# U.S.C.G. Merchant Marine Exam

## QMED

## Q804 Oiler - Part I

## (Sample Examination)

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U.S.C.G. Merchant Marine Exam
QMED
Illustrations: 11

**Choose the best answer to the following Multiple Choice Questions:**

**1.** Which of the following problems could develop due to the accumulation of oil vapors in the crankcase of a diesel engine?

- (A) Crankcase explosion
- (B) Reduced lubrication
- (C) Combustion knock
- (D) Poor fuel economy

*If choice A is selected set score to 1.*

**2.** What is the source of heat for a second stage feed heater (deaerating feed tank) while a vessel is underway under full load?

- (A) High-pressure bleed steam
- (B) Auxiliary exhaust steam
- (C) Intermediate pressure bleed steam
- (D) Low-pressure bleed steam

*If choice B is selected set score to 1.*

**3.** A "hygroscopic" lubricant used in refrigeration compressors would have what characteristic?

- (A) decreasing in viscosity at low temperatures
- (B) having a high affinity for moisture which requires it to be kept in a sealed container
- (C) losing its lubrication qualities at higher temperatures
- (D) being highly toxic

*If choice B is selected set score to 1.*

**4.** In the diagram illustrated, the direction of flow through item 3 is _____. Illustration GS-0125

- (A) in one direction only
- (B) dependent on the pump's discharge pressure
- (C) in either direction
- (D) dependent on the pump's suction pressure

*If choice A is selected set score to 1.*

**5.** In a two-stage flash evaporator, the sea water feed temperature is increased as it passes through the _____.

- (A) second stage distilling condenser
- (B) first stage distilling condenser
- (C) salt water feed heater
- (D) all of the above

*If choice D is selected set score to 1.*

**6.** Which of the fluids listed is suitable for use as a secondary refrigerant?

- (A) Cuprous chloride
- (B) Brine
- (C) Methyl alcohol
- (D) Carbon dioxide

*If choice B is selected set score to 1.*

**7.** What is used to prevent contamination of a potable water system supplying a plumbing fixture such as a galley sink from a backup of sewage sanitary drains?

- (A) A "P" trap in the drain line draining sewage waste from the galley sink.
- (B) Check valves in the potable water supply lines delivering water to the galley sink.
- (C) Location of the potable water spigots below the rim of the galley sink.
- (D) Location of the potable water spigots above the rim of the galley sink.

*If choice D is selected set score to 1.*

**8.** The thermal energy produced by an internal combustion engine is transformed into _____.

- (A) combustion energy
- (B) internal energy
- (C) external energy
- (D) mechanical energy

*If choice D is selected set score to 1.*

**9.** Guardian valves are installed on main propulsion turbines to _____.

- (A) provide an emergency means of quickly closing the throttle
- (B) provide a means to supply steam directly to the astern element of the turbine
- (C) prevent steam from leaking into the astern element while at full sea speed
- (D) prevent steam from leaking into the astern element while the vessel is maneuvering

*If choice C is selected set score to 1.*

**10.** If you hear the general alarm sounded 3 times supplemented by 3 short blasts of the whistle, what does this indicate?

- (A) Fire and emergency.
- (B) Dismissal from a boat drill.
- (C) Abandon ship.
- (D) Dismissal from fire and emergency.

*If choice D is selected set score to 1.*

**11.** The exhaust system for a turbocharged diesel engine functions to _____.

- (A) power the aftercoolers
- (B) power the turbocharger
- (C) reduce the cylinder scavenge effect
- (D) cool the turbocharger

*If choice B is selected set score to 1.*

**12.** A common method of preheating main turbine lube oil prior to rolling over the main unit would be to _____.

- (A) slightly increase gland sealing steam pressure
- (B) bypass the lube oil gravity tank
- (C) run both the lube oil pumps simultaneously
- (D) operate the lube oil purifier on the main lube oil sump

*If choice D is selected set score to 1.*

**13.** Fuel oil settling tanks are used to _____.

- (A) facilitate the stripping of sludge and water
- (B) precipitate out water and solids
- (C) store oil for immediate use
- (D) all of the above

*If choice D is selected set score to 1.*

**14.** The "tare weight" of a refrigerant storage cylinder refers to what weight?

- (A) the weight of an empty cylinder
- (B) the maximum weight of the refrigerant allowed
- (C) the total weight of a fully charged cylinder
- (D) the weight of a cylinder AND its current contents

*If choice A is selected set score to 1.*

**15.** Which of the tanks, shown in the illustration, supplies fuel to the emergency generator? Illustration MO-0058

- (A) Diesel Oil Service Tank
- (B) Diesel Oil Settling Tank
- (C) Diesel Oil Boiler Tank
- (D) Diesel Oil Booster Tank

*If choice A is selected set score to 1.*

**16.** Inhalation of high concentrations of chlorofluorocarbon refrigerants (CFCs) may have which of the following effects?

- (A) loss of concentration
- (B) cardiac arrhythmias
- (C) drowsiness
- (D) all of the above

*If choice D is selected set score to 1.*

**17.** The primary reason low-pressure evaporators produce distillate more efficiently, and with less scale formation, than high-pressure evaporators is _____.

- (A) evaporation in a submerged medium produces more distillate
- (B) evaporation is accomplished in a vacuum
- (C) due to the latent heat of evaporation principle
- (D) due to the higher temperature of the incoming feed

*If choice B is selected set score to 1.*

**18.** The expansion tank in a diesel engine closed fresh water cooling system is located at _____.

- (A) or near the tank top level
- (B) or near the floor plate level
- (C) the lowest point in the system
- (D) the highest point in the system

*If choice D is selected set score to 1.*

**19.** Auxiliary boilers are divided into several classifications, one of which is _____.

- (A) water-tube supercritical circulation
- (B) water-tube forced circulation
- (C) fire-tube controlled circulation
- (D) fire-tube express circulation

*If choice B is selected set score to 1.*

**20.** A three-way thermostatic control valve regulates the diesel engine cooling water temperature by passing a portion of the water _____.

- (A) to the expansion tank
- (B) overboard
- (C) around the engine
- (D) around the cooler

*If choice D is selected set score to 1.*

**21.** Which of the following modes of heat transfer does NOT require any physical contact between a warmer and a cooler substance?

- (A) Conduction
- (B) Lamination
- (C) Radiation
- (D) All of the above

*If choice C is selected set score to 1.*

**22.** The main advantage of unit injectors over other fuel injection systems is _____.

- (A) the lack of high-pressure fuel lines
- (B) their relatively low injection pressures
- (C) reduced wear of spray orifices
- (D) the lessened chance of fuel leaks into the engine sump

*If choice A is selected set score to 1.*

**23.** Cooling water to the vent condenser in a DC heater is supplied by the _____.

- (A) main and/or auxiliary condensate pump
- (B) salt water circulator
- (C) feed booster pump
- (D) main feed pump

*If choice A is selected set score to 1.*

**24.** Which of the listed types of superchargers will NOT have a volumetric capacity proportional to engine speed?

- (A) Exhaust gas turbocharger
- (B) Roots blower
- (C) Piston type blower
- (D) Vane type blower

*If choice A is selected set score to 1.*

**25.** A naturally aspirated diesel engine at full throttle will have an intake manifold pressure _____.

- (A) slightly less than atmospheric pressure
- (B) approximately equal to exhaust manifold pressure at all times
- (C) that is widely fluctuating
- (D) constantly decreasing as engine load increases

*If choice A is selected set score to 1.*

**26.** In order for microbiological growths to thrive in a fuel tank it is necessary for _____.

- (A) vanadium to be present
- (B) low temperatures to exist
- (C) moisture or water to be present
- (D) electrolysis to be occurring

*If choice C is selected set score to 1.*

**27.** One function of the air receiver in a compressed air system is to _____.

- (A) receive exhaust air from pneumatic accessories
- (B) dry the air discharged from the intercooler
- (C) minimize the system's line pulsations
- (D) remove all traces of oil from the air

*If choice C is selected set score to 1.*

**28.** A main condenser utilizing a scoop for the circulation of sea water must be constructed as a _____.

- (A) counterflow heat exchanger
- (B) parallel flow heat exchanger
- (C) two-pass heat exchanger
- (D) single-pass heat exchanger

*If choice D is selected set score to 1.*

**29.** Which of the fuel injection systems listed uses a spring loaded differential spray needle valve and an individual pump for each cylinder?

