



SHEET METAL CONTRACTORS GENERAL TRADE KNOWLEDGE EXAMINATION CONTENT INFORMATION

Revised March 2009

The General Trade Knowledge examination will be administered in one session on the morning of the first day of the examination administration. It will consist of 80 equally weighted questions.

The examination will have questions relating to the following content areas and necessary knowledge for each area includes:

- reading and interpreting plans and specifications
- reading and interpreting codes
- basic mathematics
(addition, subtraction, multiplication, division, calculations of area and volume, fractions, decimals, percentages, calculating the sides of triangles, square roots, powers of numbers, and solving simple algebraic equations for unknown variables)

You should be prepared to respond to examination questions on any of the content areas listed. Questions asked and content areas tested on previous examinations should not be assumed to be the only possible questions to be asked or content areas to be tested on this examination.

The percentage of questions shown for each content area may vary by as much as plus or minus three (3) percent. Please refer to the Candidate Information Brochure and the Reference List for additional information.

Content Area A **15%** **Pre-Installation and Site Work**

1. Recommending changes to plans and specifications

- knowledge of symbols
- knowledge of abbreviations
- knowledge of terminology
- knowledge of dimensioning
- knowledge of material costing
- knowledge of equipment costing
- knowledge of labor costing

2. Designing duct systems

- knowledge of design requirements
- knowledge of symbols
- knowledge of abbreviations
- knowledge of air velocity's static pressures
- knowledge of final test and balance of completed air distribution system
- knowledge of drafting
- knowledge of local, state, and national codes
- knowledge of SMACNA requirements
- knowledge of sealants and mastics

3. Designing roof drainage systems (sheet metal)

- knowledge of flashing requirements
- knowledge of roofing materials
- knowledge of gutter installation requirements
- knowledge of downspout installation requirements

4. Designing sheet metal specialties

- knowledge of louver requirements
- knowledge of screen requirements
- knowledge of gravity ventilator requirements
- knowledge of power roof exhauster requirements
- knowledge of smoke hatch requirements
- knowledge of linen and trash shoot requirements
- knowledge of stack requirements
- knowledge of types of locks and seams
- knowledge of design requirements

5. Designing grease handling duct systems

- knowledge of design requirements
- knowledge of fire codes

6. Determining proper gauge of metals used

- knowledge of gauge tables
- knowledge of reinforcement requirements
- knowledge of proper gauges
- knowledge of types of metal and bracing
- knowledge of local, state, and national codes
- knowledge of SMACNA requirements

- 7. **Transporting equipment and materials**
knowledge of safety requirements
- 8. **Unloading, lifting and lowering materials**
knowledge of live loads
knowledge of safety requirements

Content Area B **25%**
Industrial Duct Fabrication

- 1. **Fabricating rectangular ducts under 2 ft.**
knowledge of sheet metal duct requirements
knowledge of fiberglass duct requirements
knowledge of flex duct requirements
knowledge of duct fitting requirements
knowledge of duct outlets and grilles
knowledge of joining requirements
knowledge of double seam corner
knowledge of elbow longitudinal seams
knowledge of butt welding techniques and requirements
knowledge of using a pattern
knowledge of double angles
knowledge of mitering
knowledge of plug weld or spot weld techniques and requirements
knowledge of irregular angles
knowledge of how to operate light gauge welding units
knowledge of safety requirements
- 2. **Fabricating rectangular ducts over 2 ft.**
knowledge of sheet metal duct requirements
knowledge of fiberglass duct requirements
knowledge of flex duct requirements
knowledge of duct fitting requirements
knowledge of duct outlets and grilles
knowledge of joining requirements
knowledge of double seam corner
knowledge of elbow longitudinal seams
knowledge of butt welding techniques and requirements
knowledge of using a pattern
knowledge of double angles
knowledge of mitering
knowledge of plug weld or spot weld techniques and requirements
knowledge of irregular angles
knowledge of how to operate light gauge welding units
knowledge of safety requirements

