U.S.C.G. Merchant Marine Exam

QMED

Q808 Pump Technician

(Sample Examination)

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Illustrations: 8

Choose the best answer to the following Multiple-Choice Questions.

1. To prevent blowback when attempting to light off an idle boiler, what statement is true?

A. The boiler fuel oil supply header temperature must be maintained at the temperature necessary to obtain proper atomization of the fuel, the furnace floor should be free of oil, and there should be sufficient combustible gases in the furnace.
B. The boiler fuel oil supply header temperature must be maintained above the flash point of the fuel, the furnace floor should be free of oil, and there should be sufficient combustible gases in the furnace.
C. The boiler fuel oil supply header temperature must be maintained below the pour point of the fuel, the furnace floor should be free of oil, and the furnace should be purged.
D. The boiler fuel oil supply header temperature must be maintained at the temperature necessary to obtain proper atomization of the fuel, the furnace floor should be free of oil, and the furnace should be purged.

Correct answer: D

2. To avoid excessive pressures in the fuel oil filling system during bunkering, you should _____.

A. close the tank filling valves quickly
B. fill one tank at a time
C. top off all tanks at the same time
D. reduce the loading rate when topping off

Correct answer: D

3. Which of the listed devices would be installed in the air compressor discharge line between the compressor and receiver of a control air system?

A. Vacuum breaker
B. Moisture separator
C. P-I converter
D. Lubricator

Correct answer: B

4. Which factor determines the size of the ring dam for a fuel oil centrifugal purifier?

A. The viscosity of the fuel.
B. The quantity of water to be removed from the fuel.
C. The specific gravity of the fuel.
D. The quantity of dirt to be removed from the fuel.

Correct answer: C

5. In the system illustrated, which of the following readings should be indicated on the pressure gauge, if the load (x) is 8000 lbs. (3632 kg) and the piston area (y) is 10 sq. in (64.5 sq. cm)? Illustration GS-0062

A. 80 psi (5.63 kg/cm2)
B. 800 psi (56.31 kg/cm2)
C. 8,000 psi (563.1 kg/cm2)
D. 80,000 psi (5631 kg/cm2)

Correct answer: B

6. Spring reinforced oil seals for retention of lubricant, are installed with the lip of the seal facing _____. Illustration GS-0152

A. toward the bearing preload washer
B. away from the bearing housing recess
C. away from the oil pressure being sealed
D. toward the oil pressure being sealed

Correct answer: D

7. 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

Correct answer: A

8. When repacking a reciprocating pump with more than four rings of packing, the packing is cut square, installed with the ends abutted, and each succeeding ring staggered with the butted ends _____.

A. 45° apart
B. 90° apart
C. 120° apart
D. 180° apart

Correct answer: B

9. Which of the pumping systems listed for use aboard ship will most likely use a propeller type pump?

A. Fluid power transmission system
B. Fuel oil service booster system
C. Steering gear system
D. Main circulating system

Correct answer: D

10. Kapok life jackets require proper care and should NOT be _____.

A. used as seats, pillows, or footrests
B. stowed near open flame or where smoking is permitted
C. left on open decks
D. all of the above

Correct answer: D

11. The component shown in the illustration would be installed in which of the following types of fire detection systems? Illustration SF-0004

A. Fixed temperature
B. Line type pneumatic
C. Combined fixed temperature and rate-of-rise
D. Rate-of-rise

Correct answer: A

12. What type of wound is most susceptible to a tetanus (lockjaw) infection?

A. Puncture
B. Abrasion
C. Incision
D. Laceration

Correct answer: A

13. Which of the devices listed would be safe to use in a compartment with insufficient oxygen?

A. Wet handkerchief.
B. Dust or gas mask.
C. Self-contained breathing apparatus.
D. Air-purifying respirator

Correct answer: C

14. If both the shell-and-tube lube oil cooler and shell-and-tube jacket water cooler of a diesel engine are sea water-cooled, what statement is true?

A. Sea water flows through the tubes of the lube oil cooler and through the shell of the jacket water cooler.
B. Sea water flows through the tubes of the jacket water cooler and through the shell of the lube oil cooler.
C. Sea water flows through the tubes of both the lube oil and jacket water coolers.
D. Sea water flows through the shells of both the lube oil and jacket water coolers.

Correct answer: C

15. Which of the following statements is correct concerning heat transfer?

A. Heat is given off from a high temperature region known as a heat sink.
B. Heat transfer rate is affected most by the size of the heat sink involved.
C. Heat transfer rate is affected most by the temperature difference between the heat source and the heat sink.
D. Heat transfer by radiation will occur only by mass motion of a fluid substance.

Correct answer: C

16. What is the alarm signal for manning boat stations or boat drills onboard a merchant ship?

A. Continuous blast of the whistle for not less than 10 seconds supplemented by the continuous ringing of the general alarm bells for not less than 10 seconds.
B. Continuous blast of the whistle for not less than 3 seconds supplemented by the continuous ringing of the general alarm bells for not less than 3 seconds.
C. General alarm sounded 3 times supplemented by 3 short blasts of the whistle.
D. A succession of more than 6 short blasts followed by 1 long blast of the whistle supplemented by a comparable signal on the general alarm.

Correct answer: D

17. The highest pressure in a diesel engine cylinder normally occurs _____.

A. at TDC
B. before TDC
C. after TDC
D. during air starting

Correct answer: C

18. A thread chaser is a hand tool that should only be used for _____.

A. straightening tapered threads
B. enlarging existing threads
C. cutting original threads
D. restoring damaged threads

Correct answer: D

19. The line labeled "C", as shown in the illustration, would be identified as the _____. Illustration GS-0175

A. oily bilge water inlet
B. clean water flushing line
C. tank drain line
D. oil discharge line

Correct answer: B

20. When cleaning boiler fuel oil atomizer parts, what type of cleaning tool should NEVER be used?

A. Copper tools
B. Brass tools
C. Steel tools
D. Wood tools

Correct answer: C

21. Which of the following extinguishing effects for dry chemical extinguishing agents is considered the most prevalent?

A. smothering and removing the oxygen from the fuel
B. cooling the fuel below ignition temperature
C. removing the fuel by absorbing the heated vapors
D. breaking up the molecular chain reaction

Correct answer: D

22. Which of the listed types of seals is used effectively for pumps handling toxic or highly flammable liquids that cannot be permitted to escape into the atmosphere?

