

# Gas and Oil Heating



**PREPARING FOR THE NATE EXAM**

## Review Questions

# Introduction to Gas and Oil Heating

## Review Questions

In a modern gas furnace, the component that separates the combustion gases from the supply air is the \_\_\_\_\_

- a. Gas valve.
- b. Heat exchanger.
- c. Inducer fan.
- d. Plenum box.

What type of furnace moves warm air through the conditioned space without a fan?

- a. Gravity.
- b. Horizontal.
- c. Lowboy.
- d. Upflow.

Furnace heat exchangers generally are made of

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- a. Ceramic.
- b. Copper.
- c. Plastic.
- d. Steel.

What does AFUE stand for?

- a. Actual Fuel Usage Efficiency.
- b. Annual Fuel Utilization Efficiency.
- c. Annual Furnace Usage Equivalency.
- d. Approved Fuel Usage Estimate.

The main purpose of a secondary heat exchanger  
is to \_\_\_\_\_

- a. Evaporate the flue gases.
- b. Provide a backup containment.
- c. Remove additional heat from the flue gases.
- d. Reverse the primary air flow.

Which gas commonly used as a fuel in gas furnaces is heavier than air?

- a. Butane.
- b. Isobutene.
- c. Methane.
- d. Propane.

Which grade of fuel oil is most commonly used in residential furnaces?

- a. 1
- b. 2
- c. 3
- d. 4

How many cubic feet of air are needed to burn 1 ft<sup>3</sup> of natural gas?

- a. 6 ft<sup>3</sup>
- b. 10 ft<sup>3</sup>
- c. 18 ft<sup>3</sup>
- d. 24 ft<sup>3</sup>

How many cubic feet of air are needed to burn 1 ft<sup>3</sup> of propane?

- a. 6 ft<sup>3</sup>
- b. 10 ft<sup>3</sup>
- c. 18 ft<sup>3</sup>
- d. 24 ft<sup>3</sup>

What is the average heat content of 1 ft<sup>3</sup> of natural gas?

- a. 500 Btu.
- b. 800 Btu.
- c. 1,050 Btu.
- d. 2,500 Btu.

What is the average heat content of 1 ft<sup>3</sup> of propane?

- a. 500 Btu.
- b. 800 Btu.
- c. 1,050 Btu.
- d. 2,500 Btu.

What is the average heat content of one gallon of No. 2 fuel oil?

- a. 80,000 Btu.
- b. 110,000 Btu.
- c. 140,000 Btu.
- d. 170,000 Btu.

What is the typical manifold pressure for a natural-gas furnace?

- a. 3.5 in. w.g.
- b. 11 in. w.g.
- c. 2 psi.
- d. 5 psi.

What is the typical manifold pressure for a propane furnace?

- a. 3.5 in. w.g.
- b. 11 in. w.g.
- c. 2 psi.
- d. 5 psi.

What type of furnace is commonly installed in a closet with under floor supply ducts?

- a. Downflow.
- b. Horizontal.
- c. Lowboy.
- d. Upflow.

# Combustion

## Review Questions

Which of the following is required for combustion?

- a. Fuel.
- b. Heat.
- c. Oxygen.
- d. All of the above.

Which of the following is *not* a product of complete combustion?

- a. Carbon dioxide.
- b. Carbon monoxide.
- c. Heat.
- d. Water.

An *unconfined space* (in terms of furnace installation) is defined as a space with a volume equal to or greater than \_\_\_\_\_ per 1,000 Btu of input rating.

- a. 25 ft<sup>3</sup>
- b. 50 ft<sup>3</sup>
- c. 75 ft<sup>3</sup>
- d. 100 ft<sup>3</sup>

Combustion air may be added to a confined space by a duct to the outside, sized on an input of 1 in<sup>2</sup> per \_\_\_\_\_

- a. 1,000 Btu.
- b. 2,000 Btu.
- c. 4,000 Btu.
- d. 5,000 Btu.

What type of burners are commonly used with induced-draft furnaces?

- a. Gun style.
- b. Pot style.
- c. Ribbon.
- d. Inshot.

What is the typical color of a properly burning gas flame?

- a. Blue.
- b. Orange.
- c. Red.
- d. Yellow.

In a gas furnace, primary combustion air is introduced in the \_\_\_\_\_

- a. burner prior to ignition.
- b. burner after ignition.
- c. gas line.
- d. heat exchanger.

