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EPA 608 Practice Questions and Answers

100 practice questions, 25 per section, each with the answer, a short explanation and the rule it comes from.

What's inside

- Core: 25 questions, then the answer key
- Type 1 (small appliances): 25 questions, then the answer key
- Type 2 (medium-, high- and very high-pressure appliances): 25 questions, then the answer key
- Type 3 (low-pressure chillers): 25 questions, then the answer key

How to use it

Answer one section's 25 without looking at the key, then mark yourself. 18 of 25 passes. Each key starts on a new page, so you can cover it while you work.

Where the questions come from

We wrote them from ESCO Institute and SkillCat study materials and checked each one against 40 CFR Part 82. They are practice questions, not questions from the real exam.

Take the same sections online

For a timer and a score by topic, free and with no signup:

- epa608practicetest.net/core.html Core
- epa608practicetest.net/type-1.html Type 1
- epa608practicetest.net/type-2.html Type 2
- epa608practicetest.net/type-3.html Type 3
- epa608practicetest.net/universal.html Universal, all 100

Checked against 40 CFR Part 82, November 2026. Trieu Ly, EPA608PracticeTest.

Core: 25 practice questions

1. **Why are HFCs still considered harmful to the environment?**
   A. Because they increase global warming
   B. Because they deplete the ozone layer
   C. Because they cause cancer
   D. Because they are harmful to plants

2. **About how long can a CFC refrigerant such as R-12 remain in the atmosphere once it is released?**
   A. A few days
   B. About 100 years
   C. About 1 year
   D. About 10,000 years

3. **Which list orders these refrigerants from highest to lowest ozone depletion potential?**
   A. HCFC-22, CFC-12, HFC-134a
   B. HFC-134a, HCFC-22, CFC-12
   C. CFC-12, HCFC-22, HFC-134a
   D. CFC-12, HFC-134a, HCFC-22

4. **How do greenhouse gases cause the earth to warm?**
   A. They give off extra heat as they break down in the stratosphere
   B. They destroy the ozone that normally cools the surface
   C. They reflect incoming sunlight back toward space
   D. They absorb infrared energy and slow its escape to space, like a blanket

5. **What is the current maximum civil penalty per day, per violation, for violating the Clean Air Act (40 CFR 19.4, adjusted January 2025)?**
   A. $124,426
   B. $37,500
   C. $69,733
   D. $472,901

6. **In the United States, when did production and import of R-22 and R-142b end?**
   A. 1995
   B. 2020
   C. 2000
   D. 2030

7. **What makes a small refrigerant release during service a de minimis release?**
   A. It totals less than one pound of refrigerant
   B. It is under 5 percent of the full charge
   C. It occurs during a good-faith recovery attempt
   D. It involves an HFC rather than a CFC or HCFC

8. **Which organizations has EPA approved to certify refrigerant recovery and recycling equipment used on stationary appliances?**
   A. EPA itself
   B. ASHRAE
   C. The Department of Transportation (DOT)
   D. AHRI and UL

9. **EPA assigns an appliance's pressure class using which property of its refrigerant?**
   A. Liquid saturation pressure at 104 F
   B. Boiling point at atmospheric pressure
   C. Vapor pressure at 70 F
   D. Critical temperature alone

10. **What is the longest time a person can work under the Section 608 apprentice exemption?**
    A. 6 months
    B. 2 years
    C. 5 years
    D. No time limit

11. **What is the chemical name for the HFO refrigerant R-1234yf commonly used in HVAC systems?**
    A. Trifluoroethane
    B. Dichlorofluoromethane
    C. Tetrafluoropropene
    D. Pentafluoropropane

12. **Which refrigerant family includes R-600a and R-290?**
    A. HFCs
    B. HCFCs
    C. CFCs
    D. HCs

13. **What should be done before retrofitting an HCFC system to an HFC refrigerant?**
    A. Remove the other oil types before adding ester-based oil
    B. Mix the old oil with POE to save time
    C. Add water to improve miscibility
    D. Vent the old oil through the service port

14. A technician needs a replacement O-ring for a system that runs on an HFO refrigerant. What should they do?

A. Reuse any O-ring rated for R-22, because every refrigerant affects seal materials the same way
B. Check the SDS and the manufacturer's material-compatibility data before choosing the seal material
C. Use any rubber O-ring, because seal compatibility only matters on ammonia systems
D. Skip the check, because HFOs do not touch the seals while the system runs

15. What does reclaim mean under EPA Section 608?

A. Recover refrigerant into any empty container
B. Charge recovered refrigerant into any system
C. Process refrigerant back to virgin specifications by chemical analysis
D. Separate refrigerant from oil using only a filter-drier

16. On a job site, a tech runs recovered refrigerant through an oil separator and a filter-drier so it can go back into the same owner's system. Which term describes this?

A. Reclaiming
B. Recovering
C. Reprocessing to virgin specification
D. Recycling

17. In common industry practice, when is a system considered dehydrated?

A. When it reaches and holds 500 microns or less
B. When the gauge reaches 1,000 microns once
C. When the compressor is restarted
D. When the liquid line feels warm

18. Which condition speeds up dehydration of a system?

A. A colder system
B. A warmer system
C. Longer hoses
D. A smaller vacuum pump

19. A recovery cylinder has a water capacity of 50 lb and a tare weight of 30 lb. The refrigerant's specific gravity is 1.10. Using the 80% safe-fill limit, what is the most the filled cylinder should weigh?

A. 85 lb
B. 70 lb
C. 74 lb
D. 44 lb

20. What must be true of a recovery machine used on an R-454B system?

A. Any machine certified for R-410A may be used
B. It must be a passive (system-dependent) device
C. It must be rated for low-pressure refrigerants
D. Its manufacturer must rate it for A2L refrigerants

21. Why is a large refrigerant leak in a basement or other low, enclosed space dangerous?

A. Refrigerant vapor is heavier than air and can displace oxygen
B. Refrigerant vapor rises and collects at the ceiling
C. Refrigerant vapor is always explosive
D. Refrigerant vapor turns into water

22. A supplier is loading refrigerant cylinders for transport to a reclaimer. To meet transport rules, how must the cylinders be arranged?