A. Conventional stuffing box
B. Rubber bellows mechanical seal
C. External mechanical seal
D. Double mechanical seal

Correct answer: D

23. At a minimum threshold, how many milliamps of current through the body produces a condition where most people would suffer ventricular fibrillation and could only be resuscitated with a ventricular defibrillator?

A. 3 to 7 mA
B. 10 to 16 mA
C. 30 mA
D. 75 mA for 5 sec.

Correct answer: D

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

A. 3
B. 4
C. 7
D. 10

Correct answer: B

25. Which of the following statements describes the characteristics of precision manufactured roller bearings?

A. Their lubrication is complicated and requires constant attention.
B. They are well adapted to variable speed operation.
C. They are not capable of maintaining alignment over long periods of time.
D. They have a relatively high power loss due to friction.

Correct answer: B

26. Which of the following methods applies to how a vacuum is created by a jet pump or an eductor?

A. A reciprocating plunger directly applying force to a fluid.
B. Centrifugal force converted into potential energy.
C. A propeller drawing a fluid through a Venturi nozzle.
D. A rapidly moving stream of fluid passing through a nozzle.

Correct answer: D

27. 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 moisture trap at the inlet.
C. It must be fitted with a sight glass.
D. It must be fitted with a manhole.

Correct answer: A

28. The pressure of a liquid leaving the pump can be referred to as the _____.

A. discharge head
B. net positive suction head
C. suction head
D. total head

Correct answer: A

29. High concentrations of hydrogen sulfide gas are most dangerous to personnel because they can _____.

A. cause eye inflammation
B. cause involuntary skeletal muscle contractions
C. paralyze your breathing system
D. cause dizziness

Correct answer: C

30. Diesel engines are classified as reciprocating internal combustion engines because they _____.

A. use a continuous combustion process to impart rotary motion to the pistons
B. use energy from fuel burned outside their cylinders
C. burn fuel in a closed chamber which imparts linear motion to pistons
D. burn fuel in a combustion chamber that moves back and forth

Correct answer: C

31. What information can be obtained from a marine chemist's certificate on a tank barge?

A. The barge's stability information.
B. The number of fire extinguishers required onboard.
C. The quality of the barge's cargo.
D. The tanks which are safe to enter when the certificate was issued.

Correct answer: D

32. Which of the following statements is true concerning centrifugal pumps?

A. They are always mounted in a horizontal position.
B. The flow of liquid is developed by imparting energy due to the rotation of an impeller.
C. They are started with the discharge valve opened.
D. They are particularly suited for pumping high viscosity fluids.

Correct answer: B

33. A pump is defined as a device that _____.

A. produces pressure
B. imparts energy to a fluid to move it from point "A" to point "B"
C. creates a vacuum to move a liquid in all installations
D. is to develop a pressure differential

Correct answer: B

34. Which of the following is an example of a solid bearing?

A. Spring bearing
B. Piston pin bushing
C. Turbo-generator turbine bearing
D. Thrust bearing

Correct answer: B

35. When re-entering an engine room that has been flooded with CO2, the investigating team should initially _____.

A. attempt to operate propulsion machinery
B. enter from the highest level with breathing apparatus
C. leave the access door partially open
D. enter from the lowest possible level

Correct answer: B

36. To find the relative humidity of an accommodation space, you would use a _____.

A. Psychrometric Chart
B. Mollier Chart
C. Enthalpy Chart
D. Entropy Chart

Correct answer: A

37. Copper tubing is manufactured and classified as type K, L, and M. Which type would offer the greatest wall thickness for a given nominal size?

A. Type K
B. Type L
C. Type M
D. Type K, L and M have identical wall thicknesses

Correct answer: A

38. Low-velocity water fog is used in firefighting EXCEPT?

A. smothering agent
B. barrier against radiant heat
C. cooling agent
D. creating a coarse water spray

Correct answer: D

39. Remote valve operators are frequently fitted with a handwheel for local operation if the motor fails. If this is so, what is the procedure for local manual control?

A. Just rotate the handwheel in the appropriate direction for valve operation.
B. First move the lever to engage the motor clutch, then rotate the handwheel.
C. First move the lever to disengage the motor clutch, then rotate the handwheel.
D. Motor operated valves are generally not fitted with local handwheels.

Correct answer: C

40. What is the primary purpose of a reach rod as used as a valve remote operator?

A. It decreases the turning effort required to operate the valve.
B. It allows for the operation of valves that would otherwise be out of reach.
C. It reverses the direction of rotation normally required to operate the valve.
D. It changes the type of motion normally required to operate the valve.

Correct answer: B

41. Saltwater ballast is to be discharged into the #6 port and starboard wing tanks. Which combination of valves, illustrated, must be opened, and which valves should be closed? Illustration GS-0139

A. 1, 2, 5 and 6 open; 4, 7, 8 and 9 closed.
B. 1, 2, 7 and 9 open; 3, 4, 5, 6, 8 and 10 closed.
C. 1, 3, 5, 6, 8 and 10 open; 2, 4, 7 and 9 closed.
D. 3, 4, 7 and 9 open; 1, 2, 5, 6 and 10 closed.

