



Study and Test Material
for the

DENFA / FA2
ASSESSMENT
2025

This assessment is a combination exam incorporating the FA2 exam and
Denver Amendments

January 7, 2026

This document contains study material and sample questions to help participants
study.

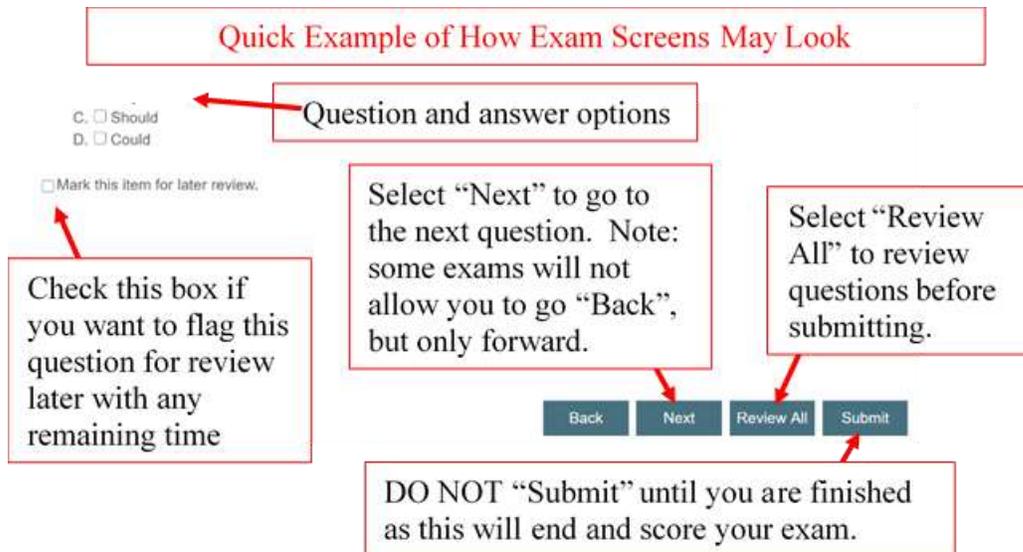
If you intend to use this booklet in the test, make sure it is bound in a binder or
stapled. Loose papers are not allowed.

IMPORTANT: Material provided is not intended to endorse, represent quality, recommend a particular product, or single out any product. Material may be used to provide standardized content for test questions to ensure that participants know how to use data sheets and manufacturer materials to establish listing and installation limitations of these types of products. There is no implied or other relationship between CSA and the manufacturers or suppliers of information used. CSA is not liable for accuracy or content of material contained within these documents. Material in this booklet is for testing purposes only and is not to be used for installation of these systems / components. Check with suppliers for current and specific information to be used in actual design and installation conditions.

THE FOLLOWING ARE THE ONLY MATERIALS ALLOWED IN AN EXAM COVERED BY THIS STUDY GUIDE

- CSA Study and Test Material for the DENFA / FA2 Assessment
- NFPA 70 – National Electrical Code
- NFPA 72 – National Fire Alarm and Signaling Code
- Amendments to the Building and Fire Code for the City and County of Denver (2025)
- International Fire Code (IFC)
- Non-programmable calculator (at physical center only)

If you will be working within the City/County of Denver you will need to take the DENFA exam that incorporates the FA2 and Denver Amendments.



About the Assessments:

Assessment: DENFA / FA2 – Combined Denver Fire Alarm and FA2 Fire Alarm On-Site

Number of Questions: 100

Amount of Time for Test: 150 Minutes

Exam format: Open book (bring your own books); You are required to provide your own basic non-programmable calculator for voltage drop calculations at a physical proctoring center. An on-line split screen with calculator will be provided for on-line exams. Any books or documents brought into assessment must be bound as no loose papers are allowed. Tabbed pages must use permanent tabs. We recommend using handbooks (when available) such as the NFPA 72 handbook. These provide more detailed information to help understand the intent of code requirements with additional commentary, pictures, figures, etc. NFPA handbooks include all code language. IFC handbooks do NOT contain all the code language so if purchasing IFC Handbook you also need the IFC code. IFC handbooks are not recommended for CSA exams.

Passing Score: 80%

Cell Phones: Do not bring cell phones, pagers, or radios into the test center/room.

Codes / Materials Used for Assessment and Editions:

- 2024 Edition of the International Fire Code
- 2025 Amendments to the Building and Fire Code for the City and County of Denver (download condensed version from CSA website)
- NFPA 72: 2025 (2022 may be used with a few changes noted in this study guide)
- NFPA 70 (NEC) 2020 - 2026 These editions have been verified for assessment content.
- There will be a few questions related to Occupational Safety and Health Act related to Lock-out Tag-out, fall protection, hard hats, and other safety gear.
- Calculator is recommended for this assessment (basic non-programmable provided by the candidate when taken at a physical testing location. An on-line calculator is also provided.)
- There are quite a few recommended study documents on the CSA exams website under the Assessments Subject page for Fire Alarms. These items are not allowed in the exam but do provide good learning materials.

General Assessment Information:

About the Questions: Questions are randomly selected from respective topics within a larger database. Answer choices are randomly mixed.

Exam Format: Questions are computer based and will be delivered one at a time. You will have the opportunity to go back and review all questions. You can also “check” a box within each question which will flag it for later review. During the review, checked questions will be marked for easier identification.

Time Clock: Some assessments will have a count-down timer displayed on the screen. Do not steadily watch the clock, but rather use it as a general guide. Long pauses between questions may result in time jump as the computers verify that you are still testing and did not lose the Internet connection.

Important Candidate Information

YOUR SCORE & PRINTING SCORE REPORTS

All scores provided at the end of your exam and in your score email are “preliminary”. Exams are subject to review of audio / video recordings, or concerns raised by proctors.

Your preliminary score will be automatically emailed following the exam. Candidates may also log into their Webassessor account to view/print score reports. Use the link and info in your scheduling emails.

Score reports for failed exams will provide a breakdown of scores by topics/subjects within the exam. Your overall score determines Pass/Fail. However, the topic scores help to identify areas that need more attention when studying. Topic scores will not be provided on Pass emails.

Taking Materials Into Exams

CSA exams are open book. You must provide your own books and required exam materials. Check this guide to verify what editions exams are based on. All material must be bound (no loose papers). Other than items listed on Page 2 of this guide, do not take other items into the exam.

Page tabs must be of permanent type. Do not mark in any materials during an exam.
Phones, radios, pagers are not allowed in exam rooms, please leave these in your vehicles.
Two forms of ID are required for exams.

Photographs

Your photo is required to be submitted to CSA with your initial registration request. This photo may be used by proctors to verify who is scheduled for the exam. Although not required, you may want to wear a company shirt/logo for your picture. Pictures are cropped to best fit ID card, so there is no guarantee the logo will show. You will be recorded and a photo may be taken during exam sessions.