A. Horizontal with chocks under both ends
B. Upright and secured against tipping
C. Valve-down orientation, loosely packed
D. Laid flat but strapped at the middle

23. Which component has the opposite function to the condenser?

A. Compressor
B. Metering Device
C. Evaporator
D. Suction Line

24. With its ports open to the air at sea level, what does a properly zeroed compound gauge read?

A. 14.7 psig on the pressure scale
B. 29.92 inches Hg on the vacuum scale
C. 10 inches Hg on the vacuum scale
D. 0 psig on the pressure scale

25. A technician passes Type I, Type II and Type III but fails Core. What certification does the technician hold?

A. None until Core is passed
B. Universal certification
C. Type I, II and III only
D. Type I only, as the base level

Core answer key

Mark yourself: 18 of 25 passes.

1. **A.** HFCs contain no chlorine, so their ozone depletion potential is zero and they do not harm the ozone layer. They are still harmful because many HFCs have a high global warming potential: released refrigerant traps heat in the atmosphere.

2. **B.** CFCs are very stable and do not break down in the lower atmosphere, so R-12 lasts about 100 years. It breaks apart only when UV light hits it high in the stratosphere.

3. **C.** CFC-12 has an ODP of 1.0, HCFC-22 has 0.055, and HFC-134a has 0 because it has no chlorine. CFCs rank above HCFCs, which rank above HFCs.
   Rule: 40 CFR Part 82 Subpart A Appendices A and B

4. **D.** Greenhouse gases trap outgoing infrared energy, so the surface loses heat more slowly and the planet warms. This is a separate problem from ozone depletion, which is about the loss of the layer that blocks ultraviolet light.

5. **A.** The current maximum Clean Air Act civil penalty is $124,426 per day, per violation, for penalties assessed on or after January 8, 2025. EPA adjusts it for inflation, so older guides show lower figures.
   Rule: 40 CFR §19.4; CAA §113(b)

6. **B.** Production and import of HCFC-22 and HCFC-142b ended on January 1, 2020, but existing R-22 systems may still be serviced with recovered, reclaimed or previously produced R-22.
   Rule: EPA 608 Test Topics: Core - Clean Air Act and Montreal Protocol (R-22 phaseout date)

7. **C.** No pound or percent limit exists. A small release, such as when hoses are connected or disconnected, is de minimis only during a good-faith recovery attempt that follows the required practices with certified equipment.
   Rule: 40 CFR §82.154(a)(2)

8. **D.** Recovery and recycling equipment must be certified by an EPA-approved equipment testing organization. AHRI and Underwriters Laboratories (UL) are approved testing organizations. EPA approves the testers but does not test equipment itself.
   Rule: 40 CFR §82.158

9. **A.** Since 2016, EPA sets the low, medium, high and very high pressure classes by the refrigerant's liquid saturation pressure at 104 F. The older boiling-point basis is outdated.
   Rule: 40 CFR §82.152 (pressure classes)

10. **B.** A person may work as an apprentice for only two years from first registering with the Department of Labor's Office of Apprenticeship. After that, they must pass a certification exam.
    Rule: 40 CFR §82.152 "Apprentice" (two years from first registration)

11. **C.** R-1234yf is tetrafluoropropene, a hydrofluoroolefin (HFO) refrigerant. The other options are different chemicals: trifluoroethane and pentafluoropropane are HFCs, and dichlorofluoromethane is an HCFC.

12. **D.** R-600a (isobutane) and R-290 (propane) are hydrocarbon (HC) refrigerants. They contain no chlorine or fluorine, so they are not CFCs, HCFCs or HFCs.

13. **A.** HFCs need ester (POE) oil, and the old mineral or alkylbenzene oil must be removed first because it does not mix well with HFCs. Mixing oils or adding water contaminates the system.

14. **B.** Each refrigerant and oil combination can swell, shrink or harden seal and gasket materials differently, so the technician checks the Safety Data Sheet and the equipment or seal manufacturer's compatibility data before replacing a seal.
    Rule: 40 CFR §82.152 "Retrofit" (gaskets, o-rings)

15. **C.** Reclaiming reprocesses used refrigerant to the purity of new product, verified by chemical analysis. It is done by an EPA-certified reclaimer, not on the job site.
    Rule: 40 CFR §82.152 (Reclaim)

16. **D.** Recycling cleans refrigerant for reuse by separating oil and passing it through filter-driers, with no chemical analysis. Reclaiming goes further and must meet new-product purity verified by analysis.
    Rule: 40 CFR §82.152 "Recycle"

17. **A.** Industry practice treats a system as dehydrated when it reaches about 500 microns and holds there after the vacuum pump is isolated. This is a practice target, not an EPA rule.
    Rule: EPA 608 Test Topics: Core Evacuation and Dehydration (500 microns is practice, not CFR)

18. **B.** Water boils at a lower vacuum when it is warmer, so a warm system releases moisture faster. Cold system parts slow dehydration.

19. **C.** Max gross weight = water capacity x specific gravity x 0.80 + tare: 50 x 1.10 x 0.80 = 44 lb of refrigerant, plus the 30 lb tare, gives 74 lb.

20. **D.** R-454B is an A2L (lower flammability) refrigerant. Recovery machines for flammable refrigerants are built to avoid ignition sources, so the manufacturer must rate the machine for A2L use.
    Rule: 40 CFR §82.158(d)(3), App. B4 (flammable-refrigerant recovery equipment)

21. **A.** Most refrigerant vapors are heavier than air. They sink, collect in low spaces and push out oxygen, which can cause suffocation. Leave the area and ventilate it.

22. B. Cylinders are shipped upright and secured so they cannot tip or roll. Recovered refrigerant travels in DOT recovery cylinders labeled with the refrigerant type.
Rule: DOT cylinder transport rules (49 CFR 171-180)

23. C. The condenser rejects heat and turns refrigerant vapor into liquid. The evaporator does the opposite: it absorbs heat and turns liquid into vapor.

