

DO NOT MAKE MARKS ON THE EXAM

Journeyperson - Level 2

USE A PENCIL TO COMPLETELY FILL IN THE CIRCLE ON THE BUBBLE SHEET DO NOT SELECT MORE THAN ONE ANSWER PER QUESTION DO NOT X OUT UNWANTED ANSWERS, **ERASE** THEM COMPLETELY

Version A

- 1. Which component is recommended for use on a system scaffold to form a bridge?
 - a. System trusses or girders.
 - b. System putlogs.
 - c. System I-beam.
 - d. System bridge beam.
- 2. The jobsite where the scaffold is erected has received a very heavy rainfall and the scaffold seems to have leaned slightly towards the building. What is the most likely cause?
 - a. The upper layer of soil has lost its stability due to water saturation.
 - b. The run-off water has caused the soil to expand in areas.
 - c. Likely a heavy wind accompanied the rain and has tilted the structure
 - d. The excess water caused the bearing soil to expand.
- 3. What kind of drawing is a blueprint?
 - a. Disproportionate
 - b. Isometric
 - c. Plan-view
 - d. Multi-view
- 4. What is one way in which a frame scaffold can be buttressed?
 - a. Increase the length of the sills.
 - b. Installing longer side arms.
 - c. Increasing the base with additional sills.
 - d. Adding additional Frames.
- 5. The Pythagorean Theorem is a formula used to calculate the measurements of:
 - a. triangles.
 - b. circles.
 - c. perimeters.
 - d. diameters.



- 6. From a **safety** perspective, what is the **most** important consideration when erecting a frame scaffold.
 - a. The height to base ratio.
 - b. The weather conditions.
 - c. The needs of the end user.
 - d. The scaffold manufacturer.
- 7. Which component directly transfers horizontal loads to the adjacent building or structure?
 - a. Ties
 - b. Couplers
 - c. Mudsills
 - d. Braces
- 8. Besides swivel clamps, which of the following can be used as a check clamp?
 - a. parallel coupler
 - b. expansion connector
 - c. outside joiner
 - d. right angle coupler
- 9. A rectangular building has an area of 8,161 m². If the width of the building is 32 metres, what is the length of scaffold run needed for the length of the building?
 - a. 200 metres
 - b. 105 metres
 - c. 255 metres
 - d. 195 metres
- 10. If a lanyard is used to stop a fall, regardless of the distance, what should be done with it?
 - a. It can be reused if there is no visible damage.
 - b. It must be discarded.
 - c. It must be returned to the manufacturer.
 - d. It can be repaired and reused.



- 11. If a joiner is used to join two tubes in a runner or guardrail situation, how far away from the upright should the joiner be located?
 - a. 150 mm (6 inches)
 - b. 1.2 meters (4 feet)
 - c. 610 mm (2 feet)
 - d. 300 mm (12 inches)
- 12. Select the **best** answer. In order for a load to be equally balanced, the _____ must be placed directly above the centre of gravity.
 - a. hook
 - b. turn buckle
 - c. softener
 - d. sling
- 13. A circular storage tank needs to have a scaffold erected around it in order to re-finish the exterior sides. The scaffold is to be placed 500 mm from the exterior surface of the tank. The tank diameter is 8 metres what will the circumference of the inside leg of the scaffold be?
 - a. 22 metres
 - b. 28.3 metres
 - c. 56.5 metres
 - d. 25 metres
- 14. Select the **best** explanation of the placement of a wedge-style coupler.
 - a. The coupler should be positioned with the narrow end facing outwards.
 - b. The coupler should be positioned with the narrow end facing upwards.
 - c. The coupler should be positioned so the wedges drive both upward and inward.
 - d. The coupler should be positioned so the wedges drive both downward and outward.
- 15. Select the **best** answer. A shipment of bricks has been lifted by crane to the platform of a scaffold structure. These bricks will increase the scaffold's _____.
 - a. actual load
 - b. load path
 - c. allowable load
 - d. accumulation.