Correct answer: C

42. Which of the listed pipe sizes is not commonly used?

A. 3/8 inch
B. 1/2 inch
C. 5/8 inch
D. 3/4 inch

Correct answer: C

43. According to the illustrated steam tables, what would be the latent heat of vaporization for boiler water if the auxiliary boiler was operating at 135.3 psig? Illustration SG-0004

A. 330.5 BTU/lb.
B. 358.42 BTU/lb.
C. 863.6 BTU/lb.
D. 1194.1 BTU/lb.

Correct answer: C

44. Positive displacement, helical gear pumps are well suited for pumping oil because _____.

A. stuffing boxes eliminate the leakage problems usually associated with other gear pumps
B. these pumps are designed with extreme tooth angles
C. they are essentially self-priming and capable of a high suction lift
D. it is not necessary to closely maintain design clearances with this pump

Correct answer: C

45. What statement below summarizes an engine lubricating oil's viscosity given as 20W-50?

A. It is formulated for hot summer days when the cooling water temp is 50°F higher than the oil temperature.
B. It is formulated for a metric weight of 20 milligrams at 50°F.
C. The "W" designates what the additives are that are added to this oil.
D. It is formulated for both a low temperature and a high temperature based on viscosities determined at 100°C.

Correct answer: D

46. Where will you find the procedures for the reporting of oil discharge into the water?

A. The vessel's Oil Record Book
B. The vessel's Certificate of Inspection
C. The vessel's International Oil Pollution Prevention Certificate
D. The vessel's Response plan

Correct answer: D

47. Pressure in an operating hydraulic system is developed _____.

A. solely by the charge applied by the accumulators
B. only by the pump as its primary function
C. by resistance to the fluid flow through the system
D. by the thermal input to the system's fluid

Correct answer: C

48. Under what conditions is a CAUTION tag installed at equipment control stations in preparation for performing maintenance or repairs?

A. When operation of the equipment requires temporary special instructions to be provided.
B. When operation of the equipment will endanger personnel ONLY.
C. When operation of the equipment will harm the equipment ONLY.
D. When operation of the equipment will endanger personnel OR harm the equipment.

Correct answer: A

49. The Muster List ("Station Bill") shows each crew lifeboat station, their duties during abandonment, basic instructions, and _____.

A. work schedule
B. the time each weekly drill will be held
C. instructions for lowering the survival capsule
D. all emergency signals

Correct answer: D

50. When renewing spiral packing in a centrifugal pump stuffing box, the packing gland nuts should be _____.

A. loosened until the gland clears the stuffing box
B. first tightened, and then backed off, start pump, and while running under normal conditions; tighten evenly and slightly, over time
C. tightened an additional 10% to compress the packing
D. left in that position

Correct answer: B

51. The three basic parts of any eductor are the nozzle, the suction chamber, and the _____.

A. compressor
B. diffuser
C. siphon
D. injector

Correct answer: B

52. Taps and dies used for threading pipe, under U.S. standards, are _____.

A. not fluted
B. straight
C. tapered
D. not hardened

Correct answer: C

53. What type of direct reading thermometer works on the principle of thermal volumetric expansion of a liquid as the temperature rises and features a linear scale?

A. Bimetallic thermometer
B. Thermocouple pyrometer
C. Liquid-in-glass thermometer
D. Bourdon tube thermometer

Correct answer: C

54. The cubic inch (or liter) displacement of a cylinder is determined by the diameter of the piston and the _____.

A. length of the crankshaft
B. volume of the clearance space
C. weight of the piston
D. length of the stroke

Correct answer: D

55. In terms of the completeness of combustion, in performing a stack gas analysis on an operating boiler, what would be the indication of the LEAST complete combustion?

A. Relatively high CO_2 percentage and relatively low CO percentage.
B. Relatively low CO_2 percentage and relatively low CO percentage.
C. Relatively high CO_2 percentage and relatively high CO percentage.
D. Relatively low CO_2 percentage and relatively high CO percentage.

Correct answer: D

56. A hole in the hull above the waterline may be temporarily patched with _____.

A. mattresses
B. blankets
C. pillows
D. all of the above

Correct answer: D

57. One of the limitations of foam as a fire extinguishing agent is that foam _____.

A. is corrosive and a hazard to firefighters
B. is heavier than oil and sinks below its surface
C. cannot be made with salt water
D. conducts electricity

Correct answer: D

58. A definite advantage in the use of water as a fire extinguishing agent is its ability to _____.

A. vaporize and rapidly expand as water absorbs heat
B. absorb smoke and gases as water is converted from liquid to vapor
C. rapidly contract as water is converted from a liquid to a vapor
D. alternate expansion and contraction as water in liquid state becomes vapor

Correct answer: A

59. Why is it essential to introduce CO2 from a fixed fire extinguishing system, into a large engine room, as quickly as possible?

A. To keep the fire from spreading through the bulkheads.
B. The fire may warp the CO2 piping.
C. Carbon dioxide takes a long time to disperse to all portions of a space.
D. Updraft from the fire tends to carry the CO2 away.

Correct answer: D

60. If vomiting occurs during a resuscitation effort, the best immediate procedure to follow is _____.

A. ignore it and continue mouth-to-mouth ventilation
B. switch to mouth-to-mouth ventilation
C. pause for a moment until the patient appears quiet again, then resume mouth-to-mouth ventilation
D. turn the patient's body to the side, sweep out the mouth and resume CPR

Correct answer: D

61. A magnetic strainer is primarily used in diesel engine reduction gear oil systems to remove small particles of _____.

