U.S.C.G. Merchant Marine Exam

OSV – Chief Engineer

Q683 Engineering Safety & Environmental Protection

(Sample Examination)

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

1. Your vessel has just been struck by another vessel. After meeting with the captain and chief mate, you have immediately ordered the vessel specific damage control procedures in the vessel's approved stability booklet to be enacted. Which of the following statements is true?

   A. The vessel general arrangement plan would be a critical reference document for your response providing accurate data showing watertight compartments, closures, vents and downflooding angles.
   B. The Certificate of Documentation issued to the vessel will be the primary reference document in order to calculate free surface corrections.
   C. The universal station billet assigning crew member responsibilities will provide adequate reference information to determine the adequate damage control response.
   D. The Safety Management System will provide an IMO standard response for all collision response procedures, including damage control.

   Correct answer: A

2. Which of the methods shown in the illustration is the correct way to fit shoring? Illustration SF-0016

   A. A
   B. B
   C. C
   D. D

   Correct answer: A

3. While maneuvering up the East River your vessel runs aground. As the chief engineer of the vessel how would you proceed?

   A. Sound all fuel oil tanks and inspect the engine room bilges and void spaces.
   B. Switch the saltwater cooling suction to the low sea suction.
   C. Wait until the vessel docks to sound the fuel oil tanks.
   D. Call your port engineer.

   Correct answer: A

4. The wooden plug fitted tightly in the vent of a damaged tank may prevent the tank from _____.

   A. collapsing
   B. developing free surface moments
   C. filling completely
   D. developing free surfaces

   Correct answer: C

5. In a compartment that has been completely flooded with water, the greatest pressure will be exerted _____.

   A. at the vertical center of the bulkhead
   B. along the top of the bulkhead
   C. at a point that is one-third from the bottom of the bulkhead
   D. along the bottom of any bulkhead

   Correct answer: D

6. The safe and efficient use of the facepiece of a self-contained breathing apparatus is directly influenced by _____.

   A. the donning of the facepiece
   B. the stowing of the facepiece
   C. the maintenance of the facepiece
   D. all of the above

   Correct answer: D

7. Which of the following statements is TRUE concerning life jackets?

   A. Buoyant vests may be substituted for life jackets.
   B. Life jackets are designed to turn an unconscious person's face clear of the water.
   C. Life jackets must always be worn with the same side facing outwards to float properly.
   D. Lightly stained or faded life jackets will fail in the water and should not be used.

   Correct answer: B

8. If for any reason it is necessary to abandon ship while far at sea, it is important for the crew members to _____.

   A. separate from each other as this will increase the chances of being rescued
   B. get away from the area because sharks will be attracted to the vessel
   C. immediately head for the nearest land
   D. remain together in the area because rescuers will start searching at the vessel's last known position

   Correct answer: D

9. Which of the following statements concerning immersion suits is correct?

   A. Suits are not required to automatically turn an unconscious person face-up in the water.
   B. The immersion suit seals in all body heat and provides protection against hypothermia for weeks.
   C. The suit is flameproof and provides protection to the wearer while swimming through burning oil.
   D. The suits provide for limited body movement such as walking, climbing a ladder, and picking up small objects like a pencil.

   Correct answer: D

10. In order to retrieve an inflatable life raft and place it on deck, you should heave on the _____.

    A. lifelines
    B. righting strap
    C. sea anchor
    D. towing bridle

    Correct answer: D

11. Which of the lifeboat parts listed must be painted bright red?

    A. Hatches
    B. Releasing gear lever
    C. Boat hooks
    D. Compass

    Correct answer: B

12. A self-righting survival craft will return to an upright position provided that all personnel _____.

    A. are seated with seatbelts on and doors shut
    B. are seated with seatbelts on and doors open
    C. are to shift to one side to right it
    D. escape from the craft

    Correct answer: A

13. When a rescue vessel approaches a survival craft in heavy seas, the person in charge of the survival craft should _____.