Respectful of Others

At a proctoring center, please be respectful of others taking exams by minimizing noise and interruptions. If you have any exam or computer problems please notify the proctor so they can assist. If necessary, the proctor can log a report for further investigation. Then notify CSA so we can look into the problem.
If taking an Online proctored exam, please make sure others know to not interrupt. Your exam may be terminated and require new payments for interruptions or suspicious behavior.

Proctoring Options

You have two options for proctoring. Online proctoring where you use your computer and USB webcam to take the exam with a proctor watching you via camera, or at a physical proctoring center. See website for info.

How to Request Your First Exam / Assessment

First, download study material and get the required codes/standards needed for your exam. Then, review our website to understand the options for proctoring, and decide which option works best for you.

You are required to pay for your assessment and submit a picture at the time of submitting the request. Have payment and a photo file ready.

To start the process, you must “Request an Assessment” from www.CSAexams.com. Within 1-3 days you should receive an email with information to schedule your exam. Make sure you are requesting and paying for the correct exam as there are no refunds.

Cancel or Rescheduling an Exam

To cancel or reschedule an exam you must log back into the system where you scheduled the exam, or using links at www.CSAexams.com under Contractor Info. Online Proctored exams require 24 hrs and Proctoring Centers require 72 hrs notice. If the system will not give you the option to Cancel/Reschedule than you must show up or forfeit your fees. There are no refunds.

If You Fail an Exam

If you fail an exam, you must Request a new Assessment and make full payment from www.CSAexams.com. Within 1-3 days you will get an email to schedule your exam.

When you Pass an Exam

ID cards and certificates will generally be mailed out within three weeks. They will be mailed to the address provided when requesting the assessment. If the address has changed, please email CSA with new address.

If You Need a New ID Card

To change the company name, change your last name, or if you have lost your card, go to www.CSAexams.com and select Replacement ID link. Exams are good for 3 years. Then a new exam is required for renewal.

Please report cheating to the proctor or CSA.

CSA has provided supplemental study materials on our website under the Assessment Subjects – Fire Alarm page, near bottom. These materials are not required to pass exams. These materials are NOT ALLOWED IN EXAMS. Common principles and limitations are essential to properly install fire alarm systems and are therefore tested to validate your understanding of code objectives. We strongly recommend candidates review these materials not only for the exams, but to have a better understanding of key concepts identified by code requirements. CSA provides this information for your use. However, CSA is not responsible for the content or accuracy of these materials as they are prepared by others and have been found through Internet searches. CSA has reviewed certain criteria to avoid conflicts with our questions. Users assume all risk for use of this material. Additional videos and training materials can be found on the Internet. However, be cautious as not all information is correct, is properly presented, or may have changed. Review applicable code sections and requirements with the training material to verify accuracy and understand the code intent. Appendix material in NFPA 72 are also critical to understand the intent and limitations of a code requirement.

The following questions are related to the fire alarm assessments. Some of these sample questions may have the answers, while most will not. Some will provide an explanation on how to calculate. There is also information that describes topics to study without any specific questions. Questions will often start off with an indication of the book or standard that the question is based out of, such as [NFPA 72]. We suggest that you tab sections of your code books with permanent tabs to help find them faster. We recommend that you purchase and use “handbooks” when available, such as the NFPA 72 handbook. These handbooks provide the code language in addition to other beneficial theory, examples, figures, and more. Note that NFPA has been moving away from handbooks so newer additions may not be available. Many items can be searched on the Internet, and you can find examples or discussions. Use judgement and be careful as there are things on the internet that are not correct per code or to current code. Exams are validated to the editions identified on page 3.

It is important to understand that the Denver Amendments are modifications to the respective model codes, such as the International Fire Code. It is critical to study and understand the actual code requirements and the Denver Amendments as they go together. A sentence modified by Denver likely applies to another sentence or paragraph within the model code. Denver may have totally replaced a paragraph or added a sentence to the model code section.

Common question areas include but may not be limited to the following:

2024 International Fire Code and 2025 Denver amendments to the IFC. [Indicates “topic” on score report]

- Section 104 [Administrative]
- Section 105 [Administrative]
- Section 108 [Administrative]
- Section 114 [Administrative]
- Section 117 [Administrative]
- Section 508 [General IFC 508 – 906]
- Section 510 [General IFC 508 – 906]
- Section 901 [General IFC 508 – 906]

- Section 903 [General IFC 508 – 906]
- Section 904 [General IFC 508 – 906]
- Section 907 [General IFC 907]
- Sections 908+ [IFC 908 to Appendix N]

Sample question from Denver Amendments.

Note that questions from Denver Amendments and/or the IFC will start off with [DEN]. This is to help the candidate identify what code/book the question comes from.

{Although the question below does not appear to be related to fire alarm systems, how you mount your fire alarm cabinets inside this room very much impacts the required fire rating of this room. The size of the room and location of fire alarm equipment with all the other equipment is critical. Thus, it is fire alarm installer related.}

[DEN] The Fire Command Center (FCC) shall be separated from the remainder of the building by not less than a ___ fire barrier.

30 minutes

1 hour

90 minutes

2 hour

1 hour when fully sprinklered

The following questions are related to the FA2 portion of assessment.

1. Which wire size is largest in diameter?

- 12 AWG
- 18 AWG
- 14 AWG
- 24 AWG

2. Which wire size has the least resistance in Ohms?

- 12 AWG
- 18 AWG
- 14 AWG
- 24 AWG

3. Ohms law is defined by what equation?

- $a^2 + b^2 = c^2$
- $V = IR$
- $l \times w = a$
- $r + i = v$

4. A fire alarm circuit has five strobes with current values of 0.125A, 0.095A, 0.209A, 0.209A, 0.209A. What is the total current of these devices?

Answer: $0.125A + 0.095A + 0.209A + 0.209A + 0.209A = 0.847A$

Now, let's use this information and calculate voltage drop for the circuit.

Using the information above, and a wire resistance of 3.07 ohm per 1,000 feet (0.00307 ohms per foot). The total distance between the panel to the last device is 500 ft. What is the voltage drop on the circuit?

We need to know and apply Ohms Law: $V=IR$, in our case V is V_{drop} or the Voltage drop. "I" is Current, "R" is Resistance.

Answer: First you must account for the wire resistance in the pair of wires (out to last device on black wire and back on red wire). Thus, the total distance of wire is 1,000 ft. Using ohms law you calculate the following: $V = 0.847A \times (1,000' \times 0.00307\text{ohm/ft})$. This results in a voltage drop of 2.60 volts.

