

RED SEAL EXAM PREP

308A Sheet Metal Worker

Free 50-Question Mock Exam

Practice for the Red Seal / Certificate of Qualification exam

Pass mark: 70% · Aligned to the published occupational standard topic weightings
<https://redsealquiz.ca> · Edition 2026-07

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Mock Exam — answer all questions, then check the key

Q1. A sheet metal worker must install flashing on a roof with a slope greater than 4:12 (18°). What fall protection is typically required when working at this height above ground?

- A) A personal fall arrest system or guardrails above 3 m (10 ft)
- B) Non-slip footwear is the only requirement on sloped roofs
- C) No fall protection is required if the worker is experienced
- D) Safety nets are mandatory for all roof work in Canada

Q2. When developing the pattern for a right cone using radial line development, what measurement represents the radius of the arc drawn in the pattern?

- A) The diameter of the cone base
- B) The slant height of the cone
- C) The circumference of the base divided by pi
- D) The vertical height of the cone

Q3. A duct offset requires two identical 45° transition pieces. What pattern development technique is used for each mitre cut?

- A) The pattern is derived from a standard fitting table only
- B) Radial line from the centreline of the offset
- C) Parallel line development — each mitre is a cylinder cut at 45°
- D) Triangulation for the angled face

Q4. Which type of transverse joint is rated by SMACNA for use in ducts up to 4" WG?

- A) Companion angle flange
- B) Pocket lock
- C) Slip-and-drive (S & Drive)
- D) SMACNA TDC/TDF flange

Q5. What is a "squaring arm" on a press brake used for?

- A) Clamping the die to the press brake bed
- B) Measuring the inside angle of the bend
- C) Holding the sheet flat during the bend
- D) Stopping the sheet at a set distance from the bend

Q6. What is "springback" in sheet metal bending and how is it compensated?

- A) Elastic return after bending — corrected by overbending
- B) Thermal expansion during welding — corrected by pre-heating
- C) Sheet vibration during cutting — corrected by clamping
- D) Stretch at the bend — corrected by adding material

Q7. A square-to-round transition connects a 300mm×300mm plenum to a 200mm diameter round duct. Which pattern development method is most appropriate?

- A) Triangulation
- B) Seam allowance method
- C) Radial line development
- D) Parallel line development

Q8. What is the standard galvanized steel sheet gauge used for low-pressure residential HVAC ductwork (1/2" WG pressure class, duct sizes up to 24")?

- A) 24 gauge
- B) 14 gauge
- C) 36 gauge
- D) 30 gauge

Q9. What is the purpose of a turning vane installed inside a 90° rectangular duct elbow?

- A) To reduce sheet metal gauge requirements at the elbow
- B) To balance airflow between multiple branches at the elbow
- C) To prevent condensation inside the elbow on humid days
- D) To guide airflow smoothly around the bend, reducing turbulence and noise

Q10. When laying out a round elbow using parallel line development, why is the stretchout line equal to the circumference of the duct?

- A) It is equal to the diameter only, not the circumference
- B) Because the stretchout is the unrolled cylinder surface (πd)
- C) SMACNA mandates this for pressure class compliance
- D) To account for material stretch during bending

Q11. A VAV (Variable Air Volume) system modulates airflow to individual zones. What controls the airflow at each zone terminal?

- A) A fixed orifice plate in the branch duct
- B) The AHU supply fan speed alone
- C) Manual balancing dampers set at commissioning
- D) A VAV box with a thermostat-controlled damper

Q12. A nipper (throatless shear) differs from a guillotine shear in that it:

- A) Can cut curves and irregular shapes freely
- B) Only cuts sheet metal up to 16ga thickness
- C) Cuts faster and with far less operator force
- D) Uses a rotating circular cutting blade

Q13. What is the minimum overlap for a soldered lap joint in sheet metal work?

