



# RESIDENTIAL POOL CONTRACTORS GENERAL TRADE KNOWLEDGE EXAMINATION CONTENT INFORMATION

Revised September 14

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** 7 ½% **Pre-Installation and Site Preparation**

- 1. Drawing plans that meet job requirements**
  - knowledge of local ordinances and setback requirements
  - knowledge of survey restrictions
  - knowledge of environmental requirements
  - knowledge of ANSI 5 design criteria
  - knowledge of ANSI 3 design criteria
  - knowledge of system design
  - knowledge of symbols
  - knowledge of abbreviations
  - knowledge of terminology

knowledge of site dimensions  
knowledge of scale dimensions  
knowledge of soil types

## **2. Determine appropriate equipment needed for jobs**

knowledge of Florida Building Code and any local amendments  
knowledge of site conditions  
knowledge of availability of utilities  
knowledge of subsoil conditions  
knowledge of water tables  
knowledge of characteristics of gunite, tile, steel, fiberglass, vinyl, concrete piping, and wiring

## **3. Complying with building department requirements**

knowledge of permitting requirements  
knowledge of required inspections  
knowledge of life safety issues

## **Content Area B** 15% **Pool and Spa Excavation**

### **1. Locating underground, above ground and overhead obstructions**

knowledge of where to find information  
knowledge of job site restrictions  
knowledge of site conditions  
knowledge of how to identify obstructions  
knowledge of when and how to notify appropriate authorities  
knowledge of permissible working conditions

### **2. Excavating or clearing sites**

knowledge of staking out excavation  
knowledge of determining location of excavation  
knowledge of shoring  
knowledge of soil conditions  
knowledge of invert elevations  
knowledge of basic surveying  
knowledge of layout methods

knowledge of interpreting plans and specifications  
knowledge of surveying and leveling equipment  
knowledge of compaction equipment  
knowledge of earth moving and excavation equipment

**3. Performing site grading**

knowledge of elevation requirements  
knowledge of basic surveying and leveling techniques  
knowledge of surveying and leveling equipment  
knowledge of identification of obstructions  
knowledge of removal of site debris  
knowledge of drainage

**4. Determining water tables**

knowledge of subsoil conditions  
knowledge of augers  
knowledge of aquifers  
knowledge of drilling equipment and practices

**5. Determining soil conditions**

knowledge of subsoil conditions  
knowledge of excavation  
knowledge of sampling  
knowledge of soil composition  
knowledge of soil testing

**6. Performing de-watering, de-mucking and well-pointing**

knowledge of dewatering equipment  
knowledge of piping requirements  
knowledge of soils  
knowledge of soil permeability  
knowledge of excavation equipment  
knowledge of excavating techniques and requirements  
knowledge of water table  
knowledge of well points  
knowledge of drawdown  
knowledge of pump requirements and techniques

**7. Backfilling and compacting**

knowledge of different types of backfill material  
knowledge of surveying and leveling equipment  
knowledge of surveying and leveling techniques  
knowledge of soil properties  
knowledge of tamping

knowledge of correct moisture content  
knowledge of percent compaction  
knowledge of soil density testing techniques  
knowledge of calculations to determine the amount of dirt to fill

**8. Removing foreign materials and debris**

knowledge of hand tools  
knowledge of excavation equipment  
knowledge of hauling equipment  
knowledge of materials disposal requirements  
knowledge of environmental standards protection

**Content Area C  
Plumbing Work**

**12 ½%**

**1. Installing recirculating lines**

knowledge of interpreting plans and specifications  
knowledge of piping materials and applications  
knowledge of placement  
knowledge of associated fittings  
knowledge of valve requirements  
knowledge of related components

**2. Pressure testing recirculating lines**

knowledge of theory  
knowledge of psi's  
knowledge of hook-up and placement  
ability to understand test results  
knowledge of dangers of pressure plugs  
knowledge of pressure testing techniques  
knowledge of the dangers of pressurized lines

**3. Installing filter equipment**

knowledge of filtration requirements  
knowledge of manufacturer's specifications  
knowledge of type of filters  
knowledge of gauges and valves  
knowledge of placement of pumps  
knowledge of types and capacities of motors

knowledge of flow rates and piping pressures  
knowledge of ANSI 7 requirements  
knowledge of inlets and outlets