- (A) Common rail injection
- (B) Air injection
- (C) Jerk pump injection
- (D) Distributor injection

*If choice C is selected set score to 1.*

**30.** What is the function of the aftercoolers installed in the diesel engine air intake system?

- (A) Decrease the air density
- (B) Increase the exhaust temperature
- (C) Decrease the lube oil temperature
- (D) Increase the air density

*If choice D is selected set score to 1.*

**31.** In a main propulsion steam turbine installation, the condensate pump initially discharges to the _____.

- (A) distillate tank
- (B) first stage heater
- (C) deaerating feed tank
- (D) air ejector condenser

*If choice D is selected set score to 1.*

**32.** When the compressed air reservoir is placed in line with an air compressor and is used as an aftercooler, what must be done with the reservoir?

- (A) It must be frequently drained of condensed water.
- (B) It must be fitted with a sight glass.
- (C) It must be fitted with a moisture trap at the inlet.
- (D) It must be fitted with a manhole.

*If choice A is selected set score to 1.*

**33.** According to the illustrated steam tables, what would be the superheater outlet temperature if saturated steam at 400 psia was elevated 192.83°F? Illustration SG-0004

- (A) 192.83°F
- (B) 247.31°F
- (C) 444.59°F
- (D) 637.42°F

*If choice D is selected set score to 1.*

**34.** Greases used for most marine applications would have what National Lubricating Grease Institute (NLGI) grade?

- (A) 00
- (B) 2
- (C) 4
- (D) 6

*If choice B is selected set score to 1.*

**35.** The automatic recirculating valve in the main condensate recirculating line is controlled by a temperature sensor which is located at the _____.

- (A) main condensate pump suction
- (B) air ejector condensate discharge
- (C) main condensate pump discharge
- (D) condensate inlet to the main air ejectors

*If choice B is selected set score to 1.*

**36.** Which of the valves listed should be closed before lighting off a boiler?

- (A) Superheater vent valve
- (B) Air cock valve
- (C) Economizer drain valve
- (D) Superheater drain valve

*If choice C is selected set score to 1.*

**37.** If a slow-speed two-stroke cycle diesel engine is fitted with exhaust valves located in the cylinder heads, what scavenging flow-pattern is utilized?

- (A) Loop scavenging
- (B) Cross-flow scavenging
- (C) Uniflow scavenging
- (D) Return-flow scavenging

*If choice C is selected set score to 1.*

**38.** In addition to achieving a speed reduction for efficient propeller operation, what statement represents other possible functional purposes for reduction gears?

- (A) Reduction gears can be used for propeller thrust reversal and reduction gears can be used for multiple prime mover inputs.
- (B) Reduction gears can be used for engine rotation reversal and reduction gears can be used for multiple prime mover inputs.
- (C) Reduction gears can be used for engine rotation reversal and reduction gears can be used for multiple propeller shaft outputs.
- (D) Reduction gears can be used for propeller thrust reversal and reduction gears can be used for multiple propeller shaft outputs.

*If choice A is selected set score to 1.*

**39.** The device shown in the illustration is a/an _____. Illustration GS-0116

- (A) mechanical shaft seal
- (B) oil scraper ring stuffing box for a crosshead engine
- (C) diesel engine motor mount
- (D) vane type steering gear

*If choice D is selected set score to 1.*

**40.** As shown in the illustrated D type single furnace boiler, what does item "F" represent? Illustration SG-0008

- (A) Superheater tubes
- (B) Generating tubes
- (C) Desuperheater tubes
- (D) Screening tubes

*If choice B is selected set score to 1.*

**41.** Which of the following methods is normally used to lubricate bearings in a small high-speed diesel engine?

- (A) Mechanical lubricators
- (B) Splash lubrication
- (C) Pressure lubrication
- (D) Sight feed lubricators

*If choice C is selected set score to 1.*

**42.** The purpose of try-cocks used on an auxiliary boiler is to _____.

- (A) provide an alternate means of determining the water level, if the gage glass fails
- (B) provide a means of adding chemical feed to the boiler water
- (C) provide a means for blowing down the gage glass
- (D) act as a steam sentinel valve, if any of the fusible plugs should melt

*If choice A is selected set score to 1.*

**43.** If you wish to initiate a station-to-station call over a sound-powered telephone circuit, what is the correct procedure?

- (A) Select the station you are calling from with the rotary selector switch, turn the hand-crank a few revolutions, depress the button on the handset, and listen for your party to answer the call.
- (B) Select the station you wish to call with the rotary selector switch, turn the hand-crank a few revolutions, depress the button on the handset, and listen for your party to answer the call.
- (C) Select the station you wish to call with the rotary selector switch, turn the hand-crank a few revolutions, and listen for your party to answer the call.
- (D) Select the station you wish to call with the rotary selector switch, depress the button on the handset, and listen for your party to answer the call.

*If choice B is selected set score to 1.*

**44.** While vacuum is being raised on the main unit and the turbine warmed, condensate is recirculated to the main condenser to _____.

- (A) maintain a proper DC heater water level
- (B) ensure the condensation of air ejector steam
- (C) provide a condenser vacuum seal
- (D) cool the main condenser shell for better vacuum

*If choice B is selected set score to 1.*

**45.** What is the reason that P-type or S-type traps are fitted on the sinks in a head?

- (A) to reduce water velocity and minimize erosion
- (B) to create a strong siphon effect
- (C) to provide a cushion of water to reduce the effects of water hammer
- (D) to provide a seal against sewer gas rising into the compartment

*If choice D is selected set score to 1.*

**46.** Which of the listed substances can be satisfactorily removed from diesel fuel by centrifuging?

- (A) Sludge
- (B) Gasoline
- (C) Fuel oil
- (D) Lube oil

*If choice A is selected set score to 1.*

**47.** Auxiliary diesel engine electric starting motors use _____.

- (A) alternating current transformers
- (B) 400 cycle per second motor-generator power
- (C) low amperage, high voltage AC power
- (D) battery power direct current

*If choice D is selected set score to 1.*

**48.** As shown on the illustrated sootblower diagram, how is the sootblower element rotated? Illustration SG-0023

- (A) Manually operated with a handwheel.
- (B) Manually operated with an endless chain.
- (C) Manually operated with a hand-crank.
- (D) Air operated with a pneumatic motor.

*If choice B is selected set score to 1.*

**49.** Diesel engine electric starting motors generally require heavier duty motors and operate at higher voltages than comparable starting motors for gasoline engines due to _____.

- (A) flywheel effect
- (B) higher speed required
- (C) higher compression pressures
- (D) lower starting temperatures

*If choice C is selected set score to 1.*

**50.** In the system illustrated, what type of valves are downstream of point "A"? Illustration SG-0005

- (A) globe valves/ gate valves
- (B) gauge valves/ drain valves
- (C) swing check/ stop valves
- (D) stop-check/ stop valves

*If choice D is selected set score to 1.*

**51.** When a slow-speed diesel engine is used to directly drive a fixed-pitch propeller, upon execution of a stop order and cutting off fuel delivery, if there is way on the ship how is engine rotation stopped?