    A. tie up to the rescue vessel
    B. transfer only those personnel who are not seasick
    C. wait for calmer weather before transferring personnel
    D. transfer all personnel immediately

    Correct answer: C

14. Before entering any space that has been sealed, its oxygen level should be tested. What level of oxygen in the space is equal to fresh air?

    A. 10.0%
    B. 15.8%
    C. 20.8%
    D. 25.8%

    Correct answer: C

15. All of the following are part of the fire triangle EXCEPT _____.

    A. fuel
    B. oxygen
    C. heat
    D. electricity

    Correct answer: D

16. The upper explosive limit (UEL) of a mixture of flammable vapors and air is defined as _____.

    A. that concentration above which there is just enough flammable vapor to produce an explosion
    B. that concentration above which the mixture is too rich to burn
    C. the percentage of flammable vapor by volume in air sufficient to create an explosion
    D. the percentage of oxygen present in the air sufficient to support combustion

    Correct answer: B

17. Through which of the listed processes is sufficient heat produced to cause spontaneous ignition?

    A. Aeration
    B. Anaerobic decomposition
    C. Putrefaction
    D. Oxidation

    Correct answer: D

18. To prevent the spread of fire by convection you should _____.

    A. cool the bulkhead around the fire
    B. shut off electrical power
    C. close all openings to the area
    D. remove combustibles from direct exposure

    Correct answer: C

19. You are conducting training on firefighting procedures. What type of fire is characterized by the burning of ordinary combustible materials where the quenching and cooling effects of quantities of water, or solutions containing large percentages of water, are of first importance?

    A. Type A
    B. Type B
    C. Type C
    D. Type D

    Correct answer: A

20. A Type A fire has been reported onboard your vessel. What type of materials would your fire teams expect to find at the scene?

    A. Flammable liquids, greases, etc., where a blanketing effect is essential
    B. Electrical equipment where the use of a non-conducting extinguishing agent is of first importance
    C. Ordinary combustible materials where the quenching and cooling effects of quantities of water, or solutions containing large percentages of water, are of first importance
    D. Metals

    Correct answer: C

21. Which of the following procedures reduces the possibility of an interior ventilation duct fire from rapidly spreading?

    A. Having a portable CO2 ready at each duct opening
    B. Keeping the duct exterior clean
    C. Having a fire hose charged at each duct opening
    D. Keeping the duct interior clean

    Correct answer: D

22. When required to work in an area where explosive gases may accumulate, you should use hand tools which are _____.

    A. fixed with a ferrous cover
    B. high carbon steel
    C. approved by the Coast Guard
    D. non-ferrous

    Correct answer: D

23. Good housekeeping on a vessel prevents fires by _____.

    A. allowing better access in an emergency
    B. eliminating potential fuel sources
    C. eliminating trip hazards
    D. improving personnel qualifications

    Correct answer: B

24. Your ship is leaving port after almost a complete crew change out. The captain has ordered a fire drill simulating a fire in the engine room with full emergency gear and all hoses run out. What is the reason for drilling with this kind of simulation?

    A. The World Health Organization requires crews to get regular exercise in the form of fire drills.
    B. This ensures that your crew is prepared to combat a shipboard fire using ship's equipment.
    C. Regulations require a full fire drill when more than half the crew changes out.
    D. It provides a quick method to inventory all of the firefighting gear.

    Correct answer: B

25. How would you ensure that your crew is prepared to combat a shipboard fire using ship's equipment?

    A. Conduct required drills, simulating fire conditions and training with ship's equipment.
    B. Check training records, to see if crew members have attended a firefighting training course.
    C. Have them read a firefighting textbook.
    D. Show crew generic fire training videos.