- 3. **Fabricating round sheet metal ducts**
knowledge of sheet metal duct requirements
knowledge of fiberglass duct requirements
knowledge of flex duct requirements
knowledge of duct fitting requirements
knowledge of duct outlets and grilles
knowledge of joining requirements
knowledge of double seam corner
knowledge of elbow longitudinal seams
knowledge of butt welding techniques and requirements
knowledge of using a pattern
knowledge of mitering
knowledge of plug weld or spot weld techniques and requirements
knowledge of how to operate light gauge welding units
knowledge of safety requirements
- 4. **Fabricating oval sheet metal ducts**
knowledge of triangulation
knowledge of measuring lines
knowledge of mitering
knowledge of how to operate light gauge welding units
knowledge of safety requirements
- 5. **Fabricating fittings for rectangular ducts**
knowledge of layout requirements and techniques
knowledge of mitering
knowledge of how to operate light gauge welding units
knowledge of safety requirements
- 6. **Fabricating fittings for round ducts**
knowledge of layout requirements and techniques
knowledge of radial line layout
knowledge of mitering
knowledge of how to operate light gauge welding units
knowledge of safety requirements
- 7. **Fabricating fittings for oval ducts**
knowledge of layout requirements and techniques
knowledge of mitering
knowledge of how to operate light gauge welding units
knowledge of safety requirements

- 8. Fabricating snaplock seams**
knowledge of allowances
- 9. Fabricating standing seams**
knowledge of layout requirements and techniques
- 10. Fabricating other types of locks and seams**
knowledge of other types of seam techniques and requirements
knowledge of welding requirements and techniques
knowledge of mechanical seam requirements
- 11. Fabricating interior lined sheet metal ducts**
knowledge of layout and design techniques and requirements
knowledge of seam requirements and techniques
knowledge of pin spacing (well pins, etc.)
knowledge of adhesives and coverage
- 12. Fabricating kitchen hoods**
knowledge of exhaust out vs. fresh air intake requirements
knowledge of design requirements and materials
knowledge of state and national codes
knowledge of layout and design
knowledge of welding requirements
knowledge of fire codes
knowledge of SMACNA requirements
- 13. Fabricating kitchen hood exhaust systems**
knowledge of exhaust out vs. fresh air intake requirements
knowledge of design requirements and materials
knowledge of state and national codes
knowledge of layout and design
knowledge of welding requirements
knowledge of fire codes
knowledge of SMACNA requirements
knowledge of how to operate light gauge welding units
knowledge of safety requirements
- 14. Fabricating drain pans**
knowledge of layout and design requirements and techniques
knowledge of seam requirements and techniques
knowledge of soldering

- 15. Fabricating air handling systems (ducts and fans)**
knowledge of seam requirements and techniques
knowledge of fittings
- 16. Fabricating turning vanes**
knowledge of different types (single blade, air foil)
knowledge of spacing requirements
knowledge of required numbers of elbows

Content Area C
Architectural Sheet Metal

10%

- 1. Fabricating formed gravel stop fascia systems**
knowledge of pitch drippage
knowledge of lips
knowledge of soffits
knowledge of drip edge
knowledge of gauge requirements
knowledge of flange
knowledge of crimped metal requirements and techniques
knowledge of longitudinal break
- 2. Fabricating through-wall flashings**
knowledge of materials requirements
knowledge of dowels
knowledge of extension length
knowledge of wall cavity protection
- 3. Fabricating gravel stops**
knowledge of minimum gauge requirements
knowledge of cleat requirements
knowledge of edge strips
knowledge of types of gravel stops
knowledge of fascia
knowledge of mastic
knowledge of back-up plate
knowledge of top cover plate
knowledge of fastener requirements
knowledge of watertight washers
knowledge of soffits
knowledge of joint requirements
knowledge of corner requirements

4. Fabricating base and counter flashing systems

knowledge of receivers
knowledge of masonry walls
knowledge of effects of drippage
knowledge of notching and lapping
knowledge of drip edge requirements
knowledge of raggle
knowledge of wedges
knowledge of gauge requirements

5. Fabricating valley flashings

knowledge of gauge requirements
knowledge of hook edges
knowledge of cleat requirements
knowledge of properties of zinc alloy and painted terne metal
knowledge of crimping techniques and requirements

6. Fabricating hip and ridge flashings

knowledge of length requirements
knowledge of shingle roof requirements

7. Fabricating flashing around roof penetrations

knowledge of bonnet flashing requirements
knowledge of collar requirements
knowledge of fastener requirements
knowledge of flanges
knowledge of sealing requirements
knowledge of cap flashing requirements