24. D. A gauge is zeroed to the surrounding air, so atmospheric pressure reads 0 psig (14.7 psia). Any reading on the vacuum scale means pressure below atmospheric.
Rule: 40 CFR §82.156(a) Table 1 (inches Hg vacuum relative to 29.9 in Hg)

25. A. Every Type I, II and III certification also requires passing the Core section, so a technician who fails Core holds no certification until Core is passed.
Rule: 40 CFR Part 82 Subpart F, Appendix D(d); 40 CFR §82.161(c)

Type 1: 25 practice questions

1. **A 1988 window air conditioner with a running compressor is recovered with a certified machine built in 2015. Which target applies?**
   A. 80 percent of the refrigerant, or a 4 in. Hg vacuum
   B. 90 percent of the refrigerant, or a 4 in. Hg vacuum
   C. 100 percent of the refrigerant
   D. No target, because the appliance was built before 1993

2. **A technician uses a recovery machine built in 1991 on a dorm refrigerator with a working compressor. What is the minimum recovery?**
   A. 90 percent of the refrigerant
   B. 95 percent of the refrigerant
   C. 80 percent of the refrigerant
   D. No minimum, because the machine predates the rule

3. **Using recovery equipment made on or after November 15, 1993, what percentage of the refrigerant must be recovered from a small appliance whose compressor is running?**
   A. 70 percent
   B. 80 percent
   C. 100 percent
   D. 90 percent

4. **Which of these is a small appliance under EPA's Section 608 definition?**
   A. A drinking water cooler
   B. A centrifugal chiller
   C. A supermarket rack system
   D. A split-system central air conditioner

5. **The 90 percent and 80 percent targets for small appliance recovery are measures of what?**
   A. The pounds of refrigerant the machine moves per minute
   B. The percent of the unit's refrigerant the machine removes
   C. The purity of the refrigerant after recycling
   D. The lowest pressure the machine can reach

6. **Which combination helps release refrigerant trapped under compressor oil during passive recovery on a non-operating system?**
   A. Open the cylinder valve fully and vent the top
   B. Add nitrogen to 200 psig and recover later
   C. Heat the compressor with a heat gun and strike it with a rubber mallet
   D. Pull a deep vacuum through the process stub only

7. **On a small appliance with a working compressor and a completely restricted capillary tube, how many access valves are required for recovery?**
   A. One low-side access valve
   B. Two access valves, one on each side
   C. No access valves are needed
   D. One high-side access valve

8. **A vending machine's compressor is seized, but the unit still has power. Can system-dependent recovery be used, and what is the target?**
   A. Yes, and the target is 80 percent or a 4 in. Hg vacuum
   B. Yes, and the target is still 90 percent
   C. No, only self-contained equipment may be used
   D. No, system-dependent recovery needs a running compressor

9. **A technician services only small appliances. Which kind of recovery equipment may be used instead of a self-contained recovery machine?**
   A. A vacuum pump pushing refrigerant into a pressurized recovery cylinder
   B. System-dependent (passive) recovery equipment
   C. Equipment certified for very high-pressure appliances only
   D. Any equipment that holds a Type II sticker

10. **Passive recovery is under way on a refrigerator with a dead compressor. Why does warming the compressor shell increase the amount of refrigerant recovered?**
    A. Heat thins the oil so it drains out with the refrigerant
    B. Heat restarts the compressor motor
    C. Heat drives refrigerant dissolved in the oil out as vapor so it can be recovered
    D. Heat lowers the pressure in the appliance so the container fills faster

11. **Many small appliances have no service valves. Where does a technician usually install a piercing-type access valve?**
    A. On the compressor discharge dome
    B. On the condenser fan housing
    C. On the filter drier body
    D. On the process stub

12. **A tank has no label. A technician wants to check what refrigerant it holds. Which method is sound?**
    A. Compare the pressure to a P-T chart once the tank has stabilized at a known temperature
    B. Smell the vapor
    C. Weigh the tank and guess
    D. Check the color of the valve

13. After a burnout left acid and debris in the oil, a technician wants to install the new compressor without cleaning the system. What is the likely result?

A. Nothing, the new compressor oil neutralizes the acid
B. Acid and debris left in the system attack the new compressor and can cause another burnout
C. The new unit runs colder and more efficiently
D. The system only needs a larger refrigerant charge

14. Why must a recovery cylinder be filled to no more than 80 percent of its capacity?

A. So non-condensables have room to collect
B. So the scale reading stays accurate
C. Liquid refrigerant expands as it warms, and without vapor space the cylinder can rupture
D. So the recovery machine runs cooler

15. What color are the markings placed on the process tubes and service points of an appliance that uses a flammable refrigerant?

A. Green
B. Blue
C. Yellow
D. Red

16. A technician recovers R-410A from a small unit. Which container should the refrigerant go into?

A. A clearly marked, refillable DOT recovery cylinder
B. A disposable virgin refrigerant cylinder
C. Any empty propane cylinder
D. An empty vacuum pump oil bottle

17. A technician recovers R-134a and R-22 into the same recovery cylinder. What is the main consequence?

A. The mixture can be charged back into any system that used either refrigerant
B. The mixture may not be reclaimable and may have to be destroyed
C. The reclaimer will separate the two refrigerants at no extra cost
D. The mixture becomes exempt from the venting prohibition

18. A technician arrives at a small appliance with no nameplate and starts connecting a recovery cylinder. Why should the refrigerant type be known first?

A. Because the type decides the color of the hoses
B. Because recovery cannot start until the model number is registered
C. To keep refrigerants from being mixed and to pick the correct cylinder and equipment
D. Because the type sets how long the recovery machine may run

19. A refrigerant has a liquid saturation pressure of 120 psia at 104 F. Under EPA rules, which pressure class is an appliance using it?

A. Low pressure
B. High pressure
C. Very high pressure
D. Medium pressure

20. A technician buys a new recovery machine for refrigerator and window unit work. What must be true of it under Section 608?

A. It must be certified by an EPA-approved lab
B. It must have its own built-in compressor
C. It must be able to pull a 500 micron vacuum
D. It must recover 100 percent of the charge

21. A technician holds only a Type I certification. Which of these jobs is within the scope of that card?

A. Servicing a 30 ton chiller
B. Servicing a window air conditioner with a 4 lb factory charge
C. Servicing a rooftop unit with 20 lb of R-410A
D. Servicing a low-pressure centrifugal chiller

22. A technician passed Core as an open-book, mail-in exam and now wants Universal certification. What must they do about the Core section?