The standard format that NFPA 70 and manufacturers provide for wire resistance is ohms per 1,000 feet. If a question is provided with this format you will need to convert this to a resistance/foot. Example: Resistance is 3.07 ohms per 1,000 ft is converted by $3.07 \text{ ohms} / 1000 \text{ ft} = 0.00307 \text{ ohms/ft}$

If you were asked to find the end-of-line voltage you would apply the starting voltage - voltage drop = end-of-line voltage. Such as $24 - 2.6 = 21.4$ volts at end-of-line.

You may find additional information about calculating voltage drops on the internet or links at the bottom of the Fire Alarm Assessment Subject page.

5. Given a wire resistance value of $R = 4.89 \text{ Ohms}/1000\text{ft}$ from NEC Chapter 9, Table 8 and excluding temperature (16 AWG wire).

Class B circuit

The circuit was designed with a conduit length between panel and last device of 800 feet (red wire out to device).

Circuit has 8 - 110 cd strobes at 200ma each ($I = 1.6 \text{ amp}$) [$8 \times 200\text{ma} = 1600\text{ma}$ or 1.6A].

Nominal panel voltage of 24 vdc

What is the voltage drop in this circuit using lump-sum (also called End-Line-Load) approach?

0.46 volts

12.5 volts (correct)

14.2 volts

1.96 volts

6. Which term defines a mandatory requirement of the code?

a) should

b) must

c) AHJ

d) shall

7. What section of NFPA 72 applies to Electrically Locked Doors with emergency control function interfaces?

- a) 1.2
- b) 10.6
- c) 12.1
- d) 21.10

8. Several documents are required to be provided to an owner. Out of those listed, which form (document) is required to be completed and delivered to the owner upon completion of a mass notification system?

- a) Flush Test
- b) Invoice
- c) Maintenance contract
- d) Record of Completion

9. Visual notification appliances are required in all exam rooms within a doctor's office. (Also see supplemental study documents on CSA exam site under fire alarm assessments.)

- True
- False

10. Notification zones shall be consistent with the emergency response or evacuation plan for the protected premises.

- True
- False

11. In accordance with NFPA 72, 21.6, elevators are not allowed to be used for emergency egress during a fire.

- True
- False

12. Detection devices used for door hold-open release service are not required to be monitored for integrity if within 5' of the door.

- True
- False

The following are some additional topics that will be tested over. This is not all inclusive, but we want to make sure you have studied this material. Make sure you have put your eyes on the material and do not answer questions based on what others have taught you or what you thought the answer was. If you put your eyes on every one of the items covered in this study guide you will have covered nearly every type of question on the exams.

- **This updated exam will have more questions from the National Electrical Code (NEC). At minimum the following sections may be covered. Failure to have, study, and be prepared for NEC questions will impact your scores more than in the past.**

- **IMPORTANT NEC NOTE:** NEC has changed format in 2026 edition, so things have moved around from previous editions. Example, fire alarm wire types have moved from 760 to 722.170 to 722.172 which is Part VIII Power-Limited Fire Alarm (PLFA) Cables and Wiring Methods. We have not identified any technical changes, but finding things will take some preparation ahead of time during studies. Our questions have been verified to the 2020, 2023, and 2026 editions. We believe most questions are valid to older editions of the NEC. However, CSA has not verified every question since we have also changed up many of our NEC questions with this exam.
- NEC sections including 110 Part 1 and II, 300, 722, 760, and others that may apply to fire alarms, conduit, wiring, spacing, supports, underground conductors.
- See NEC 110.26 for spaces around electrical equipment. This includes restrictions to battery cabinets, wire gutters, area in front of panels, width of work area, and more.
- Note that some of these sections have moved in 2026 edition. Verify subject and section as we are showing older locations since most candidates will be using older versions. See NEC 310 for conductors and ampacity. NEC 305 for underground conductors. NEC 300.11 for securing and supporting. NEC 300.14 for free conductors inside junction box, terminations, etc. NEC 314 for pull boxes, junction boxes, supports including back boxes, etc. NEC 348 for Flexible Metal Conduit (FMC). NEC 358 for Electrical Metallic Tubing (EMT) including reaming and supports.
- The updated exam will have more scenario type questions where the candidate will need to look at an image and identify if it complies with code or not. Such questions include strobe coverage based on candela, audibility levels due to distance and walls, and similar.
- Understand the reasoning for synchronized strobes and what can happen if they are not synchronized. Also reasoning for synchronization of audible devices.
- The majority of questions are related to Notification and Detection. Other questions are grouped into topics of Definitions, General, Voltage, Voltage Calculations, NEC, Power, Residential, and OSHA.
- Understand general criteria of the Occupational Safety and Health Act (OSHA) as related to fall protection, Lockout Tagout, and confined spaces.
- Review the OSHA Pocket Guide, Fall Protection Booklet, Lockout Tagout, and other documents at the bottom of the Assessments Subjects Fire Alarm page. These documents are not allowed into the exam. Questions on the exam are things that all workers must memorize and practice on every job. Questions will include topics on scaffolds, fall protection, Lockout Tagout
- Limitations to the number of addressable devices that can be impacted by a single fault, 23.6. This has changed over the years.
- Strobe spacing and candela of the strobes for wall and ceiling mount.
- Strobe candela and spacing objectives to understand how spacing impacts candela. Review A.18.5.5.9.
- How room strobe spacing can be used in corridors.
- What defines a “corridor” with regards to strobe spacing.
- Power supplies, batteries, duration of secondary supply for horn only and speaker systems. Also, time for signals due to loss of power and other trouble conditions.
- Battery voltage and what happens when batteries are wired in series vs. parallel.

- Understand voltage drop calculations, the purpose, how wire size, resistance, length, and current all impact and effect the circuits. There are different ways to calculate with point-to-point and lump-sum (also called End-Line-Load or ELL) being the two most common methods. Point-to-point adjusts the starting voltage after each device to reduce the past loads. This approach is very accurate and has no safety factor, so a safety factor must be added in. Lump-sum (ELL) adds up all the current draw and all the wire and lumps it into one calculation. This approach has a built in safety margin and is more conservative to deal with slight field deviations in circuit routing. See additional study materials on our website.
- How to measure end-of-line voltage considering worst case on battery power.
- Over the last several editions NFPA 72 has incorporated very specific requirements for performing battery load tests. You should NOT turn off breakers and let the system run in alarm for extended time. This is bad on batteries. NFPA 72 Chapter 14 addresses the requirements for load banks, temperature and voltage monitoring, and more.
- Understand battery calculations to understand what happens to battery size when the devices or current draw changes on a system. NFPA 72 recently changed the derating factor to be used to account for shelf life of batteries.
- Review to verify what date is required to be on batteries. The wrong date is frequently provided.
- Ground fault and what this is on a fire alarm system.
- Open circuits vs. closed circuits.
- The various trouble conditions and components that initiate trouble conditions.
- Understand what “T-Tapping” is and how it applies to fire alarm systems. When can it be used and when it cannot be used. Also see A.12.6 and extended content in handbook or online.
- How circuits are supervised. Circuit polarity and how it is used in a fire alarm circuit. How resistors and capacitors are used in circuits. What function does a diode serve in a strobe?
- Audibility levels including ambient, public mode, private mode.
- Ways to deal with fire alarm audibility in very loud spaces, such as sports bar. What are effective ways to hear the fire alarm?
- Typical ambient audibility levels for various spaces (see Annex A).
- Make sure to understand the difference between public mode and private mode and how / where they are applicable. See supplemental study material on CSA website.
- Impacts of doubling the distance and doubling the wattage of speakers and horns. It is critical to understand how distance and wattage impact system design and installation. This is also critical when applied to how much sound is lost through walls into offices, conference rooms, bathrooms, etc. See supplemental study material on CSA website.
- Wire types, ratings, limitations.
- Review the proper way to terminate circuits at devices. Looping, cutting, clips, etc.
- Detector spacing such as heat, smoke, duct detectors, flow switches, pull stations, room temperature sensors, etc.
- Review proper criteria for smoke detectors installed at doors for door hold-open magnets.
- Review proper location of smoke detectors with respect to beams, what defines beam vs. smooth ceiling, how beam pockets impact smoke spread and detector spacing.