#### **4. Installing pumps**

knowledge of filtration requirements  
knowledge of types of pumps and pump loads  
knowledge of grounding  
knowledge of piping techniques and requirements  
knowledge of pressures and flow requirements  
knowledge of manufacturer's specifications  
knowledge of hydraulics

#### **5. Installing skimmers**

knowledge of filtration requirements  
knowledge of types of skimmers  
knowledge of skimmer housings  
knowledge of strainer baskets  
knowledge of weirs and valves  
knowledge of vacuum cleaning connections  
knowledge of flow rates, pressures, and overflow systems

#### **6. Installing solar heaters**

knowledge of solar heating requirements and practices  
knowledge of roof penetrations  
knowledge of solar collectors  
knowledge of piping techniques and requirements  
knowledge of pipe fittings  
knowledge of control requirements  
knowledge of pump requirements

#### **7. Installing conventional heaters (gas, heat pump, electric)**

knowledge of state and local codes  
knowledge of location requirements  
knowledge of fire and gas codes  
knowledge of sizing and flow rates  
knowledge of heat exchangers for gas heaters  
knowledge of location of L.P. Gas tanks for gas heaters  
knowledge of heat pumps for electric heaters  
knowledge of immersion elements for electric heaters  
knowledge of manufacturer's specifications

#### **8. Installing automatic cleaners**

knowledge of piping requirements  
knowledge of safety requirements  
knowledge of pipe fitting  
knowledge of fittings  
knowledge of pumps

knowledge of filtration requirements  
knowledge of materials  
knowledge of manufacturer's specifications  
knowledge of processes for automatic feeders

#### **9. Installing automatic feeders**

knowledge of piping techniques and requirements  
knowledge of pipe fitting requirements  
knowledge of pipe fitting  
knowledge of pipe materials  
knowledge of processes for automatic feeders  
knowledge of manufacturer's specifications

#### **10. Sizing pipes**

knowledge of hydraulics  
knowledge of ANSI 7 requirements  
knowledge of pump specifications  
knowledge of pump flow rates

### **Content Area D Electrical Work**

**5%**

#### **1. Determining power line requirements**

knowledge of wire size based on amperage  
knowledge of size of conduits  
knowledge of types of conduits  
knowledge of wire type  
knowledge of overhead power  
knowledge of "call before you dig"  
knowledge for determining line sizes

#### **2. Installing electric control panels**

knowledge of safety requirements  
knowledge of location and clearance requirements  
knowledge of electrical grounding requirements  
knowledge of sizing breakers

#### **3. Perform bonding procedures**

knowledge of safety requirements  
knowledge of bonding requirements  
knowledge of NEC requirements

#### **4. Perform grounding procedures**

knowledge of safety requirements  
knowledge of electrical grounding requirements  
knowledge of NEC requirements

**5. Installing light niches**

- knowledge of proper installation requirements (conduit)
- knowledge of safety requirements
- knowledge of types of niches
- knowledge of location and amount of illumination
- knowledge of bonding requirements
- knowledge of manufacturer's specifications
- knowledge of elevation and placement of niche
- knowledge of voltage limitations

**6. Installing, replacing and repairing electrical components**

- knowledge of local and state codes
- knowledge of automatic timers
- knowledge of lights
- knowledge of electrical connections to chlorinating generators
- knowledge of manufacturer's specifications
- knowledge of scope of work

**Content Area E  
Shell Placement**

**10%**

**1. Installing steel reinforcing bars**

- knowledge of reinforcing practices and procedures
- knowledge of scale dimensions
- knowledge of measurement requirements
  
- knowledge of bonding requirements
- knowledge of concrete coverage and rebar clearances

**2. Installing fiberglass walls**

- knowledge of material properties
- knowledge of specific handling requirements
- knowledge of supports and anchorage
- knowledge of backfilling requirements
- knowledge of surveying and leveling equipment
- knowledge of surveying and leveling techniques
- knowledge of soil properties and angle of repose
- knowledge of excavation techniques
- knowledge of manufacturer's specifications

**3. Installing metal walls**

- knowledge of material properties

- knowledge of specific handling requirements
- knowledge of supports and anchorage
- knowledge of backfilling requirements
- knowledge of surveying and leveling equipment
- knowledge of surveying and leveling techniques
- knowledge of soil properties and angle of repose
- knowledge of excavation techniques
- knowledge of manufacturer's specifications