- A) 25mm (1") minimum
- B) 6mm (1/4") minimum
- C) Equal to one sheet thickness
- D) 3× the sheet thickness

Q14. According to SMACNA, pressure class for HVAC ductwork is defined by the maximum static pressure the duct system will operate under. Which of the following correctly lists SMACNA low-pressure classes?

- A) Class 100, 200, 300 based on CFM airflow
- B) Class A, B, C based on material gauge only
- C) Pressure class is not defined by SMACNA — it is determined by the HVAC engineer only
- D) Class 1/2, Class 1, Class 2 (in inches of water gauge, WG)

Q15. What is the primary purpose of insulating HVAC supply ductwork in an unconditioned attic?

- A) To reduce duct velocity noise in the attic
- B) To meet SMACNA pressure class requirements
- C) To prevent condensation and reduce thermal loss
- D) To allow higher static pressure ratings

Q16. When working in a ceiling plenum space above a suspended ceiling, what is a key safety concern specific to sheet metal workers?

- A) UV radiation from the building light fixtures
- B) Energised conduit contact and falls through the grid
- C) Noise levels from operating HVAC equipment
- D) Chemical hazards from duct sealant curing

Q17. A sheet metal worker is installing a flexible connection (flex connector) between the AHU and rigid ductwork. What is the primary purpose?

- A) To allow disassembly for duct cleaning
- B) To isolate AHU fan vibration from the ductwork
- C) To increase the duct cross-section area
- D) To act as a volume control damper

Q18. After TIG welding stainless steel ductwork, a golden/straw heat tint in the heat-affected zone indicates:

- A) A proper weld — no action is required
- B) Slight oxidation — acceptable for non-critical HVAC work
- C) Carbide precipitation — the weld is rejected
- D) Severe oxidation — the weld must be redone

Q19. A sheet metal worker is TIG welding a 16-gauge (1.6mm) 304 stainless steel duct section. During welding, the area around the weld turns a dark gold/brown/blue colour. What does this indicate and what is the cause?

- A) Heat tint — oxidation from inadequate shielding gas coverage
- B) The filler rod composition is incorrect for 304 stainless
- C) The material is not stainless — carbon steel does not discolour this way
- D) Normal colour — stainless always discolours when welded

Q20. Under BC and most Canadian OH&S regulations, what is the maximum height from which a worker can fall before fall protection is mandatory on a construction site?

- A) 6m (20 ft)
- B) 3m (10 ft)
- C) 4.5m (15 ft)
- D) 1.5m (5 ft)

Q21. When using a slip roll to form a cone (tapered cylinder), how is the taper achieved?

- A) A tapered forming die is inserted between the rolls
- B) The slip roll cannot form cones — hand forming is required
- C) One end of the rear roller is set higher than the other
- D) The sheet is fed at an angle using a guide fence

Q22. Which pattern development method is used to lay out a straight rectangular duct section?

- A) Radial line development
- B) Triangulation
- C) Parallel line development
- D) Gore construction

Q23. What is the difference between a drive cleat and an S-cleat used in rectangular duct assembly?

- A) Drive cleats are used on round duct; S-cleats are for rectangular duct only
- B) They are interchangeable — the choice is based on installer preference
- C) Drive cleats are for high-pressure duct; S-cleats are for low-pressure duct
- D) A drive cleat is hammered onto one duct end; an S-cleat slides over both ends

Q24. A grooved seam is commonly used in which application?

- A) As the spiral seam on round duct and on joined curved edges
- B) As a transverse (cross) connection between rectangular duct sections
- C) As a standing seam on architectural metal roofing
- D) As the longitudinal seam on rectangular duct sections

Q25. A sheet metal worker is cutting sheet metal on a layout table when a piece of sheet slips and causes a laceration. Under OH&S regulations, the employer is required to:

- A) Provide first aid only — no reporting is needed
- B) Report the injury to the OH&S authority and investigate
- C) Investigate only if the worker requests it
- D) Document internally only if no work time was missed

Q26. What type of snips is designed to cut straight lines and large curves in sheet metal?