- Speech Intelligibility. Review Annex D in detail.
- What is an Acoustically Distinguishable Space (ADS).
- Review Annex F for Wiring Diagrams and Guide for Testing Fire Alarm Circuits.
- Review Annex I for recommended Color Coded Tagging Programs as system inspection and testing needs to be documented per Chapter 14.
- Proper installation of duct smoke detectors. See 17.7.6. These are often installed wrong and questions missed. Also review about remote test switches, lights and if/when they are required. This changed a long time ago but gets missed.
- Measuring velocity / pressure readings on duct detectors, how and what equipment. See supplemental study documents on CSA exam site under fire alarm assessments.
- Frequency of inspection, testing, and maintenance for various components.
- ADA requirements for strobes in common use / public use areas. See supplemental study documents on CSA exam site under fire alarm assessments.
- Fire pump run signals and other fire alarm input signals per 23.8.5.
- Digital Alarm Communicator Transmitters and configuration
- Devices that receive power from initiating device circuits or signaling line circuits per Chapter 10.
- Fundamentals Chapter 10 requirements, which includes but is not limited to silencing of occupant notification devices in a building, protection of panels, qualifications, signals, supervision of circuit, annunciation zoning, monitoring for integrity, impairments, and more.
- Review Chapter 24 criteria including 24.3.5 for Ancillary Functions of ECS.
- Review Chapter 24 criteria including 24.3.6 for ECS/MNS messages. These message requirements can be different than fire EVACS messages and tones in 24.4.2.
- Mass notification, risk assessments, intelligibility, message priority, etc.
- Understanding requirements of Chapter 12 for circuits and pathways and how the various types of circuits perform and are monitored for faults. Also see Pathway Survivability criteria specific to ECS/MNS systems in Chapter 24.3.14. This includes separation distances of certain circuits.
- Recognize that fire only EVACS systems (24.4) are different than ECS/MNS systems that can be used for other than fire emergencies. As such, they have different limitations and restrictions. As such, you can have a voice fire alarm evac system which cannot be used for tornado, active shooter, or other emergencies. The difference in criteria and limitations are important.
- The difference between an Initiating Device Circuit (IDC) and Signaling Line Circuit (SLC)
- Strobe candela and spacing in rooms used for sleeping.
- Residential smoke detector spacing for homes, hotels, dorms, apartments, etc. This includes criteria for detectors outside of bedrooms and adjacent to kitchen areas.
- Manual pull stations including where they are to be located, height, travel distance, etc.
- What is required when a fire alarm panel is provided in a building that also has independent suppression systems such as kitchen hood systems.
- Monitoring of suppression system equipment such as valves, temperature sensors, water tanks, water level, pump run, air / nitrogen pressures, etc.

- Location of smoke detectors on walls, smooth ceilings, sloped ceilings, beam pockets, high airflow rooms, under raised floors, etc. Detector spacing in odd shaped rooms and corners.
- Location and criteria for beam detectors, aspirating detectors, flame detectors, video smoke detection, video flame detection, linear heat detection, and other detection technologies.
- Aspirating smoke detection limitations and integration of other detection such as for chemicals or gases.
- Limitations of aspirating smoke detection systems including pressure balancing and returning the exhaust back to the room or pressure zone of sampling. See supplemental material on CSA website.
- Understand what stratification is and how it impacts smoke and heat detection. This is especially critical in tall spaces.
- Response Time Index (RTI) and how it relates to detector and sprinkler activation, such as for elevator sprinklers and heat detectors.
- Monitoring of power for devices such as elevator shunt, damper closing, smoke control power, etc.
- Exit marking audible notification systems.
- If / When sprinklers can be utilized as automatic detection devices.
- Installation of detection devices prior to construction clean-up of all trades.
- Cross-zoned detection design for smoke / heat detection. How it works and the intent.
- Carbon monoxide detection, activation, testing, etc.
- Initial commissioning procedures, testing frequency, and how devices are to be tested.
- Understand that nothing can be installed on or strapped to sprinkler pipe unless specifically related to the sprinkler system. It is common to see fire alarm cable strapped to pipe which is not allowed per NFPA 13 for sprinklers. Linear heat detector cable as part of a pre-action system could be strapped to the pipe since it is associated with the sprinkler system activation.
- Review and understand who can be considered an Authority Having Jurisdiction (AHJ). See Annex A.3.2.2. The code often refers to the AHJ and this can be a number of different people / organizations depending on project.
- Review and understand what alarm verification features are, what they apply to, and limitations.
- Understand the difference between addressable systems and conventional zoned systems.
- Review and understand the requirements of what is required when you press the silence button to silence the audible devices. What else is required to happen. Clue: Long ago this was not addressed in the code. However, since ADA (early 1990's) the hearing impaired are required to be treated the same as the hearing.
- Understand the typical difference in codes vs. standards and the building code vs NFPA 72. The building code requires a building to have a fire alarm system. NFPA 72 tells you how to design and install the system when required by another code or standard. The owner or insurance company may also require a system. Once it has been established that it will be installed, it is required to be installed to the code. Codes such as the building code will also provide exceptions such as manual pull stations may not be required in a school if fully sprinklered. Smoke detectors may also be omitted if sprinklered but

required in certain occupancies if not sprinklered. However, if they are required then they must be spaced and installed per NFPA 72. Thus, the building code must be used first to verify what is required, then NFPA 72 on how.