**4. Installing plastic walls**

- knowledge of material properties
- knowledge of specific handling requirements
- knowledge of supports and anchorage
- knowledge of backfilling requirements
- knowledge of surveying and leveling equipment
- knowledge of surveying and leveling techniques
- knowledge of soil properties and angle of repose
- knowledge of excavation techniques
- knowledge of manufacturer's specifications

**5. Installing structural polymer walls**

- knowledge of material properties
- knowledge of specific handling requirements
- knowledge of supports and anchorage
- knowledge of backfilling requirements
- knowledge of surveying and leveling equipment
- knowledge of surveying and leveling techniques
- knowledge of soil properties and angle of repose
- knowledge of excavation techniques
- knowledge of manufacturer's specifications

**6. Testing for leakage in pool and spa shells**

- knowledge of measuring elevation differentials
- knowledge of evaporation
- knowledge of testing procedures
- knowledge of rate of loss procedures

**7. Mixing pneumatically applied concrete**

- knowledge of concrete reinforcement requirements
- knowledge of concrete properties
- knowledge of concrete testing
- knowledge of placement techniques
- knowledge of finishing techniques
- knowledge of pressurized concrete equipment

- 8. Installing precast support pilings**  
 knowledge of soils  
 knowledge of precast piles  
 knowledge of pile driving methods and procedures  
 knowledge of engineer's specifications

**Content Area F** **5%**  
**Deck Work**

- 1. Laying out and forming decks**  
 knowledge of surveying and leveling equipment  
 knowledge of surveying and leveling techniques  
 knowledge of excavation and backfill  
 knowledge of drainage requirements  
 knowledge of form work  
 knowledge of safety requirements  
 knowledge of compaction requirements
- 2. Installing wood decks**  
 knowledge of pressure treated wood  
 knowledge of other wood protection  
 knowledge of carpentry  
 knowledge of carpentry tools  
 knowledge of foundations  
 knowledge of piers  
 knowledge of connectors  
 knowledge of safety requirements
- 3. Installing concrete decks**  
 knowledge of concrete properties  
 knowledge of concrete reinforcement  
 knowledge of concrete placement  
 knowledge of concrete finishing  
 knowledge of form work  
 knowledge of expansion and contraction protection  
 knowledge of drainage and slope  
 knowledge of deck drains and plumbing  
 knowledge of deck finishes  
 knowledge of compaction requirements  
 knowledge of soil treatments
- 4. Installing masonry type decks (tile, stone, and brick)**  
 knowledge of sub-base materials  
 knowledge of work requirements  
 knowledge of material placement  
 knowledge of drainage and slope  
 knowledge of deck drains

- knowledge of stabilization  
 knowledge of compaction

**Content Area G** **10%**  
**Tile, Coping and Trim Work**

- 1. Installing tiles**  
 knowledge of material properties  
 knowledge of specific handling requirements  
 knowledge of measurements  
 knowledge of measuring equipment  
 knowledge of types of grouts and requirements  
 knowledge of adhesive requirements  
 knowledge of mortar requirements  
 knowledge of cleaning  
 knowledge of leveling techniques and requirements  
 knowledge of architectural effects  
 knowledge of manufacturer's specifications  
 knowledge of control joints  
 knowledge of code requirements  
 knowledge of plans and specifications
- 2. Installing masonry trims (brick, stone, and precast coping)**  
 knowledge of material properties  
 knowledge of specific handling requirements  
 knowledge of measurements  
 knowledge of measuring equipment  
 knowledge of types of grouts and requirements  
 knowledge of adhesive requirements  
 knowledge of mortar requirements  
 knowledge of cleaning  
 knowledge of leveling techniques and requirements  
 knowledge of architectural effects  
 knowledge of mitering  
 knowledge of manufacturer's specifications  
 knowledge of control joints  
 knowledge of code requirements  
 knowledge of plans and specifications
- 3. Checking for level placement of materials**  
 knowledge of leveling equipment  
 knowledge of leveling techniques and requirements  
 knowledge of code requirements  
 knowledge of plans and specifications

**Content Area H**  
**Accessory Work**

**5%**

**1. Installing fencing**

knowledge of state and local codes  
knowledge of location requirements  
knowledge of picket spacing  
knowledge of safety requirements  
knowledge of barrier code and insurance requirements