    Correct answer: A

26. Fire detecting systems on merchant vessels may be arranged to sense _____.

    A. rate of temperature rise
    B. ionized particles
    C. smoke
    D. all of the above

    Correct answer: D

27. When an oil fire has been extinguished, the surface of the oil should be kept covered with foam to prevent _____.

    A. spontaneous combustion below the oil surface
    B. toxic fumes from escaping to the surface
    C. boiling of the heated oil
    D. air from contacting the oil vapors permitting reignition

    Correct answer: D

28. The most common cooling agent used for fighting fires on tank vessels is _____.

    A. flue gas
    B. carbon dioxide
    C. steam smothering
    D. water

    Correct answer: D

29. To activate a foam type portable fire extinguisher, you must _____.

    A. strike the bottom of the extinguisher against the deck
    B. pump the hand lever for pressure
    C. pull the pin and squeeze the grips
    D. turn the extinguisher upside down

    Correct answer: D

30. The state of charge of a stored pressure type dry chemical fire extinguisher can be readily determined by _____.

    A. weighing the CO2 cartridge
    B. visual inspection of the pressure gage
    C. weighing the cylinder
    D. removing the lid and checking the level of dry chemical

    Correct answer: B

31. The fire extinguishing equipment shown in the illustration is a large _____. Illustration SF-0009

    A. Halon 1301 hose reel system
    B. dry chemical hose reel system
    C. CO2 hose reel system
    D. light water hose reel system

    Correct answer: B

32. Water applied as a "fog" can be more effective than water applied as a "solid stream", because _____.

    A. it reduces the total amount of water that must be pumped into the ship to fight a given fire
    B. a given amount of water can absorb more heat when it is in the form of fog
    C. it does not have to hit the seat of fire to be effective
    D. of all of the above

    Correct answer: D

33. The physical difference of the water spray patterns developed by the high velocity tip and low velocity applicator is due to _____.

    A. the capacity of the fire pump
    B. a difference in water pressure
    C. the method of breaking up the water stream
    D. the type of fire being fought

    Correct answer: C

34. Actuating the fixed CO2 system should cause the automatic shutdown of the _____.

    A. fuel supply only
    B. supply and exhaust ventilation
    C. exhaust ventilation only
    D. mechanical and natural ventilation

    Correct answer: B

35. What would be a major consequence of allowing the refrigeration system of a low-pressure fixed CO2 fire extinguishing system to remain inoperable?

    A. The warmed charge of CO2 would not be effective in extinguishing a fire.
    B. The entire charge may eventually be lost due to CO2 boil-off venting through the relief valve.
    C. Excessive condensation inside the tank would freeze causing a restriction in the discharge piping.
    D. Liquid CO2 would overflow from the tank through the drain line as the temperature is increased.

    Correct answer: B

36. If a fire ignites in the engine room as a result of a high-pressure fuel oil leak, you should FIRST _____.

    A. shut off the fuel oil supply
    B. secure the ventilation
    C. find a soda acid extinguisher
    D. secure the generator

    Correct answer: A

37. You are the engineer on a vessel with a periodically unattended machinery space. A fire has been reported in the engine room and you cannot make entry into the space. How would you direct the emergency squad team leader to charge the fire main?

    A. Start the emergency fire pump remotely from the chief mate's office.
    B. Start the engine room fire pump from the chief engineer's office.
    C. Start the engine room fire pump from the bridge.
    D. Start the emergency fire pump remotely from the bridge or emergency gear locker.

    Correct answer: D

38. If a fire occurs in an electric cable, in which the inner layers of insulation, or the insulation covered by armor is burning, you should _____.

    A. secure power to the cable
    B. separate the two ends
    C. cut the cable with an insulated cable cutter
    D. all of the above

    Correct answer: D

39. When fighting a liquefied natural gas fire, you should _____.

    A. use only carbon dioxide
    B. secure the source of gas, then extinguish the fire
    C. use only dry chemical
    D. extinguish the fire, then secure the source of gas

    Correct answer: B

40. In the event of an exhaust duct fire, most dry chemical and carbon dioxide galley range fixed extinguishing systems are automatically activated through the action of a stainless-steel cable, spring and a _____.

    A. fusible link
    B. stack switch
    C. thermostat
    D. pyrostat

    Correct answer: A

41. As first engineer you are the senior engineering officer in Emergency Squad #1. The fire alarm sounds, and you report to the muster station where the bridge informs you smoke has been reported coming from the ship's laundry room. What should your first action be?