8. Fabricating flashing for equipment supports

knowledge of counter flashing requirements
knowledge of insulation requirements
knowledge of cants
knowledge of seaming techniques and requirements
knowledge of inverted V and hemming

9. Fabricating formed metal coping

knowledge of gauge requirements
knowledge of types of materials
knowledge of fastener requirements and techniques
knowledge of sealing requirements
knowledge of mitering

10. Fabricating extruded coping

knowledge of mitering
knowledge of gauge requirements

11. Fabricating expansion joint intersections

knowledge of expansion and contraction sizing requirements
knowledge of curb requirements

12. Fabricating roof and separation joint intersections

knowledge of minimum wood curb requirements
knowledge of maximum allowance for expansion
knowledge of continuous flange
knowledge of expansion cap
knowledge of counter flashing requirements
knowledge of standing seam requirements
knowledge of cleat requirements

13. Fabricating expansion joints designed to allow independent roof movement

knowledge of face plate requirements
knowledge of hook seam requirements
knowledge of curbs
knowledge of neoprene and weather resistant materials requirements
knowledge of receiver requirements
knowledge of links
knowledge of adhesives
knowledge of minimum gauge requirements
knowledge of length requirements
knowledge of horizontal working width
knowledge of mitering
knowledge of sealing

14. Fabricating water stops

knowledge of mitering

15. Fabricating expansion joints for floor slabs

knowledge of minimum gauge requirements

16. Fabricating seams for flat metal roofs

knowledge of types of seams
knowledge of sealing
knowledge of fastening requirements
knowledge of joint requirements

17. Determining gauge and pan width for standing seam roofs

knowledge of materials
knowledge of gauge requirements
knowledge of pan width requirements

18. Fabricating batten seams for metal roofs

knowledge of types of seams
knowledge of sealing
knowledge of fastening requirements
knowledge of joint requirements

19. Fabricating chevron batten seams for metal roofs

knowledge of gauge requirements
knowledge of lock and seam requirements

20. Fabricating mansard roofs and screens

knowledge of cap flashing requirements
knowledge of sill flashing requirements
knowledge of batten requirements
knowledge of standing seam requirements and techniques
knowledge of snaplock seam requirements and techniques
knowledge of double S seam requirements and techniques

21. Fabricating parts of an ornamental roof

knowledge of standing seam requirements and techniques
knowledge of batten requirements
knowledge of canopy requirements

22. Fabricating parts of a bermuda type roof

knowledge of wood framing requirements and techniques
knowledge of pans
knowledge of continuous cleat requirements
knowledge of minimum gauge requirements
knowledge of pan widths

23. Manufacturing parts of a skylight

knowledge of single and double pitch requirements
knowledge of condensate gutters
knowledge of skylight bars
knowledge of weep holes
knowledge of bar joints
knowledge of mitering
knowledge of soldering requirements and techniques
knowledge of material requirements
knowledge of gauge requirements

24. Fabricating roof scuttles

knowledge of forming a curb
knowledge of scuttle requirements
knowledge of metal skirt requirements

25. Manufacturing formed louvers

knowledge of stiffener bars
knowledge of mullion connected sections
knowledge of sealing requirements
knowledge of metal sill flashing
knowledge of screening

26. Fabricating louvered enclosures

knowledge of gauge requirements
knowledge of material requirements

27. Fabricating louvered sunshades

knowledge of gauge requirements
knowledge of material requirements

28. Fabricating sunshade canopies

knowledge of support requirements
knowledge of sunshade frame requirements

29. Fabricating rectangular gutters

knowledge of sizing gutters
knowledge of design requirements

30. Fabricating half round gutters

knowledge of sizing
knowledge of design requirements

31. Fabricating built-in gutters

knowledge of corrosion resistant materials
knowledge of soldering techniques and requirements
knowledge of riveting techniques and requirements
knowledge of seaming techniques and requirements
knowledge of wood box frame requirements
knowledge of expansion joints
knowledge of continuous cleat techniques and requirements
knowledge of outlet requirements