**2. Installing diving boards and diving platforms**

knowledge of materials for diving boards  
knowledge of installation requirements  
knowledge of safety requirements  
knowledge of proper placement  
knowledge of manufacturer's specifications  
knowledge of bonding requirements

**3. Installing slides**

knowledge of materials for slides  
knowledge of installation requirements  
knowledge of proper placement  
knowledge of safety requirements  
knowledge of manufacturer's specifications  
knowledge of bonding requirements

**4. Installing auxiliary lighting**

knowledge of fiber optic lighting  
knowledge of low voltage accent lighting  
knowledge of manufacturer's specifications  
knowledge of proximity location  
knowledge of NEC requirements

**5. Installing alternate sanitation devices**

knowledge of different types of devices  
knowledge of manufacturer's specifications  
knowledge of installation  
knowledge of different device applications  
knowledge of scope of work

**Content Area I**

**5%**

**Interior Surface Preparation and Finishing**

**1. Performing interior pool and spa clean-outs**

knowledge of pool draining procedures  
knowledge of possible uplift  
knowledge of chemicals  
knowledge of cleaning solutions  
knowledge of cleaning procedures

knowledge of safety requirements  
knowledge of disposal requirements  
knowledge of surface adhesion

**2. Performing interior pool and spa finishes of concrete pools**

knowledge of concrete requirements  
knowledge of concrete testing  
knowledge of concrete properties  
knowledge of finishing and brazing  
knowledge of surface adhesion

**3. Installing lining in vinyl-lined pools**

knowledge of materials  
knowledge of methods  
knowledge of soils and stabilization  
knowledge of retaining walls  
knowledge of coping  
knowledge of leveling and installing  
knowledge of anchoring  
knowledge of manufacturer's specifications

**Content Area J**

**5%**

**Start Up**

**1. Pre-testing fill water**

knowledge of water chemistry  
knowledge of testing procedures and requirements  
knowledge of reagents  
knowledge of saturation  
knowledge of pH  
knowledge of total alkalinity  
knowledge of hardness  
knowledge of prefiltering procedures  
knowledge of TDS levels

**2. Testing filters and filtration**

knowledge of pressurizing procedures and requirements  
knowledge of turnover rates  
knowledge of pumps  
knowledge testing procedures  
knowledge of manufacturer's specifications

**3. Balancing pool water**

knowledge of water chemistry  
knowledge of testing procedures and requirements  
knowledge of solutions  
knowledge of reagents

knowledge of saturation  
knowledge of pH  
knowledge of total alkalinity  
knowledge of hardness  
knowledge of disinfecting  
knowledge of sanitizing  
knowledge of safety requirements  
knowledge of chemical dangers  
knowledge of algae identification

**4. Starting pool and spa auxiliary equipment**

knowledge of manufacturer's specifications  
knowledge of system design  
knowledge of system calibration  
knowledge of turnover rate

**5. Testing heating equipment**

knowledge of wiring  
knowledge of fuels  
knowledge of solar input  
knowledge of testing procedures  
knowledge of temperature measurement  
knowledge of system design  
knowledge of exhaust venting  
knowledge of manufacturer's specification  
knowledge of types of heaters

**6. Testing pump**

knowledge of testing procedures  
knowledge of pump requirements  
knowledge of system design  
knowledge of hydraulics

**7. Performing final pool and spa clean-ups**

knowledge of material procedures  
knowledge of safety requirements

**Content Area K  
Service and Maintenance**

**10%**

**1. Demonstrating pool operation to owners**

knowledge of mechanical and hydraulic systems  
knowledge of chemical systems  
knowledge of general pool care requirements  
knowledge of communicating safety requirements  
knowledge of equipment  
knowledge of communication skills  
knowledge of daily reports  
knowledge of maintenance procedures

**2. Sanitizing pools and spas through chlorination**

knowledge of water chemistry  
knowledge of pH  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of practices of pool chemicals  
knowledge of safety requirements  
knowledge of dangers of chlorinating agents  
knowledge of chlorinating requirements  
knowledge of chlorinating procedures  
knowledge of chemical balancing techniques and requirements  
knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements

**3. Performing shock treatments or super-chlorinations**

knowledge of water chemistry  
knowledge of pH  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of safety requirements  
knowledge of dangers of chlorinating agents  
knowledge of chlorinating requirements  
knowledge of chlorinating procedures and techniques  
knowledge of chemical balancing  
knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements  
knowledge of identifying chemical demand  
knowledge of algae identification