- (A) In all cases, the engine rotation is stopped by applying the shaft brake.
- (B) In some cases, a shaft brake is applied. In other cases, start air is admitted in the opposite direction until the engine stops rotating.
- (C) In all cases, the engine is allowed to rotate until it eventually stops.
- (D) In all cases, start air is admitted to the engine in the opposite direction of rotation until the engine stops rotating.

*If choice B is selected set score to 1.*

**52.** What is the purpose of the items labeled "moving blades" located on the illustrated steam turbine? Illustration SE-0003

- (A) Convert the kinetic energy of the steam exiting the nozzle to potential energy.
- (B) Convert the potential energy of the steam exiting the nozzle to mechanical energy of rotation.
- (C) Convert the kinetic energy of the steam exiting the nozzle to mechanical energy of rotation.
- (D) Change the direction of travel of the steam.

*If choice C is selected set score to 1.*

**53.** An excess pressure governor is a special type of control device. On what equipment would an excess pressure governor normally be found?

- (A) forced draft fan
- (B) turbine-driven feed pump
- (C) main circulator pump
- (D) low-pressure propulsion turbine

*If choice B is selected set score to 1.*

**54.** A bearing using an oiling ring as a means of static oil feed must occasionally be serviced by removing the wear particles, grit, and moisture. How is this accomplished?

- (A) Rotating the handle of the lube oil strainer.
- (B) Draining the bottom of the strainer housing.
- (C) Draining the bottom of the bearing lube oil sump.
- (D) Changing the filter element.

*If choice C is selected set score to 1.*

**55.** If an attempted light off of an idle boiler fails, what should be done?

- (A) The fuel should be secured to the boiler and the boiler allowed to remain idle for a few minutes before another light off attempt is made.
- (B) The fuel should be secured to the boiler and the furnace purged of combustible vapors with the forced draft fan before another light off attempt is made.
- (C) Another light off attempt (just one) can be undertaken before any additional precautions need to be observed.
- (D) Another light off attempt (with no limit) can be undertaken before any additional precautions need to be observed.

*If choice B is selected set score to 1.*

**56.** Which of the following reasons represents why the designed compression ratio of a gasoline engine is lower than that of a diesel engine?

- (A) Compression must be low to have effective pre-ignition.
- (B) The heat of compression is not used as an ignition source of the fuel.
- (C) Compression must be low for effective spark ignition.
- (D) Compression must be low for smooth operation.

*If choice B is selected set score to 1.*

**57.** In terms of the completeness of combustion, in viewing the condition of the stack, what would be the indication of the MOST complete combustion and HIGHEST boiler efficiency?

- (A) Light brown haze
- (B) White smoke
- (C) Clear stack
- (D) Black smoke

*If choice A is selected set score to 1.*

**58.** The tube sheets installed in a fire-tube auxiliary boiler are normally connected by _____.

- ○ (A) girder stays
- • (B) fire-tubes and stay-tubes
- ○ (C) external boiler plating
- ○ (D) separate crown sheets

*If choice B is selected set score to 1.*

**59.** The pressure in the feedwater system must exceed boiler steam drum pressure in order to _____.

- ○ (A) prevent air leakage into the feedwater system
- ○ (B) remove the steam from the steam drum
- ○ (C) prevent water hammer in the lines
- • (D) force the feedwater into the boiler

*If choice D is selected set score to 1.*

**60.** How is the emergency bilge suction valve typically used?

- ○ (A) when the main condenser becomes fouled, in order to provide additional cooling water circulation
- ○ (B) to inject cleaning additives when the bilges are extremely dirty
- ○ (C) to connect the rose box to the independent bilge suction
- • (D) if the bilges become flooded and they cannot be emptied by any other means

*If choice D is selected set score to 1.*

**61.** In a diesel engine closed fresh water cooling system employing a radiator, proper water temperature can be obtained by _____.

- ○ (A) passing cooling water through a space heater
- ○ (B) piping exhaust gases across the radiator front
- • (C) adjusting the radiator louvers
- ○ (D) passing cooling water through the lube oil cooler

*If choice C is selected set score to 1.*

**62.** What is a quick and effective way of determining whether or not a boiler water gauge glass is operating properly?

- • (A) Quickly opening and then reclosing the gauge glass drain valve.
- ○ (B) Quickly opening and then reclosing the gauge glass lower root valve.
- ○ (C) Quickly opening and then reclosing the gauge glass upper root valve.
- ○ (D) Watching for the level to fluctuate in the glass corresponding to ship movements such as pitching.

*If choice A is selected set score to 1.*

**63.** The component shown in the illustration, labeled "IV", is the _____. Illustration SE-0013

- (A) low-speed pinion
- (B) first reduction gear
- (C) high-speed pinion
- (D) bull gear

*If choice D is selected set score to 1.*

**64.** Which of the following statements about boilers is correct?

- (A) A hot boiler will continue to generate steam after the fires are secured.
- (B) The water level in a properly operated boiler will not shrink or swell.
- (C) No boiler will continue to generate steam after the fires are secured.
- (D) Loss of water will not harm a boiler if the water level can be restored.

*If choice A is selected set score to 1.*

**65.** The purpose of the main reduction gears is to _____.

- (A) reduce engine room noise levels during high-speed operations
- (B) provide a means of reversing the main engines in an emergency
- (C) transmit vibration and thrust to the ship's hull
- (D) reduce high turbine RPM to an efficient propeller RPM

*If choice D is selected set score to 1.*

**66.** Fuel piping should be regularly inspected for leaks. What leak location would be particularly troublesome in terms of presenting a fire hazard?

- (A) Fuel oil transfer pump suction strainer.
- (B) Fuel oil service pump discharge strainer.
- (C) Fuel oil service pump shaft seal.
- (D) Fuel oil service pump suction strainer.

*If choice B is selected set score to 1.*

**67.** If there is a "large" release of R-134a refrigerant gas in a confined area, which of the following statements would be true?

- (A) a self-contained breathing apparatus (SCBA) would be required before entering the space
- (B) safety goggles and lined butyl gloves would be required before entering the space
- (C) dust or particle masks would be required before entering the space
- (D) an explosive atmosphere would be created

*If choice A is selected set score to 1.*

**68.** The component shown in the illustration, labeled "IV", is the _____. Illustration SE-0013

- (A) high-speed pinion
- (B) bull gear
- (C) first reduction gear
- (D) low-speed pinion

*If choice B is selected set score to 1.*

**69.** The lube oil strainer shown in the illustration is used on the reduction gear of a mid-size diesel engine. The strainer elements consist of _____. Illustration MO-0057

