



UNDERGROUND UTILITY CONTRACTORS GENERAL TRADE KNOWLEDGE EXAMINATION CONTENT INFORMATION

Effective September 9, 2014

The General Trade Knowledge portion of the examination is administered daily in Computer Based Testing (CBT) format. 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 **20%** **Pre-Installation**

1. Performing a visual inspection of site and equipment

knowledge of equipment needed for site work
ability to identify obstructions and access points
knowledge of removal of site debris
knowledge of types of equipment
knowledge of figuring quantity of materials

2. Review plans and specifications and recommend changes

knowledge of construction techniques
knowledge of local utility specifications
knowledge of plans and materials specifications
knowledge of latest pipe technologies
knowledge of estimating

3. Preparing shop drawings

knowledge of standards (e.g., ASTM, AWWA)
knowledge of materials specifications and products
ability to organize, read, and understand specifications and plans

4. Reviewing federal, state, and local codes and ordinances

knowledge of pre-installation requirements
knowledge of local code requirements and jurisdictions of utility districts
knowledge of references, sources of codes and ordinances
knowledge of MSDS's
knowledge of SWPPP (Storm Water Pollution Prevention Plan)

5. Determining location of excavations

knowledge of invert elevations
knowledge of basic surveying and layout techniques
knowledge of safety requirements
knowledge of recording pre-existing job conditions (e.g., location of existing utilities)
knowledge of sub-surface ground conditions

6. Digging test holes to determine water levels

knowledge of drilling equipment and practices
knowledge of existing utilities
knowledge of seasonal variations

7. Coordinating and directing soil preparation and testing soil and ground water

knowledge of excavating and soil composition
knowledge of soil and water testing procedures
knowledge of potentially contaminated soils

- 8. Determining burial depth and slope**
knowledge of excavation
knowledge of surveying and leveling techniques

- 9. Locating existing utilities and underground obstructions**
knowledge of where to find information
knowledge of when and how to notify the appropriate authority
knowledge of permissible working conditions

- 10. Complying with erosion control guidelines**
knowledge of erosion control guidelines
knowledge of turbidity and testing

- 11. Unloading, lifting and transporting pipes**
knowledge of weight capacity of front end loaders
knowledge of cabling and rigging or other material
knowledge of handling equipment

- 12. Stacking and storing pipes**
knowledge of dividers
knowledge of appropriate conditions for stacking and storing pipes

- 13. Reading plans and specifications**
knowledge of plan scales and symbols
knowledge of cross sections and profiles
knowledge of geotechnical reports

Content Area B **5%**
Traffic Control

- 1. Complying with traffic control laws and contract requirements**
knowledge of traffic codes and regulations
ability to communicate with emergency services
knowledge of current MOT requirements
- 2. Erecting and positioning road signs, cones, barricades and detours**
knowledge of traffic codes and regulations
- 3. Applying temporary pavement markings**
knowledge of traffic codes and regulations
- 4. Managing and coordinating flaggers**
knowledge of traffic codes and regulations
knowledge of location of stockpiled material along right-of-way

Content Area C **20%**
Excavating, Backfill, and Compaction

- 1. Constructing trenches**
knowledge of pipe layout
knowledge of appropriate widths for different pipes
knowledge of surveying techniques
knowledge of shoring techniques
knowledge of soil types
knowledge of OSHA requirements (e.g., competent person on job site)
- 2. Calculating excavation and backfill**
knowledge of effects of compaction
knowledge of soil properties
- 3. Removing trees, shrubs, and fences**
knowledge of excavation equipment
knowledge of demolition
- 4. Cutting and replacing pavement**
knowledge of safety
knowledge of local specifications and regulations
knowledge of asphalt types
- 5. Performing dewatering**
knowledge of pumping techniques
knowledge of well points
knowledge of piping hook-up
knowledge of soil permeability and drainage
knowledge of water table
knowledge of drawdown
knowledge of sock drains
knowledge of turbidity and testing
- 6. Installing sheet piling and reinforcing requirements**
knowledge of angles of repose
knowledge of stress supports
knowledge of wood piling
knowledge of metal piling
knowledge of OSHA regulations
- 7. Utilizing trench boxes and shields**
knowledge of excavating
knowledge of soil properties
knowledge of OSHA regulations
- 8. Installing tunnels**
knowledge of drilling
knowledge of excavating
knowledge of bracing

knowledge of surveying techniques
knowledge of ventilation
knowledge of safety requirements
knowledge of dewatering
knowledge of pumps