A. ferrous materials
B. babbitt
C. acidic materials
D. copper

Correct answer: A

62. When securing the operation of an inert gas system, the final step should be _____.

A. secure the inert gas blower
B. close the deck isolating valve
C. close the flue gas isolating valve
D. secure the saltwater supply to the scrubber

Correct answer: D

63. The possibility of a diesel engine crankcase explosion will be increased by operating an engine _____.

A. in cooler sea water temperatures
B. with a crankcase vacuum between 1.5" and 2" of water
C. equipped with a crankcase exhaust blower which vents to fresh air
D. with a leaking crankcase inspection cover gasket

Correct answer: D

64. Of the many impurities commonly found in marine lubricating oil, which of the following CANNOT be removed by a centrifugal purifier at normal operating speeds and temperatures?

A. Metal particles
B. Carbon particles
C. Water
D. Diesel fuel oil

Correct answer: D

65. Wooden shoring is used in shipboard damage control to _____.

A. force a sprung bulkhead back into place
B. support a damaged bulkhead in position
C. prevent fractures from spreading
D. force a warped bulkhead back into its normal position

Correct answer: B

66. The simplest method to use for determining if a centrifugal pump is operating as designed, is to _____.

A. close off the discharge valve, and watch for a rise in pressure
B. closely observe the pump discharge temperature
C. momentarily close off the suction valve, and watch for a rise in pressure
D. use a clamp-on ammeter and compare the readings to past records

Correct answer: A

67. What is an engine room bilge oily-water separator designed to do?

A. Remove small amounts of water from large amounts of oil.
B. Remove small amounts of water from small amounts of oil.
C. Remove small amounts of oil from large amounts of water.
D. Remove small amounts of oil from small amounts of water.

Correct answer: C

68. What is the best protection against hand injuries from pinch points associated with being required to perform maintenance or repairs on rotating machinery?

A. Donning the appropriate hand protection such as work gloves.
B. Donning the appropriate head protection such as a hard hat.
C. Donning the appropriate foot protection such as steel-toed safety shoes.
D. Properly locking out and tagging out the machine before work begins.

Correct answer: D

69. Which fire extinguisher is most prone to freezing when stowed in low temperatures?

A. Foam
B. Carbon dioxide
C. Halon 1211
D. Dry chemical

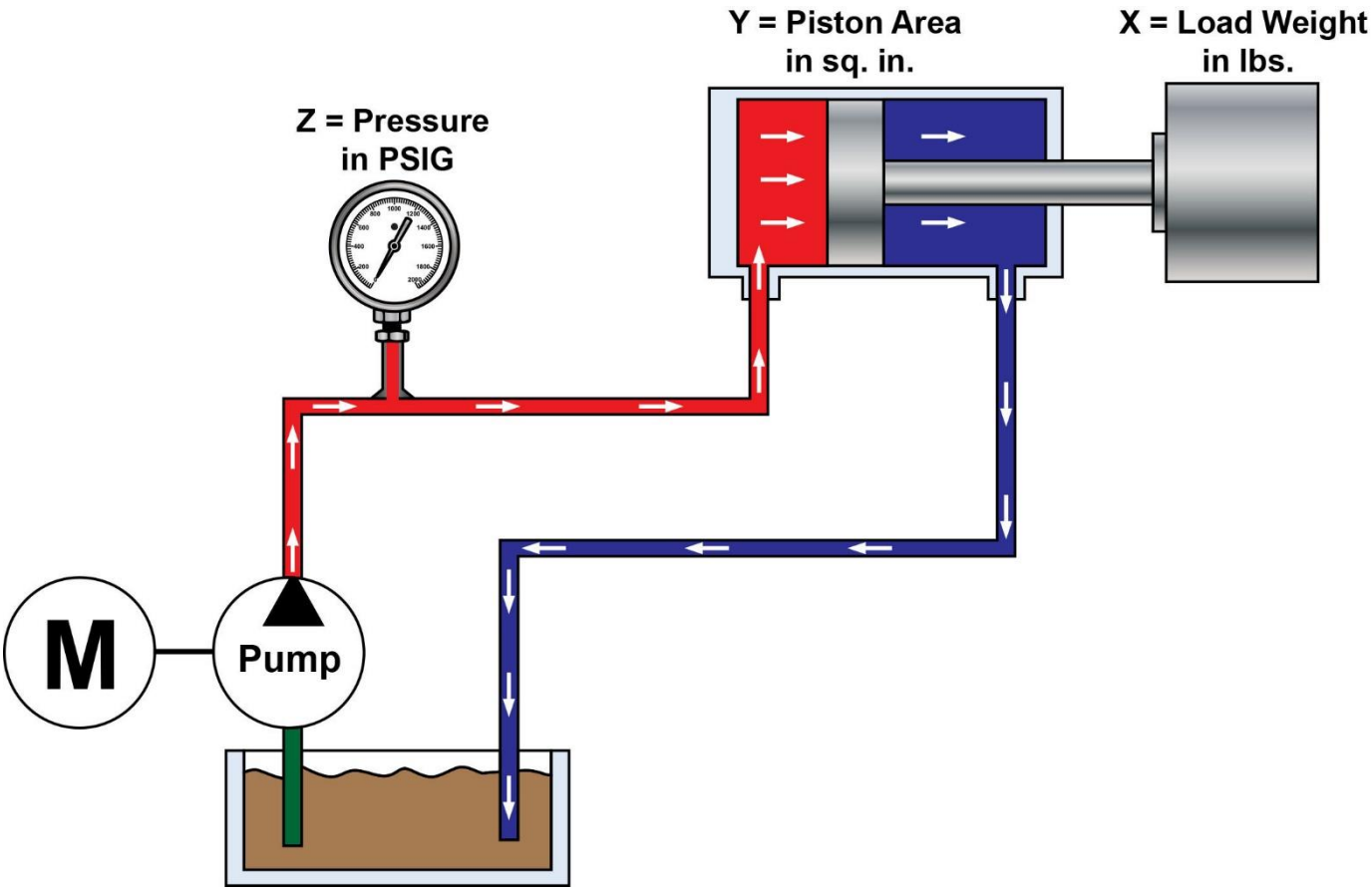
Correct answer: A

70. Mechanical shaft seals used on water service pumps require lubrication of the seal faces to minimize deposits of foreign matter on those surfaces. Which of the following pressures and lubricants are required?