- 16. What is the function of vertical diagonal tubes on tube and coupler scaffold?
 - a. They increase the load bearing capacity of the scaffold structure.
 - b. They keep the scaffold plumb.
 - c. They support ledgers and transoms.
 - d. They maintain an equal distance between inner and outer posts.
- 17. Why, are fabricated scaffold decks a good choice for rolling frame scaffold?
 - a. They are capable of carrying the heaviest loads.
 - b. They are inexpensive and can be easily replaced.
 - c. They are very lightweight and easy to install.
 - d. They help to keep the scaffold from racking.
- 18. If a scaffold has been erected on a suitable soil foundation, and will be in place for a long time what additional step should be taken?
 - a. Install guy wires to increase stability.
 - b. Cover the area with a layer of crushed gravel.
 - c. Drive stacks to ensure the sills will not shift.
 - d. Provide surface drainage away from the scaffold base.
- 19. Where would you position yourself to have a plan view of a structure?
 - a. Directly in front of the structure.
 - b. Directly beside the structure.
 - c. Directly above the structure.
 - d. Directly behind the structure.
- 20. Why is it important to ensure the first lift of a scaffold is plumb and level in all directions?
 - a. So that the mudsills do not cause damage to the ground level.
 - b. To maintain the stability of the entire scaffold structure.
 - c. To avoid uneccessary damage to the baseplates and mudsills.
 - d. So that all cross braces connect in the correct location.



- 21. What is the most important piece of information you must know before installing ties on a scaffold?
 - a. The supporting structure is plumb.
 - b. The supporting structure is brick.
 - c. The supporting structure is stable.
 - d. The supporting structure is higher.
- 22. What is the minimum height an access ladder must extend above a working level?
 - a. 900 mm (35 inches)
 - b. 250 mm (10 inches)
 - c. 1 metre (39 inches)
 - d. 500 mm (20 inches)
- 23. Select the **best** answer. What is the correct location for check clamps on a hanging scaffold?
 - a. On the inside of the main supporting clamps.
 - b. 150 mm (6 inches) below the supporting clamp.
 - c. Either above or below the main supporting clamp.
 - d. Check clamps are not permitted on hanging scaffold.
- 24. What is the circumference of a circular storage tank that has a radius of 14 metres? (round up to the nearest whole number)
 - a. 18 metres
 - b. 616 metres
 - c. 44 metres
 - d. 88 metres
- 25. Why are the majority of system scaffold components made from a standard size of tube?
 - a. Because all scaffold tubes are made in one consistent size.
 - b. So that components from different manufacturers can be used.
 - c. So that tube and coupler fittings can be used if needed.
 - d. Because it allows for consistent allowable load calculations.



- 26. When beginning a new scaffold build, where is the **best** place to start from?
 - a. The location closest to the scaffold material, as it is easier to move material.
 - b. The centre point of the scaffold area, because it is easier to move material.
 - c. The lowest ground level because it is easy to adjust the height as you progress.
 - d. The highest ground level because it is easy to adjust the height as you progress.
- 27. Before making an equipment list for a scaffold, what should be done?
 - a. Determine the end use of the scaffold.
 - b. Obtain all of the necessary permits.
 - c. Consider the total cost of the equipment.
 - d. Create a sketch of the scaffold.
- 28. In the case of a fall, a lanyard must not allow the worker to free fall more than:
 - a. 4.2 metres.
 - b. 1.2 metres.
 - c. 0.5 metres.
 - d. 3.7 meters.
- 29. What is the standard distance between the pre-formed connectors on a System scaffold post?
 - a. Every 635 mm (25 inches).
 - b. Every 510 mm (20 inches).
 - c. Every 305 mm (12 inches).
 - d. Every 405 mm (16 inches).
- 30. The standard factor of safety for rigging and hoisting is:
 - a. 30% of the breaking strength of the component.
 - b. 20% of the breaking strength of the component.
 - c. 40% of the breaking strength of the component.
 - d. 10% of the breaking strength of the component.



- 31. Select the **best** available answer. What is a key factor in determining if a toeboard should be installed on a scaffold?
 - a. They must be installed on platforms less than 1.22m (4 feet) wide.
 - b. When midrails are not required, toeboards must be installed.
 - c. When midrails are not required, toeboards are also not required.
 - d. They must be installed where there is a danger to workers below.
- 32. Select the **best** description of debris nets.
 - a. Their purpose is to protect people below the net, not above it.
 - b. They must be thoroughly cleaned once every seven days.
 - c. They can be used interchangeably with personnel nets.
 - d. Once installed, they cannot be moved until the job is complete.
- 33. To stabilize a long length of tube used in a buttress, what must be added?
 - a. Stiffener brace.
 - b. Horizontal beams
 - c. Guy wires
 - d. Outriggers
- 34. You are required to erect a scaffold on a sloped foundation, where do you start the build?
 - a. Anywhere along the slope.
 - b. The low end of the slope.
 - c. In the middle of the slope.
 - d. The high end of the slope.
- 35. Select the **best** answer. In what way are buttresses similar to ties?
 - a. Neither are suitable for installation in high-wind situations.
 - b. They both use forces of tension and compression to provide stability.
 - c. They both require anchors to connect to a supporting structure.
 - d. Neither should be installed on more than one side of a scaffold.