32. Fabricating water diverters

knowledge of sizing
knowledge of pitch requirements
knowledge of gauge requirements
knowledge of cleat requirements
knowledge of bracing requirements
knowledge of allowances for expansion
knowledge of flanges and effects of temperature

33. Placing expansion joints in gutters

knowledge of materials
knowledge of width of joints
knowledge of expansion rates

34. Fabricating lap type gutter expansion joints

knowledge of riveting techniques and requirements
knowledge of sizing

35. Fabricating butt type gutter expansion joints

knowledge of materials
knowledge of width of joints
knowledge of expansion rates

36. Fabricating built-in gutter expansion joints

knowledge of materials
knowledge of width of joints
knowledge of expansion rates

37. Fabricating expansion joints in welded gutters

knowledge of riveting techniques and requirements
knowledge of sizing

38. Fabricating combination scuppers and gutters

knowledge of soldering techniques and requirements
knowledge of intervals
knowledge of rims

39. Fabricating hanging gutters

knowledge of sizing
knowledge of gutter brackets and straps
knowledge of material requirements
knowledge of spaces
knowledge of spike and ferrule

40. Fabricating gutter accessories (e.g., baffle, screen, strainers)

knowledge of sizing
knowledge of material compatibility

41. Fabricating conductor heads

knowledge of sizing
knowledge of minimum length for outlet tube
knowledge of gauges

42. Fabricating formed roof sumps

knowledge of flanges
knowledge of gravel stop requirements
knowledge of welding requirements and techniques
knowledge of gauges
knowledge of sizing

43. Fabricating scuppers

knowledge of material compatibility
knowledge of gauges
knowledge of welding requirements and techniques

44. Fabricating overflow scuppers

knowledge of material compatibility
knowledge of gauges
knowledge of welding requirements and techniques

45. Fabricating downspouts

knowledge of dimensioning
knowledge of minimum gauges for standard downspouts
knowledge of material compatibility
knowledge of elbow requirements
knowledge of hanger requirements

46. Determining types of downspout hangers

knowledge of types of hangers
knowledge of material compatibility

47. Fabricating downspout hangers

knowledge of material compatibility
knowledge of support requirements

48. Constructing and installing splash pans

knowledge of placement requirements
knowledge of dimensioning

Content Area D
Fabricating Other Sheet Metal Structures

10%

1. Fabricating gravity ventilators

knowledge of seaming techniques and requirements
knowledge of material requirements
knowledge of curbs
knowledge of weep hole requirements
knowledge of cants
knowledge of flashing requirements
knowledge of riveting techniques and requirements
knowledge of dampers
knowledge of screening techniques and requirements

2. Fabricating power roof ventilators (exhauster)

knowledge of sizing
knowledge of material requirements

3. Fabricating smoke hatches

knowledge of spring requirements
knowledge of material requirements
knowledge of riveting techniques and requirements
knowledge of sizing

4. Fabricating draft and fire curtains

knowledge of seaming techniques and requirements
knowledge of gauge requirements
knowledge of bracing requirements

5. Fabricating cornices

knowledge of sheathing techniques and requirements
knowledge of blocking techniques and requirements
knowledge of fastening techniques and requirements
knowledge of soldering and welding techniques and requirements
knowledge of mitering

6. Fabricating spires

knowledge of material requirements
knowledge of welding techniques and requirements
knowledge of fastening techniques and requirements

7. Fabricating cornerstone boxes

knowledge of soldering techniques and requirements
knowledge of insulation requirements
knowledge of riveting

8. Fabricating column covers

knowledge of gauge requirements
knowledge of material compatibility
knowledge of soldering and welding techniques and requirements

9. Fabricating corner guards

knowledge of fastening techniques and requirements

10. Fabricating wall panels

knowledge of fastening techniques and requirements

11. Fabricating metal siding and roofing

knowledge of welding and soldering techniques and requirements
knowledge of fastening techniques and requirements

12. Fabricating exhausts

knowledge of welding and soldering techniques and requirements
knowledge of riveting techniques and requirements

13. Fabricating partition and column closures

knowledge of sizing

14. Fabricating ornamental hoods

knowledge of welding and soldering techniques and requirements

15. Fabricating linen and trash chutes

knowledge of welding and soldering techniques and requirements

16. Fabricating stacks

knowledge of welding and soldering techniques and requirements

Content Area E **25%**
Installation of Sheet Metal Systems

1. Installing rectangular sheet metal ducts and fittings

knowledge of hanger types
knowledge of hanging techniques and requirements
knowledge of fittings
knowledge of sealants and mastics