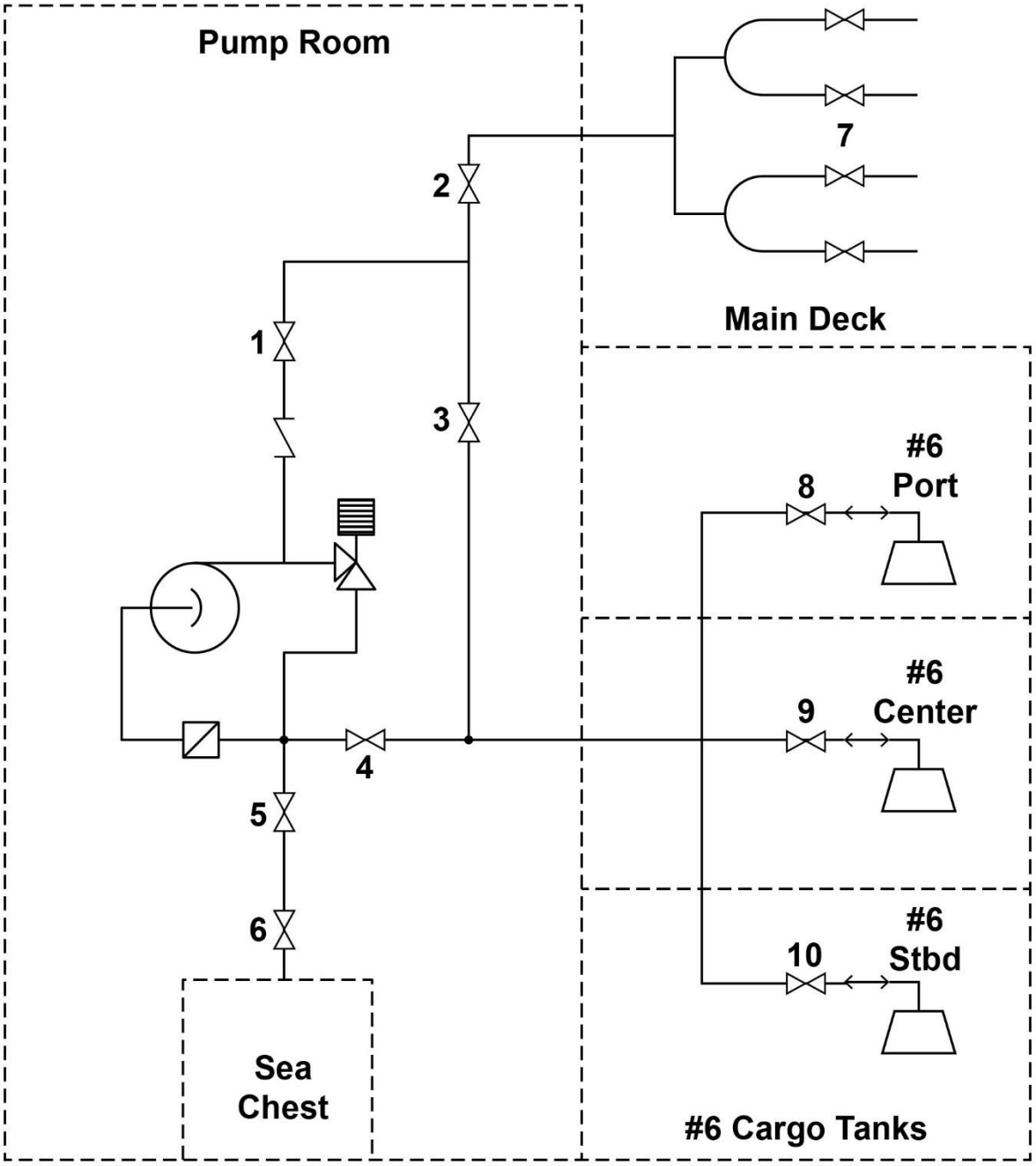
A. Oil under positive pressure.
B. Water under negative pressure.
C. Water under positive pressure.
D. Oil under negative pressure.