- In Chapter 24 where Mass Notification Systems (MNS), also covered under the Emergency Communications System (ECS) sections of the code, are used for other than fire alarm evacuation. These may include active shooter, tornado, chemical threat, etc. Understand stakeholders, risk analysis, the emergency response plan, etc. Many newer requirements for how things work or when they are to be provided are established by the stakeholders and is to be documented in the risk analysis based on criteria of the emergency response plan. Thus, these systems are designed by multiple people based on the unique hazards of that building in that location. As such, these systems can vary greatly from project to project and must be based on the Risk Analysis.
- Fire fighter phones, area of refuge, stairway, elevator landings, and other similar in-building communication systems are addressed in Chapter 24. Fire fighter phones are being phased out for Emergency Responder Communication Enhancement Systems per 24.9. Area of refuge, stairway, elevator landing, etc. are addressed in 24.10. Make sure to review these sections and Annex material for better understanding.
- With the 2025 edition, Section 17.11 recognizes a new type of Acoustic Leak Detection and the criteria for such type of detection.
- With the 2025 edition, Section 17.12 outlines criteria for Thermal Image Fire Detection and requires that the detector has a clear line-of-sight to the hazard it is protecting. A supervisory signal shall be produced if the lens is blocked or dirty to impede operation. Although these detectors have been used for a long time under the criteria for Other Detectors and per listings, there is now specific criteria within the code.
- With the 2025 edition and discussed in Annex of 18.4.8, the intent of Restricted Audible Mode Operation is to be used where loud sounds may be detrimental to typical occupants having sensitivity to noise, light, or other stimuli.
- With the 2025 edition, Section 26.2.11 of Supervising Station Alarm Systems requires failure of any communication pathway between the Auxiliary Service Provider (ASP) and the supervising Station shall be annunciated at the supervising station and the ASP within 90 seconds.
- With the 2025 edition, 18.3.7.4 requires notification appliance circuits voltage drop to be calculated by either End-Line-Loaded (also known as lump-sum) or point-to-point methods.

The following are new to the 2025 Edition of NFPA 72 and will apply to related test questions. Highlighted text indicates changes or new from previous edition.

12.6.7 (Monitoring Integrity)

Monitoring for integrity shall not be required for the interconnection between enclosures containing control equipment located within 20 ft (6 m) of each other where the conductors are installed in metal raceway or metal armored cable.

12.6.9 (Monitoring Integrity) *(Revised format only, criteria are the same)*

Monitoring for integrity shall not be required for the interconnecting wiring or cabling of a stationary computer and the computer's keyboard, video monitor, mouse-type device, or touch screen if the interconnecting wiring or cabling meets all of the following conditions:

- (1) The interconnecting wiring or cabling does not exceed 8 ft (2.4 m) in length.
- (2) The interconnecting wiring or cabling is a listed computer/data processing cable as permitted by NFPA 70.
- (3) Failure of the interconnecting wiring or cabling does not cause failure of the required system functions not initiated from the keyboard, mouse, or touch screen.

17.7.4.2.3.1* (Spot Smoke Detector Spacing) (added ceiling limit)

In the absence of specific performance-based design criteria, detectors on ceilings up to 40 ft (12.2 m) in height shall be spaced in accordance with either of the following:

- (1) The detectors shall comply with the following:
 - (a) The distance between detectors shall not exceed a nominal spacing of 30 ft (9.1 m).
 - (b) There shall be detectors within a distance of one-half the nominal spacing, measured at right angles from all walls or partitions extending upward to within the top 15 percent of the ceiling height.
- (2)* All points on the ceiling shall have a detector within a distance equal to or less than 0.7 times the nominal 30 ft (9.1 m) spacing (0.7S).

EXAMPLE STROBE CONDITIONS:

The following are some examples of strobe notification scenarios. Before looking at the Caption, identify if they are or are not code compliant. These are only intended for strobe spacing and not audible signaling. Normally audibility must also be considered and that may impact strobe spacing depending on speakers or horns. These are examples of scenarios that will be incorporated into exam questions. Review closely and ensure you understand how they do or do not comply with code.