**4. Determining breakpoint chlorinations**

knowledge of pH  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of practices of pool chemicals  
knowledge of safety requirements  
knowledge of dangers of chlorinating agents  
knowledge of chlorinating requirements  
knowledge of chlorinating procedures  
knowledge of chemical balancing techniques and requirements  
knowledge of testing techniques and requirements  
knowledge of reagents

knowledge of adjusting techniques and requirements

**5. Sanitizing pools and spas through oxidation**

knowledge of effects of pool chemicals  
knowledge of practices of pool chemicals  
knowledge of safety requirements  
knowledge of chemical balancing techniques and requirements  
knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements

**6. Checking accurate turbidity**

knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements

**7. Testing and adjusting pH values**

knowledge of water chemistry  
knowledge of pH  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of safety requirements  
knowledge of dangers of chlorinating agents  
knowledge of chlorinating requirements  
knowledge of chlorinating procedures  
knowledge of chemical balancing techniques and requirements  
knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements

**8. Testing and adjusting water hardness**

knowledge of water chemistry  
knowledge of pH  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of practices of pool chemicals  
knowledge of safety requirements  
knowledge of dangers of chlorinating agents  
knowledge of chlorinating requirements  
knowledge of chlorinating procedures  
knowledge of chemical balancing techniques and requirements

knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements  
knowledge of calcium hardness

**9. Testing and adjusting total alkalinity**

knowledge of water chemistry  
knowledge of pH  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of safety requirements  
knowledge of dangers of chlorinating agents  
knowledge of chlorinating requirements  
knowledge of chlorinating procedures  
knowledge of chemical balancing techniques and requirements  
knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements

**10. Testing and adjusting cyanuric acid**

knowledge of water chemistry  
knowledge of pH  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of safety requirements  
knowledge of dangers of chlorinating agents  
knowledge of chlorinating requirements  
knowledge of chlorinating procedures  
knowledge of chemical balancing techniques and requirements  
knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements  
knowledge of effects of cyanuric acid

**11. Testing and adjusting metals**

knowledge of water chemistry  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of safety requirements  
knowledge of dangers of chlorinating agents  
knowledge of chlorinating procedures  
knowledge of chemical balancing techniques and requirements



knowledge of testing techniques and requirements  
knowledge of reagents  
knowledge of adjusting techniques and requirements  
knowledge of sequestering agents

**12. Cleaning D.E. filters by backwashing and jet spraying**

knowledge of system design  
knowledge of pump requirements  
knowledge of flow rates  
knowledge of safety requirements  
knowledge of testing procedures  
knowledge of water clarity  
knowledge of gauges  
knowledge of drainage  
knowledge of valves  
knowledge of filter media disposal

**13. Backwashing sand filters**

knowledge of system design  
knowledge of pump requirements  
knowledge of flow rates  
knowledge of safety requirements  
knowledge of testing procedures  
knowledge of water clarity  
knowledge of gauges  
knowledge of drainage  
knowledge of valves  
knowledge of manufacturer's specifications

**14. Using sodium hypochlorite for disinfecting and deck cleaning**

knowledge of safety requirements  
knowledge of chemical properties  
knowledge of mixing procedures  
knowledge of chemical effects  
knowledge of chemical balancing techniques and requirements  
knowledge of storage procedures and requirements

**15. Using calcium hypochlorite to sanitize decks and locker rooms**

knowledge of safety requirements  
knowledge of chemicals  
knowledge of chemical properties  
knowledge of mixing procedures  
knowledge of chemical effects  
knowledge of chemical balancing techniques and requirements

knowledge of storage procedures and requirements

**16. Using other pool sanitizers (e.g., bromine, iodine, ozone, ultraviolet, silver and electrolytic cells)**

knowledge of safety requirements  
knowledge of chemicals  
knowledge of chemical properties  
knowledge of mixing procedures  
knowledge of chemical effects  
knowledge of chemical balancing techniques and requirements  
knowledge of chemical storage procedures and requirements  
knowledge of chemical application procedures and requirements