A “dumbbell” style CO<sub>2</sub> tester \_\_\_\_\_

- a. contains a test fluid that absorbs CO<sub>2</sub>.
- b. measures CO<sub>2</sub> in parts per million.
- c. provides a digital readout.
- d. requires a power supply.

Useful heat output, expressed as a percentage of the total burner input, is known as the \_\_\_\_\_ of a gas furnace.

- a. combustion efficiency
- b. fuel efficiency
- c. heat exchanger performance factor
- d. heating coefficient

Which type of ignition system uses a thermocouple?

- a. Direct ignition.
- b. Hot-surface.
- c. Intermittent ignition.
- d. Standing pilot.

The blower in a standing pilot furnace is generally started by a(n) \_\_\_\_\_

- a. differential pressure switch.
- b. ignition module.
- c. temperature switch.
- d. time-delay relay.

A furnace with an induced-draft fan uses a \_\_\_\_\_ to prove air flow.

- a. a high-pressure switch
- b. low-pressure switch
- c. pressure differential switch
- d. sail switch

*Flame rectification* proves flame by creating a signal in response to a \_\_\_\_\_

- a. change in resistance.
- b. current conducted in one direction through the flame.
- c. temperature-activated switch.
- d. voltage produced by the flame.

Which of the following is contained within a combination gas valve?

- a. Main gas valve.
- b. Manual shutoff valve.
- c. Pressure regulator.
- d. All of the above.

The pilot valve on a direct ignition gas furnace is operated by a \_\_\_\_\_

- a. 24-V signal from the thermostat.
- b. control voltage from the temperature switch.
- c. dc voltage from the flame rectifier.
- d. small voltage from the thermocouple.

# Furnace Installation

## Review Questions

Residential load calculations should be completed according to ACCA's \_\_\_\_\_

- a. *Manual D.*
- b. *Manual J.*
- c. *Manual N.*
- d. *Manual P.*

When the output of a furnace matches the heat loss of the conditioned space, the system is said to be at the \_\_\_\_\_

- a. balance point.
- b. design temperature.
- c. full-load condition.
- d. reference point.

When furnaces are installed in attics or crawl spaces, special care must be taken to \_\_\_\_\_

- a. distribute the weight properly.
- b. insulate the ductwork.
- c. protect water lines from freezing.
- d. all of the above.

Which of the following is true of low-voltage control wiring?

- a. It is exempt from NEC requirements.
- b. It may not be run in the same conduit as line-voltage wiring.
- c. It may not exceed 100 ft in length.
- d. It must be run in metal conduit.

What is the maximum pressure that can be supplied to most natural-gas furnaces?

- a. 3.5 in. w.g.
- b. 14 in. w.g.
- c. 2 psi.
- d. 5 psi.

The sensor of an electronic leak detector can be affected by \_\_\_\_\_, which may cause the instrument to give a false indication of a gas leak.

- a. Cutting oil.
- b. Moisture.
- c. Pipe sealant.
- d. Teflon tape.

What is the minimum diameter for condensate drain piping?

- a.  $\frac{1}{2}$  in.
- b.  $\frac{3}{4}$  in.
- c. 1 in.
- d.  $1\frac{1}{4}$  in.

What is the minimum diameter for condensate drain piping?

- a.  $\frac{1}{2}$  in.
- b.  $\frac{3}{4}$  in.
- c. 1 in.
- d.  $1\frac{1}{4}$  in.

Generally speaking, a residential thermostat should be mounted \_\_\_\_\_

- a. Approximately 5 ft off the floor.
- b. In the kitchen.
- c. Near a supply register.
- d. On an exterior wall.

Which is the proper terminal for heating on thermostats?

- a. C.
- b. G.
- c. W.
- d. Y.

On an *auto changeover* thermostat, the difference between the heating and cooling setpoints (that keeps the equipment from cycling back and forth between heating and cooling) is known as the \_\_\_\_\_

- a. deadband.
- b. droop.
- c. offset.
- d. throttling range.

In order to prevent condensation from forming in the heat exchanger of a furnace, the cooling coil should always be mounted \_\_\_\_\_

- a. above the heat exchanger.
- b. below the heat exchanger.
- c. downstream from the heat exchanger.
- d. upstream from the heat exchanger.

In the summer months, the damper on a bypass humidifier should be \_\_\_\_\_

- a. fully closed.
- b. fully open.
- c. partially open.
- d. removed.

Which of the following is *not* true of a zoned system?

