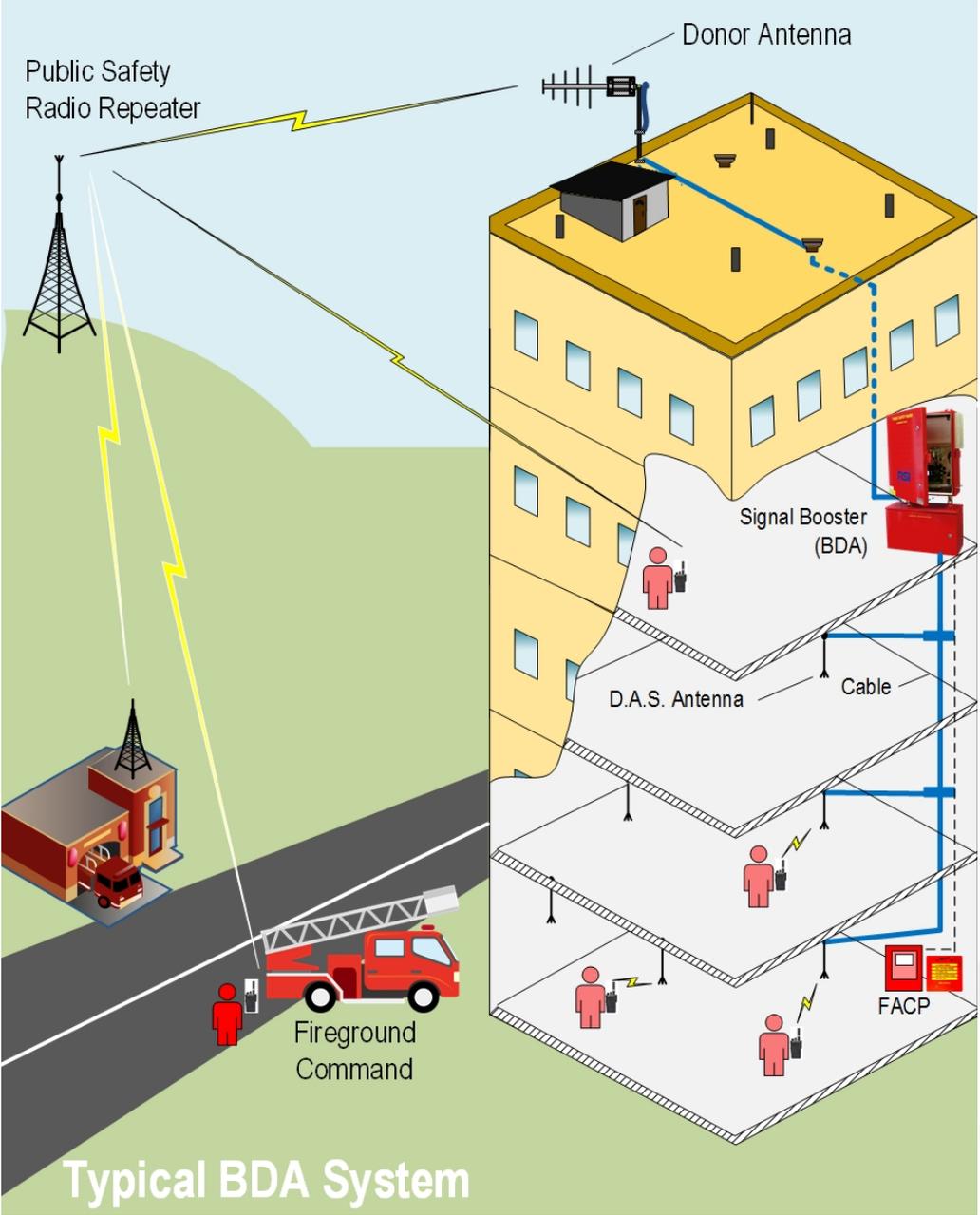
- Addressable Monitoring Module is now available as an option for simple connection to NOTIFIER

BDA System Components – 5 of 5



- BDA (Signal Booster)
 - Must meet requirements of the local AHJ.
 - Each jurisdiction is different:
 - Frequencies / channels required?
 - VHF, UHF, 700 or 800MHz, or multi-band?
 - Fire only or Fire, Police, EMS, Regional?
 - Bandwidth?
 - Monitoring Requirements?
 - Annunciator Location?
 - Labeling Requirements?
 - Any other requirements?
 - AHJs in larger jurisdictions usually have well-written specs, but for many this is still a new requirement and there is no written spec.
 - RSI Project Managers can assist AHJs with technical specifications.