- 36. Which of the following **best** describes a sway brace?
 - a. A long brace, installed diagonally, to support the decking material.
 - b. A brace installed horizontally, to keep the scaffold structure square and level.
 - c. A long brace, installed diagonally, to keep the structure plumb and vertical.
 - d. A brace attached to the face of the building to prevent the structure from tipping.
- 37. If ties cannot be used to provide stability to a scaffold and buttresses are used, at what intervals must they be placed?
 - a. Equal to every second tie spacing requirement.
 - b. Every fourth bay along the scaffold length.
 - c. At least equal to the tie spacing requirement.
 - d. At every interval where access is provided.
- 38. Which of the following is a method to extend the width of the working platform on a system scaffold?
 - a. Erect an additional cantilever scaffold.
 - b. Cantilever a wood plank.
 - c. Extend the platform with side brackets
 - d. Install an inside plank.
- 39. A diagonal (face or sway) brace is to be installed on a scaffold. If the top connection point of the brace is 10 units high and the distance across the base of the scaffold is 10 units, how long will the brace need to be?
 - a. 10 units
 - b. 14.14 units
 - c. 28.28 units
 - d. 10.49 units
- 40. Why is a horizontal diagonal brace (plan brace) required on a rolling scaffold?
 - a. To be used as an alternative means of access if the ladders are not accessible.
 - b. To stabilize the locking casters when the foundation is unstable or slanted.
 - c. To keep the scaffold square and prevent it from collapsing when being moved.
 - d. To be installed instead of cross braces if the scaffold is near an obstruction.



- 41. How must a guardrail gate open in relation to the platform?
 - a. It must only open from the right side.
 - b. It must swing out towards the ladder.
 - c. It must only open from the left side.
 - d. It must swing in towards the platform.
- 42. You are building a two-tier frame scaffold. In your determination of the scaffold load, which component needs to have the greatest load capacity?
 - a. The platform.
 - b. The bearers.
 - c. The scaffold legs.
 - d. The top rail.
- 43. The outer dimension of a building is called the:
 - a. linear.
 - b. perimeter.
 - c. radius
 - d. diameter.
- 44. What is the volume of a rectangular scaffold that is 12 metres long, 8 metres wide and 6 metres high?
 - a. 26 metres³
 - b. 576 metres³
 - c. 52 metres³
 - d. 1152 metres³
- 45. The scaffold tie anchor selection is based on:
 - a. The type of restraint needed.
 - b. The strength required.
 - c. The available components.
 - d. The scaffold base width.
- 46. What purpose can runners and bearers serve above the working platform level?
 - a. They can provide diagonal bracing to the scaffold structure.
 - b. They can be used as the top and mid rail in a guardrail application.
 - c. They can help distribute the loads horizontally to the ties.
 - d. They can provide a tie-off point for fall arrest equipment.



- 47. What is the purpose of compacting the soil when preparing for scaffold erection?
 - a. To ensure scaffold loads are distributed evenly.
 - b. To keep mudsills from slipping or shifting.
 - c. To stop water from absorbing into the soil.
 - d. To make the sub-surface completely level.
- 48. Select the best description of OH&S Codes and Regulations.
 - a. They only apply when there is no CSA standard.
 - b. They apply to all Canadian jobsites equally.
 - c. They do not apply to jobsites in Canada.
 - d. They apply in each province individually
- 49. The **primary** difference between hoists and winches is the:
 - a. factor of safety.
 - b. rope material.
 - c. pulling direction.
 - d. load capacity.
- 50. Select the **best** description of an eccentric load.
 - a. A load that occurs inside the base of a structure.
 - b. A load on a structure caused by high winds.
 - c. A load that occurs outside the base of a structure.
 - d. A load that affects the ties on a structure.
- 51. For frame scaffolds, how should a frame style putlog be placed on the support when used for a frame scaffold platform?
 - a. Extend the putlog 75 mm (3 inches) beyond the support.
 - b. Extend the putlog 150 mm (6 inches) beyond the support.
 - c. Bolt the putlog to the u-head and anchor both to the frame leg.
 - d. Place the putlog ends directly on the center of the support.
- 52. What is the **most important** component of a fall protection system?
 - a. The anchor.
 - b. The field level hazard assessment.
 - c. The harness.
 - d. The fall protection plan.