Correct answer: C

GS-0062



GS-0139



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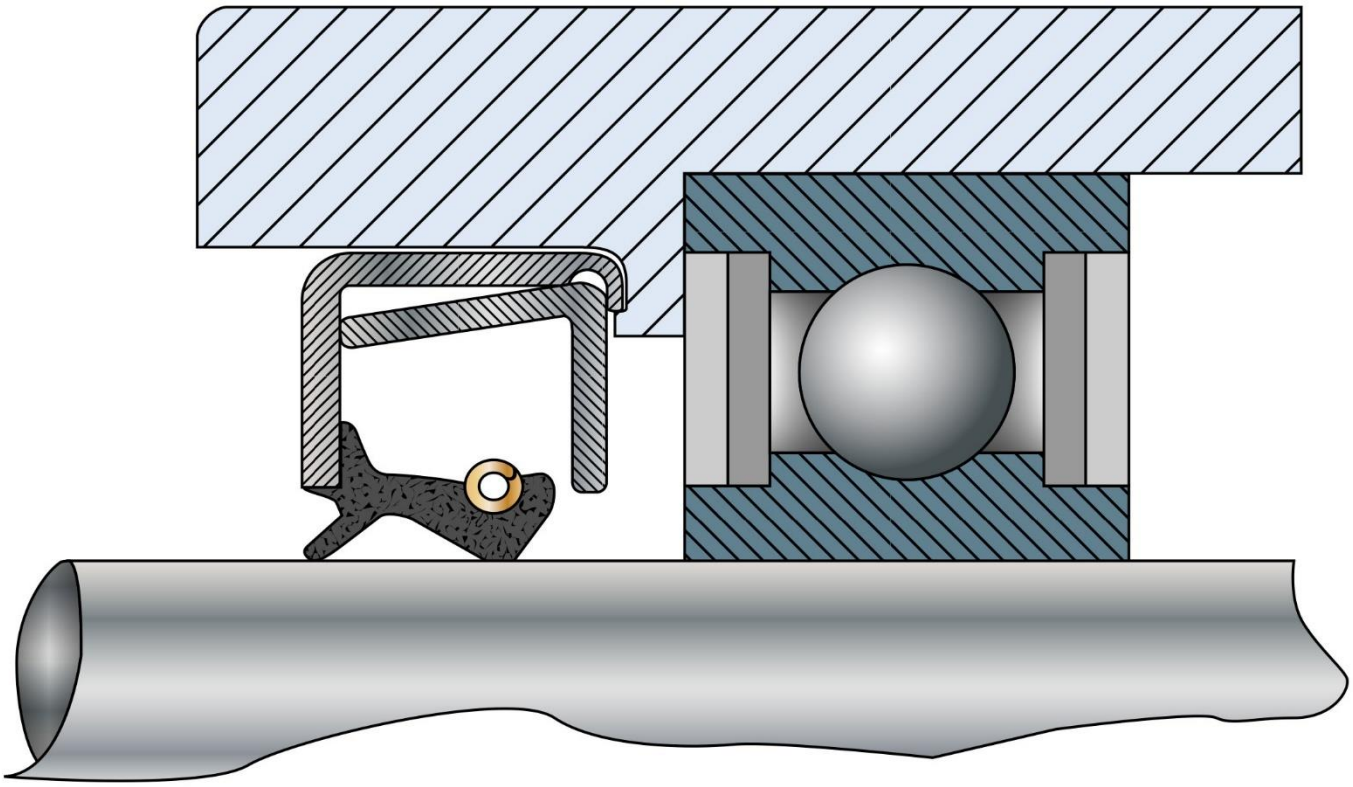

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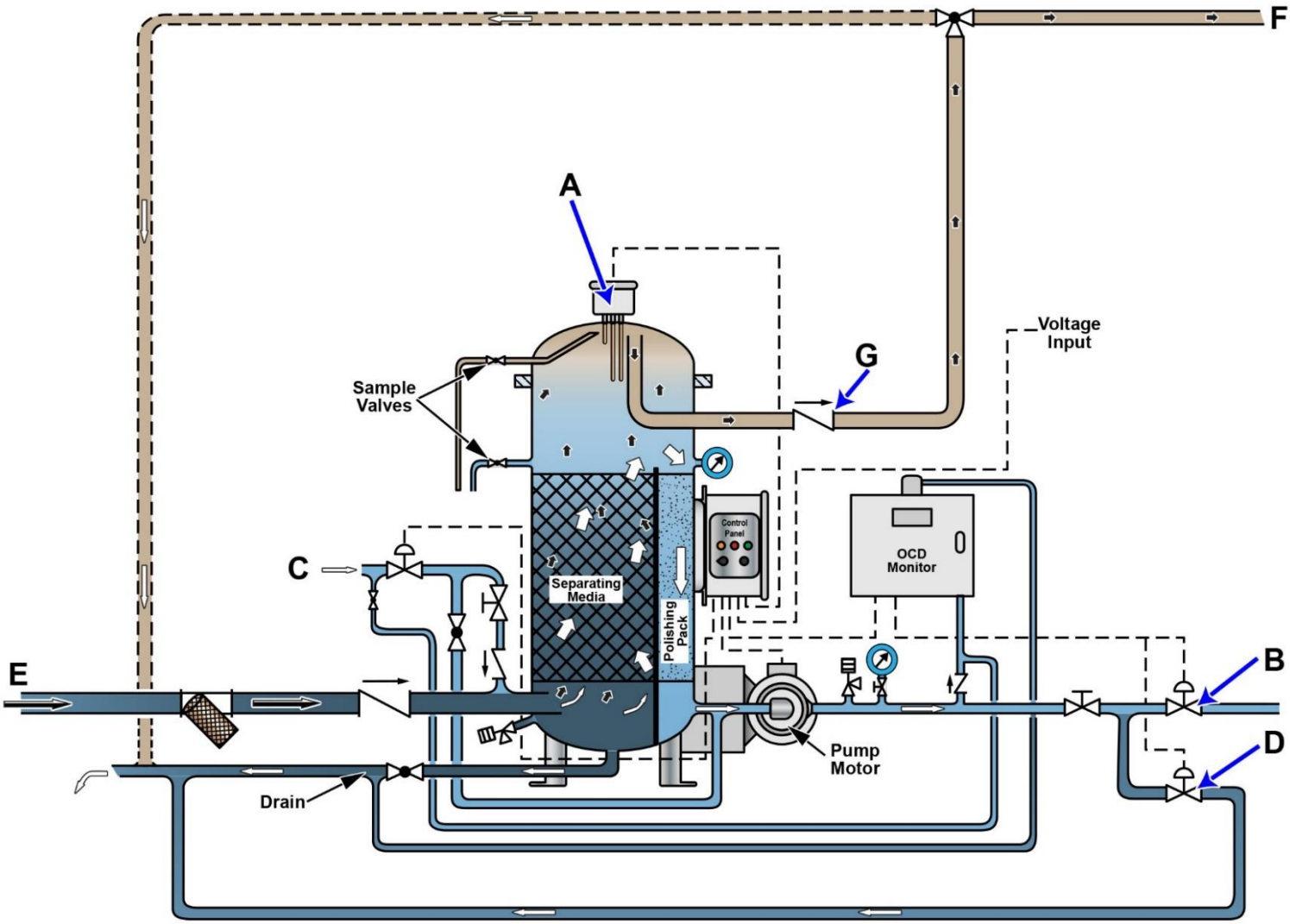