A. Keep the open-book Core, since it already counts
B. Retake Core open-book and score 21 of 25 or more
C. Retake Core as a closed-book, proctored exam
D. Skip Core, since Universal covers only Types I, II and III

23. What is the maximum hydrocarbon refrigerant charge per circuit allowed in a new household refrigerator?

A. 57 grams (2 oz)
B. 2 pounds
C. 500 grams (17.6 oz)
D. 150 grams (5.3 oz)

24. A factory-sealed window unit holds 3 lb of R-410A, a high-pressure refrigerant. Which certification covers servicing it, besides Universal?

A. Type I
B. Type II
C. Type III
D. Core only

25. On an open-book, mail-in Type I exam, how many of the 25 questions must be answered correctly to pass?

A. 18
B. 21
C. 20
D. 25

Type 1 answer key

Mark yourself: 18 of 25 passes.

1. **B.** The machine was made after November 15, 1993 and the compressor runs, so the target is 90 percent or 4 in. Hg. The 1988 appliance date does not matter.
   Rule: 40 CFR §82.156(b)(2)-(3)

2. **C.** Recovery equipment made before November 15, 1993 must recover 80 percent of the refrigerant whatever the compressor state, or reach a 4 in. Hg vacuum. The 90 percent target applies only to newer equipment.
   Rule: 40 CFR §82.156(b)(1), (b)(3)

3. **D.** With recovery equipment made on or after November 15, 1993, the target is 90 percent when the compressor runs and 80 percent when it does not. Reaching 4 in. Hg vacuum also complies.
   Rule: 40 CFR §82.156(b)(2)

4. **A.** A small appliance is fully manufactured, charged and hermetically sealed in a factory with 5 lb or less of refrigerant. Drinking water coolers are a named example; chillers, racks and split systems are not.
   Rule: 40 CFR §82.152 (small appliance)

5. **B.** These targets measure recovery efficiency: the percentage of the appliance's refrigerant that the recovery equipment removes. Speed, purity and vacuum depth are separate measures.
   Rule: 40 CFR §82.152 (recovery efficiency)

6. **C.** Heat drives refrigerant out of the compressor oil, and sharply striking the compressor helps release refrigerant trapped there. Both help passive recovery when the compressor cannot run.

7. **D.** A working compressor can move the refrigerant into the high side, so one high-side access valve is enough. Both high- and low-side valves are needed when the compressor does not run.

8. **A.** System-dependent equipment uses the appliance's own pressure, so it works with a seized compressor. When the compressor cannot run, the target is 80 percent of the refrigerant or a 4 in. Hg vacuum.
   Rule: 40 CFR §82.152 (system-dependent recovery equipment)

9. **B.** Small appliances may be recovered with certified system-dependent (passive) equipment, which uses the appliance's compressor or internal pressure. A vacuum pump cannot push refrigerant into a pressurized cylinder.
   Rule: 40 CFR §82.152 (system-dependent recovery equipment)

10. **C.** Refrigerant dissolves in compressor oil, and warming the oil drives it back out as vapor that the recovery setup can capture. Heat raises pressure in the appliance rather than lowering it.

11. **D.** Small appliances usually have a process stub, a short tube left from factory charging, and the piercing valve clamps onto it. The compressor dome and fan housing are not access points.
    Rule: 40 CFR §82.154(e)(2) (process stub)

12. **A.** Each pure refrigerant has a known pressure at a given temperature, so once the tank stabilizes at a known temperature its pressure can be compared to a P-T chart. Smell and valve color are not reliable.

13. **B.** When a burnout leaves contaminants, the system must be flushed or cleaned and fitted with the proper filter drier before restart. Acid left behind breaks down the new motor insulation and oil. Fresh oil does not neutralize it.

14. **C.** Liquid refrigerant expands when its temperature rises. A cylinder filled past 80 percent can become liquid full and burst from hydrostatic pressure.

15. **D.** Appliances charged with a flammable refrigerant carry red markings on process tubes and service points, so technicians see the fire hazard before opening the circuit. This is an EPA SNAP use condition.

16. **A.** Recovered R-410A goes into a refillable, DOT-rated recovery cylinder that is clearly labeled and rated for its pressure. Disposable cylinders must never be refilled. A propane cylinder or an oil bottle is not rated or labeled for refrigerant.
    Rule: DOT refillable cylinder rules (49 CFR 180)

17. **B.** A mix of two refrigerants cannot meet the purity standard for either one, so a reclaimer may refuse it or charge to destroy it. Mixed refrigerant still may not be vented. Use one refrigerant per cylinder.
    Rule: 40 CFR §82.152 (reclaim, appendix A / AHRI 700-2016)

18. **C.** A mixture of refrigerants may be impossible to reclaim, so the type must be known before choosing a cylinder. Recovery equipment and cylinders must also suit the refrigerant and its pressure.
    Rule: 40 CFR §82.152 (reclaim)

19. **D.** EPA sorts appliances by liquid saturation pressure at 104 F: below 45 psia is low, 45 to 170 psia medium, 170 to 355 psia high, above 355 psia very high. 120 psia is medium.
    Rule: 40 CFR §82.152 (low-, medium-, high-, very high-pressure appliance definitions)

20. **A.** Small-appliance recovery equipment must be certified by an EPA-approved testing organization. Self-contained and system-dependent machines can both be certified, so a built-in compressor, a micron rating or 100 percent recovery is not required.
    Rule: 40 CFR §82.158(e)

21. B. Type I covers small appliances: units fully manufactured, charged and hermetically sealed in a factory with 5 lb or less of refrigerant, like a window air conditioner. Rooftop units and chillers are Type II or Type III work.
Rule: 40 CFR §82.161(a)(1)(i)

22. C. Universal certification requires a closed-book, proctored Core test, so an open-book, mail-in Core does not count and must be retaken under a proctor.
Rule: 40 CFR 82 Subpart F, Appendix D (closed-book, proctored Universal exam)

23. D. Since September 2018, the SNAP use condition for R-600a, R-290 and R-441A in new household refrigerators allows up to 150 g (5.3 oz) per circuit. The older limit was 57 g. Retrofits are not allowed.
Rule: SNAP use conditions 83 FR 38969 (150 g per circuit); 40 CFR §82.154(a)(1)(viii)-(x)

24. A. Small appliances fall under Type I whatever refrigerant they use. Type II covers high-pressure appliances except small appliances and MVACs.
Rule: 40 CFR §82.161(a)(1)(i)-(ii)