Typical BDA System with Fireground Command



Typical Deployment Process

Once the building is substantially complete, a qualified and FCC licensed vendor will perform the signal survey to check the current radio signal levels inside the building.

SIGNAL SURVEY

Signal readings are documented/noted on print floor plan and forwarded to the system design engineer

DOCUMENT LEVELS

VERIFY LOCAL REQUIREMENTS

Review AHJ requirements

- Not all have a BDA written specification
- Frequencies that need to be covered?
- Fire Only? Or Fire & Police? Other?
- Repeater locations?
- Backup sites?
- Additional requirements?

MEASURE SIGNALS

Vendor will measure the incoming signal levels by monitoring the AHJ radio repeater talk-out frequency. Vendor shall notify AHJ and get approval for the testing.

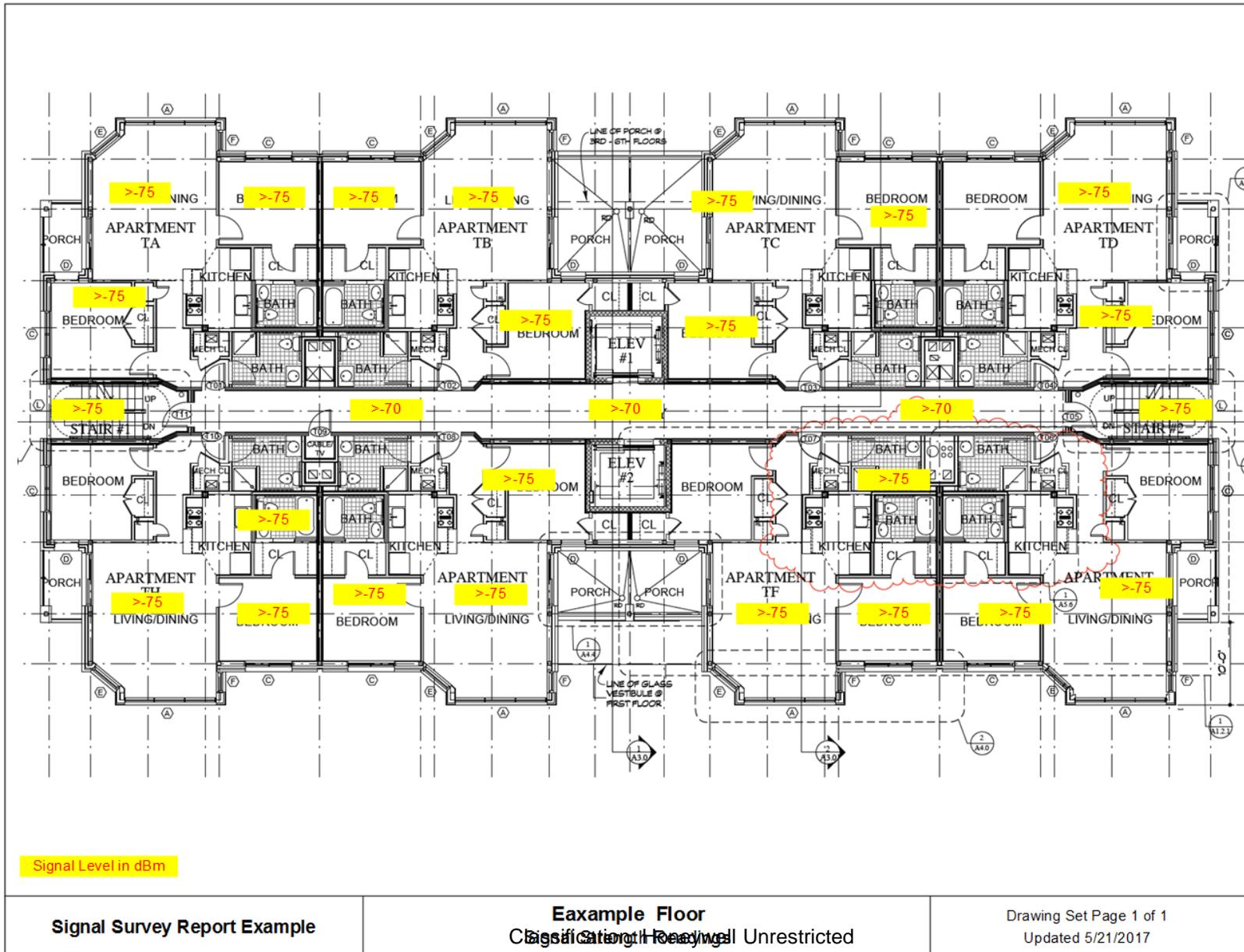
BDA REQUIRED?