    A. Charge the ship's fire main.
    B. Help dress out other crew members in fireman's outfit.
    C. Start boundary cooling the area.
    D. Secure power and ventilation to the laundry room and inform the bridge once this is done.

    Correct answer: D

42. The volatility of a liquid is the tendency of a liquid to _____.

    A. vaporize
    B. ignite
    C. asphyxiate
    D. explode

    Correct answer: A

43. The "flammable limits" of an atmosphere are the _____.

    A. two temperatures between which an atmosphere will self-ignite
    B. upper and lower pressures between which an atmosphere will not burn
    C. upper and lower percentage of vapor concentrations in an atmosphere which will burn if an ignition source is present
    D. two temperatures between which an atmosphere will burn if an ignition source is present

    Correct answer: C

44. When preparing to pump flammable liquids with a centrifugal pump, you should _____.

    A. have a standby pump running with the discharge valve closed
    B. lift the relief valve by hand to check its operation
    C. check for gland leakage and any fire hazard
    D. draw a small quantity of liquid to prime the pump

    Correct answer: C

45. Which of the following is classified as a grade "E" combustible liquid?

    A. Most commercial gasoline
    B. Very light naphtha
    C. Benzene
    D. Bunker "C"

    Correct answer: D

46. Which of the following methods will reduce the possibility of producing an electrical spark?

    A. Using a cargo hose with a built-in electrical bonding wire
    B. Placing an insulating flange or a section of non-conducting hose in the hose setup
    C. Connecting a bonding wire between the shoreside piping and the vessel
    D. All of the above.

    Correct answer: D

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

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

    Correct answer: B

48. The atmosphere of an empty fuel tank is tested and designated "gas free". Which of the following statements is correct concerning this tank?

    A. The tank should be frequently retested.
    B. The gas free status is good as long as the initial conditions remain unchanged.
    C. The concentration of flammable gas in the compartment is less than 10% of the lower flammable limit.
    D. All of the above.

    Correct answer: D

49. If the chemical material is a mixture, what must the Safety Data Sheet (SDS) identify?

    A. Paints or coatings that are safe to use with it
    B. The name of each hazardous ingredient
    C. Other similar mixtures of liquids, solids or gases
    D. None of the above

    Correct answer: B

50. With regards to a ship's Oil Record Book, an oil tanker of 150 gross tons and above must maintain entries in _____.

    A. Part I only
    B. Part II only
    C. Both Part I and Part II
    D. Part III

    Correct answer: C

51. Which ship must maintain Part II (Cargo/Ballast Operations) of the Oil Record Book?

    A. A non-tanker that carries more than 200 cubic meters of oil in bulk
    B. An oil tanker of 100 gross tons or above
    C. A ship of 200 gross tons or above, other than an oil tanker
    D. A ship of 150 gross tons or above, other than an oil tanker

    Correct answer: A

52. Which of the following machinery space operations is required to be logged in the Oil Record Book?

    A. Daily inspection of engine room bilges
    B. Changing out sprayer plates to adjust for steam demand
    C. Ballasting or cleaning of fuel oil tanks
    D. Shifting suction of main fuel pump to reserve fuel oil tank

    Correct answer: C

53. During fueling operations oil is detected in the water adjacent to your vessel. If, however, it is determined to be from some source other than your vessel, you should _____.

    A. make an entry in the Oil Record Book to that effect
    B. notify the Coast Guard
    C. secure operations until the exact type of oil is determined
    D. all of the above

    Correct answer: B

54. After fuel tanks have been filled and bunkers completed, which of the listed procedures should be followed next?

    A. The tanks should be marked with a bull stamp on the manifold filling valve.
    B. The tanks should be sounded to verify levels.
    C. The pressure-vacuum relief valve should be reset.
    D. The tanks should be made seaworthy to prevent contamination.