25. B. A mail-in, open-book Type I test requires 21 of 25 correct. Closed-book, proctored sections require 18 of 25, so 18 is the trap answer here.
Rule: 40 CFR 82 Subpart F, Appendix D (mail-in Type I passing score 21 of 25)

Type 2: 25 practice questions

1. **A 90 lb R-22 chiller air-conditions an office building. For leak repair rules, what category is it and what is its threshold?**
   A. Commercial refrigeration at 20 percent
   B. Industrial process refrigeration at 30 percent
   C. Comfort cooling at 10 percent
   D. Comfort cooling at 35 percent

2. **Each appliance below holds 300 lb of R-22. Which one has a 30 percent leak rate trigger?**
   A. A supermarket display case rack
   B. An office building chiller
   C. A cold storage warehouse system
   D. A chemical plant process cooling loop

3. **You are about to add refrigerant to a 60-lb R-22 commercial refrigeration system, so you must calculate its leak rate, and that starts with the full charge. Which of these is a method EPA accepts for determining the full charge?**
   A. Calculations based on component sizes, refrigerant density and piping volume
   B. Calculations based on power consumption, in kWh
   C. Calculations based on tonnage
   D. Calculations based on the BTU capacity of the system

4. **An R-22 commercial refrigeration system with a 200 lb charge is over its leak rate. The repair is delayed because a needed part cannot be delivered, and the owner meets EPA's conditions for an extension. No industrial process shutdown is involved. Counted from the day the leak rate was exceeded, what is the most time allowed to finish the repair?**
   A. 120 days
   B. 180 days
   C. 270 days
   D. 30 days

5. **A 600 lb R-22 commercial refrigeration system exceeded its leak rate and now needs quarterly leak inspections. What can replace those inspections?**
   A. A sight glass check by the operator every month
   B. A standing pressure decay test every quarter
   C. An automatic leak detection system audited or calibrated every year
   D. A leak rate calculation at every refrigerant addition

6. **When using the rolling average method to calculate a leak rate, which refrigerant additions are counted?**
   A. Only the most recent addition, scaled up to a full year by the days since the addition before it
   B. All additions made since the appliance was first installed and charged at the job site
   C. All additions made since January 1 of the current calendar year, whatever the repair history
   D. All additions in the past 365 days, or since the last successful follow-up verification test if that is shorter

7. **Using post-1993 recovery equipment, what recovery level applies before a major repair on a high-pressure appliance with a full charge of 200 pounds or more?**
   A. 10 inches of Hg vacuum
   B. 0 inches of Hg
   C. 0 psig
   D. 15 inches of Hg vacuum

8. **Under EPA rules, which of the following is considered a MAJOR repair requiring evacuation to the prescribed vacuum level?**
   A. Replacing a liquid-line filter drier
   B. Removing the compressor
   C. Replacing a Schrader valve core
   D. Adjusting the TXV superheat setting

9. **Leaks in an appliance make the Table 1 evacuation level unattainable, or reaching it would substantially contaminate the recovered refrigerant. What does EPA require for the leaking components?**
   A. Vent the remaining refrigerant slowly outdoors
   B. Skip recovery entirely and repair the leak first
   C. Evacuate them to the lowest level reachable without substantially contaminating the refrigerant, never above 0 psig
   D. Pressurize with nitrogen and then release the mixture

10. **Using recovery equipment made after November 15, 1993, to what level must an R-134a appliance with a 150 lb full charge be evacuated before a major repair?**
    A. 0 inches Hg vacuum
    B. 15 inches Hg vacuum
    C. 25 mm Hg absolute
    D. 10 inches Hg vacuum

11. **What does mothballing an appliance involve?**
    A. Evacuating the refrigerant to at least atmospheric pressure and temporarily shutting the appliance down
    B. Recharging the system with nitrogen only
    C. Moving the appliance to a warehouse on the same site
    D. Venting the charge to the atmosphere before shutdown

12. Before using the same recovery unit on a different refrigerant than the last one recovered, what must be done?

A. Add a trace amount of the new refrigerant to the old charge
B. Remove any remaining refrigerant in the unit and change the unit's filter
C. Open the recovery cylinder to atmosphere
D. Only replace the unit's oil if the charge is above 200 pounds

13. Why might vapor recovery be preferred after liquid refrigerant has already been removed?

A. It raises compressor discharge pressure for faster charging
B. It allows passive recovery above 15 pounds
C. It minimizes oil loss from the appliance
D. It eliminates the need for a recovery cylinder

14. When recovering a large charge, why do technicians connect to the liquid line or receiver outlet and remove liquid first?

A. EPA requires liquid to be removed before vapor
B. Vapor recovery damages the recovery cylinder
C. Liquid recovery removes the need to reach the Table 1 level
D. Liquid moves much faster than vapor, so recovery time drops

15. A Type II technician has pulled all the liquid out of a rooftop unit and the gauges still show pressure after a short wait. What is the next step?

A. Continue by recovering the refrigerant vapor until the required vacuum is reached
B. Close the recovery cylinder valve and release the leftover vapor to the atmosphere
C. Add nitrogen to push out the leftover refrigerant
D. Stop, because removing the liquid completes the recovery

16. When leak-checking a newly assembled split system, what should be used first to pressurize the unit?

A. Oxygen
B. An inert gas such as nitrogen
C. Compressed air
D. Pure refrigerant vapor only

17. If a trace gas is absolutely necessary during leak detection on an R-407C system, which setup is allowed?

A. Pure R-407C vapor with no nitrogen
B. Compressed air with a trace amount of R-407C
C. Dry nitrogen with a trace amount of R-407C
D. Oxygen with a trace amount of R-407C

18. A leak in a high-pressure capillary tube system should be suspected if the system operates with:

A. Excessive subcooling
B. Very low head pressure only
C. A flooded evaporator only
D. Excessive superheat

19. What is the purpose of the receiver in a refrigeration system?

A. To store liquid refrigerant leaving the condenser
B. To prevent liquid refrigerant from reaching the compressor
C. To remove moisture from the refrigerant
D. To meter refrigerant into the evaporator

20. Bubbles seen in a liquid-line sight glass during normal operation most likely indicate what?

A. An overcharged system
B. A low refrigerant charge (flash gas in the liquid line)
C. A restricted suction line
D. Too much oil in the system

21. An R-134a system with a water-cooled heat exchanger is charged with vapor first, until pressure is above the saturation pressure at 32 F, before any liquid is added. What is the main reason?