9. Jack and bore casings

knowledge of hydraulic jacking and boring equipment
knowledge of hydraulic jacking and boring procedures

10. Trenching in non-cohesive soil or sand

knowledge of digging devices
knowledge of sheet piling
knowledge of soil properties
knowledge of angle of repose

11. Installing pipe bedding

knowledge of appropriate types
knowledge of determining depth or thickness needed
knowledge of grading

12. Replacing finish surfaces (e.g., asphalt, concrete)

knowledge of appropriate asphalt and concrete types
knowledge of testing
ability to layout and calculate volume and area (square footage, cubic yards)
knowledge of grade and compaction
knowledge of curing periods
knowledge of local and state codes and regulations

13. Installing filter fabrics and backfill migration preventers

knowledge of soils
knowledge of water tables
knowledge of filter fabric

14. Checking for required finish grade and invert elevation

knowledge of reading levels
knowledge of leveling and surveying techniques

15. Proper sloping

16. Installing backfill material for pipes and structures

knowledge of different types of backfill materials

knowledge of correct grade surveying equipment
knowledge of grade and compaction
knowledge of proper backfill to support existing utilities after digging

Content Area D

15%

Pipe Installation and Repairs

1. Installing, replacing and repairing pressure pipes knowledge of types and application

knowledge of placement
knowledge of associated fittings
knowledge of elevations
knowledge of laser grade beams
knowledge of survey instruments
knowledge of testing
knowledge of OSHA regulations
knowledge of local and state codes and regulations

2. Installing, replacing and repairing gravity sewer pipes

knowledge of piping materials
knowledge of equipment
knowledge of pipe laser equipment
knowledge of survey instruments and techniques
knowledge of ground water
knowledge of pipe slopes and grades
knowledge of bedding requirements and placement of bedding
knowledge of air testing
knowledge of proper compaction
knowledge of OSHA regulations
knowledge of assembly
knowledge of sealants
knowledge of preventing and testing for pipe deflection
knowledge of trenchless installation procedures
knowledge of local and state codes and regulations

3. Installing piping for pumps

knowledge of capacity of different size pumps
knowledge of fittings and valves

4. Installing manholes, lift stations and catch basins

knowledge of cutting and sizing of materials
knowledge of form work
knowledge of concrete mixtures
knowledge of concrete placement
knowledge of brick masonry

knowledge of surveying techniques
knowledge of drop connections
knowledge of handling
knowledge of working in confined spaces

5. Placing grout

knowledge of mixtures
knowledge of properties
knowledge of setting time
knowledge of chemical grouting
knowledge of health risks involved
knowledge of applications of chemical grouting
knowledge of when and what type to use

6. Removing asbestos cement pipe

knowledge of health risks
knowledge of federal and state laws
knowledge of proper disposal of broken cement
asbestos pipe
knowledge of license restrictions

7. Using hydraulic cement

knowledge of properties
knowledge of setting time
knowledge of health risks and safety precautions

8. Installing two or more pipes in one excavation

knowledge of spacing requirements
knowledge of backfill requirements

9. Installing piers

knowledge of concrete mixtures
knowledge of reinforcing
knowledge of form work
knowledge of precast piers
knowledge of anchoring

10. Installing a slip liner

knowledge of materials and procedures used for
slip liners

11. Installing pipe by directional boring

knowledge of pipe and slurry
knowledge of equipment and procedures

Content Area E

15%

Piping, Valves and Fittings

**1. Layout and determining pipes, valves, fittings
and related components**

knowledge of installation
knowledge of replacement

knowledge of monitoring
knowledge of appropriate use of pipes of various
materials
knowledge of appropriate use of valves, fittings,
and related components of various materials

2. Installing pump stations

knowledge of basic mechanics of pumps
knowledge of slabs
knowledge of foundations
knowledge of walls
knowledge of working in confined spaces

3. Installing fittings

knowledge of types and application for use

**4. Installing backflow prevention devices, flow
regulators and meters**

knowledge of how flow regulators operate
knowledge of how to set a flow regulator
knowledge of meter types
knowledge of meter installation
knowledge of regulations governing backflow
prevention

5. Installing pumps and motors

knowledge of anchoring
knowledge of piers and foundations

6. Installing metal cathodic protection

knowledge of installation
knowledge of coatings
knowledge of local and state codes and
regulations

