



STUDY AND TEST MATERIAL FOR THE PEG2 ASSESSMENT

(Pre-Engineered Gas Clean Agent On-site)

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This document contains important information and sample questions to help participants study for the PEG2 assessment.

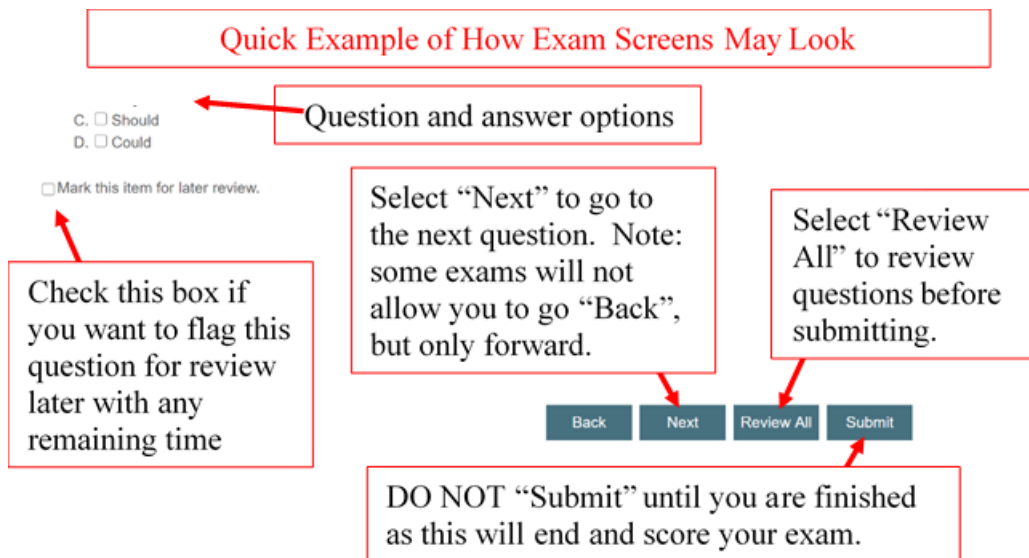
If you intend to use this booklet in the test, make sure it is bound in a binder or stapled. Loose papers are not allowed.

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 PEG2 Assessments
- NFPA 70 – National Electrical Code
- NFPA 72 – National Fire Alarm and Signaling Code
- International Building Code (IBC)
- NFPA 2001 – Clean Agent Fire Extinguishing Systems
- Non-programmable calculator

Your exam may not require all these items, but these are the only items allowed during an exam covered by this study guide. Page 3 provides a list of what materials are required for each exam.



About the Assessments:

Assessment: PEG2 – Pre-Engineered Gas Clean Agent On-site

Number of Questions: 80

Amount of Time for Test: 120 Minutes

Exam format: Open book (bring your own books); You are responsible to provide your own non-programmable calculator for voltage drop calculations. Scratch paper or an online split screen will be provided for calculations. Any books or exam documents brought into exam must be bound as no loose papers are allowed. Tabbed pages must use permanent tabs. We strongly 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.

Passing Score: 80%

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

Codes / Materials Used for Exam and Editions:

- NFPA 72 – 2019 Edition
- NFPA 70 (NEC) 2008 - 2020 These editions have been verified for same exam content so any of these editions will work for CSA exams.
- NFPA 2001 – 2018 Edition
- There may 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.

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: Most assessments will have a count-down timer displayed on the screen. It may appear as if this timer is fluctuating between questions (gaining time on one question and losing time on the next question). This is normal. 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, including calculators. 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 fireproof 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.

The following questions are intended to represent an example of how questions may be worded related to the PEG2 Assessment. This exam includes questions from NFPA 72 due to these systems incorporating releasing control panels, detection systems, notification systems, and control of other systems. It also includes questions from the body of NFPA 2001 in addition to Annex material. As designers and installers of these systems you are expected to be well versed in the code requirements and principles to ensure effective systems.

Questions from a specific code will generally start with a reference to what code they are associated with or will include a reference within the question. Such as [NFPA 72], or [NFPA 2001], Questions that are general in nature such as wire size or science will not include a reference.

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?

$$\text{Answer: } 0.125A + 0.095A + 0.209A + 0.209A + 0.209A = 0.847A$$

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. [NFPA 72] 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 fire alarm system?

a) Flush Test

b) Invoice

c) Maintenance contract

d) Record of Completion

8. [NFPA 72] Fire alarm visual notification devices are required to be spaced in accordance with criteria established by UL 1971 for hearing impaired individuals.

True

False

9. 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

10. [NFPA 2001] The following is defined as: Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

Listed

Approved

Standard

Mandatory

11. [NFPA 2001] The following is defined as: A fire in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.

Class A fire

Class B fire

Deep seated fire

Class C fire

12. [NFPA 2001] The following is defined as: A fraction of the agent minimum design quantity (MDQ) added thereto deemed appropriate due to a specific feature of the protection application or design of the suppression system.

Engineered system

Design Factor

Maximum quantity

Local application

13. [NFPA 2001] Storage containers and accessories shall be located within 50' travel of the entrance to a protected space to allow for quickly disabling during a false activation and during the pre-discharge signal.

True

False

14. [NFPA 2001] The containers used in these systems shall be designed to meet the requirements of the U.S. Department of Transportation or the Canadian Transport Commission, if used as shipping containers. If not shipping containers, they shall be designed, fabricated, inspected, certified, and stamped in accordance with Section VIII of the ASME *Boiler and Pressure Vessel Code*; independent inspection and certification are recommended.

True

False

15. [NFPA 2001] The temperature at which agent containers are stored shall be _____.

- Between 32 degrees F and 80 degrees F
- 20 degrees F and 100 degrees F
- Temperature is not limited
- Within the manufacturers listed limits

16. [NFPA 2001] Flow calculations along with the working plans shall be submitted to the authority having jurisdiction for approval. What is required to be identified on the computer calculation printout.

- Supplier of the system
- Version of the flow calculation program
- Version of the Windows software running the calculation
- Name of the authority having jurisdiction

17. [NFPA 2001] Where special conditions could affect the extinguishing efficiency, the minimum quantity of agent shall be increased through the use of design factors. Design factors for piping tees are identified in Table _____.

- 5.5.3.3
- 5.5.3.1
- 5.5.2.3

18. [NFPA 2001] A series of interexposed hazards shall be permitted to be subdivided into smaller groups or sections with the approval of the authority having jurisdiction.

- True
- False

19. [NFPA 2001] The quantity of clean agent required for local application systems shall be based on the rate of discharge and _____ to ensure complete extinguishment.

- The volume of the room
- The temperature of the room
- The time that the discharge must be maintained
- The quantity of agent within the tanks

The following are some additional NFPA 72 topics that may 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.
- Pathway survivability Classes.
- Wire types, ratings, limitations.
- NEC sections including 110, 300, 760, and others.
- Detector spacing such as heat, smoke, duct detectors, flow switches, pull stations, 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