- a. Each zone has its own temperature control.
- b. There can be no more than four zones within a single structure.
- c. Zoned units may use a bypass damper to pass excess supply air to the return duct.
- d. Zoned units may use a dump damper to pass excess supply air to a non-critical area.

A type of equipment that uses outside air to provide “free cooling” during mild conditions is known as a(n) \_\_\_\_\_

- a. economizer.
- b. energy recovery ventilator.
- c. fresh air intake.
- d. heat recovery ventilator.

A type of equipment that transfers both latent and sensible heat from the exhaust air to the supply air is known as a(n) \_\_\_\_\_

- a. economizer.
- b. energy recovery ventilator.
- c. fresh air intake.
- d. heat recovery ventilator.

# Venting

## Review Questions

A standing pilot furnace with an atmospheric burner is an example of a \_\_\_\_\_ gas appliance.

- a. Category I
- b. Category II
- c. Category III
- d. Category IV

A high-efficiency condensing furnace is an example of a \_\_\_\_\_ gas appliance.

- a. Category I
- b. Category II
- c. Category III
- d. Category IV

When two Category I appliances vent into a common flue, the common flue is sized to be equal to the \_\_\_\_\_

- a. area of the larger flue.
- b. area of the larger flue plus 50% of the smaller flue.
- c. area of the smaller flue plus 50% of the larger flue.
- d. sum of the individual flues.

Burning of 1 ft<sup>3</sup> of natural gas produces  
\_\_\_\_\_ of flue gas.

- a. 1 ft<sup>3</sup>
- b. 2 ft<sup>3</sup>
- c. 10 ft<sup>3</sup>
- d. 11 ft<sup>3</sup>

Which of the following affects the venting force in a gravity venting system?

- a. The height of the chimney.
- b. The percentage of CO<sub>2</sub> in the flue gas.
- c. The type of fuel used.
- d. The type of fuel pipe used.

A fan is used to pull flue gases through the combustion chamber in a(n) \_\_\_\_\_ vent system.

- a. forced-draft
- b. gravity
- c. induced-draft
- d. natural draft

How far above the roof peak should the chimney extend?

- a. 1 ft
- b. 2 ft
- c. 3 ft
- d. 4 ft

A horizontal flue vent must have an upward slope of at least \_\_\_\_ per/ft length.

- a. 1/8 in.
- b. ¼ in.
- c. ½ in.
- d. 1 in.

Problems related to a shortage of combustion air are eliminated in a(n) \_\_\_\_\_ vent system.

- a. direct
- b. forced-draft
- c. gravity
- d. induced-draft

When can a masonry chimney be used to vent Category IV appliances?

- a. When it is an existing chimney.
- b. When it is no more than one story tall.
- c. When it is used as a common vent along with Category I appliances.
- d. Never.

Category IV furnaces are commonly vented with what type of material?

- a. Single-wall metal.
- b. Double-wall Class B.
- c. Masonry.
- d. PVC pipe.

When does a Category IV vent pipe require insulation?

- a. Always.
- b. Only when the vent pipe runs outdoors.
- c. When the length of the vent pipe running through an unconditioned space exceeds the length listed in the manufacturer's tables.
- d. Never.

Category IV equipment requires a condensate drain. A trap must be installed in the drain line to \_\_\_\_\_

- a. break the vacuum and allow the water to drain.
- b. keep the water from draining too quickly.
- c. prevent the water from freezing in the flue pipe.
- d. provide a seal that prohibits the leakage of flue gas.

Based on the table on slide 22, what size vent pipe should be used on a 100,000-Btu furnace with 24 ft of pipe and two elbows (at an altitude of less than 2,000 ft)?

- a. 1  $\frac{1}{2}$  in.
- b. 2 in.
- c. 2  $\frac{1}{2}$  in.
- d. 3 in.

# Air Flow

## Review Questions

Too much air flow can cause \_\_\_\_\_

- a. cycling on the limit switch
- b. increased energy consumption
- c. the furnace to shut down
- d. the heat exchanger to overheat

Before using the temperature rise method to calculate air flow for a gas furnace, you must first \_\_\_\_\_

- a. clean the fan blade.
- b. make sure that the furnace has not been running for at least 30 minutes.
- c. remove the air filter.
- d. verify the proper burner output.

Calculate air flow given the following conditions: 80,000 Btu input, 84% efficiency, 45°F temperature rise.

- a. 1,295 cfm.
- b. 1,383 cfm.
- c. 1,510 cfm.
- d. 1,777 cfm.