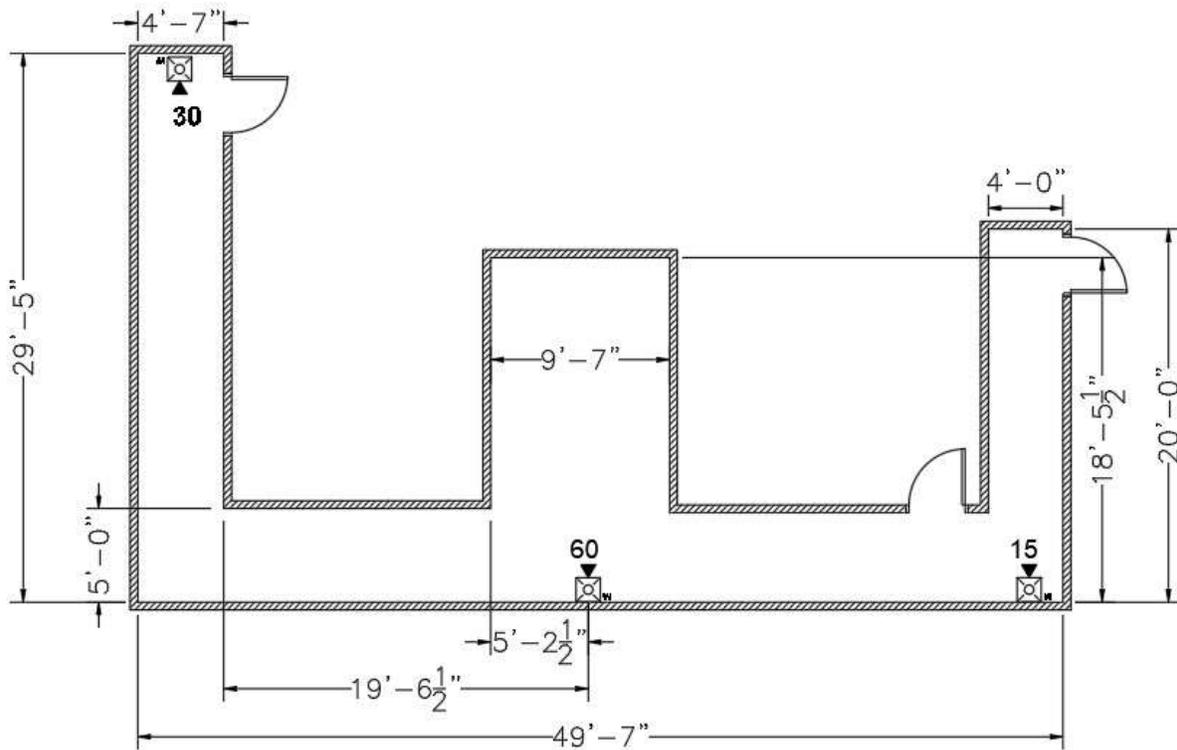


Figure 1: This is compliant with NFPA 72

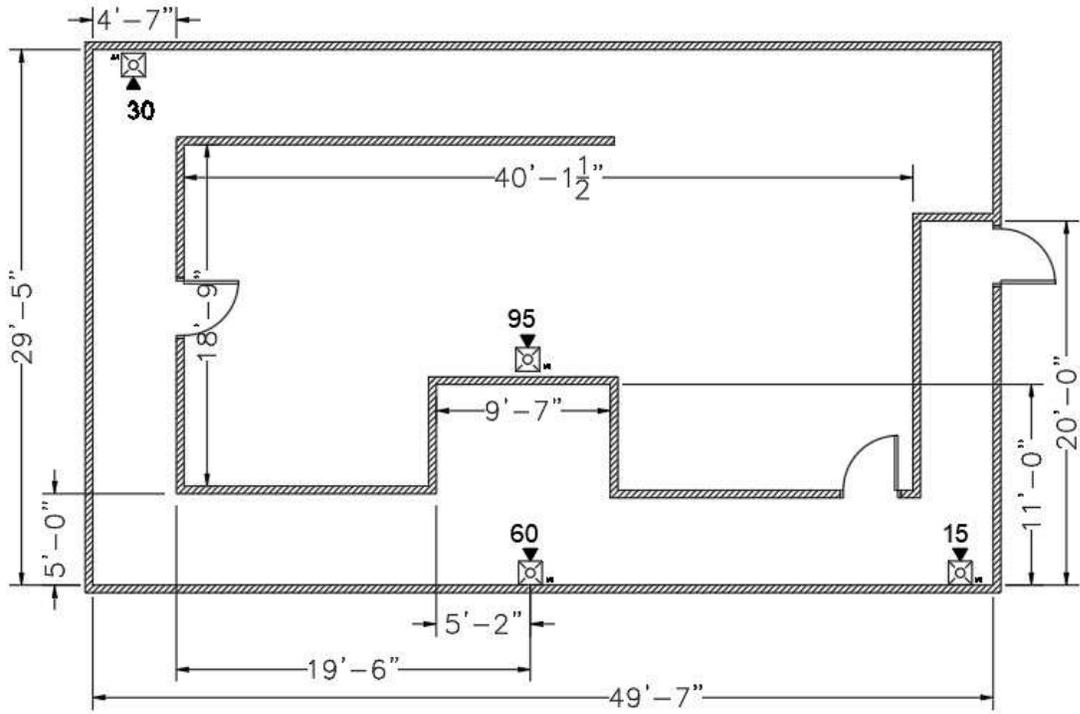


Figure 2: This is NOT compliant with NFPA 72

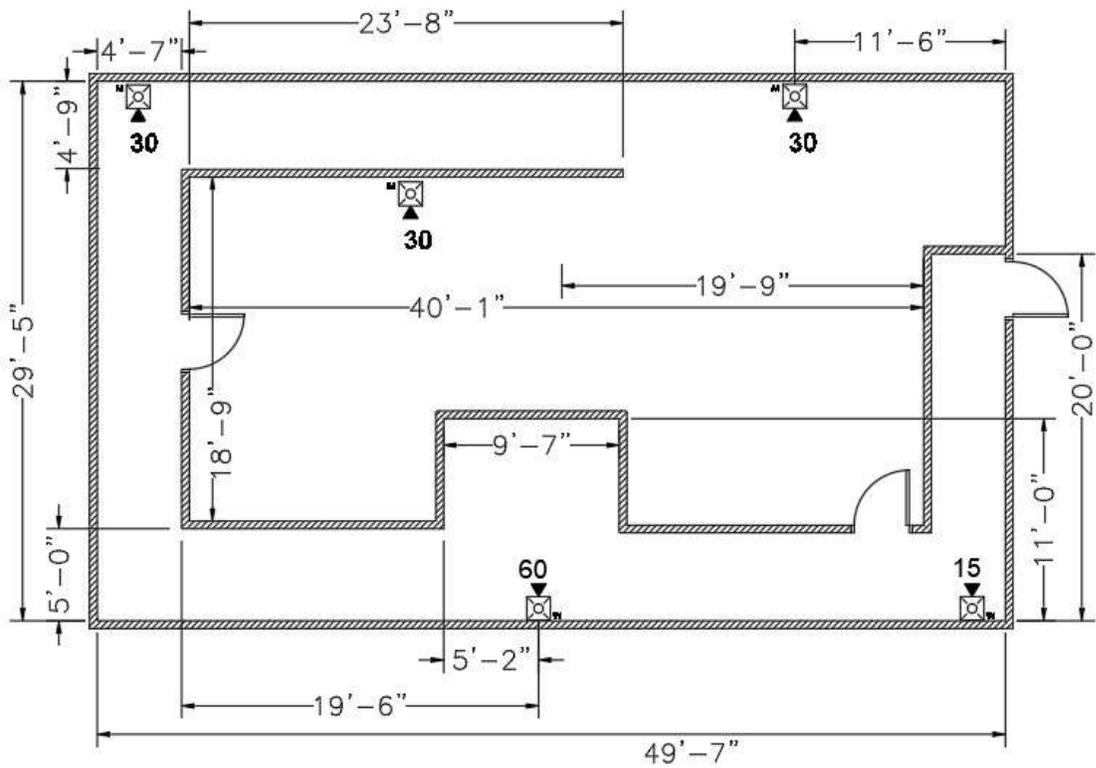
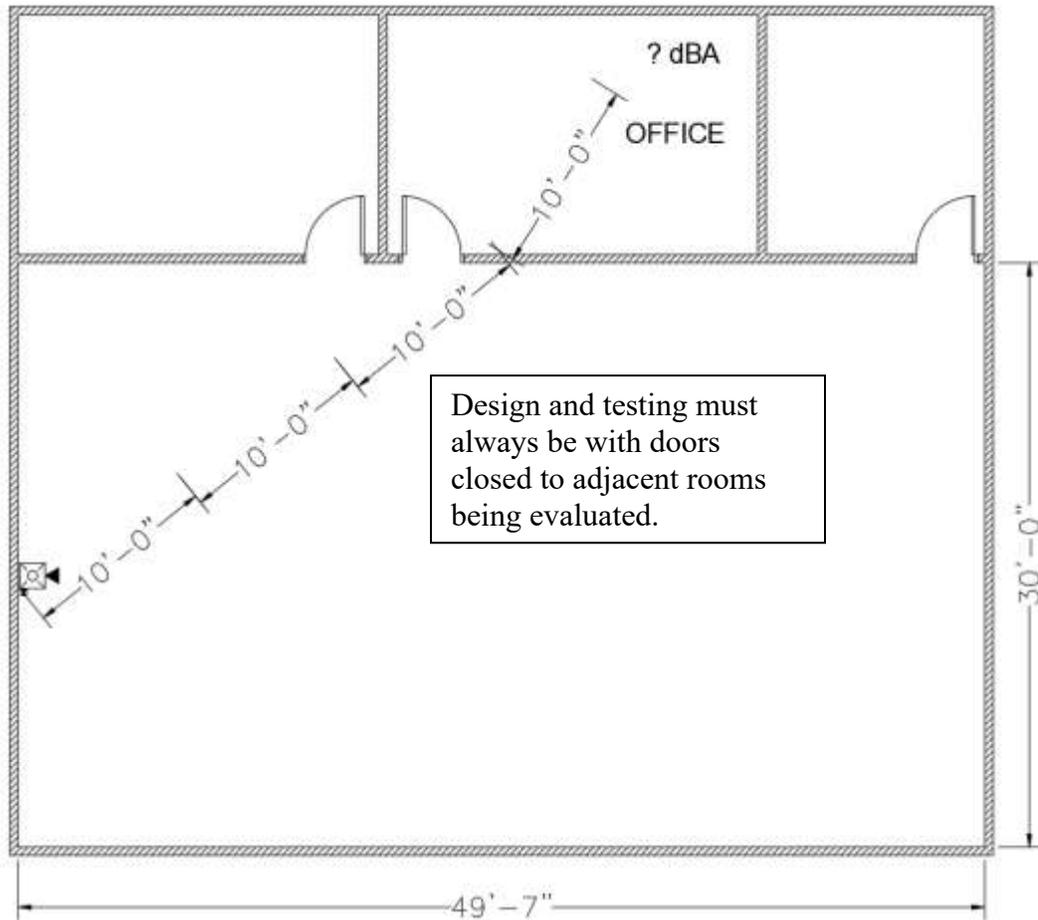