- 53. In the absence of specific jurisdictional regulations, a ladder cage is required when the ladder height is more than:
 - a. 4 metres
 - b. 10 metres
 - c. 6 metres
 - d. 3 metres
- 54. Can a scaffold be erected on a surface where grass or weeds are present?
 - a. No, the surface must be levelled and compacted in all active areas.
 - b. No, the ground cover must be removed, replaced with gravel, and compacted.
 - c. Yes, but paving stones or blocks must be used instead of mudsills.
 - d. Yes, but mudsills must be used in areas where the ground is soft.
- 55. Select the **best** answer. Why is a ladder not a suitable way to access a scaffold when many workers require access?
 - a. Too many users will cause a ladder to overturn.
 - b. Carrying material up a busy ladder is difficult.
 - c. Some workers are not able to climb ladders.
 - d. Only one person can use a ladder at a time.
- 56. Prior to dismantling a scaffold tower, the inspection revealed that some braces had been removed. What should be done?
 - a. Install outriggers for extra support.
 - b. Make sure all levels have full platforms.
 - c. Nothing, if the ties are still in place.
 - d. Replace the braces that were removed.
- 57. Where can you find detailed information about the load rating of a specific system scaffold component?
 - a. In the manufacturer's specification document.
 - b. In a scaffold apprenticeship training document.
 - c. In the CSA Z797-18 regulation document.
 - d. In the provincial OH&S regulation document.



- 58. The maximum height a worker can climb an access ladder between platforms is:
 - a. 4 meters (13 feet)
 - b. 3.1 meters (10 feet)
 - c. 9.1 meters (30 feet)
 - d. 6.2 meters (20 feet)
- 59. Why is special paper used to create isometric sketches?
 - a. It helps to keep the whole sketch in proportion.
 - b. It is able to show many proportions at once.
 - c. It shows a one-dimensional view of the sketch.
 - d. It helps keep all lines at a 45-degree angle.
- 60. Which of the following jobsite conditions would require a scaffold to be erected with ties?
 - a. A location that causes vibratory loads.
 - b. A jobsite with too many workers.
 - c. An area with an unstable foundation.
 - d. A location with strong winds.
- 61. Select the **best** description of shrink wrap.
 - a. It is installed on structures that require temperature control.
 - b. It adds a significant amount of extra weight to the structure.
 - c. It has a big impact on the potential wind load of the structure.
 - d. It is made up of a thin layer polyester lined with neoprene.
- 62. Which horizontal member on a system scaffold is the **primary** load carrying member?
 - a. The guardrail.
 - b. The braces.
 - c. The bearer.
 - d. The runner.
- 63. What is the purpose of making a grid out of bearers and runners at every lift when erecting an area scaffold?
 - a. For the installation of sway braces.
 - b. To tie all the posts together.
 - c. To facilitate stair installation.
 - d. To support the platforms.



- 64. When erecting a rolling scaffold, which of the following components are required?
 - a. Mudsills and adjustable screwjacks.
 - b. Inflatable casters and outriggers.
 - c. Outriggers for two sides of the structure.
 - d. Casters with locking wheels, or blocks.
- 65. Which of the following components should be used to attach a system bridging unit to a system scaffold leg when running past the system standards?
 - a. Right angle clamp
 - b. Truss hangers
 - c. Putlog couplers
 - d. U-bolt
- 66. According to CSA Z797, how often must a scaffold be inspected?
 - a. Every day.
 - b. Every 10 days.
 - c. Every 21 days.
 - d. Once a week.
- 67. What is used to prevent trusses, bridging units or putlogs from overturning when they are used as a part of the scaffold bridge?
 - a. Knee brace.
 - b. Lateral bracing.
 - c. Top and bottom bearers.
 - d. The platform.
- 68. You are instructed to erect a scaffold on an unsuitable soil foundation. What do you do?
 - a. Call OH&S to the site for an inspection.
 - b. Fill in low areas to ensure the soil is level.
 - c. Determine the soil capacity through tables.
 - d. Recognize poor conditions and seek help.