A. To raise the charge faster than liquid charging would
B. To keep air from being drawn in through the access valve
C. To keep liquid refrigerant from flashing cold enough to freeze the water and rupture the tubes
D. To keep the compressor oil from foaming during start-up

22. Where two pressure relief valves protect one vessel, how are they arranged so that one can be serviced?

A. In series on the same line
B. One on the suction line and one on the liquid line
C. In series with a check valve between them
D. In parallel, usually through a three-way valve so one stays in service

23. A technician pulls a system down to 500 microns and then isolates the vacuum pump. Using common industry practice, which reading shows the system is dehydrated?

A. The gauge stays at or near 500 microns after the pump is isolated
B. The gauge rises steadily until it reaches atmospheric pressure
C. The gauge rises and levels off at about 5,000 microns
D. The gauge reads 25 mm Hg absolute

24. On a water-cooled recovery machine, which part rejects heat into a tap water flow?

A. The oil separator
B. The condenser
C. The inlet filter
D. The cylinder float switch

25. To what level must a very-high-pressure appliance using R-503 be evacuated before opening, regardless of charge size?

A. 4 inches Hg vacuum
B. 10 inches Hg vacuum
C. 0 inches Hg vacuum
D. 15 inches Hg vacuum

Type 2 answer key

Mark yourself: 18 of 25 passes.

1. **C.** Appliances that control heat or humidity in occupied buildings are comfort cooling, with a 10 percent trigger. Commercial refrigeration is 20 percent and industrial process refrigeration 30 percent; 35 percent is an outdated rule.
   Rule: 40 CFR §82.157(c)(2)(iii)

2. **D.** The 30 percent trigger applies to industrial process refrigeration, such as chemical plant process cooling. Supermarket racks and cold storage are commercial refrigeration at 20 percent; an office chiller is comfort cooling at 10 percent.
   Rule: 40 CFR §82.157(c)(2)

3. **A.** 40 CFR 82.152 lists four ways to set the full charge: the manufacturer's figure, calculations from component sizes, refrigerant density and piping volume, actual measurements of refrigerant added or removed, or the midpoint of an established range.
   Rule: 40 CFR §82.152 (full charge, four methods)

4. **B.** If a needed part is unavailable, the repair may finish up to 30 days after the part arrives, but never more than 180 days after the leak rate was exceeded (270 days with an industrial process shutdown).
   Rule: 40 CFR §82.157(f)(1)(iii)

5. **C.** Quarterly or annual leak inspections are not required on equipment continuously monitored by an automatic leak detection system that is audited or calibrated every year.
   Rule: 40 CFR §82.157(g)(4)

6. **D.** The rolling average adds every refrigerant addition over the past 365 days, or since the last successful follow-up verification test if that is shorter, and divides by the full charge.
   Rule: 40 CFR §82.152 "Leak rate" (2) Rolling Average Method

7. **A.** Under Table 1, a high-pressure appliance with a full charge of 200 lb or more must be evacuated to 10 in. Hg vacuum when the recovery equipment was made on or after November 15, 1993.
   Rule: 40 CFR §82.156(a) Table 1

8. **B.** EPA defines major repairs as removal of the compressor, condenser, evaporator, or auxiliary heat exchanger coil. Swapping small components like driers or valve cores is non-major.
   Rule: 40 CFR §82.152 (major maintenance, service, or repair)

9. **C.** Isolate leaking from non-leaking parts where possible. Non-leaking parts still go to the Table 1 level; leaking parts go as low as possible without contaminating the refrigerant, never above 0 psig.
   Rule: 40 CFR §82.156(a)(2)

10. **D.** R-134a is medium-pressure. Table 1 requires 10 in Hg for a medium-pressure appliance under 200 lb on post-1993 equipment, and 15 in Hg at 200 lb or more.
    Rule: 40 CFR §82.156(a) Table 1

11. **A.** To mothball is to evacuate the refrigerant from an appliance, or an isolated section of it, to at least atmospheric pressure and temporarily shut it down. Venting the charge is prohibited.
    Rule: 40 CFR §82.152 "Mothball"

12. **B.** Before switching to a different refrigerant, remove any refrigerant left in the recovery unit and change its filter. This keeps the two refrigerants from mixing.
    Rule: 40 CFR §82.156(g)

13. **C.** Recovering refrigerant in the vapor phase is slower than liquid recovery, but it minimizes oil loss from the appliance.

14. **D.** Most of a large charge sits as liquid in the liquid line and receiver, and removing it as liquid is far faster than boiling it off as vapor. The vapor is recovered afterward.

15. **A.** Liquid recovery is only the first stage. Vapor and refrigerant dissolved in oil remain, so recovery continues in vapor mode until the required Table 1 vacuum is reached. Releasing it would be venting.

16. **B.** After assembly and installation of a split-system, the unit should first be pressurized with an inert gas, such as nitrogen, and leak checked.

17. **C.** Use dry nitrogen with a trace of the system's own refrigerant. Pure refrigerant is wasted at the leak, compressed air brings in moisture, and oxygen can explode in contact with oil.

18. **D.** A leak leaves too little refrigerant in the evaporator, so the vapor picks up extra heat and superheat climbs. Excessive superheat is a classic sign of an undercharged capillary tube system.

19. **A.** The receiver is a storage vessel in the liquid line after the condenser that holds liquid refrigerant. The accumulator (in the suction line) is the component that protects the compressor from liquid.

20. **B.** A full column of liquid shows a clear sight glass. Bubbles mean flash gas, most commonly caused by an undercharge (or a liquid-line restriction upstream of the glass).

21. **C.** At 32 F, R-134a saturates near 28 psig. Liquid added below that pressure can chill the heat exchanger below freezing and burst the water tubes, so vapor goes in first.

22. **D.** Dual relief valves are installed in parallel, usually on a three-way shutoff, so one can be removed for service while the other still protects the vessel. Valves in series could block each other.
Rule: not CFR)

23. **A.** Industry practice treats a system as dry when it reaches about 500 microns and holds near that level with the pump isolated. A steady rise points to a leak; a rise that levels off points to moisture.