- A) Yellow-handled (straight-cut) aviation snips
- B) Green-handled (right-cut) aviation snips
- C) Compound-action snips
- D) Red-handled (left-cut) aviation snips

Q27. A sheet metal worker needs to lay out a pattern for a fitting that transitions from a 12"x12" square duct to a 10" round duct. Which development method is MOST appropriate?

- A) Parallel line development — both shapes are straight
- B) Radial line development — the round end is conical
- C) Gore construction — used for round-to-square transitions
- D) Triangulation — the fitting joins two different shapes

Q28. What is the purpose of tack welds during sheet metal assembly?

- A) To replace clamps on thin sheet material
- B) To hold parts in position before full welding
- C) To provide the final weld strength alone
- D) To test electrode compatibility first

Q29. When using a Pittsburgh lock former (pittsburgh machine) to form a pocket on a panel, what is the correct orientation of the panel relative to the rollers?

- A) The panel is clamped vertically — orientation does not matter
- B) Face side up, the edge to be formed facing the operator
- C) Face side down, edge inserted from the rear
- D) Edge inserted at 45° to the roller axis

Q30. A sheet metal worker is developing a pattern for an offset transition fitting — a rectangular duct offset to one side connecting to a round duct. Which sequence correctly describes the triangulation method?

- A) Draw the elevation only → project parallel lines to a stretch-out line → mark off the perimeter
- B) Draw plan and elevation → divide surfaces into triangles → find true lengths → build the pattern
- C) Divide only the round end into segments → project them directly to the square end → connect points
- D) Find the apex of the cone → draw radial lines from the apex → swing arcs for each section

Q31. What is the purpose of a balancing damper installed in a duct branch?

- A) To open automatically on a call for cooling
- B) To maintain constant static pressure in the main
- C) To throttle branch airflow to the design CFM
- D) To prevent backflow in the branch duct

Q32. When forming a wired edge on a sheet metal piece, what is the purpose of the wire inserted into the hem?

- A) To mark the seam location for later inspection
- B) To act as a solder filler inside the hem
- C) To give a rigid, rounded edge safe to handle
- D) To conduct electricity for resistance welding

Q33. What is the correct name for the tool used to form the "male" standing seam edge on a duct panel using a sheet metal brake?

- A) Bar folder
- B) Slip roll
- C) Pittsburgh machine
- D) Notcher

Q34. A box and pan brake is used for what sheet metal forming operation?

- A) Forming the Pittsburgh lock seam on duct sections
- B) Cutting sheet metal to exact lengths only
- C) Bending sheet metal into boxes and pans at precise angles
- D) Rolling sheet metal into cylindrical shapes

Q35. Before starting any work on an energised electrical panel in the mechanical room where ductwork is being installed, the sheet metal worker must:

- A) Apply LOTO procedures on all energy sources
- B) Wear rubber insulating gloves only
- C) Simply turn off the panel breaker and proceed
- D) Notify the foreman verbally and proceed

Q36. When developing a pattern for a cylindrical elbow using parallel line development, what determines the number of divisions used around the circumference?

- A) The number of divisions on the stretchout line
- B) The gauge of the sheet being formed
- C) The centreline radius of the elbow
- D) The number of gores in the elbow

Q37. What is a Pittsburgh lock seam and for what application is it primarily used?

- A) A cross-seam used to connect two sections of rectangular duct end-to-end
- B) A longitudinal seam used to close the sides of rectangular duct sections
- C) A spiral seam used on round ductwork formed by a spiral pipe machine
- D) A double-folded flat seam used on architectural metal roofing

Q38. A 45° mitre elbow is cut from round duct. How many gore lines are required for a 3-piece elbow?