- 69. The **depth x safety factor** applies to what situation?
 - a. The distance from which a scaffold leg must be from an excavation.
 - b. The distance from which a midrail must be positioned above the toeboard.
 - c. The depth at which an anchor must be installed in a structure or wall.
 - d. The depth at which a wedge must be hammered into the coupler.
- 70. Which of the following is the vertical supporting element of a properly erected Frame Scaffold?
 - a. Runner
 - b. Platform
 - c. Cross brace
 - d. Frame leg
- 71. Select the **best** answer. Why does a jobsite need to be inspected before any scaffold materials are delivered?
 - a. To make sure the material order matches the blueprint requirements.
 - b. To ensure that material storage won't block access and egress points.
 - c. To obtain all the necessary permits from the site superintendent.
 - d. To ensure that other trades will be offsite during material delivery.
- 72. At what location is the force of wind the strongest?
 - a. The ties at located at the ends of the scaffold.
 - b. The guardrails in the middle of the scaffold.
 - c. The ledgers located at the top of the scaffold.
 - d. The mudsills at the bottom of the scaffold.
- 73. When installing a stair tower, where are midrails required?
 - a. On both sides of the stairway.
 - b. On stairs higher than three lifts.
 - c. On the outside face of the stairway.
 - d. On the stair landings.



- 74. To comply with provincial OH&S regulations, what is the maximum allowable distance between the bottom of a toe board and the platform?
 - a. 25 mm (1 inch)
 - b. 51 mm (2 inch)
 - c. 38 mm (1.5 inch)
 - d. 6 mm (1/4 inch)
- 75. When do CSA Standards, such as the CSA Z797, apply to the work you are doing?
 - a. Only when the provincial OH&S code includes them.
 - b. CSA Standards do not apply to jobsites in Canada.
 - c. The apply only when there is no provincial OH&S code.
 - d. CSA Standards apply on all jobsites across Canada.
- 76. Select the **best** answer. What is the safest way to install ladders on a multi-tier scaffold?
 - a. Stairs must be used on multi-tier scaffolds.
 - b. On alternating sides of the scaffold.
 - c. In one unbroken length.
 - d. In a staggered pattern.
- 77. What is the recommended way in which laminated planks should be inspected?
 - a. Planks must be subjected to an above average point load without warping.
 - b. Each plank must be subjected to a moisture content analysis for 24 hours.
 - c. Laminated planks do not require regular inspection as they don't degrade.
 - d. Inspections must be conducted according to manufacturer's specifications.
- 78. Which of the following is the **best** place to work from while dismantling a scaffold?
 - a. Ladders that can be easily moved from place to place.
 - b. Planks used as temporary work platforms at each level.
 - c. Crossbraces can be used if the scaffold has ties.
 - d. Any horizontal member, as long as it is loadbearing.
- 79. When are tag lines required on a load?
 - a. When synthetic fibre ropes are used to secure the lift.
 - b. When load softeners cannot be used to support the load.
 - c. When the length of the material is longer than 3 metres.
 - d. When the lift is happening close to a nearby structure.



- 80. A key benefit of using ramps for access on scaffold is:
 - a. Ramps have a higher allowable load rating.
 - b. Ramps require less frequent inspections.
 - c. Ramps are safer to use in wet environments.
 - d. Ramps can be used for loading material.
- 81. What is the **primary** purpose of outriggers on a rolling scaffold?
 - a. They are required for caster installation.
 - b. They provide space for more platforms.
 - c. They are used for additional bracing.
 - d. They extend the base of the scaffold.
- 82. What is the **primary** consideration regarding the strength of a rolling scaffold?
 - a. The type of work performed on the scaffold.
 - b. The overall size of the rolling platform.
 - c. The spot where ladders will be installed.
 - d. The allowable load rating of the casters.
- 83. When making a sketch of a scaffold, what views are typically shown?
 - a. The left and right elevations, and the plan view.
 - b. The top, front, and back elevations.
 - c. The front and plan elevations, and a sectional view.
 - d. The back, front, and left elevations.
- 84. How strong does a scaffold toe board have to be?
 - a. Able to restrain 9 kg (20 pounds) in any downward or horizontal direction.
 - b. Able to restrain 16 kg (35 pounds) in any downward or horizontal direction.
 - c. Able to restrain 22.5 kg (50 pounds) in any downward or horizontal direction.
 - d. Able to restrain 45 kg (100 pounds) in any downward or horizontal direction.
- 85. If a buttress is required on a scaffold tower, what is the most efficient angle for the brace?
 - a. 60 degrees.
 - b. 45 degrees.
 - c. 15 degrees.
 - d. 30 degrees.