    Correct answer: B

55. Coast Guard regulations require a shipboard oil pollution emergency plan to be reviewed _____.

    A. once a year
    B. once every two years
    C. once every four years
    D. once every five years

    Correct answer: A

56. Which of the following statements is true concerning the overboard discharge of vessel sewage at sea?

    A. The vessel must have an approved sewage plant.
    B. The vessel may discharge disinfected and comminuted sewage into the sea, from an approved system, only if the vessel is more than 3 nautical miles from the nearest land.
    C. The vessel may discharge sewage into the sea, from an approved system which is not comminuted or disinfected, only if the vessel is more than 12 nautical miles from the nearest land.
    D. All of the above.

    Correct answer: D

57. Victual waste is _____.

    A. any garbage that comes from food or food provisions
    B. the final waste product of a manufacturing process
    C. the resultant sludge that is collected after water washing a boiler
    D. the final discharge of sewage treatment plants

    Correct answer: A

58. You are providing onboard training to your engineers on the factors affecting trim and stability. What instructions do you give your engineers to stabilize the ship should it experience an unstable rolling behavior?

    A. Add ballast to a centerline double bottom tank
    B. Discharge dirty ballast from a centerline double bottom tank
    C. Discharge water from the forepeak tank
    D. Add ballast to wing tank to the side of the ship with an angle of list

    Correct answer: A

59. As chief engineer of an oceangoing passenger vessel, it is important to know the effect of trim and stability of your ship in the event of damage to a compartment. To minimize the impact of flooding in the event of a grounding, what should be your ship's safe practice regarding watertight doors and hatches?

    A. All watertight doors in subdivision bulkheads shall be kept open during normal operation, except during adverse weather when they shall be closed.
    B. All watertight doors in subdivision bulkheads shall be kept closed during navigation except when necessarily opened for working of the vessel, and in such cases, they shall always be ready to be immediately closed.
    C. All watertight doors in subdivision bulkheads shall be kept closed when the vessel is anchored except when necessarily opened for working of the vessel, and in such cases, they shall always be ready to be immediately closed.
    D. All watertight doors in subdivision bulkheads shall be kept open during navigation to facilitate crew movement and in all cases, they shall always be ready to be immediately closed.

    Correct answer: B

60. As chief engineer you should understand the fundamental principles of ship construction and theory and factors affecting trim and stability, including the concept of loll and its cause. An angle of loll is commonly caused by which of the following conditions?

    A. A negative GM
    B. An off-center weight
    C. Free surface with G remaining below M
    D. High external force such as wind and current

    Correct answer: A

61. Your vessel was damaged in a collision and one compartment has partially flooded. The vessel has free communication with the sea with water flowing in and out as the vessel rolls. Which of the following is the most important factor contributing to free communication loss of stability?

    A. Distance from the vessel centerline to the centerline of the damaged compartment
    B. Depth from the bottom of the damaged compartment to the waterline
    C. Breadth of the damaged compartment affected
    D. Whether or not the damaged compartment on the opposite side of the vessel is full or empty

    Correct answer: A

62. With no environmental forces acting on the vessel, the center of gravity of an inclined vessel is vertically aligned with the _____.

    A. original vertical centerline
    B. metacenter
    C. center of flotation
    D. longitudinal centerline

    Correct answer: A

63. When a vessel is inclined, the tendency for it to return to its original position is caused by the _____.

    A. upward movement of the center of flotation
    B. movement of the center of buoyancy toward the low side of the vessel
    C. movement of the center of gravity
    D. increased free surface in the buoyant wedge

    Correct answer: B

64. If flammable vapors have penetrated a gas free space, which of the following actions would be the most hazardous to perform?

    A. Opening switches in the space to de-energize circuits
    B. Closing switches adjacent to the space to operate vent fans
    C. Leaving electrical circuits energized in the space
    D. Securing all power to the space from a remote location

    Correct answer: A

65. The airborne concentrations of substances (such as hydrogen sulfide) under which nearly all workers may be repeatedly exposed without adverse effects are called _____.