Which of the following is the best instrument to use for measuring ESP?

- a. Anemometer
- b. Balometer
- c. Diaphragm-type differential pressure gauge
- d. U-tube manometer

Based on the table found on slide 7, what is the air flow from a vertical unit operating at 230 V with the motor on medium speed tap when the ESP measures 0.30 in. w.g.?

- a. 800 cfm
- b. 850 cfm
- c. 900 cfm
- d. 950 cfm

When using velocity pressure to calculate air flow, you must be sure to \_\_\_\_\_

- a. face the Pitot tube downstream from the direction of air flow.
- b. get an accurate temperature reading.
- c. traverse the duct.
- d. use a velocity gun.

What is a proper air velocity in residential trunk lines?

- a. 400 ft/min
- b. 600 ft/min
- c. 800 ft/min
- d. 1,000 ft/min

What is a recommended air velocity across a disposable filter?

- a. 250 ft/min
- b. 500 ft/min
- c. 750 ft/min
- d. 1,000 ft/min

Proper *throw* from a diffuser depends primarily on the \_\_\_\_\_

- a. face velocity.
- b. free area of the diffuser.
- c. height of the diffuser.
- d. temperature of the air being delivered.

Insulation is required on ductwork when  
ducts are run \_\_\_\_\_

- a. horizontally between floor joists.
- b. vertically between wall studs.
- c. overhead in dropped ceilings.
- d. through unconditioned spaces.

What is the minimum recommended MERV rating for filters used in residential equipment?

- a. 2
- b. 4
- c. 6
- d. 8

When is an air filter most efficient at moving air?

- a. When it is brand new.
- b. After the initial break-in period.
- c. At 50% of its life.
- d. Near the end of its life.

When is an air filter most efficient at trapping dirt?

- a. When it is brand new.
- b. After the initial break-in period.
- c. At 50% of its life.
- d. Near the end of its life.

Electronic air cleaners work by \_\_\_\_\_

- a. electromagnetic force.
- b. ionizing particles.
- c. stripping neutrons from the particles.
- d. transistor reaction.

The problem of “filter bypass” is critical because it allows \_\_\_\_\_

- a. an increase in external static pressure.
- b. a reduction in overall air flow.
- c. air to leak from the ductwork.
- d. unfiltered air to pass through the equipment.

# Troubleshooting

## Review Questions

The disconnect for a typical residential furnace is generally located \_\_\_\_\_

- a. in the breaker box.
- b. inside the front panel.
- c. on the side of the unit.
- d. on the wall behind the unit.

When you arrive to service a unit and nothing is operating, the first thing to check is the \_\_\_\_\_

- a. door switch.
- b. gas valve.
- c. power supply.
- d. thermostat.

Which of the following should be checked  
*only* with the circuit de-energized?

- a. Current.
- b. Resistance.
- c. Voltage.
- d. All of the above.

What is an acceptable voltage tolerance for most loads?

- a.  $\pm 5\%$
- b.  $\pm 10\%$
- c.  $\pm 5 \text{ V}$
- d.  $\pm 10 \text{ V}$

A voltage reading across a switch that is the same or nearly the same as the applied voltage indicates that the switch is \_\_\_\_\_

- a. open.
- b. closed.
- c. defective, probably due to corroded contacts.
- d. wired in series with another switch.

A voltage reading of 15 V across a 120-V switch indicates that the switch is \_\_\_\_\_

- a. open.
- b. closed.
- c. defective, probably due to pitted contacts.
- d. wired in parallel with another switch.

What type of reading should you get when you measure the resistance across a closed switch?

- a.  $0 \Omega$ .
- b. Some measurable amount of resistance.
- c. Infinite resistance.
- d. OL.

What type of reading should you get when you measure the resistance of a good load?

- a.  $0 \Omega$ .
- b. Some measurable amount of resistance.
- c. Infinite resistance.
- d. OL.

Signs of overheating at a terminal are often an indication of a(n) \_\_\_\_\_

- a. defective fuse.
- b. loose connection.
- c. overloaded motor.
- d. undersized wire.

Once a system has achieved full-load operation, what is the acceptable voltage drop from the no-load voltage?

- a. 1%
- b. 2%
- c. 5%
- d. 10%

If the wiring diagram for the equipment being serviced is missing, what should the technician do?

- a. Order a new service manual from the manufacturer.
- b. Replace parts until the unit works.
- c. Trace the wires and sketch out a new drawing.
- d. Use a wiring diagram from another unit made by the same manufacturer.