If the measurements show that the levels are below the required minimum, then a signal amplification system (BDA system) shall be required.

Radio Signal Survey

- Determines if a building has sufficient radio signal coverage or if it needs a signal enhancement (ERCES) system.
- It is a responsibility of the building owner or construction company to perform survey and to certify signal coverage on a **100% completed** building. Survey report needs to be submitted to the AHJ.
- AHJ Should have signal surveys for all buildings in the jurisdiction.
- Signal enhancement (ERCES) is required for building with insufficient coverage.
- Final survey / signal coverage certification is done upon building completion.
- Surveys are done by FCC GROL certified technicians. Minimum 20 readings per floor. Test all critical areas. Report submitted to AHJ.

Typical Signal Survey Report



FCC Certification and Registration Requirements

- Signal Boosters must be FCC certified (manufacturer product brochures and product labels must include FCC ID number)
- BDAs are FCC certified to operate on the licensee's frequencies
- FCC Requires frequency licensees (FD, PD, municipality, etc.) to register all signal boosters that operate on their frequencies
- Registration is free and FCC has a simple on-line registration tool:
<https://signalboosters.fcc.gov/signal-boosters>
- Registration needs to be done by the AHJ (frequency licensee) because it requires the licensee FRN (federal registration) number and FCC password.
- BDA vendor can assist if needed

Installer Requirements

- Meet one or more and AHJ accepted: (Based on State/Local Agencies supporting Code Licensure Regulations)
 - Registered, Licensed, or Certified by AHJ/State
 - Nationally recognized certification organization
 - Brand/System Specific Factory Trained and Certified Fire Alarm and Emergency Communication System Installers
- Requirement Verification
 - Qualification/Certifications by AJH
 - FCC GROL License
 - PS Project References
 - Product Certifications

SUMMARY

SITUATION

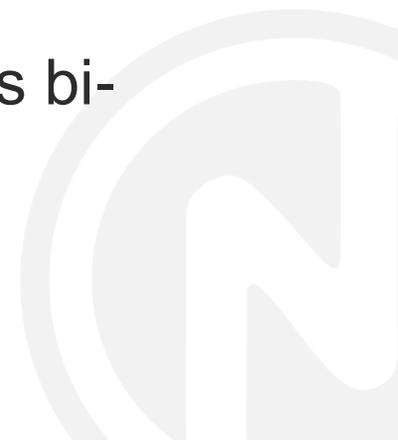
- Emergency Responders -Firefighters, EMS and Law Enforcement Officers rely on two-way radios for communications in every day operations

PROBLEM

- Radio signals in-building are weakened by structures such as concrete, windows, metal, underground, etc
- Emergency responders lack in-building radio coverage

SOLUTION

- Enhance in-building radio frequency signal coverage with NOTIFIER's bi-directional amplifier (signal booster) and distributed antenna system