2. Installing round sheet metal ducts and fittings

knowledge of hanger types
knowledge of hanging techniques and requirements
knowledge of fittings
knowledge of sealants and mastics

3. Installing oval sheet metal ducts

knowledge of hanger types
knowledge of hanging techniques and requirements
knowledge of fittings
knowledge of sealants and mastics

4. Installing spiral sheet metal ducts and fittings

knowledge of hanger types
knowledge of hanging techniques and requirements
knowledge of fittings
knowledge of sealants and mastics

5. Installing coping

knowledge of sealing techniques and requirements
knowledge of blocking techniques and requirements
knowledge of anchoring techniques and requirements
knowledge of cleat requirements

6. Installing gravel stops

knowledge of stop fascia
knowledge of cleat requirements
knowledge of fastening techniques and requirements
knowledge of soffit requirements

7. Installing fascia

knowledge of fastening techniques and requirements
knowledge of nailing techniques and requirements
knowledge of joints
knowledge of overlapping and corrosion protection

8. Installing flashing

knowledge of underlayment requirements
knowledge of fastening techniques and requirements
knowledge of nailing techniques and requirements
knowledge of joints
knowledge of overlapping and corrosion protection

9. Installing metal roofs

knowledge of dead loads
knowledge of joining requirements
knowledge of riveting techniques and requirements
knowledge of sealing techniques and requirements
knowledge of seam requirements

10. Installing metal roof components

knowledge of joining requirements
knowledge of sealing techniques and requirements
knowledge of seam requirements

11. Installing gutters and downspouts

knowledge of sizing
knowledge of hanger techniques and requirements
knowledge of seam requirements
knowledge of water diverter requirements
knowledge of allowance for gutter expansion and joints

12. Installing other sheet metal structures

knowledge of joining requirements
knowledge of fastening techniques and requirements

13. Performing fire department required smoke tests

knowledge of requirements

- 14. Installing air handling systems**
knowledge of fastening techniques and requirements
knowledge of installation techniques and requirements
- 15. Balancing air handling systems**
knowledge of balancing to CFM required in different areas
knowledge of air balance meter operation
- 16. Installing kitchen exhaust systems**
knowledge of fastening techniques and requirements
knowledge of installation techniques and requirements
knowledge of design and codes
- 17. Installing fiberglass duct systems**
knowledge of hanging techniques and requirements
knowledge of joining techniques and requirements
- 18. Installing fire dampers, smoke dampers and fire and smoke combination dampers**
knowledge of break-away techniques
knowledge of local and national codes
knowledge of NFPA requirements
knowledge of SMACNA requirements

Content Area F **15%**
Safety and Equipment

- 1. Wearing hearing protection**
knowledge of safety requirements
- 2. Wearing head protection**
knowledge of safety requirements
knowledge of types given job conditions
- 3. Wearing eye and face protection**
knowledge of safety requirements
knowledge of types given job conditions
- 4. Using respiratory protection**
knowledge of material safety data sheets (M.S.D.S.)
knowledge of types given job conditions

- 5. Using ventilation devices**
knowledge of material safety data sheets (M.S.D.S.)
knowledge of types given job conditions
- 6. Using overhead hoists or cranes**
knowledge of proper rigging techniques
- 7. Using mobile equipment (e.g., forklifts, hi-lifts, cranes)**
knowledge of weight capacities of equipment
knowledge of outriggers
- 8. Using ladders, scaffolds, and rolling platforms**
knowledge of how to assemble
knowledge of safety requirements
- 9. Using brakes**
knowledge of how to operate
knowledge of safety requirements
- 10. Using shears**
knowledge of safety requirements
- 11. Using drill presses**
knowledge of safety requirements
- 12. Using cutting equipment**
knowledge of safety requirements
- 13. Using various hand and power tools (e.g., power shears, wrenches, and snips)**
knowledge of safety requirements
- 14. Using air compressors and air tools**
knowledge of safety requirements
knowledge of safe operating pressures