**17. Using other pool chemicals (e.g., flocculents, algicides, sequestering agents, degreasers and defoamers)**

knowledge of safety requirements  
knowledge of chemicals  
knowledge of chemical properties  
knowledge of mixing procedures  
knowledge of filtration requirements  
knowledge of filtration media  
knowledge of chemical effects  
knowledge of chemical balancing techniques and requirements  
knowledge of chemical storage procedures and requirements

**18. Testing and adjusting water saturation and undersaturation**

knowledge of water chemistry  
knowledge of pH  
knowledge of pool chemicals  
knowledge of effects of pool chemicals  
knowledge of safety requirements  
knowledge of chlorinating techniques and procedures  
knowledge of chemical balancing techniques and requirements  
knowledge of testing procedures  
knowledge of reagents  
knowledge of adjusting procedures  
knowledge of Langlier Index

**19. Identify the effect of chemical balances on staining**

knowledge of safety requirements  
knowledge of chemicals  
knowledge of chemical properties  
knowledge of mixing procedures  
knowledge of chemical effects  
knowledge of storage procedures and requirements

**20. Replacing light bulbs and underwater lights**

knowledge of different voltage lights  
knowledge of proper safety procedures and requirements  
knowledge of importance of ground fault interrupter  
knowledge of safe wiring and sealing water out  
knowledge of material specifications  
knowledge of bonding and grounding requirements  
knowledge of manufacturer's specifications

**21. Utilizing pool blankets and covers**

knowledge of materials and types  
knowledge of positives and negatives of pool blankets and covers  
knowledge of the properties of materials  
knowledge of safety requirements  
knowledge of installation  
knowledge of securing installation  
knowledge of chemical balance effects

**22. Maintaining and repairing plumbing equipment**

knowledge of safety requirements  
knowledge of piping requirements  
knowledge of fittings  
knowledge of pipe fittings  
knowledge of piping protection  
knowledge of pressure requirements  
knowledge of gauges  
knowledge of pressure testing  
knowledge of flow rates  
knowledge of pumps  
knowledge of leak detection

**23. Maintaining and repairing decks**

knowledge of bonding agents for adhesion of new material to old  
knowledge of cleaning in preparation for repair  
knowledge of safety requirements

knowledge of expansion joints  
knowledge of codes  
knowledge of maintaining strength of the deck  
knowledge of soil conditions  
knowledge of compaction  
knowledge of concrete placement

**24. Maintaining and repairing accessory fixtures**

knowledge of safety requirements  
knowledge of solar heating  
knowledge of conventional heating  
knowledge of materials  
knowledge of the properties of materials  
knowledge of procedures  
knowledge of material handling  
knowledge of manufacturer's specifications

**25. Maintaining and repairing pool shells**

knowledge of leak detection  
knowledge of leak testing  
knowledge of safety requirements  
knowledge of materials  
knowledge of the properties of materials  
knowledge of crack repair procedures  
knowledge of recoating procedures

**26. Cleaning cartridge filters**

knowledge of system design  
knowledge of pump requirements  
knowledge of flow rates  
knowledge of safety requirements  
knowledge of testing procedures  
knowledge of water clarity  
knowledge of gauges  
knowledge of drainage  
knowledge of valves  
knowledge of manufacturer's specifications

**27. Performing heater care and maintenance**

knowledge of safety requirements  
knowledge of testing procedures and requirements  
knowledge of system design

- knowledge of system capacity
- knowledge of temperature measurements
- knowledge of effects of temperature  
knowledge of changes in temperature

knowledge of effects of water chemistry on heater components  
knowledge of pool chemistry

knowledge of gas and electric requirements  
knowledge of flow rates

**Content Area L**  
**Equipment**

**10%**

**1. Using jackhammers**

knowledge of safety requirements  
knowledge of OSHA requirements  
knowledge of equipment characteristics

**2. Using saw cutting machines**

knowledge of safety requirements  
knowledge of OSHA requirements  
knowledge of equipment characteristics

**3. Using bobcats or backhoes**

knowledge of safety requirements  
knowledge of OSHA requirements  
knowledge of equipment characteristics  
knowledge of traffic regulations

**4. Using compressors**

knowledge of safety requirements  
knowledge of OSHA requirements  
knowledge of pressure regulators  
knowledge of pneumatic tools

**5. Using concrete pumps**

knowledge of safety requirements  
knowledge of OSHA requirements  
knowledge of concrete properties  
knowledge of concrete procedures  
knowledge of concrete testing  
knowledge of concrete placement