Which of the following is the best method of testing a fuse?

- a. Check the current draw with an ohmmeter.
- b. Open the disconnect and check the voltage to the fuse.
- c. Remove the fuse and test it with an ohmmeter.
- d. Replace the fuse to see if a new one works.

An infinite resistance reading, from both the run terminal and the start terminal to the common terminal, is most likely an indication of a(n) \_\_\_\_\_

- a. bad fuse.
- b. bad run winding.
- c. bad start winding.
- d. open overload.

The primary purpose of the run capacitor in a motor circuit is to \_\_\_\_\_

- a. extend the life of the motor.
- b. improve the power factor.
- c. increase the starting torque.
- d. reduce the inrush current.

What type of bearings generally are used in motors designed for heavier-duty operation?

- a. Ball.
- b. Needle.
- c. Roller.
- d. Sleeve.

The part of the thermostat that contains the function switches is known as the

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- a. bimetal.
- b. cooling anticipator.
- c. heat anticipator.
- d. subbase.

How many magnetic coils does a standard gas valve contain?

- a. One.
- b. Two.
- c. Three.
- d. Four.

A properly operating door switch on a furnace is very important because it

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- a. is usually the first thing to fail.
- b. kills power to the whole furnace when it opens.
- c. shuts down the fan.
- d. turns off the gas valve.

What is the most common grade of oil used for residential and light commercial heating applications?

- a. No. 1
- b. No. 2
- c. No. 3
- d. No. 4

Which of the following is a product of complete combustion in an oil burner?

- a. Carbon
- b. Carbon monoxide
- c. Carbon dioxide
- d. Carbon trioxide

A common procedure used to prepare oil for combustion is called \_\_\_\_\_.

- a. Aeration
- b. Atomization
- c. Liquidation
- d. Optimization

A typical oil pressure produced by the oil pump on a high-pressure burner is \_\_\_\_\_.

- a. 5 psi
- b. 20 psi
- c. 50 psi
- d. 100 psi

What type of draft is used by high-pressure flame retention burners?

- a. Forced
- b. Induced
- c. Natural
- d. Thermal

In order for oil to burn completely, it must burn

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- a. At low pressure
- b. At low temperature
- c. In suspension
- d. With high velocity

The combustion chamber of an oil burner must match the \_\_\_\_\_.

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- a. Choke nozzle length
- b. Draft level
- c. Flame pattern
- d. Oil pump pressure

In which type of oil burner ignition system does the ignition spark remain on as long as the burner is firing?

- a. Constant
- b. Direct
- c. Intermittent
- d. Standing pilot

If a fuel pump cannot develop proper oil pressure, the most likely cause is a \_\_\_\_\_.

- a. Bad pump seal
- b. Dirty oil filter
- c. Failed rotary vane
- d. Plugged nozzle

What type of oil pump system should be used if the oil burner is located above the oil tank?

- a. Diaphragm
- b. Single-stage
- c. One-pipe
- d. Two-pipe

An ignition transformer of the type used with oil burners can supply a typical secondary voltage of

- 
- a. 1,000 V
  - b. 3,000 V
  - c. 5,000 V
  - d. 10,000V

The primary function of an oil nozzle is to \_\_\_\_\_.

- a. Atomize the fuel
- b. Increase the pressure of the fuel
- c. Increase the velocity of the fuel
- d. Mix air with the fuel

When should you clean a high-pressure oil burner nozzle?

- a. At the beginning of each heating season
- b. At the end of each heating season
- c. At least twice a year
- d. Only when a proper replacement is not available

Which of the following is an indication that the nozzle on an oil burner is undersized?

- a. Cycling on the high limit switch
- b. Impingement of the flame
- c. Insufficient heat output
- d. Overheated heat exchanger

Which of the following is an indication that the nozzle on an oil burner is oversized?

- a. Clogging of the strainer
- b. Impingement of the flame
- c. Insufficient heat output
- d. Poor atomization

All oil tanks must carry the \_\_\_\_\_ label.

- a. DOT
- b. EPA
- c. NFPA
- d. UL

What is the capacity of a typical above-ground indoor oil storage tank?

- a. 150 gal
- b. 275 gal
- c. 550 gal
- d. 750 gal

If the oil level in the tank is more than 6 ft above the oil burner, what additional component may be required?