- A) 1 gore line (creating 2 pieces)
- B) 3 gore lines (creating 4 pieces)
- C) 4 gore lines (creating 5 pieces)
- D) 2 gore lines (creating 3 pieces)

Q39. ASHRAE 62.1 governs ventilation for acceptable indoor air quality. Which parameter does it specify for commercial occupancies?

- A) Minimum refrigerant charge weight limits
- B) Maximum duct velocity in metres per second
- C) Minimum outdoor air CFM per person and floor area
- D) Maximum CO₂ concentration in the flue gas

Q40. A sheet metal worker is asked to install a transfer air grille between two rooms to maintain pressure balance. Where should it be located?

- A) At low level near the floor for cold air transfer
- B) At high level (near ceiling) in the partition wall
- C) Location does not matter — only the grille size matters
- D) At mid-height in the neutral pressure zone

Q41. When cutting sheet metal with aviation snips, which direction should the waste side be positioned?

- A) To the left regardless of the snip type
- B) The waste direction does not matter
- C) Above the upper blade of the snips
- D) Below the lower blade, curling downward

Q42. When soldering a flat lock seam (folded seam) on tinsplate, what is the correct heating technique to ensure full solder penetration?

- A) Melt bulk solder over the seam with a torch and let it flow
- B) Heat the seam itself until it melts solder on contact
- C) Apply solder to the iron tip, then wipe across the cold seam
- D) Heat the solder wire directly until it melts into the seam

Q43. Brazing differs from welding in that:

- A) The filler melts but the base metal does not
- B) Brazing is used only for aluminium work
- C) Brazing melts the base metal; welding does not
- D) Brazing requires flux; welding never does

Q44. A round-to-round eccentric reducer must be developed. The cone axis does not pass through the apex. Which statement is correct?

- A) Radial line development applies directly because it is still a cone
- B) Parallel line development is used since the diameters are round
- C) Triangulation must be used because true radial lines do not converge at one point
- D) A template jig replaces pattern development for eccentric fittings

Q45. What does the acronym AHU stand for in HVAC systems?

- A) Air Handling Unit
- B) Automatic Heat Updraft
- C) Airflow Humidity Unit
- D) Auxiliary Heating Unit

Q46. What type of damper is used to prevent reverse airflow in an exhaust duct when the fan is off?

- A) A barometric (backdraft) damper
- B) A manual volume control damper
- C) A fire damper with a fusible link
- D) A motorised isolation damper

Q47. Resistance spot welding is commonly used in sheet metal fabrication because it:

- A) Can join galvanized steel to aluminum without special preparation
- B) Joins sheets at discrete spots using localized resistance heating
- C) Requires flux to prevent oxidation at each weld spot
- D) Creates the strongest possible joint for all metal thicknesses

Q48. Sheet metal edges left from snipping or shearing are extremely sharp. The correct PPE to handle cut sheet metal is:

- A) Rubber chemical gloves
- B) Cut-resistant (level A4 or higher) gloves
- C) Standard leather work gloves
- D) No gloves — gloves catch on machinery

Q49. A "rotary machine" (power rotary) in a sheet metal shop can form all of the following EXCEPT:

- A) Turned edges and flanges
- B) Wired edges
- C) Punched rivet holes
- D) Pittsburgh lock seams

Q50. A duct system shows higher than design static pressure drop across a filter bank. What is the most likely cause?

- A) Filters loaded with dust and dirt
- B) Supply fan speed set too low
- C) Excessive outdoor air intake volume
- D) Duct leakage downstream of the filter

Answer Key & Explanations

Q1. Answer: A

Provincial OHS regulations generally require fall protection (personal fall arrest system or guardrails) when working at heights of 3 m (10 ft) or greater. On sloped roofs, a PFAS with shock-absorbing lanyard and a properly rated anchor point is required. The anchor must be capable of supporting 22 kN (5,000 lbs) per worker. Non-slip footwear is an additional requirement, not a substitute for fall protection.