- 86. When you are using a sling to support a load, what is the **most** important safety consideration?
 - a. Slings must never be used with rigging hardware.
 - b. Slings must never be used with load softeners.
 - c. The angle of the sling impacts the strength of the sling.
 - d. A knot in the sling increases the strength of the sling.
- 87. Select the **best** description of a positive tie.
 - a. They are only permitted when other types of ties can't be used.
 - b. They have an anchor attached directly to a supporting structure.
 - c. They can be used across openings, such as windows or doors.
 - d. They rely on friction and pressure for their holding power.
- 88. A scaffold run that is 25 units long and 22 units high needs a continuous sway brace across the face. What is the length?
 - a. 22.56 units
 - b. 6.86 units
 - c. 9.7 units
 - d. 33.3 units
- 89. How would you determine the allowable load rating for the swivel couplers you using on a job?
 - a. You can use the load of the right angle coupler.
 - b. You must take the applied load and multiply by four.
 - c. You can use the same load rating as the platforms.
 - d. You must refer to the manufacturer's specifications.
- 90. Why is tube and coupler scaffold used more often than frame and brace or system scaffold in oil refineries and gas plants?
 - a. It is more readily available.
 - b. It can be erected more quickly.
 - c. It is versatile and adaptable.
 - d. It can handle greater loads.



- 91. Planks must overlap at least _____ beyond the supporting ledger on scaffolds with multiple bays and continuous platforms.
 - a. 250 mm (9.84 inches)
 - b. 150 mm (5.90 inches)
 - c. 305 mm (12 inches)
 - d. 500 mm (19.69 inches)
- 92. What happens when a load is lifted quickly?
 - a. The load is more likely to be unbalanced.
 - b. The load is less likely to be unbalanced.
 - c. Less force is applied to the rope used for the lift.
 - d. More force is applied to the rope used for the lift.
- 93. Who has the ultimate responsibility for your safety on a scaffold crew?
 - a. Your employer
 - b. Your coworkers
 - c. Your foreman
 - d. Yourself
- 94. In what situation would guy wires be installed?
 - a. When the supporting structure is not strong enough for ties.
 - b. When the surrounding foundation is made of asphalt or concrete.
 - c. When the supporting structure has an exterior made of wood.
 - d. When the average wind speed is greater than or equal to 60 km/h.
- 95. When installing a cantilever on a scaffold tower, what is the name of the brace component that supports the cantilever from the top?
 - a. Horizontal diagonal brace.
 - b. Knee brace.
 - c. Raker brace.
 - d. Plan brace.
- 96. What is the **most important** safety consideration for enclosed scaffolds?
 - a. The design must be approved by an engineer.
 - b. There must be sufficient room below the structure.
 - c. They must only use ties designed for enclosures.
 - d. Protection must be installed on building walls.



- 97. When ordering 300 scaffold planks for a job, it is expected that 12% of them will be unusable. How many planks are unusable?
 - a. 24
 - b. 12
 - c. 36
 - d. 60
- 98. Where are the first and last horizontal anchor ties placed on a scaffold?
 - a. At each end of the scaffold.
 - b. There is no specified location.
 - c. At any suitable anchor location.
 - d. Within 30 feet of the ends.
- 99. Safe limit of approach' refers to what kind of jobsite hazard?
 - a. Wind loads.
 - b. Fall hazards.
 - c. Dust and fume hazards.
 - d. Electrical
- 100. Where is the correct placement of check clamps in relation to the load bearing coupler?
 - a. Above and in contact with the load bearing coupler.
 - b. Below, but not touching, the load bearing coupler.
 - c. Below and in contact with the load bearing coupler.
 - d. Above, but not touching, the load bearing coupler.