- (A) pleated paper
- (B) metal disks
- (C) fibrous braid
- (D) wire mesh

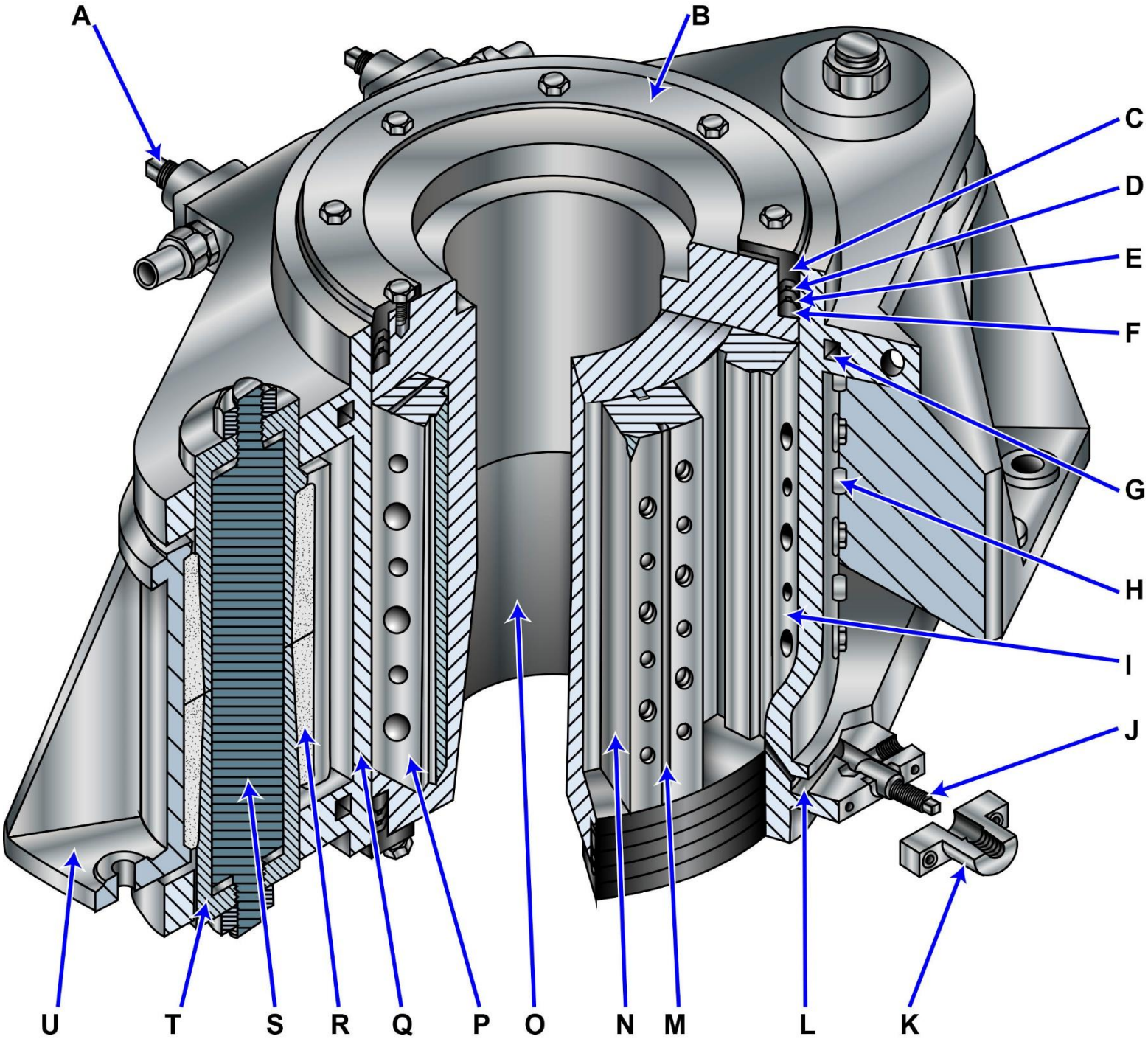
*If choice B is selected set score to 1.*