    A. exposure limits
    B. concentration limits
    C. threshold limit values
    D. substance limit values

    Correct answer: C

66. An oxygen indicator will detect _____.

    A. the presence of harmful amounts of carbon monoxide
    B. an oxygen deficiency in a space
    C. concentrations of explosive gas
    D. all of the above

    Correct answer: B

67. When taking samples of a tank atmosphere with an explosimeter, you should _____.

    A. only sample around the deck longitudinals as gases are lighter than air
    B. avoid sampling in the vicinity of deep webs to prevent false readings
    C. sample as much of the tank as possible, especially at the bottom
    D. sample only near the ullage openings as all vapors accumulate there

    Correct answer: C

68. Yawing is the angular motion of the vessel about what axis?

    A. Vertical
    B. Centerline
    C. Transverse
    D. Longitudinal

    Correct answer: A

69. Coast Guard Regulations (46 CFR) require how many 15 pound carbon dioxide fire extinguishers to be installed in the boiler room of an 8,000 horsepower steam propelled vessel?

    A. Two
    B. Four
    C. Six
    D. Eight

    Correct answer: A

70. According to Coast Guard Regulations (46 CFR), no vessel can come alongside or remain alongside a tank vessel while it is loading A, B, or C grade cargo without having the permission of the _____.

    A. tank vessel owner
    B. USCG captain of the port
    C. terminal manager
    D. officer in charge of the vessel which is loading

    Correct answer: D

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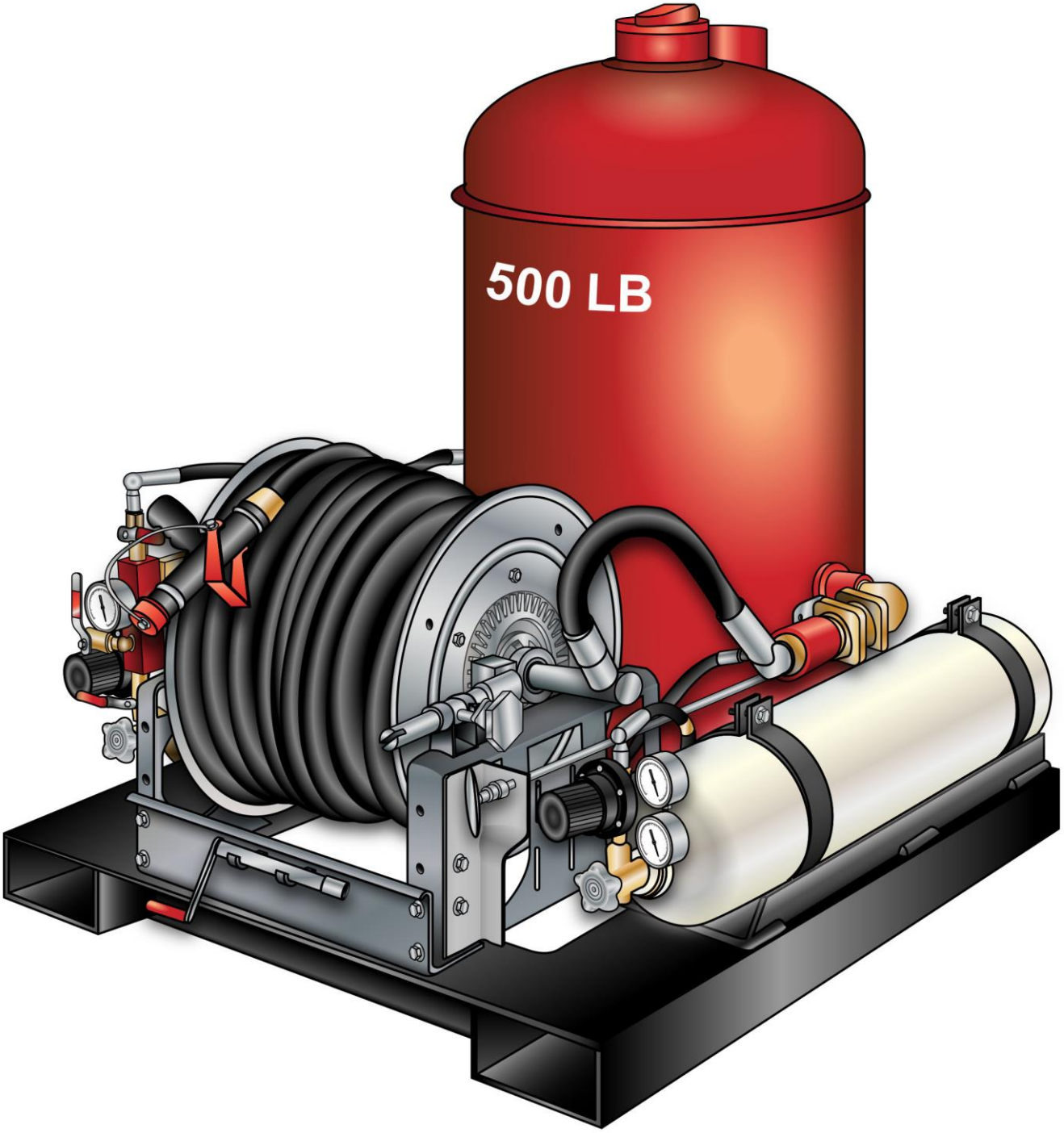