Q2. Answer: B

In radial line development of a cone, all surface lines radiate from the apex. The radius of the arc in the flat pattern equals the slant height — the true length from the apex to the edge of the base circle. The arc length then equals the circumference of the base ($2\pi r$). The height of the cone alone is not the slant height.

Q3. Answer: C

A 45° offset cut through a cylinder produces an elliptical mitre. Parallel line development is used: heights at each stretchout division are taken from the front view of the mitre cut.

Q4. Answer: D

TDC (Transverse Duct Connector) and TDF (Transverse Duct Flange) systems are rated to 4" WG and higher when properly installed per SMACNA tables.

Q5. Answer: D

The squaring arm (back gauge) positions the sheet at a set distance from the die centreline, ensuring each bend produces an identical flange length without re-measuring.

Q6. Answer: A

When a bend is released, elastic stress partially straightens the metal. To achieve the required final angle, the sheet must be overbent slightly. The overbend angle depends on material and thickness.

Q7. Answer: A

Triangulation is used for non-developable surfaces like square-to-round transitions. The surface is divided into triangles whose true lengths are found on a true-length diagram.

Q8. Answer: A

SMACNA specifies 24 gauge galvanized steel for 1/2" WG pressure class ductwork in sizes up to 24". As duct size or pressure class increases, heavier gauges are required. 14 gauge is structural steel — far too heavy for standard ductwork. 30 gauge is too thin for duct construction.

Q9. Answer: D

A square elbow without turning vanes creates significant turbulence, high pressure drop, and noise as air separates from the outer wall. Turning vanes (sheet metal blades inside the elbow) guide airflow in a smooth arc, reducing separation, pressure drop by up to 75%, and noise. Required by many specifications for critical systems.

Q10. Answer: B

When a cylinder is unrolled flat, its length equals the circumference (πd). The stretchout line represents this unrolled length; heights at each division come from the true-length view.

Q11. Answer: D

VAV boxes contain a motorised modulating damper controlled by the zone thermostat. They vary airflow from maximum to minimum (or zero) to maintain setpoint temperature.

Q12. Answer: A

A throatless (nipper) shear has no throat frame, so the sheet can be rotated freely during cutting, allowing curved and irregular cuts. A guillotine shear only cuts straight lines.

Q13. Answer: B

A minimum 6mm (1/4") lap is required for soldered sheet metal joints to allow adequate capillary solder flow and develop sufficient joint strength. Capillary action draws molten solder into the joint gap (typically 0.05–0.15mm clearance) — too small a lap leaves insufficient bond area; too large a lap does not improve strength but wastes solder and time. Wrong answers: one sheet thickness is inadequate for most soldered joints; 25mm (1") is unnecessarily large for standard sheet metal seams. The correct joint clearance for capillary soldering is different from the lap length — a tight fit (clearance 0.05–0.15mm) promotes capillary flow while a loose fit (>0.5mm) results in a cold, porous joint. Solder must be applied to the base metal (not the iron tip) once the seam reaches soldering temperature.

Q14. Answer: D

SMACNA classifies duct systems by static pressure: 1/2" WG, 1" WG, 2" WG, 3" WG, 4" WG, 6" WG, and 10" WG. The pressure class determines sheet metal gauge, seam types, reinforcement requirements, and joint spacing. Low-pressure residential systems are typically 1/2" or 1" WG.

Q15. Answer: C

Insulation on supply ducts in unconditioned spaces prevents condensation (cold ducts in humid attics), reduces heat gain from the attic, and improves system efficiency.

Q16. Answer: B

Plenum spaces contain energised conduit, communication cables, and the ceiling grid — contact with live wiring or stepping through the grid are key hazards requiring careful footing and awareness.

Q17. Answer: B

Flexible connections (canvas or neoprene) absorb AHU fan vibration, preventing noise and fatigue cracks in the rigid ductwork and building structure.