**70.** In the illustrated diesel engine, which label points to the piston? Illustration MO-0122

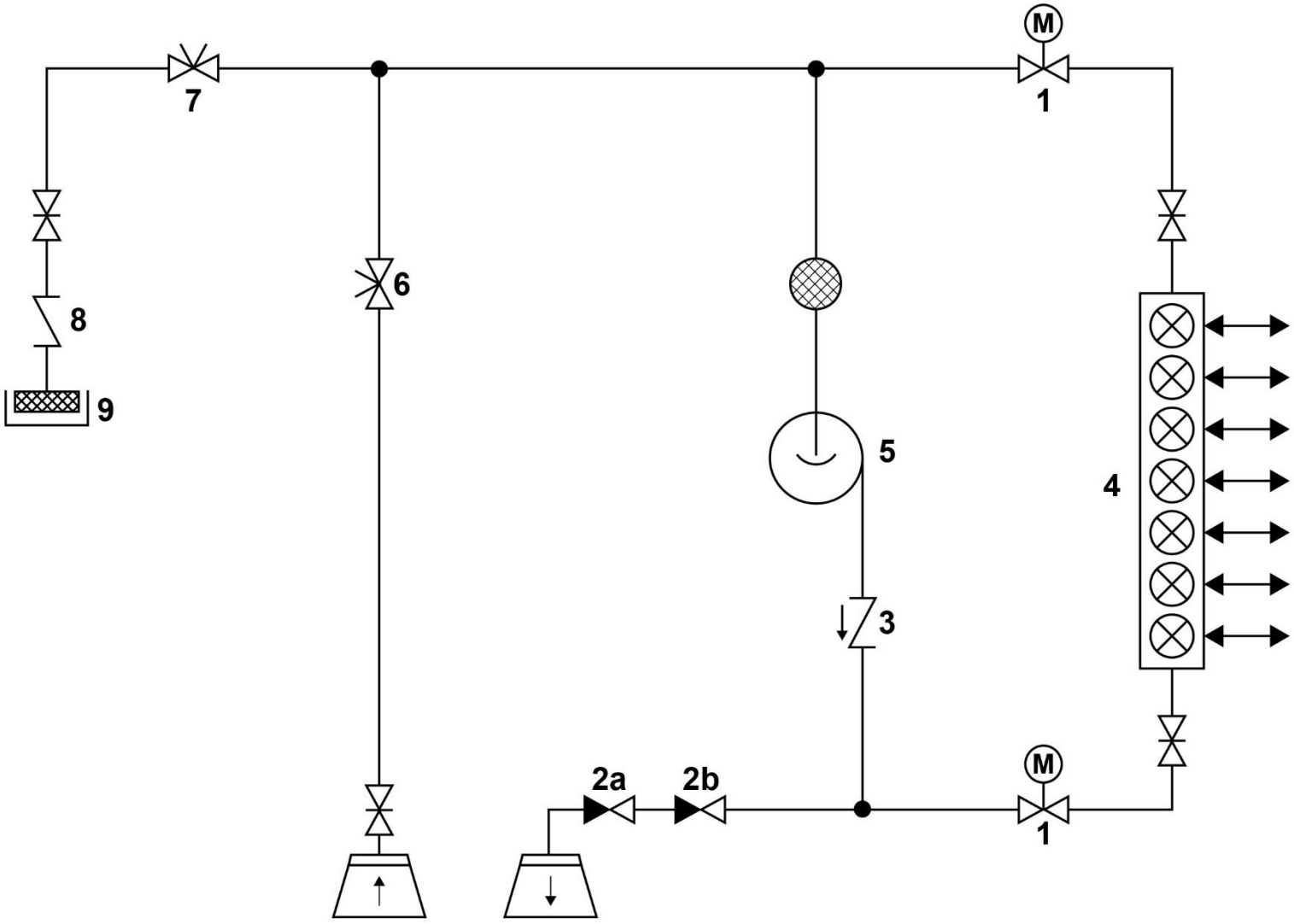
- (A) 3
- (B) 4
- (C) 6
- (D) 7

*If choice B is selected set score to 1.*

# GS-0116



# GS-0125



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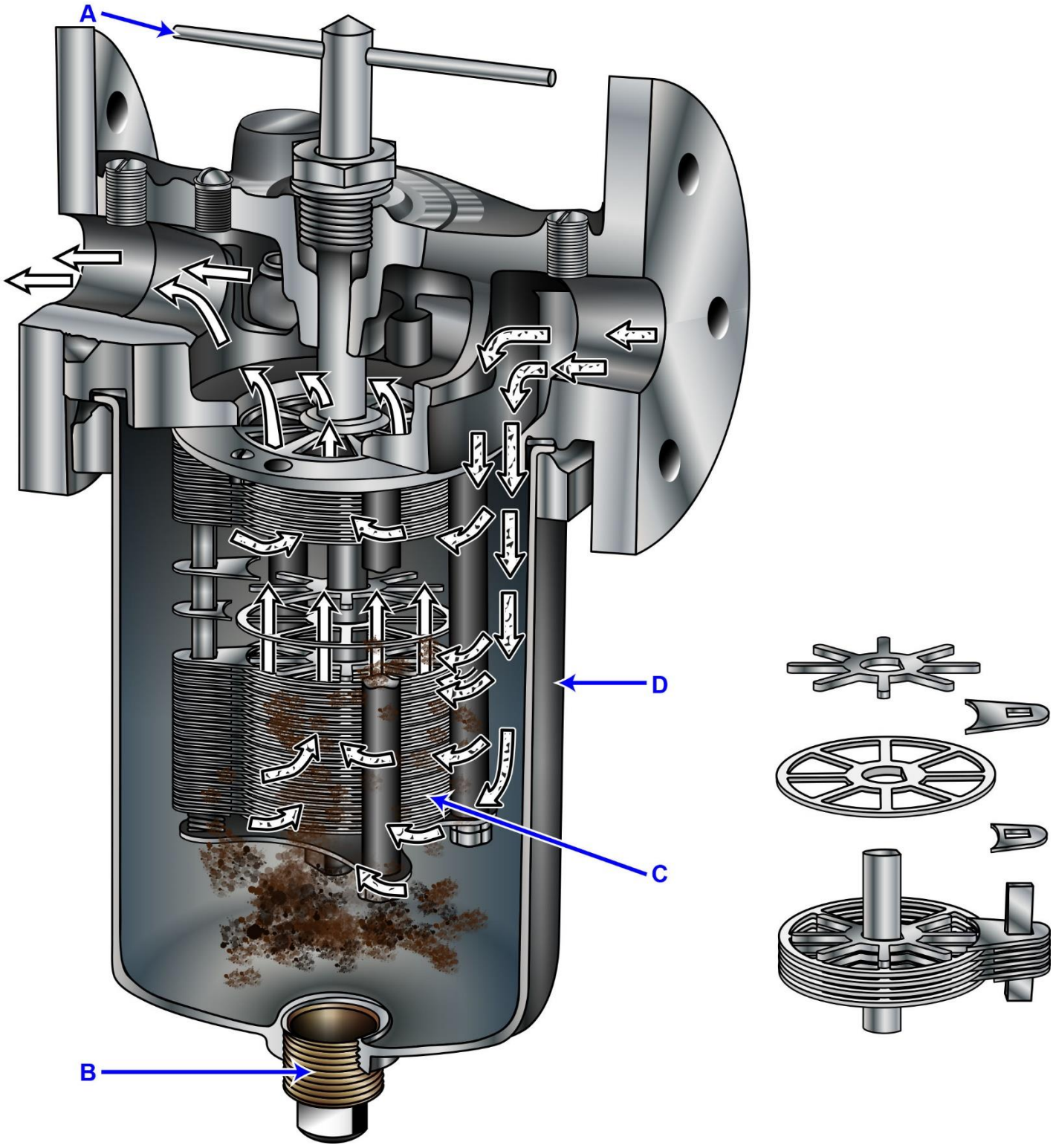

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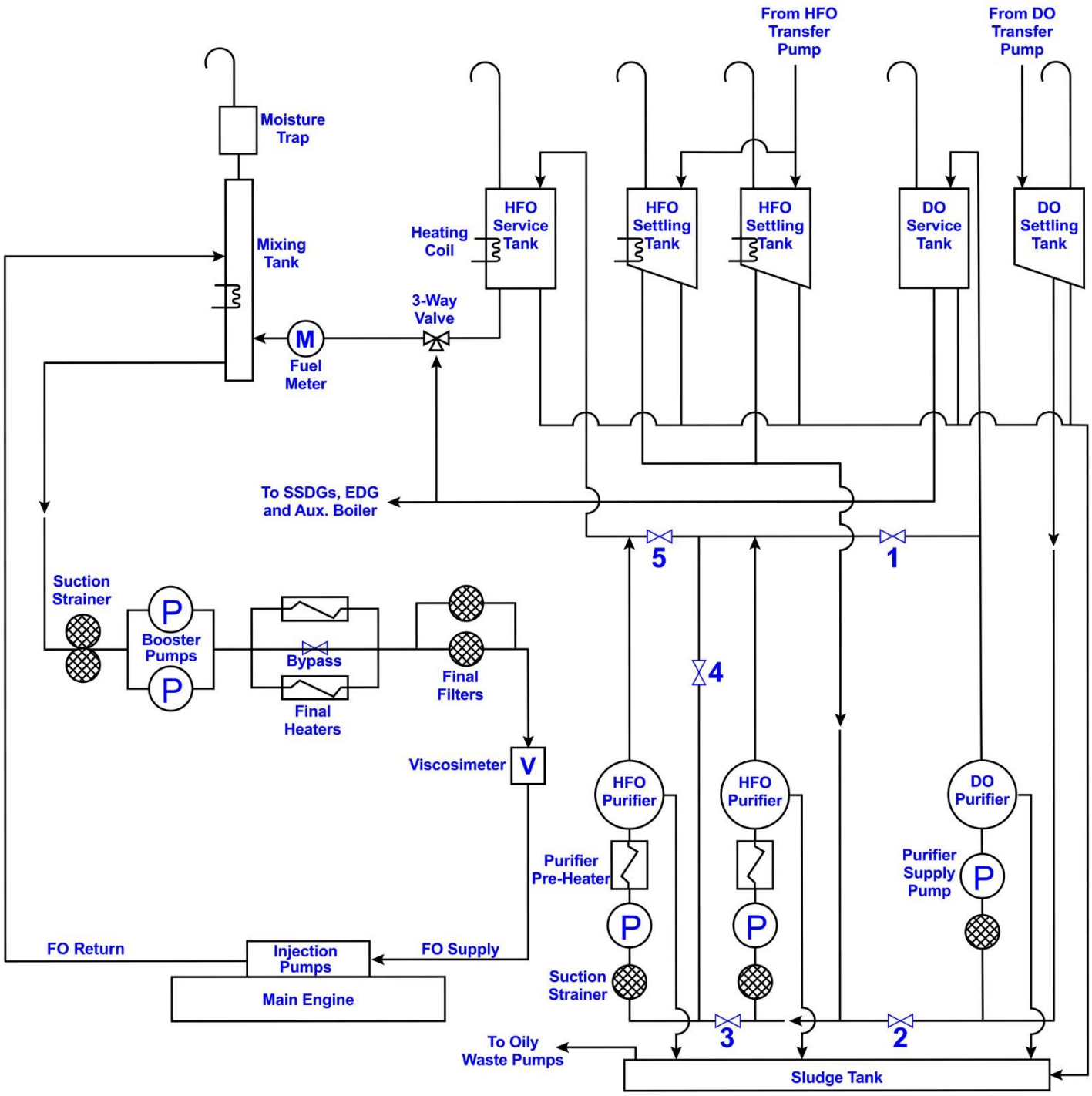