24. **B.** A water-cooled recovery unit sends municipal water through its condenser coil so refrigerant vapor condenses faster. The filter, separator and float switch do not reject heat in this way.
Rule: Recovery equipment practice (not a CFR paragraph)

25. **C.** Very-high-pressure refrigerants (R-13, R-503) only require evacuation to 0 in Hg no matter the charge size or the age of the recovery equipment.
Rule: 40 CFR §82.156(a) Table 1 (very high-pressure appliance)

Type 3: 25 practice questions

1. **A low-pressure chiller cooling an office building holds 900 pounds of refrigerant. What annual leak rate triggers the repair requirement?**
   A. 20 percent
   B. 30 percent
   C. 35 percent
   D. 10 percent

2. **Two owners each have a chiller that exceeded its leak rate threshold. Owner A will retire the chiller and replace it with one using a refrigerant exempt from the venting prohibition. Owner B will retrofit the chiller under a retrofit or retire plan. Without requesting any extension from EPA, what are the longest periods allowed?**
   A. Owner A has 18 months to retire it, Owner B has one year to finish the retrofit
   B. Owner A has one year to retire it, Owner B has 18 months to finish the retrofit
   C. Both have one year
   D. Both have 18 months

3. **An office building has two comfort cooling chillers, a 900 lb R-11 low-pressure unit and a 900 lb R-22 high-pressure unit. What leak rate triggers repair on each?**
   A. 30 percent for the R-11 unit and 10 percent for the R-22 unit
   B. 10 percent for both
   C. 20 percent for the R-11 unit and 10 percent for the R-22 unit
   D. 10 percent for the R-11 unit and 20 percent for the R-22 unit

4. **Which description best fits a comfort cooling appliance under the EPA leak repair rules?**
   A. A chiller serving a manufacturing process line
   B. A walk-in freezer in a grocery store
   C. Air conditioning that controls heat and humidity for people in a building
   D. A cold storage warehouse system

5. **Before a major repair, to what level must a low-pressure appliance be evacuated?**
   A. 0 psig
   B. 25 inches Hg vacuum
   C. 10 inches Hg vacuum
   D. 25 mm Hg absolute

6. **What makes an appliance a low-pressure appliance?**
   A. Its refrigerant has a liquid-phase saturation pressure below 45 psia at 104 F
   B. It holds less than 5 pounds of refrigerant
   C. It runs on 24 volt control power
   D. It uses a reciprocating compressor

7. **Which vacuum gauge reading is closest to 25 mm Hg absolute?**
   A. About 25 inches Hg vacuum
   B. About 29 inches Hg vacuum
   C. About 10 inches Hg vacuum
   D. About 1 inch Hg vacuum

8. **A low-pressure chiller reaches the required recovery vacuum and is isolated from the recovery unit. Over the next few minutes the pressure rises. According to EPA, what does this rise show?**
   A. The system is empty and ready to open
   B. The system has been fully dehydrated
   C. Liquid refrigerant is still in the system or oil
   D. The purge unit is adding nitrogen

9. **During a standing pressure test on an evacuated low-pressure appliance, what result indicates a leak?**
   A. The vacuum holds steady for 24 hours
   B. The oil temperature climbs above 130 F
   C. The purge unit stops running
   D. The vacuum rises from 1 mm Hg to more than 2.5 mm Hg within 24 hours

10. **Why does a leak in the evaporator of a running R-123 chiller let air in instead of letting refrigerant out?**
    A. The evaporator runs below atmospheric pressure
    B. The rupture disc holds the refrigerant inside
    C. R-123 is heavier than air
    D. The purge unit keeps the machine above atmospheric pressure

11. **What is the most effective way to reduce the refrigerant lost through the purge unit of a low-pressure chiller?**
    A. Run the purge unit all the time
    B. Leak test and repair the chiller so less air gets in
    C. Add extra refrigerant so the purge unit has more to work with
    D. Raise the purge unit's discharge rate

12. After draining the condenser water box of a chiller, a technician inserts an electronic leak detector probe into the drain valve opening and it alarms. What does this most likely show?

A. The purge unit is removing air normally
B. The rupture disc has burst
C. Refrigerant is leaking through a tube into the water side
D. The water box was drained too slowly

13. While a low-pressure machine is being evacuated, what should be done with the chilled water pumps?

A. Shut them off to save energy
B. Drain the water side completely first
C. Reverse the flow direction
D. Keep water flowing through the tubes so they cannot freeze

14. While recovering from a chiller, a technician notices a sharp acrid smell from the refrigerant. What does this most likely mean?

A. The compressor motor may have burned out
B. The charge is low
C. The purge unit is clean
D. The refrigerant is brand new

15. Which order of steps is correct when recovering refrigerant from a low-pressure chiller before opening it for a major repair?

A. Recover the vapor, open the chiller, then drain the liquid
B. Recover the liquid, recover the vapor down to 25 mm Hg absolute, then open the chiller
C. Recover the liquid, then open the chiller and let the remaining vapor escape
D. Pressurize with nitrogen to push out the vapor, then recover the liquid

16. A 350-ton low-pressure chiller still holds about 100 lb of refrigerant as vapor at 0 psig after all liquid is removed. What explains such a large amount?

A. The rupture disc traps vapor that would otherwise leave
B. The purge tank stores most of the charge as vapor
C. Its shells are very large, and even near atmospheric pressure that volume holds a lot of refrigerant vapor
D. Low-pressure refrigerant vapor is denser than its liquid

17. How do high-efficiency purge units compare with older purge units in refrigerant loss?

A. They remove air only when the chiller is shut down
B. They return all the air to the chiller along with the refrigerant
C. They discharge more refrigerant but run less often
D. They discharge very little refrigerant along with the air they remove

18. What is the approximate pressure of R-123 at 32 F?

A. About 20 in. Hg vacuum
B. About 10 psig
C. About 10 in. Hg vacuum
D. About 0 psig

19. Which standard requires a refrigerant monitor and alarm in a machinery room?

A. AHRI 700
B. ASHRAE Standard 15
C. DOT 49 CFR
D. AHRI 740

20. Where must the discharge from a low-pressure machine pressure relief device be routed?

A. Into the machinery room
B. Into the chilled water loop
C. To the outdoors
D. Back into the condenser

21. R-123 carries the safety group classification B1. What does the B tell you?

A. Higher flammability
B. Lower pressure
C. Higher global warming potential
D. Higher toxicity

22. Dry nitrogen is used to break the vacuum between evacuations because it

A. Contains no moisture, so it does not add water back into the system
B. Reacts with any remaining refrigerant
C. Is heavier than air and settles in the evaporator
D. Raises the oil temperature safely

23. Besides charging, what is the evaporator charging valve on a centrifugal chiller commonly used for, since it is the lowest access point?