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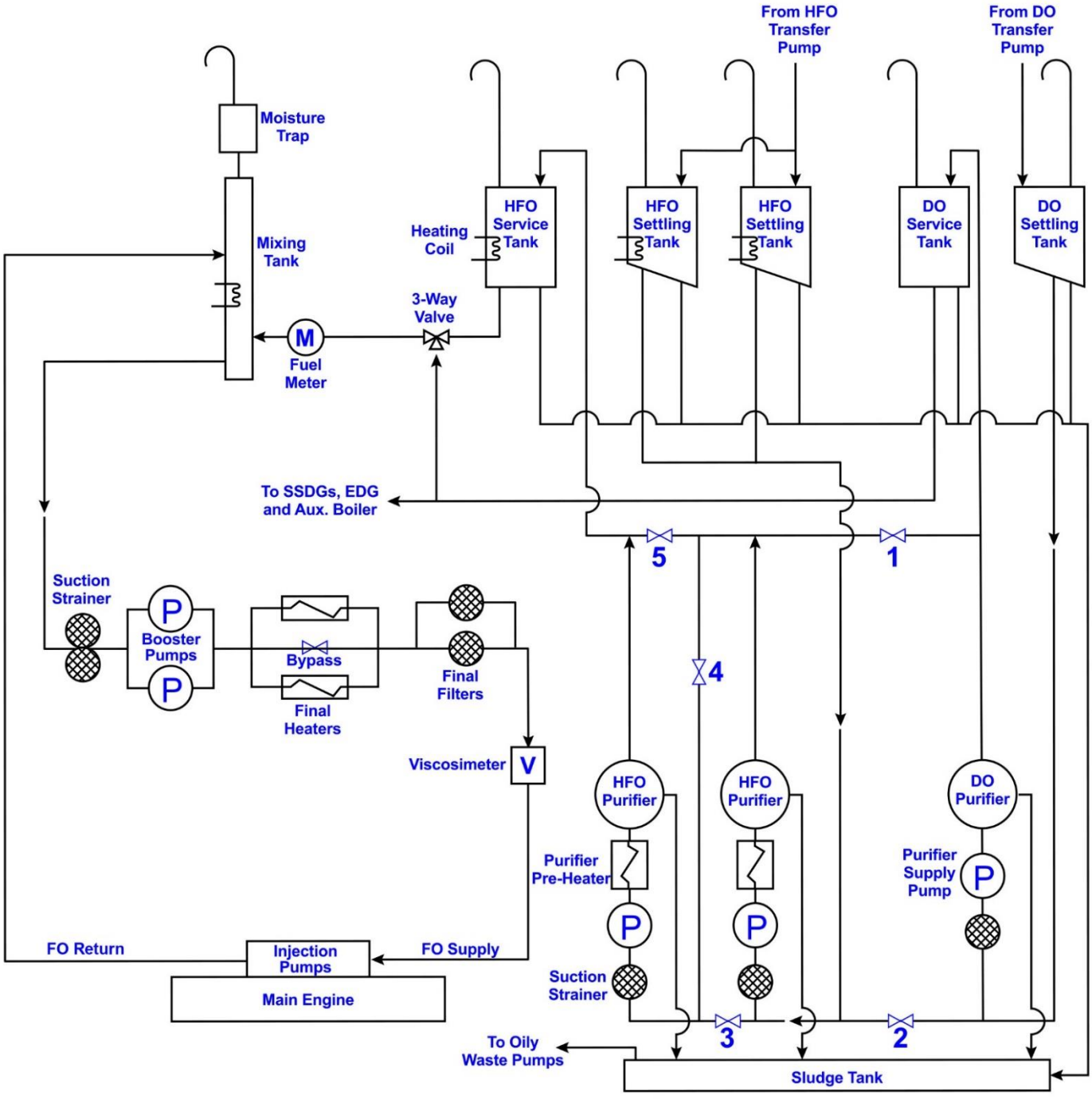