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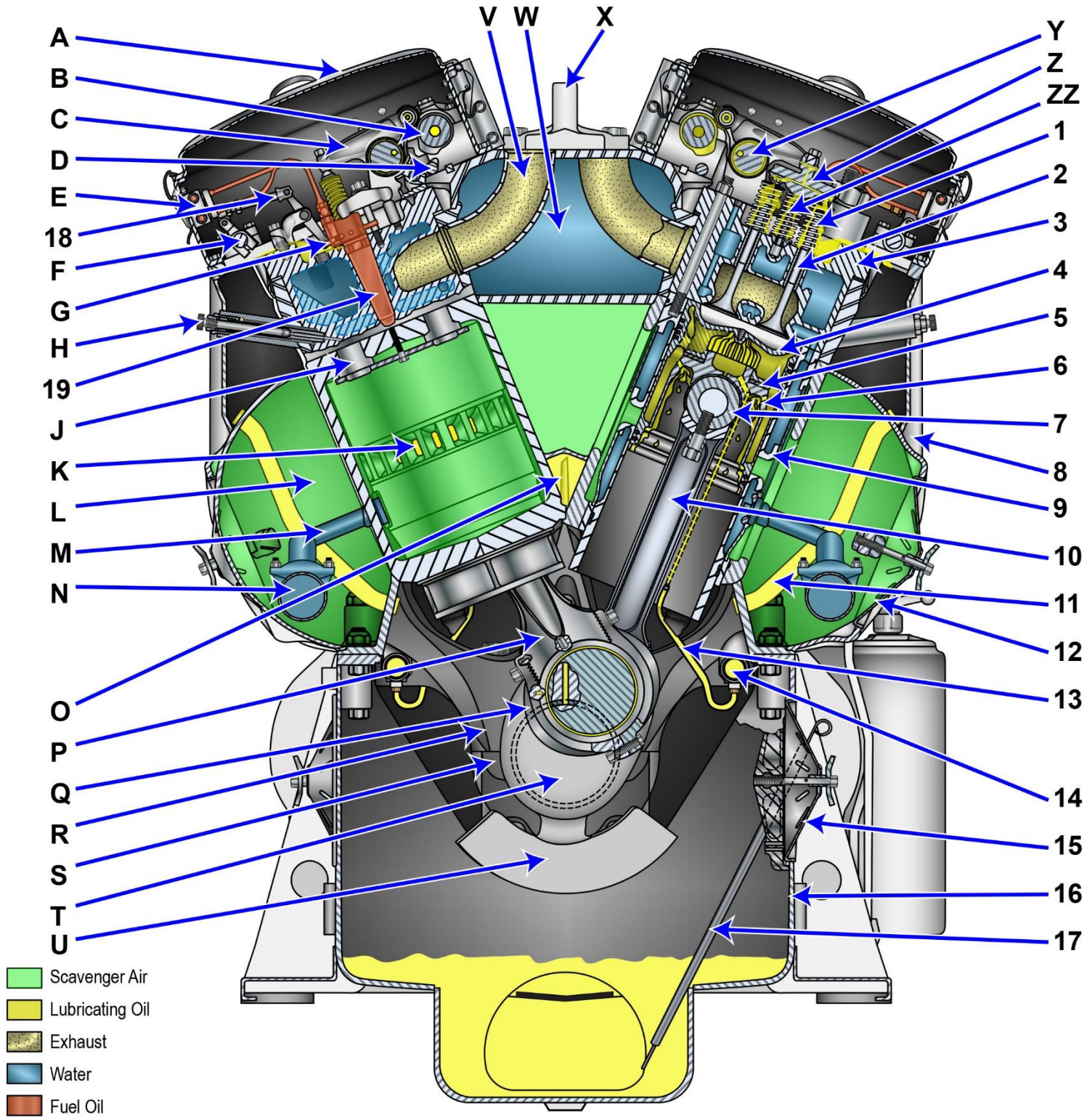

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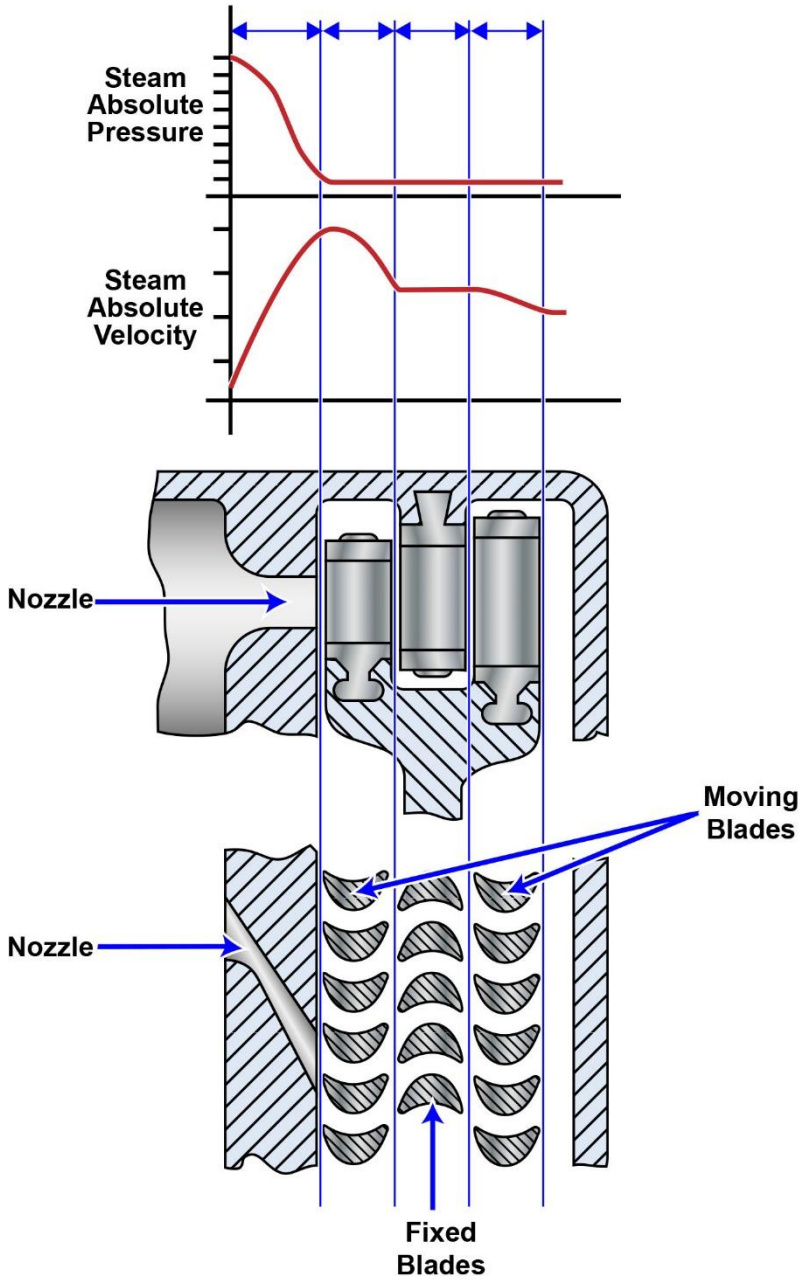
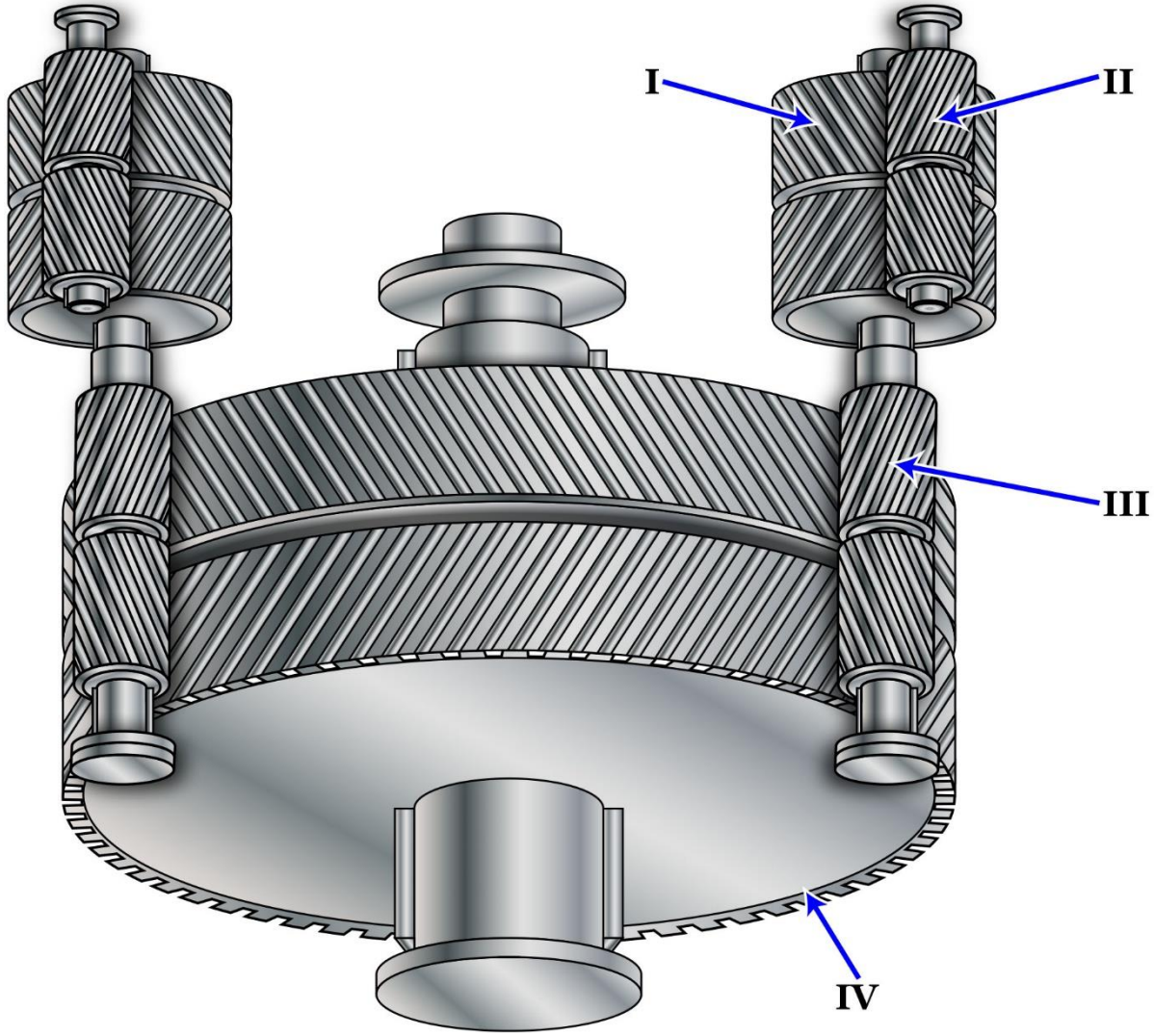