Q18. Answer: B

Golden/straw tint = slight oxidation, acceptable but not ideal. Dark blue or black tints indicate heavy oxidation requiring mechanical or chemical cleaning (passivation/pickling).

Q19. Answer: A

Heat tint on stainless steel is caused by chromium oxide formation when the hot metal is exposed to oxygen. Light gold = slightly exposed; blue/grey = significantly oxidized. Heavy heat tint reduces corrosion resistance in that area. Prevention: proper argon shielding gas coverage, sufficient flow rate, correct torch angle, and allowing the weld to cool under shielding gas before moving the torch. Inadequate shielding gas coverage or slow cooling in open air is what exposes the hot metal to oxygen.

Q20. Answer: B

In most Canadian provinces (BC, Ontario, Alberta), fall protection (guardrail, safety net, or personal fall arrest system) is required when a worker is exposed to a fall of 3m (10 ft) or more.

Q21. Answer: C

To form a cone on a slip roll, one end of the rear roller is adjusted higher (or lower) than the other. This creates greater curvature at the narrow cone end and less at the wide end.

Q22. Answer: C

Parallel line development is used for prisms (rectangular ducts) and cylinders (round ducts). Lines in the pattern are drawn parallel and equally spaced around the perimeter. Radial line is for cones and pyramids. Triangulation is for transition pieces between different shapes.

Q23. Answer: D

Drive cleats (also called drive slips) have one open channel — they are hammered (driven) onto one side of a duct joint, with the other duct end inserted first. S-cleats (S-slips) have two channels — both duct ends slide in from opposite sides of the S. Drive cleats are used on the long sides of rectangular duct joints; S-cleats are used on the short sides.

Q24. Answer: A

The grooved seam (or rolled groove seam) is used on round ductwork — particularly the spiral seam formed by a spiral pipe machine — and for connecting two curved edges. Both edges are formed into matching grooves and then rolled together to lock. It creates a smooth, mechanically tight seam without exposed sharp edges.

Q25. Answer: B

Most Canadian OH&S jurisdictions require reporting of injuries requiring medical treatment (beyond first aid) within a set period and a written investigation report.

Q26. Answer: A

Yellow-handled aviation snips are the straight-cut snips, used for straight lines and large, gentle curves. Red-handled snips cut to the left (counterclockwise curves) and green-handled snips cut to the right (clockwise curves). This colour code — yellow=straight, red=left, green=right — is standardised across manufacturers.

Q27. Answer: D

Triangulation is used when connecting two different shapes (rectangle-to-round, offset transitions). The surface is divided into triangles; true lengths of each diagonal are determined and then the triangles are unfolded into a flat pattern. Parallel line only works when both ends are the same shape. Radial line works only for cones and pyramids with a single apex point.

Q28. Answer: B

Tack welds temporarily hold parts in correct position and alignment before full seam welding, preventing movement and thermally induced distortion as the joint is welded. Wrong answers: tack welds are NOT the final structural welds — they provide only enough strength to hold position; they should not replace clamps for complex assemblies that require repositioning during fit-up (clamps are removed and repositioned, tacks are not). Tack weld quality matters: a tack that cracks during welding can become a defect in the root of the final weld. Good practice: tack at both ends first to hold square, then space intermediate tacks to control distortion. In sheet metal duct welding, tack spacing typically 150–300mm for light gauge.

Q29. Answer: B

For a Pittsburgh machine, the panel is fed face-up with the edge to be formed entering the rollers. The machine forms the "pocket" (P-lock groove) along the panel edge.

Q30. Answer: B

Triangulation sequence: 1) Draw plan and elevation views. 2) Divide the surface into triangles (diagonals across each face). 3) Find the true length of each line using a true length diagram (rotate each line to horizontal and measure). 4) Draw each triangle in sequence using the true lengths, building the flat pattern triangle by triangle.

Q31. Answer: C

Balancing dampers are manually adjusted during commissioning to set branch airflows to design values. They are locked in position after balancing is complete.