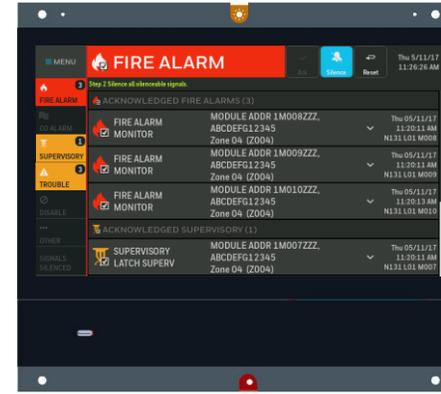


ONYX[®] Series Features

Feature	NFS-320	NFS2-640	NFS2-3030
Signaling Line Circuit (SLC)	1 SLC	1 SLC, expandable to 2	Up to 10 SLC Loops
Maximum number of intelligent points	Up to 318 (159 detectors and 159 modules)	Up to 636 (159 detectors/159 modules per SLC)	Up to 3,180 (159 detectors/159 modules per SLC)
Networkable (via NOTI•FIRE•NET)	✓	✓	✓
Audio Evacuation	FirstCommand for stand alone, DVC for Noti-Fire-Net	Optional Integrated Digital Voice Command (DVC)	Optional Integrated Digital Voice Command (DVC)
Programmable software zones	146 (100 general, 20 logic, 10 releasing, 16 special function)		2000+ (1,000 general, 1,000 logic, 10 releasing, 22 special function)
Event History Capacity/Alarm-Only	800/200		4,000/1,000
Approvals	<ul style="list-style-type: none"> ■ UL, ULC ■ FDNY, CSFM ■ FM, Marine, Seismic 		

NOTIFIER Design

- ❖ **New NOTIFIER look**
 - Released with ONYXWorks 4.0 earlier this year
- ❖ **Common User Interface**
 - Better user experience
 - Be more efficient when working with various products of the same family when key components are in the same location