- a. Pressure cutout valve
- b. Pressure differential valve
- c. Pressure-reducing valve
- d. Pressure-regulating valve

The fill pipe for an oil tank should have a diameter of  
\_\_\_\_\_.

- a. 1 in.
- b. 1  $\frac{1}{4}$  in.
- c. 1  $\frac{1}{2}$  in.
- d. 2 in.

The vent pipe for an oil tank should have a minimum diameter of \_\_\_\_\_.

- a. 1 in.
- b. 1  $\frac{1}{4}$  in.
- c. 1  $\frac{1}{2}$  in.
- d. 2 in.

The vent whistle on an oil tank lets you know that

- 
- a. A high-pressure condition exists in the tank
  - b. Filling is complete and the tank is full
  - c. Oil is escaping from the tank
  - d. The oil level in the tank is low

How frequently should the oil filter line to the burner be replaced?

- a. Annually
- b. Every time the oil tank is filled
- c. Whenever the pressure drop exceeds 5 psi
- d. Whenever the pressure drop exceeds 10 psi

A one-pipe oil feed system should be used when the

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- a. Burner is located above the fuel tank
- b. Burner is located below the fuel tank
- c. Oil pressure is above 50 psi
- d. Oil pressure is below 50 psi

What type of fitting typically is used for copper oil lines?

- a. Compression
- b. Flared
- c. Swedged
- d. Threaded

What is the main disadvantage of an underground tank?

- a. Air may be pulled in and out of the tank with changes in temperature
- b. Leaks in the tank may go undetected
- c. Moisture may condense and freeze in the oil lines
- d. Oil temperatures may be inconsistent

Which agency generally has jurisdiction over the installation of underground tanks?

- a. DOT
- b. EPA
- c. NFPA
- d. UL

Underground tanks require \_\_\_\_\_.

- a. Containment vaults
- b. Corrosion protection
- c. Fiberglass coating
- d. Oversized vent lines

What must a cad cell “see” in order for the ignition process to continue past the pre-purge cycle?

- a. A dark combustion chamber
- b. A low resistance
- c. A proper oil pressure
- d. The presence of a spark

An oil flame that burns with continuous yellow tips is

- 
- a. Burning properly
  - b. Getting too much air
  - c. Not getting enough air
  - d. Getting too much oil

What is a typical CO<sub>2</sub> reading for a properly adjusted oil burner?

- a. 8%
- b. 10%
- c. 12%
- d. 14%

A properly adjusted flame retention oil burner should have a smoke reading of \_\_\_\_\_.

- a. 0
- b. 2
- c. 4
- d. 6

A low CO<sub>2</sub> reading is an indication of \_\_\_\_\_.

- a. High oil pressure
- b. Low oil pressure
- c. Not enough excess air
- d. Too much excess air

A smoky flame may result in \_\_\_\_\_.

- a. Excessive fuel usage
- b. High CO<sub>2</sub> levels
- c. High stack temperatures
- d. Soot buildup

Which reading on the smoke scale indicates the greatest potential for soot formation in the heat exchanger?

- a. 1
- b. 2
- c. 3
- d. 4

The purpose of a draft regulator is to \_\_\_\_\_.

- a. Add dilution air
- b. Add secondary air
- c. Detect air leaks
- d. Maintain a constant overfire draft

Overfire draft for at typical oil burner should be in the range of \_\_\_\_\_.

- a. -0.001 to -0.002 in. w.g.
- b. -0.01 to -0.02 in. w.g.
- c. -0.1 to -0.2 in. w.g.
- d. -1 to -2 in. w.g.

Which of the following conditions should be measured for proper combustion analysis?

- a. CO<sub>2</sub>
- b. Smoke level
- c. Stack temperature
- d. All of the above

Which of the following resistance readings indicates a dark cad cell?

- a.  $100\ \Omega$
- b.  $500\ \Omega$
- c.  $5,000\ \Omega$
- d.  $200,000\ \Omega$

Which of the following cad cell readings indicates a properly adjusted burner flame?

- a.  $100\ \Omega$
- b.  $500\ \Omega$
- c.  $5,000\ \Omega$
- d.  $200,000\ \Omega$

# How often should burner nozzles be replaced?

- a. Once a year
- b. Every 2 years
- c. Every 5 years
- d. Only when they can no longer be cleaned

What will happen if ignition electrodes are allowed to extend into the oil spray?

- a. Carbon will bridge the electrode gap
- b. The burner will smoke
- c. The oil will ignite too quickly
- d. The transformer will fail prematurely