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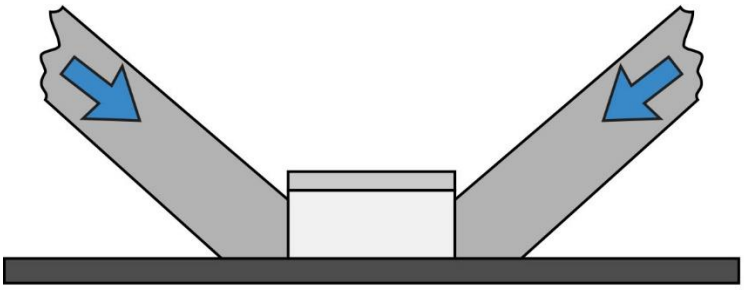

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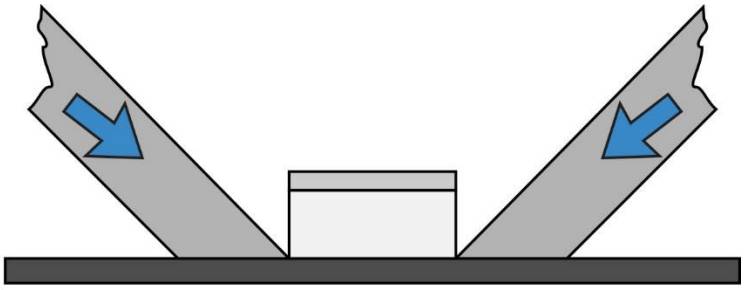

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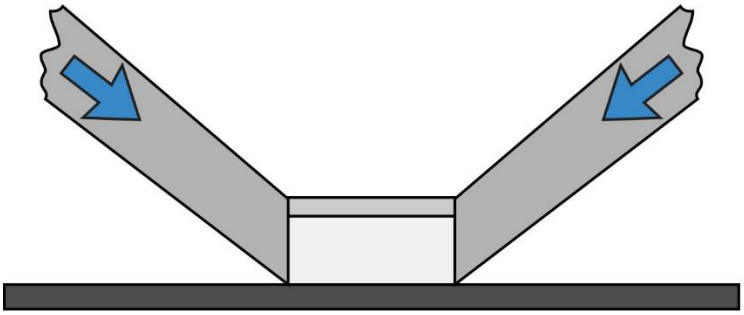

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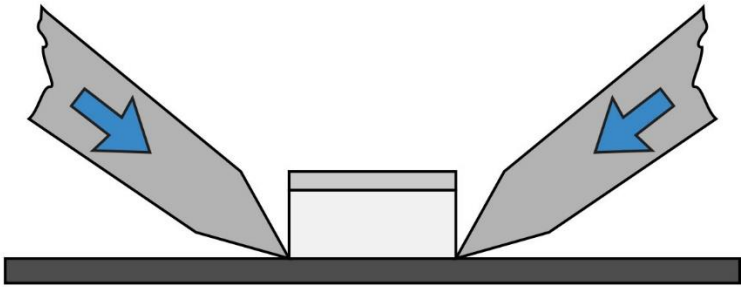

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