A. Venting non-condensables
B. Removing liquid refrigerant during recovery
C. Drawing purge unit suction
D. Draining oil from the compressor

24. Which of these refrigerants is used in low-pressure appliances?

A. R-134a
B. R-410A
C. R-245fa
D. R-22

25. The Type III section has 25 questions. What is the fewest correct answers that passes it?

A. 17
B. 20
C. 21
D. 18

Type 3 answer key

Mark yourself: 18 of 25 passes.

1. **D.** A chiller used to cool an occupied space is comfort cooling, and the comfort cooling trigger has been 10 percent per year since January 1, 2019.
   Rule: 40 CFR §82.157(c)(2)(iii)

2. **A.** Retiring and replacing with an appliance that uses an exempt refrigerant automatically allows 18 months. Under a retrofit or retire plan, the retrofit must be finished within one year.
   Rule: 40 CFR §82.157(h)(5)(i), (i)(1)

3. **B.** The leak rate trigger follows the appliance's use, not its pressure class. Comfort cooling appliances holding 50 lb or more of an ozone-depleting refrigerant are repaired at 10 percent.
   Rule: 40 CFR §82.157(a), (c)(2)(iii)

4. **C.** Comfort cooling means air conditioning that controls heat or humidity in occupied buildings such as offices, including chillers. It has a 10 percent leak rate trigger.
   Rule: 40 CFR §82.152 'Comfort cooling'

5. **D.** Table 1 sets 25 mm Hg absolute for low-pressure appliances before a major repair or disposal, whatever the recovery equipment date. 0 psig applies only to non-major repairs.
   Rule: 40 CFR §82.156(a) Table 1

6. **A.** 40 CFR 82.152 defines a low-pressure appliance by its refrigerant: liquid-phase saturation pressure below 45 psia at 104 F (R-11, R-123, R-1233zd). These machines run in a vacuum, so air and moisture leak in rather than refrigerant leaking out.
   Rule: 40 CFR §82.152 (low-pressure appliance)

7. **B.** 25 mm Hg absolute is about 1 inch Hg absolute. Against a 29.9 in. Hg atmosphere, that is about 29 in. Hg vacuum, a deep vacuum.
   Rule: 40 CFR §82.156(a) Table 1 (inches Hg vacuum relative to 29.9 in. Hg atmosphere)

8. **C.** With the recovery unit isolated, refrigerant left as liquid or dissolved in the oil keeps boiling off and raises the pressure. Wait a few minutes, and keep recovering if the pressure rises.

9. **D.** The machine is pulled to about 1 mm Hg and isolated. If the pressure climbs past 2.5 mm Hg in 24 hours, something is leaking in or moisture is still boiling off.

10. **A.** R-123 boils near 82 F at atmospheric pressure, so at chilled-water temperatures the evaporator runs in a vacuum. A leak there pulls air and moisture in instead of letting refrigerant out.
    Rule: 40 CFR §82.152

11. **B.** Every purge cycle can carry some refrigerant out with the air, and the purge runs more when air leaks in. Finding and fixing leaks cuts both the cycling and the loss.

12. **C.** A leaking tube lets refrigerant pass into the water side, and with the water drained the vapor gathers at the low drain opening, which is why the probe goes there.
    Rule: not a CFR paragraph

13. **D.** A deep vacuum drops the temperature inside the shell. Circulating water keeps the tubes above freezing so they do not burst.

14. **A.** A pungent odor usually points to acid from a burned compressor motor, so an oil acid test is a good next step. A low charge does not create an odor.
    Rule: not a CFR paragraph

15. **B.** Liquid comes out first because it moves fastest. The large volume of vapor left in the shell must then be recovered to 25 mm Hg absolute before opening. Letting vapor escape is venting.
    Rule: 40 CFR §82.156(a) Table 1

16. **C.** Vapor is thin near atmospheric pressure, but a 350-ton machine has a very large internal volume, so the total adds up to about 100 lb. Vapor recovery must follow liquid removal.
    Rule: 40 CFR §82.156(a) Table 1

17. **D.** A high-efficiency purge separates the air from the refrigerant so that only a small fraction of refrigerant leaves with the air. Older units lose more.

18. **A.** R-123 is a low-pressure refrigerant; at 32 F it saturates deep in vacuum, about 20 in. Hg. That is why vapor is charged first, so water in the tubes cannot freeze.

19. **B.** ASHRAE 15 is the safety standard for refrigeration systems and machinery rooms, including refrigerant monitors, alarms and ventilation.

20. **C.** Relief discharge is piped outside so a release cannot fill the machinery room with refrigerant and displace the air technicians are breathing.
    Rule: not CFR)

21. **D.** In ASHRAE safety groups the letter shows toxicity and the number shows flammability. B means higher toxicity and 1 means no flame propagation, so R-123 is toxic but not flammable.

22. **A.** Breaking a vacuum with shop air would put moisture straight back in. Dry nitrogen is inert and dry, so each cycle leaves the system cleaner.
    Rule: Evacuation practice (not a CFR paragraph)

23. **B.** Liquid collects at the low point of the machine, so the evaporator charging valve is also where liquid is removed during recovery. Non-condensables are taken by the purge from the top of the condenser.

24. C. R-245fa saturates below 45 psia at 104 F, the same low-pressure class as R-11, R-123 and R-113. R-134a is medium pressure; R-410A and R-22 are high pressure.
Rule: 40 CFR §82.152 'Low-pressure appliance'

25. D. Each closed-book, proctored section, Type III included, has 25 questions and passes with 18 correct. Open-book, mail-in tests require 21 of 25.
Rule: 40 CFR Part 82 Subpart F Appendix D(e)