# SE-0013



# SG-0004

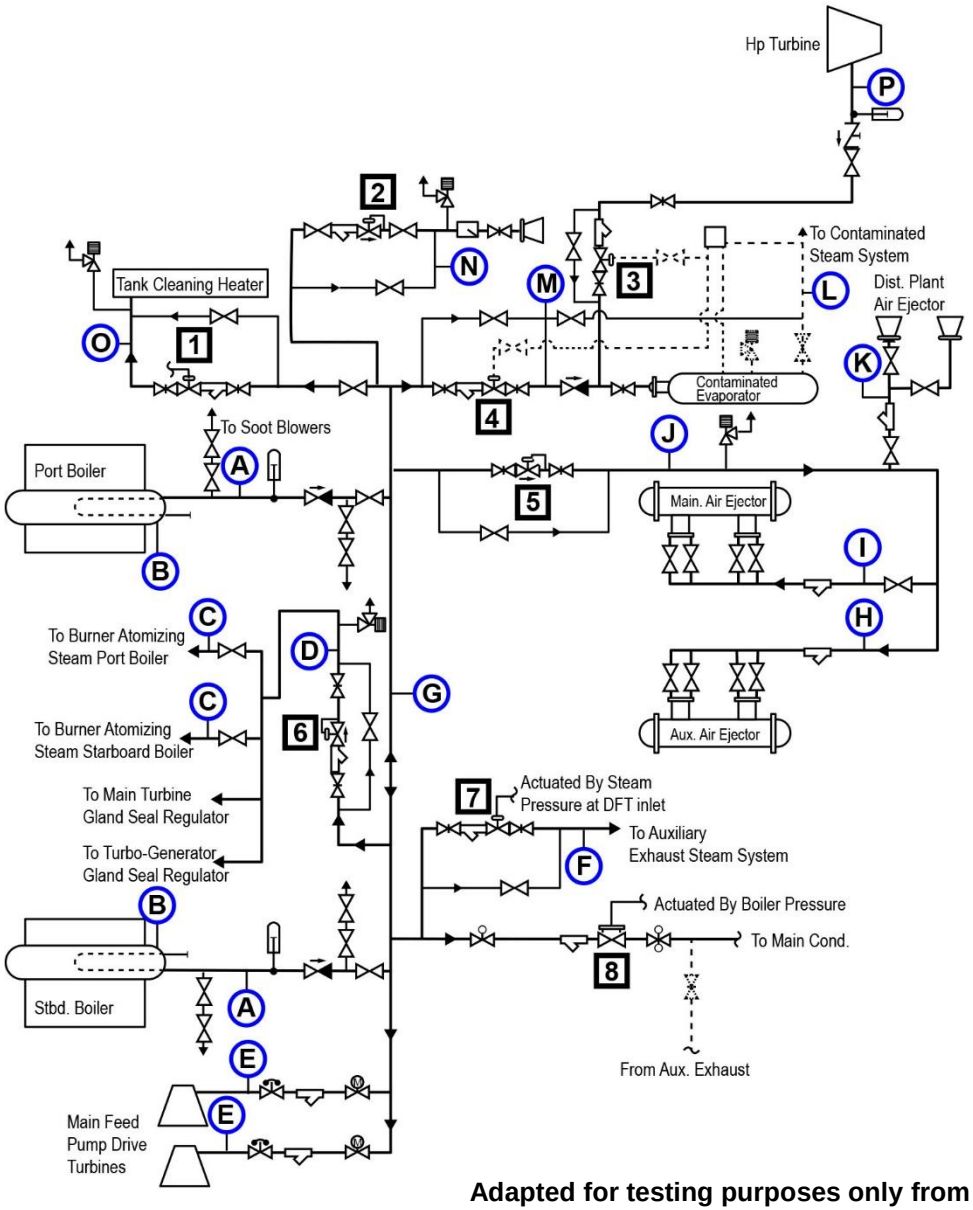
**Table 1**
**Thermodynamic Properties of Saturated Steam (Temperature)**

| Temp, °F | Absolute. Pressure, psi | Enthalpy (BTU/lb) of Liquid | Enthalpy (BTU/lb) of Evaporation | Enthalpy (BTU/lb) of vapor |
|---|---|---|---|---|
| 32 | 0.08859 | 0.01 | 1075.5 | 1075.5 |
| 40 | 0.12170 | 8.05 | 1071.3 | 1079.3 |
| 50 | 0.17811 | 18.07 | 1065.6 | 1083.7 |
| 60 | 0.25630 | 28.06 | 1059.9 | 1088.0 |
| 70 | 0.36310 | 38.04 | 1054.3 | 1092.3 |
| 80 | 0.50690 | 43.02 | 1048.6 | 1096.6 |
| 90 | 0.69820 | 57.99 | 1042.9 | 1100.9 |
| 100 | 0.94920 | 67.97 | 1037.2 | 1105.2 |
| 110 | 1.27480 | 77.94 | 1031.6 | 1109.5 |
| 120 | 1.69240 | 87.92 | 1025.8 | 1113.7 |
| 130 | 2.22250 | 97.90 | 1020.0 | 1117.9 |
| 140 | 2.88860 | 107.90 | 1014.1 | 1122.0 |
| 150 | 3.71800 | 117.90 | 1008.2 | 1126.1 |
| 160 | 4.74100 | 127.90 | 1002.3 | 1130.2 |
| 170 | 5.99200 | 137.90 | 996.3 | 1134.2 |
| 180 | 7.51000 | 147.90 | 990.2 | 1138.1 |
| 190 | 9.33900 | 157.90 | 984.1 | 1142.0 |
| 200 | 11.52600 | 168.00 | 977.9 | 1145.9 |
| 212 | 14.69600 | 180.00 | 970.4 | 1150.4 |
| 220 | 17.18600 | 188.10 | 965.2 | 1153.4 |
| 240 | 24.96900 | 208.30 | 952.2 | 1160.5 |
| 280 | 49.20300 | 249.10 | 924.7 | 1173.8 |
| 300 | 67.01300 | 269.60 | 910.1 | 1179.7 |
| 340 | 118.01000 | 311.10 | 879.0 | 1190.1 |
| 380 | 195.77000 | 353.50 | 844.6 | 1198.1 |
| 400 | 247.31000 | 375.00 | 826.0 | 1201.0 |