7. Installing fire hydrants

knowledge of types and placement

8. Installing restraining mechanisms

knowledge of thrust blocks and placement
knowledge of straps
knowledge of tie downs and tie rods
knowledge of megalugs and bell restraints
knowledge of restraining schedules'
knowledge of forces acting on pipes

9. Installing main line and service taps

knowledge of tapping saddles
knowledge of pressure taps
knowledge of equipment for tapping and
materials

**10. Piping through walls
(structures, lift-stations, manholes,
valve pits)**

knowledge of structures
knowledge of lift-stations
knowledge of manholes
knowledge of valve pits and sleeves
knowledge of sealing methods

11. Installing pipes underwater

knowledge of piping material and material
limitations
knowledge of anchoring
knowledge of pipe connection techniques
(cutting, welding, brazing, chemical bonding)
knowledge of mechanical connections
(threaded connections)
knowledge of leak detection
knowledge of hangers and supports
knowledge of pressure testing
knowledge of measurement
knowledge calculating and fitting
knowledge of thrust blocks
knowledge of drying procedures
knowledge of OSHA and other safety
requirements

12. Installing pipe supports

knowledge of straps and hangers
knowledge of concrete or other cradles

Content Area F

10%

Testing, Disinfecting and Job Close Out

1. Preparing as-built drawings

2. Testing gravity pipes

knowledge of calculations for infiltration
and exfiltration
knowledge of required equipment
knowledge of mandrel testing
knowledge of lamping procedures
knowledge of low pressure air testing
knowledge of TV testing procedures

3. Testing Pressure pipes

knowledge of test pumps
knowledge of reading pressure gauges
knowledge of air test charts
knowledge of calculating for hydrostatic head
over top of pipe
knowledge of duration time of tests

4. Flushing pipes before disinfecting

knowledge of time requirements
knowledge of safety requirements

5. Injecting chlorine or disinfectant into pipes

knowledge of safety requirements
knowledge of application of chlorine or
disinfectant
knowledge of storage and handling of chlorine

6. Pulling bacteriological samples

knowledge of sampling procedures
knowledge of D.E.P. requirements

7. Flushing pipes after disinfecting

knowledge of time requirements
knowledge of safety requirements

**8. Assemble Operating and Maintenance
Manuals**

Knowledge of equipment and materials
specifications
Knowledge of equipment operations
Knowledge of documentation

9. Perform Close Out Procedures

Knowledge of sign-off requirements
Knowledge of document submission
requirements

Content Area G

5%

Drainage Systems

**1. Installing, repairing, and replacing storm
drainage systems**

knowledge of appropriate types
knowledge of drainage requirements
knowledge of connecting to existing systems
knowledge of coring
knowledge of support bedding

2. Installing oversize culverts

knowledge of appropriate types and applications
knowledge of materials (e.g., structural plates,
corrugated pipe)
knowledge of associated fittings
knowledge of placement
knowledge of safety requirements

2. Installing standard CMP

knowledge of how to place
knowledge of assembly
knowledge of installation

3. Installing retention or detention systems

knowledge of excavation
knowledge of lining
knowledge of shaping

4. Installing perforated and underdrain pipes

knowledge of appropriate types and applications
knowledge of associated fittings
knowledge of safety requirements
knowledge of placement

5. Cleaning storm sewers

knowledge of proper cleaning procedures
knowledge of pipe protection techniques
knowledge of OSHA regulations

**Content Area H
Equipment**

10%

1. Digging with backhoes, trenchers and tractors

knowledge of safety requirements
knowledge of traffic regulations
knowledge of rigging
knowledge of equipment maintenance
ability to determine lifting capacities of equipment used

2. Using overhead hoists and cranes

knowledge of safety requirements
knowledge of weights

3. Using ventilation devices

knowledge of safety requirements
knowledge of toxic materials
knowledge of proper uses of equipment
knowledge of sewer gas trapped in existing manholes
knowledge of air monitoring devices

4. Using lasers

knowledge of safety requirements
knowledge of surveying techniques
knowledge of equipment protection
knowledge of proper setup
knowledge of calculating percentage of grade

5. Using surveying and engineering levels

knowledge of surveying techniques
knowledge of surveying equipment
knowledge to run levels

6. Using dewatering equipment

knowledge of equipment, capacity, and installation of hydraulic, gas and electric pumps
knowledge of well points and sock drain systems
knowledge of soil types
knowledge of rules of water management
knowledge of dewatering alternatives

7. Using compaction equipment

knowledge of compaction equipment
knowledge of static and vibratory compaction
knowledge of density requirements