Q32. Answer: C

A wire inserted into a folded hem creates a stiff, rounded edge. This adds rigidity to the panel edge, prevents the sharp cut edge from being exposed, and is used on cylindrical fittings.

Q33. Answer: A

A bar folder (or bar-folding machine) forms a standing seam (S-lock male edge) or short flanges by folding the sheet edge back on itself. The Pittsburgh machine forms the pocket (female side).

Q34. Answer: C

A box and pan brake (finger brake) has a segmented upper beam that can be configured to clear flanges already formed on the workpiece. This allows bending multiple sides of a box or pan without removing the previously bent flanges. Individual fingers can be removed to create different-width segments for complex shapes.

Q35. Answer: A

LOTO (Lockout/Tagout) is mandatory before working near or on energised equipment. The sheet metal worker must de-energise, lock out, and verify zero energy state.

Q36. Answer: A

Parallel line development divides the circumference into equal parts (typically 12 or 16) on the stretchout line; more divisions give a smoother curve.

Q37. Answer: B

The Pittsburgh lock (also called Pittsburgh seam) is the standard longitudinal closing seam for rectangular ducts. One edge is formed into a pocket (the "Pittsburgh pocket"), and the mating flat edge is inserted and then clinched (hammered) closed. It provides a strong, airtight closure along the full length of the duct.

Q38. Answer: D

A 3-piece elbow has two mitre cuts and one centre section, requiring 2 gore lines. The pieces are: end A, centre gore, end B.

Q39. Answer: C

ASHRAE 62.1 sets minimum outdoor air ventilation rates in CFM/person and CFM/ft² of floor area by occupancy type, ensuring adequate dilution of indoor pollutants.

Q40. Answer: B

Transfer air grilles are typically installed high in the partition wall. Warm supply air accumulates near the ceiling and pressure differences drive transfer. Some codes allow door undercuts as an alternative.

Q41. Answer: D

The waste piece curls downward and away from the cut line under the lower blade. This prevents the curl from interfering with the snip handles and allows a clean, straight cut.

Q42. Answer: B

Correct soldering: heat the base metal (the seam), not the solder. When the seam is hot enough, touch the solder wire to the metal — it melts and wicks into the joint by capillary action.

Q43. Answer: A

Brazing: filler melts (liquidus $>450^{\circ}\text{C}/840^{\circ}\text{F}$) but base metal remains solid. Welding: base metal melts. The key distinction is whether the base metal is melted.

Q44. Answer: C

An eccentric reducer is an oblique cone — radial lines from the apex are not equal length. Triangulation must be used to find true lengths of each element.

Q45. Answer: A

AHU (Air Handling Unit) conditions and circulates air: it contains a fan, heating/cooling coils, filters, and dampers. Sheet metal ductwork connects to AHU supply and return.

Q46. Answer: A

A backdraft damper (barometric damper) has gravity-held blades that open with forward airflow from the fan and close by gravity when flow stops, preventing reverse infiltration.

Q47. Answer: B

Spot welding passes high current through copper electrode tips pressed against both sheet surfaces. Resistance heating at the contact point melts and fuses the sheets at discrete spots. Advantages: fast, no filler metal, minimal distortion, no flux. Limitations: only for lap joints, limited penetration, requires electrode access to both sides.

Q48. Answer: B

Cut-resistant gloves (ANSI/ISEA level A4+ or equivalent) protect against the sharp edges of cut sheet metal. Standard leather gloves provide limited cut resistance.

Q49. Answer: C

A rotary machine (jenny/rotary) forms wired edges, turned edges, flanges, and similar rolled forms. Punching rivet holes requires a punch press or drill — not a rotary machine.

Q50. Answer: A

A clogged/loaded filter has high resistance, causing elevated pressure drop across the filter section. This also reduces airflow. Filters must be replaced or cleaned.

Scored under 70%?

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