**Table 2**
**Thermodynamic Properties of Saturated Steam (Pressure)**

| Absolute. Pressure, psi | Temp, °F | Enthalpy (BTU/lb) of Liquid | Enthalpy (BTU/lb) of Evaporation | Enthalpy (BTU/lb) of vapor |
|---|---|---|---|---|
| 0.5 | 79.58 | 47.6 | 1048.8 | 1096.4 |
| 1.0 | 101.74 | 69.7 | 1036.3 | 1106.0 |
| 5.0 | 162.24 | 130.1 | 1001.0 | 1131.1 |
| 10.0 | 193.21 | 161.2 | 982.1 | 1143.3 |
| 14.7 | 212.00 | 180.0 | 970.4 | 1150.4 |
| 15.0 | 213.03 | 181.1 | 969.7 | 1150.8 |
| 20.0 | 227.96 | 196.2 | 960.1 | 1156.3 |
| 25.0 | 240.07 | 208.5 | 952.1 | 1160.6 |
| 30.0 | 250.33 | 218.8 | 945.3 | 1164.1 |
| 40.0 | 267.25 | 236.0 | 933.7 | 1169.7 |
| 50.0 | 281.01 | 250.1 | 924.0 | 1174.1 |
| 60.0 | 292.71 | 262.1 | 915.5 | 1177.6 |
| 70.0 | 302.92 | 272.6 | 907.9 | 1180.6 |
| 80.0 | 312.03 | 282.0 | 901.1 | 1183.1 |
| 90.0 | 320.27 | 290.6 | 894.7 | 1185.3 |
| 100.0 | 327.81 | 298.4 | 888.8 | 1187.2 |
| 110.0 | 334.77 | 305.7 | 883.2 | 1188.9 |
| 120.0 | 341.25 | 312.4 | 877.9 | 1190.4 |
| 130.0 | 347.32 | 318.8 | 872.9 | 1191.7 |
| 140.0 | 353.02 | 324.8 | 868.2 | 1193.0 |
| 150.0 | 358.42 | 330.5 | 863.6 | 1194.1 |
| 200.0 | 381.79 | 355.4 | 843.0 | 1198.4 |
| 250.0 | 400.95 | 376.0 | 825.1 | 1201.1 |
| 300.0 | 417.33 | 393.8 | 809.0 | 1202.8 |
| 350.0 | 431.72 | 409.7 | 794.2 | 1203.9 |
| 400.0 | 444.59 | 424.0 | 780.5 | 1204.5 |

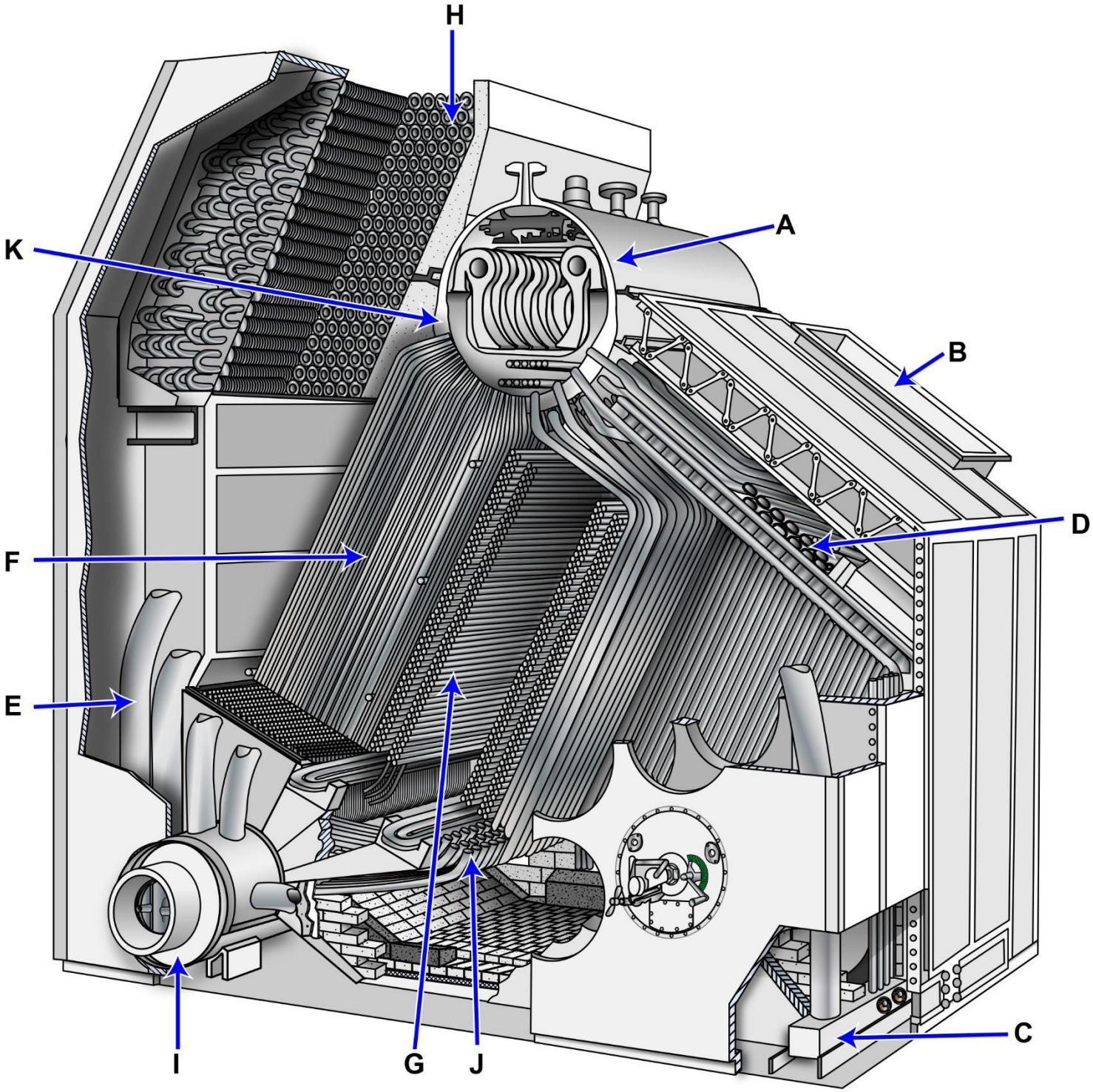
# SG-0005




| Nominal System Pressures | |
|---|---|
| **Gauge** | **psig** |
| A | 850 |
| B | 860 |
| C | 143 |
| D | 143 |
| E | 850 |
| F | 32 |
| G | 850 |
| H | 143 |
| I | 143 |
| J | 143 |
| K | 143 |
| L | 130 |
| M | 350 |
| N | 140 |
| O | 130 |
| P | 205 (at full power) |

| Device Settings | |
|---|---|
| **Valve** | **Psig** |
| 1 | 130 |
| 2 | 140 |
| 3 | 185 |
| 4 | 350 |
| 5 | 143 |
| 6 | 143 |
| 7 | 32 |
| 8 | 860 |

# SG-0008



# SG-0023