Figure 3: This is compliant with NFPA 72

EXAMPLE AUDIBLE QUESTION:



NFPA 72] Audibility and sound loss: You are working on a project and the image provided represents the floor plan and devices as they are shown on drawings. Ambient sound levels are 55 dBA. The horn/strobe device is located approximately 40' to where a chair would be located. The audible device is rated at 85 dBA at 10'.

There is a 5 dBA loss in the open office space due to furniture, carpet, and acoustic tiles.

The loss through the office wall/closed door will be 15 dBA.

Accounting for dBA loss due to distance, loss from furniture, loss through wall. Will audibility levels within the office satisfy public mode requirements?

Yes

No

Make sure you understand the physics of sound and standard 6 dBA doubling loss for distances. (Review Annex A and other sources to better understand this concept with audibility for horns and speakers). You will need to calculate the losses to establish the resulting dBA at the office location and determine if the sound level is above the minimum required for Public Mode over ambient. For this example, it does not satisfy the minimum required level. Horns can occasionally satisfy this requirement on higher settings. However, speakers will seldom satisfy audibility levels for pre-alert tones or intelligibility in any adjacent room with doors closed. This is why speakers are generally required in all rooms.

PUBLIC-MODE STROBE SPACING AND CONSIDERATIONS



COMPLIANCE SERVICES AND
ASSESSMENTS
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VALIDATE INSTALLER QUALIFICATIONS

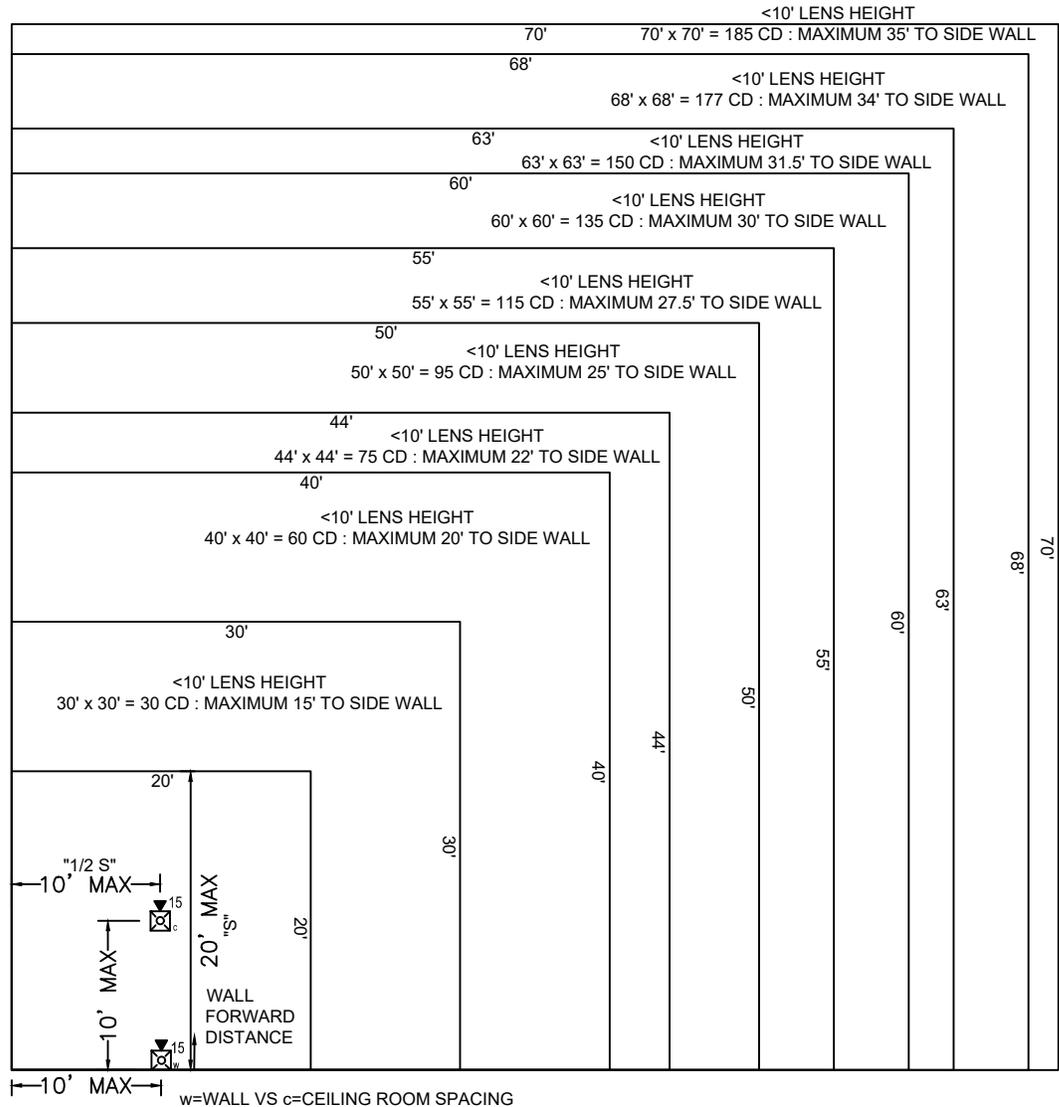
"WITHOUT ASSESSMENTS,
ALL YOU HAVE ARE ASSUMPTIONS!"