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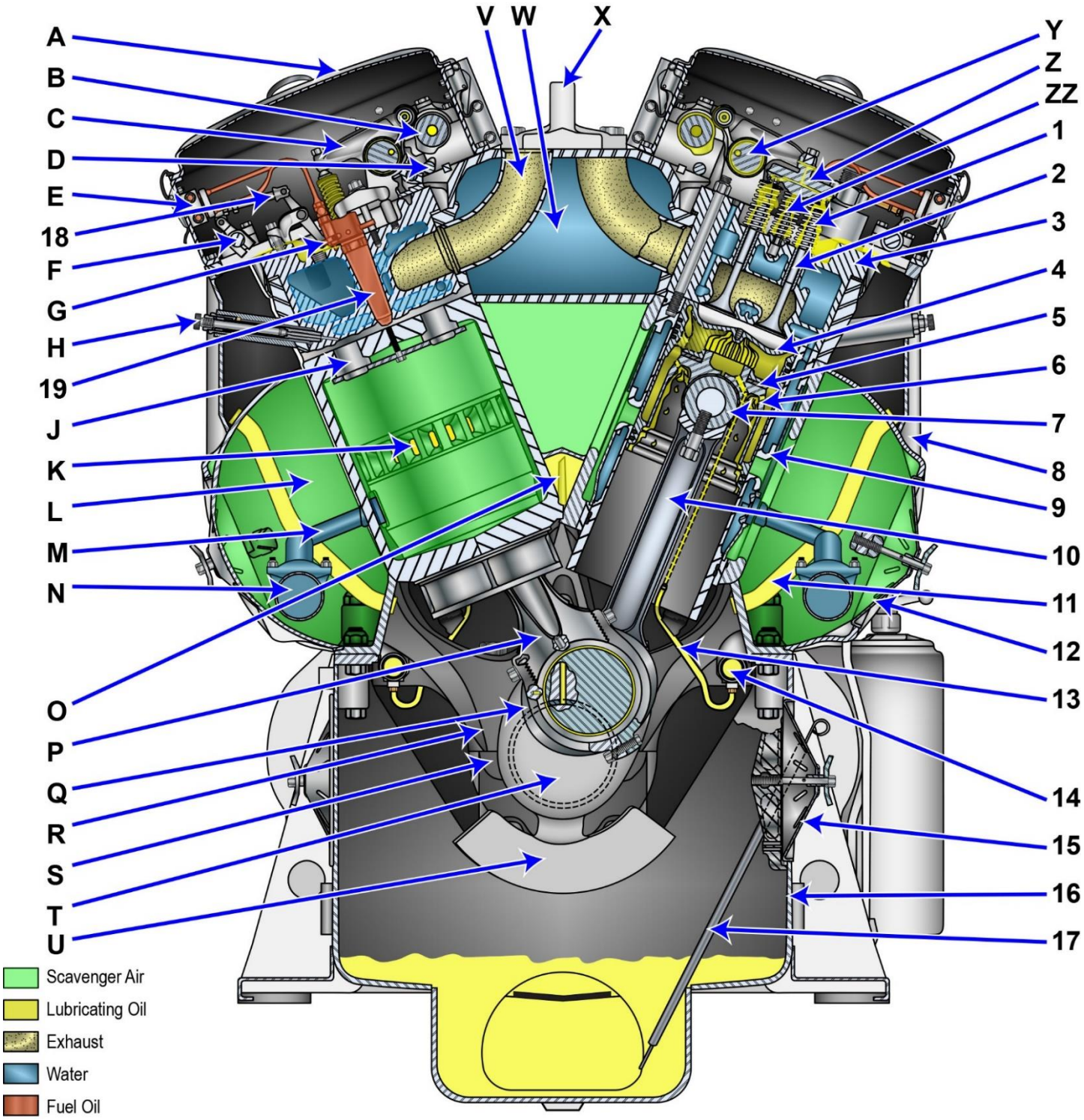
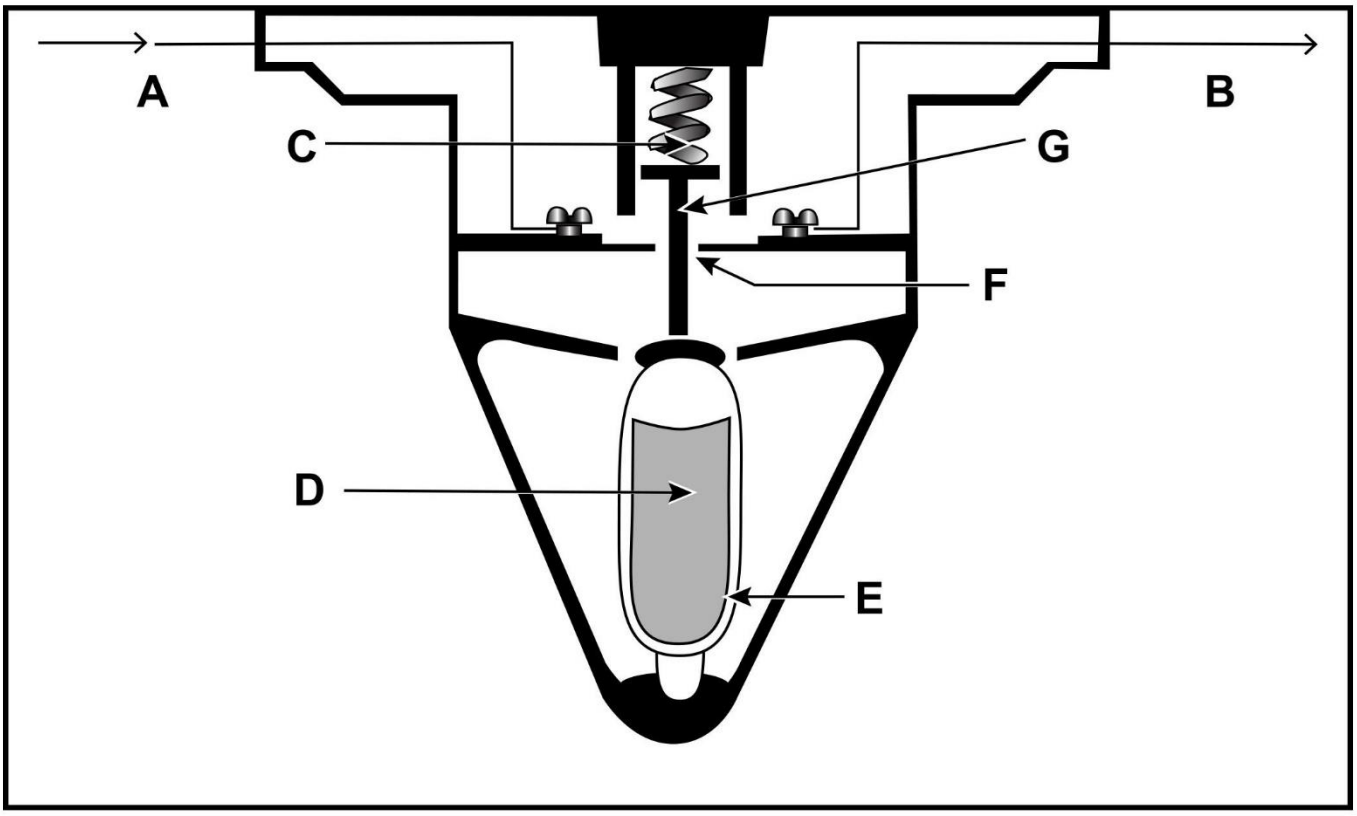


SF-0004



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