



STUDY AND TEST MATERIAL
for the combination
DENFA / FA2
ASSESSMENT

DRAFT - December 28, 2022

This is a combination assessment that incorporates Denver Fire Alarm Amendments (DENFA) and the FA2 Fire Alarm On-Site Competent Person assessment.

If a person will be working in the City or County of Denver, they are required to have taken exams that incorporate Denver amendments (see below for grace period information). The FA2 portion of this combination exam is equal to the FA2 requirements of other jurisdictions. Upon passing this exam, the individual will obtain qualifications for FA2 and DENFA.

This document contains sample questions and information 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.

Grace Period: If a candidate recently passed an FA2 assessment for another jurisdiction prior to Denver FD implementation (Jan. 1, 2023), they would fall within a grace period. They will be eligible for licensure by the Denver Fire Department with an expiration date of their current FA2. Contractors who have not recently passed the FA2 and are testing to be licensed by the Denver Fire Department, or renewals, need to take and pass the combined DENFA / FA2 assessment. A stand-alone DENFA amendment assessment will not be available. Verify all licensing requirements with Denver Fire Department.

This information is subject to change by the jurisdiction and is for reference only.

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

- CSA Study and Test Material for the DENFA / FA2 Assessment
- Amendments to the Building and Fire Code for the City and County of Denver
- International Fire Code
- NFPA 70 – National Electrical Code
- NFPA 72 – National Fire Alarm and Signaling Code (code or handbook)
- Basic Non-programmable calculator (at physical proctoring center only. Online assessments will have a split screen with calculator.)

Quick Example of How Exam Screens May Look

The diagram illustrates an exam screen layout with several callout boxes:

- Question and answer options:** Points to a question with options: C. Should, D. Could.
- Check this box if you want to flag this question for review later with any remaining time:** Points to a checkbox labeled "Mark this item for later review."
- Select "Next" to go to the next question. Note: some exams will not allow you to go "Back", but only forward.** Points to the "Next" button.
- Select "Review All" to review questions before submitting.** Points to the "Review All" button.
- DO NOT "Submit" until you are finished as this will end and score your exam.** Points to the "Submit" button.

The bottom of the screen features four buttons: Back, Next, Review All, and Submit.

About the Assessments:

Assessment Abbreviation: DENFA / FA2 – Combination Denver Fire Alarm Amendment & Fire Alarm On-Site Competent Person

Number of Questions: 100 (80 from FA2, 20 from Denver amendments)

Amount of Time for Test: 180 minutes (2.5 hours)

Codes / Materials Used for Assessment and Editions:

- 2018 Edition of the International Fire Code
- 2019 Amendments to the Building and Fire Code for the City and County of Denver
- NFPA 72: 2019
- NFPA 70 (NEC) 2008 - 2020 These editions have been verified for same assessment content so any of these editions will work for CSA assessments.
- 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 will be provided for on-line exams.)

Dual Qualifications:

Upon successfully passing the DENFA / FA2 assessment, the ID card will indicate both assessments separately as the DENFA (Denver amendments) and FA2. This is to ensure that other jurisdictions recognize the FA2 assessment.

Assessment format: Open book (provide your own books). The candidate is required to bring/provide a basic non-programmable calculator when taken at a physical proctoring location. Scratch paper or dry-erase board will be provided for assessments at a proctored facility. On-screen note and calculator section will be provided for on-line proctored assessments. Any books or assessment documents brought into assessment must be bound as no loose papers are allowed.

Passing Score: 80%

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

General Assessment Information:

About the Questions: Questions are randomly selected from respective topics within a larger database. Answer choices are randomly mixed, meaning that choice “B” will not always be in position “B”.

Assessment 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.

Exam/Assessment: These two terms are used interchangeably in this document.

Time Clock: Some assessments will have a count-down timer displayed on the screen. Do not focus on the clock but use it as a guide.

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 Assessments

CSA assessments are open book. You must provide your own books and required assessment materials. Check this guide to verify what editions assessments 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 assessment.

Page tabs must be of permanent type. Do not mark in any materials during an assessment.

Phones, radios, pagers are not allowed in assessment 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 assessment. 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 assessment 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 not to 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 Assessment

To cancel or reschedule an assessment you must log back into the system where you scheduled the assessment, 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 fireproof your fees. There are no refunds.

If You Fail an Assessment

If you fail an assessment, 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 assessment.

When you Pass an Assessment

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. Assessments are good for 3 years. Then a new assessment is required for renewal.

Please report cheating to the proctor or CSA.

Denver Amendments Fire Alarm Study Material

FA2 assessment material follows

Questions associated with the Denver Amendments Fire Alarm assessment come from multiple sections. In general, any alarm related material associated with fire alarms, monitoring, chemical alarms, gas alarms, alternative suppression systems, fire watch, carbon monoxide detection, smoke control systems, Fire Command Centers, Fire Command Rooms, etc. may be included in assessment questions.

Note that Denver currently uses the 2018 IFC/IBC which references the 2016 edition of NFPA 72. However, CSA FA2 questions are based around the 2019 edition of NFPA 72. Over 95% of the questions will apply to both editions as we recognize different jurisdictions adopt different editions. As a result, some paragraphs referenced in the Denver amendments may have moved between the 2016 and 2019 NFPA 72. Usually, the applicable section is only a few paragraphs away based on numbering changes. CSA will not use such changes to trick you. The exam questions will be based on the overall impact of a concept, not what paragraph it is located at.

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:

2018 International Fire Code and 2019 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]
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- **Additional sections to be added**

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

FA2 Example Questions

The following questions are related to the FA2 Assessment and provide examples of how questions may be presented.

1. Which wire size is largest in diameter?

- a) 12 AWG
- b) 18 AWG
- c) 14 AWG
- d) 24 AWG

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

- a) 12 AWG
- b) 18 AWG
- c) 14 AWG
- d) 24 AWG

3. Ohms law is defined by what equation?

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

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 through on-line CSA training modules that discuss electronic principles.

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 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 the 2019 edition 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.

- 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, 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 is 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.

- Limitations to the number of addressable devices that can be impacted by a single fault.
- Strobe spacing and candela of the strobes for wall and ceiling mount.
- Power supplies, batteries, duration of secondary supply.
- Audibility levels including ambient, public mode, private mode.
- Pathway survivability Classes.
- Impacts of doubling the distance, and doubling the wattage of speakers and horns.
- Wire types, ratings, limitations.
- NEC sections including 110, 300, 760, and others.
- Detector spacing such as heat, smoke, duct detectors, flow switches, pull stations, room temperature sensors, etc.
- Mass notification, risk assessments, intelligibility, message priority, etc.
- Measuring velocity / pressure readings on duct detectors, how and what equipment
- Frequency of inspection, testing, and maintenance for various components
- ADA requirements for strobes in common use / public use areas