THIS SHEET WAS COMPILED BY CSA
BASED ON CRITERIA OF NFPA 72, (18.5)
FOR COMMONLY AVAILABLE STROBE
CANDELA AND GOOD DESIGN
PRACTICES.

<10' LENS HEIGHT
20' x 20' = 15 CD WITH
MAXIMUM 10' TO SIDE WALL & 20' IN
FRONT FOR WALL MOUNT

SPACING CONCEPT OF 1/2 ROOM
DIMENSION TO SIDE WALLS APPLIES TO
EACH CANDELA AND ROOM SIZE

SIMILAR TO SPRINKLER "SPACING", THE
CANDELA MAXIMUM DISTANCE IS "S" AND
MAXIMUM DISTANCE TO A SIDE WALL IS
"1/2 S". WALL DEVICE WOULD HAVE
MAXIMUM FORWARD COVERAGE OF "S".



NOTES:

- DIAGRAM SHOWS MAXIMUM AREA THAT A SINGLE STROBE CAN COVER FOR LENS HEIGHT UP TO 10' ABOVE FLOOR, WHEN STROBE IS CENTERED IN CEILING OR ALONG ONE WALL, AND WITHOUT OBSTRUCTIONS TO EFFECTIVE COVERAGE. CANDELA SHOWN ARE CODE MINIMUMS.
- ADJUSTMENTS ARE NECESSARY FOR: LENS HEIGHTS >10' UP TO 30' MAXIMUM; IN OVERLY BRIGHT SPACES (SUN / SKYLIGHTS); OR WHERE WALLS OR EQUIPMENT WILL IMPACT EFFECT OF ACHIEVING 0.0375 LUMENS PER SQUARE FOOT. SEE NFPA 72 FOR GUIDANCE AND PERFORMANCE CRITERIA.
- IF LOCATED ON A WALL, THE SIDE SPACING DISTANCE MUST NOT EXCEED 1/2 ROOM WIDTH INDICATED. DISTANCE IN FRONT OF A WALL DEVICE MUST NOT EXCEED THE MAXIMUM ROOM DIMENSION. I.E. 95 CD FOR 50' x 50' ROOM CAN ONLY COVER 25' TO EITHER SIDE BUT UP TO 50' IN FRONT.
- CEILING DEVICES ARE LIMITED TO 1/2 ROOM WIDTH INDICATED TO ANY SIDE.
- DISTANCES BETWEEN DEVICES ARE BASED ON CANDELA AND ASSUMES AN IMAGINARY WALL / BOUNDARY SPACED BETWEEN THEM.
- CONSIDERING CEILING GRID SPACING, LIGHTING, AIR GRILLS, SPRINKLERS, ETC., IT IS RECOMMENDED TO ALLOW +4' IN ANY DIRECTION FOR FIELD ADJUSTMENTS. IF IN DOUBT GO TO NEXT CANDELA SETTING OR ADD ADDITIONAL DEVICES. IF INCREASING CANDELA OR ADDING DEVICES IN THE FIELD ENSURE VOLTAGE DROP, CURRENT DRAW, AND BATTERY CALCULATIONS CAN ACCOMMODATE THE INCREASE.
- IF STROBES ARE NOT CENTERED, THE CANDELA MUST BE BASED ON THE LONGEST DISTANCE FROM ANY WALL / ADJACENT DEVICE, OR ADDITIONAL DEVICES ADDED.
- DESIGNER IS RESPONSIBLE TO ALLOW FOR FIELD VARIATIONS OF WHERE DEVICES CAN BE LOCATED ALONG WALLS AND IN CEILINGS (INCLUDING STUD SPACING, CENTER OF TILE, ETC.). WALL DEVICES SHOULD ACCOUNT FOR CUSTOMER ARTWORK, CABINETS, DOORS, SHELVES, ALCOVES, ETC.
- DESIGNER VOLTAGE CALCS MUST ACCOUNT FOR ACTUAL FIELD / CONDUIT ROUTING INCLUDING DROPS. EACH 6' WHIP / DROP TO CEILING TILES ADDS 28' OF WIRE LENGTH DOWN AND BACK WITH JUNCTION BOX LOOPS.
- INSTALLER IS RESPONSIBLE TO VERIFY DISTANCES OF JUNCTION BOXES (AND LENS) FROM WALLS OR OTHER DEVICES BASED ON THE CANDELA AND ALLOWED SPACING. DON'T JUST RELY ON DRAWING APPROXIMATE LOCATION, MEASURE AND VERIFY IN FIELD BASED ON CANDELA.
- FIELD ADJUSTABLE DEVICES MUST BE PROPERLY SET BASED ON THE PLANS, AREA COVERED, AND DESIGNER CALCULATIONS. THIS APPLIES TO STROBE, HORN, AND SPEAKER SETTINGS. AUDIBILITY ADJUSTMENTS MAY BE REQUIRED AFTER FURNITURE AND EQUIPMENT ARE INSTALLED.
- CORRIDOR SPACING GENERALLY REQUIRES A MINIMUM 15 CD STROBE WITHIN 15' OF THE END OF CORRIDOR, NOT TO EXCEED 100' BETWEEN DEVICES (18.5.5.8). HOWEVER, ROOM SPACING IS ALLOWED IN CORRIDORS PER REFERENCE IN 18.5.5.8.1. THIS ALLOWS FOR ONE STROBE TO BE USED IN CORRIDORS LONGER THAN 30' (15' OF EACH END) OR TO EXCEED 15' FROM THE END. EXAMPLE, A 95 CD STROBE CENTERED IN A 50' LONG CORRIDOR RATHER THAN TWO 15 CD STROBES.
- STROBES MUST BE LISTED FOR THE INTENDED ORIENTATION (WALL OR CEILING) BASED ON DESIGN OF LIGHT REFLECTORS (MIRRORS).
- STROBE SPACING IN SLEEPING ROOMS MUST COMPLY WITH SEPARATE AND SPECIFIC REQUIREMENTS OF 18.5.5.10.
- VISUAL CHARACTERISTICS FOR PRIVATE MODE AREAS (HOSPITALS / DETENTION) MAY VARY AND MUST BE APPROVED BY THE AHJ (18.6).
- FOR GUIDANCE ON STROBE COVERAGE IN LARGE SPACES (WAREHOUSES, BOX RETAIL STORES, ETC.) SEARCH "DIRECT VISUAL SIGNALING AS A MEANS OF OCCUPANT NOTIFICATION IN LARGE SPACES".
- DEVICES LABELED AS 15/75 CANDELA ARE ONLY LISTED FOR 15 CD SPACING.