New products will have a common look and feel

ONYXWORKS/FIRSTVISION 4.0

❖ Version 4: Next Generation

CONNECTED SOLUTIONS

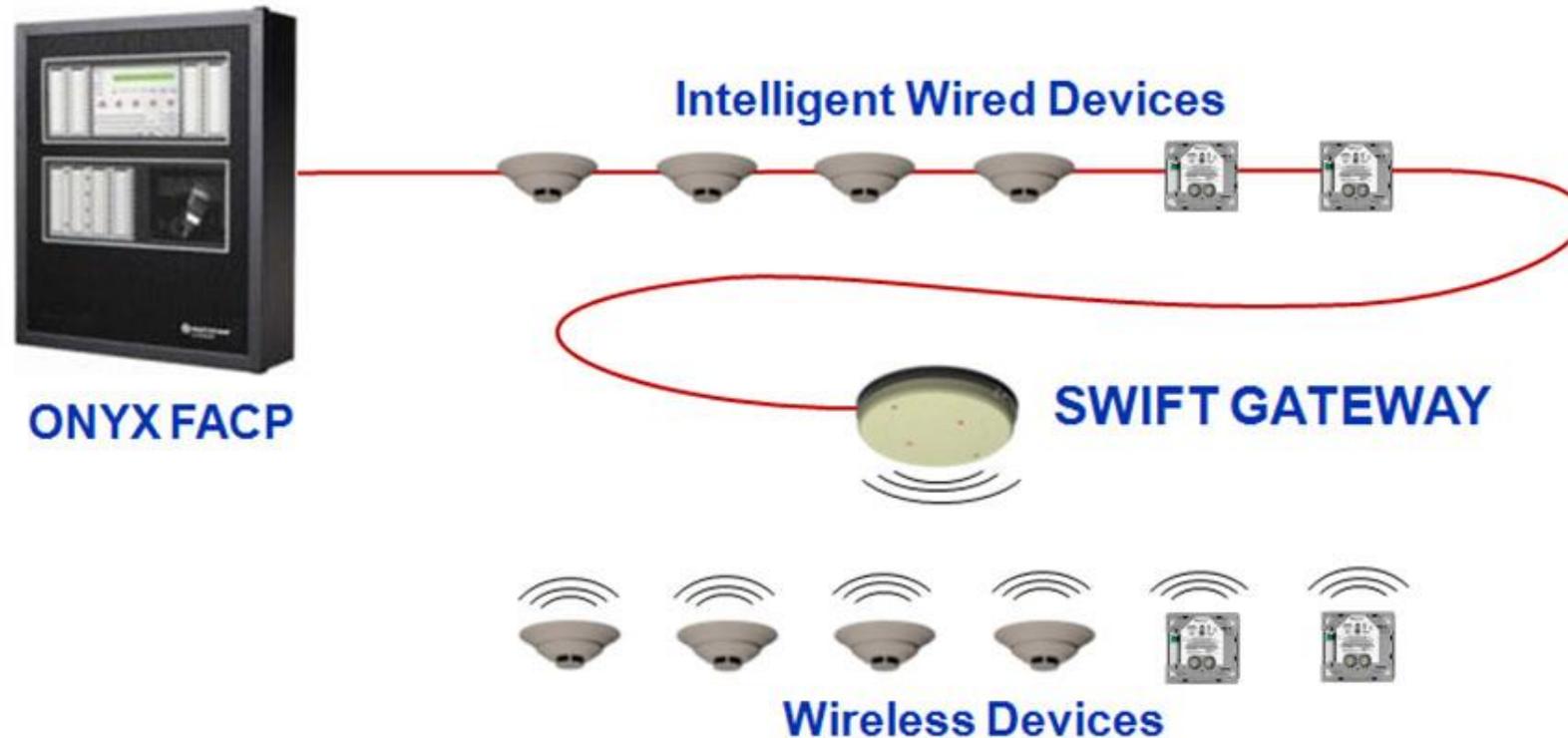


ONYXWorks®

FirstVision™

NOTIFIER's SWIFT Wireless Overview

❖ Smart **W**ireless **I**ntegrated **F**ire **T**echnology



For life safety and property protection in challenging environments

SWIFT Applications

Typical Applications



Difficult to wire

Impossible or expensive to wire

Restricted Access

Hazardous materials or security concerns

Aesthetic Concerns

Conduit or wire mold not acceptable

Temporary Occupancies

Classrooms or construction sites

Renovations

Reduce fire watches on floor by floor renovations

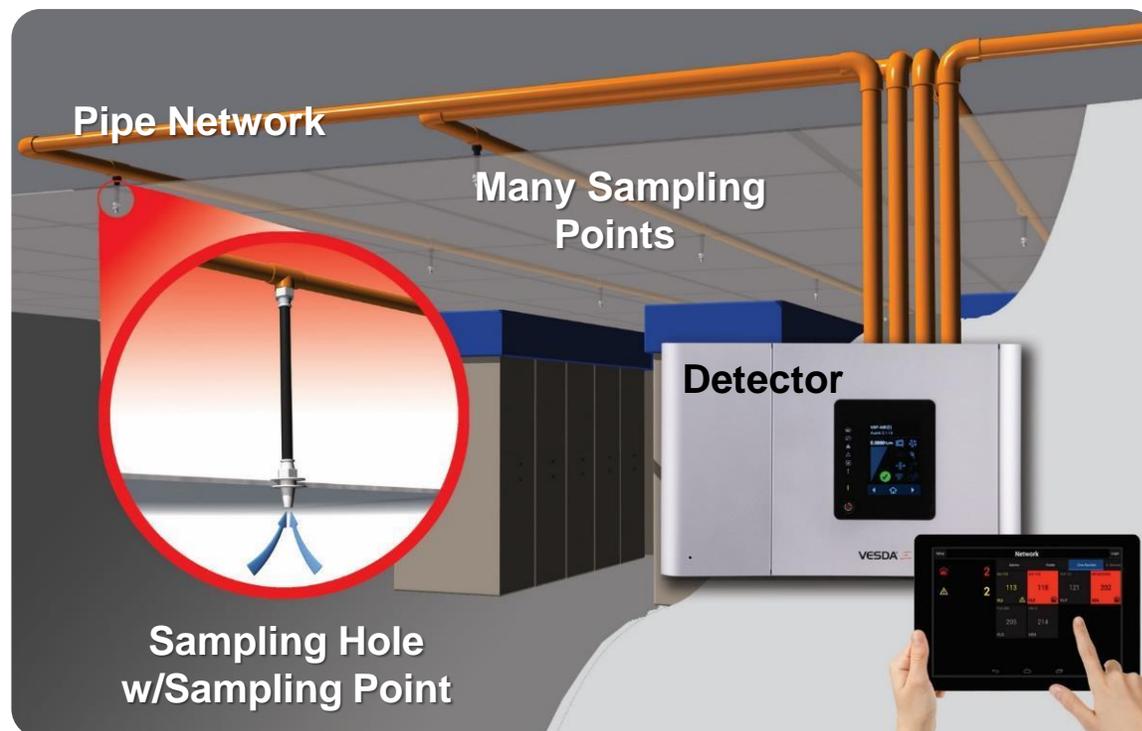
Honeywell

The Power of One

VESDA[®]



VESDA® – Very Early warning Smoke Detection Apparatus

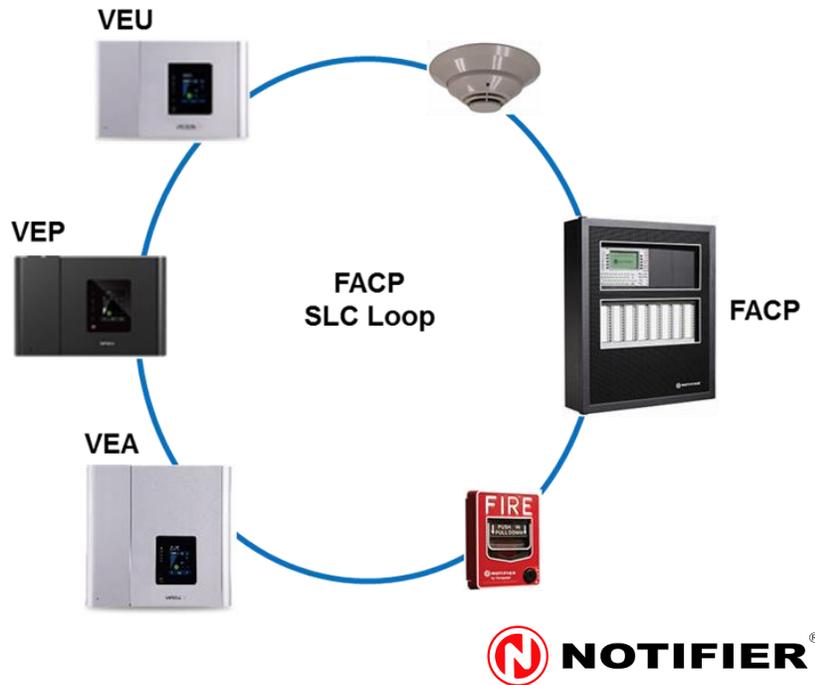


= VESDA for Every application

Active Detection



AD Integration – SLC Integration Solution



- VESDA-E detectors directly connect to the Notifier SLC loop supporting FlashScan protocol
- Addressable detector VEA takes up additional 40 addresses for individual tube alarms
- Ideal for installations where seamless fire panel annunciation is required on the SLC loop, same as spot detectors
- Low cost option especially for addressable aspirating detector VEA
- Remote monitoring through Honeywell Apps

Thank you!

For over 60 years, NOTIFIER has been a leader in the fire alarm industry

By selecting NOTIFIER, be confident that you will not only receive the very best in fire alarm and emergency communication systems, but also the knowledge, expertise, and service from NOTIFIER distributors that will exceed your expectations.



NOTIFIER[®]
by Honeywell