

Solar Thermal Installer Skills Profile



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About the Electricity Sector Council

Approximately 100,000 Canadians are involved in the generation, transmission and distribution of one of our country's essential utilities: electricity. Their work powers homes and businesses across the country, fuelling everything from light bulbs, cell phones and refrigerators to water treatment plants and road vehicle assembly lines.

The Electricity Sector Council provides support to this dedicated team by working with industry employers and other stakeholders to research and resolve human resource and workplace development issues.

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Disclaimer: Please note that some of the tasks detailed in this document will require the services of a registered tradesperson depending upon the province of work. Provincial regulations change from time to time, employers and employees should consult your provincial appropriate licensing authority for clarification regarding which tasks may be affected. It is the responsibility of the individual employer/employee to ensure they act within the regulation for their jurisdiction.

Scope of Occupation

- Solar thermal Installers utilize and practice basic elements of design to harness solar thermal heat in solar thermal collectors at low-, medium-, or high-temperature for a variety of heating purposes. These customized installations may be ground-mounted or built into the roof or walls of buildings. They install systems to collect the heat using a liquid medium, usually water that is transferred by either conduction or convection.
- The installation may serve either residential or commercial purposes.

Area of Competence A: Work Safely

Task A.1: Follow safe work procedures and provincial and federal regulations

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Identify company, provincial and federal policies required for workplace safety	<ul style="list-style-type: none"> Follow company policies and guidelines Follow WHMIS regulations Seek opportunities from employer(s) and from other safety training organizations 	
b) Identify contact person when workplace safety policies are violated	<ul style="list-style-type: none"> Inform immediate supervisor of violation/incident 	
c) Provide information about incident/violation	<ul style="list-style-type: none"> Document information using appropriate company forms 	
d) Attend safety meetings		
e) Complete safety training/certification	<ul style="list-style-type: none"> For example, WHMIS, First Aid, CPR, fire safety, fall protection, work permit training, risk management/job planning training as per company policies and/or provincial/federal guidelines 	
f) Complete appropriate forms/ documentation for incident or “near miss”	<ul style="list-style-type: none"> As per company policy 	

Task A.2: Use and maintain personal protective equipment

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Demonstrate safe and accepted practices for personal protection	<ul style="list-style-type: none"> • Follow company/government policies and guidelines 	
b) Identify locations where personal protective equipment is required	<ul style="list-style-type: none"> • Follow company/government policies and guidelines • Purchase required safety equipment 	
c) Identify personal protective equipment requirements to enter specified environments	<ul style="list-style-type: none"> • Follow company/government policies and guidelines • Obtain authorization from specified field safety officer and supervisor 	
d) Identify expiry dates on specified equipment	<ul style="list-style-type: none"> • Inform field safety officer and supervisor of equipment concerns 	
e) Identify 'wear and tear' issues on equipment	<ul style="list-style-type: none"> • Inform field safety officer and supervisor of equipment concerns 	

Task A.3: Operate motorized vehicles and equipment

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Demonstrate ability to operate motor vehicle	<ul style="list-style-type: none"> • Possess required licenses • Obtain licenses, as required 	
b) Complete applicable driving programs, certifications and/or licenses	<ul style="list-style-type: none"> • For example: defensive driving, collision avoidance, skid control, vehicle backing, scissor lift and boom trucks, etc. 	
c) Secure equipment and loads	<ul style="list-style-type: none"> • Use appropriate barriers and tie downs 	
d) Confirm that motorized vehicle is safe and ready to operate	<ul style="list-style-type: none"> • Comply with applicable regulations and maintenance procedures for motor vehicles 	

Task A.4: Demonstrate hazard recognition and mitigation

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Identify environmental hazards	<ul style="list-style-type: none"> Follow company/government policies and guidelines 	
b) Identify personal safety hazards or work site hazards	<ul style="list-style-type: none"> Use company and personal resources to identify hazards and risks found on the job site 	
c) Identify environmental hazards associated with solar thermal installations	<ul style="list-style-type: none"> For example: through demonstrated awareness of pertinent Material Safety Data Sheets (MSDSs), disposal procedures and other appropriate documents 	
d) Mitigate hazards	<ul style="list-style-type: none"> Take action to eliminate or mitigate hazards 	

Task A.5: Establish a safe work area

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Identify requirements for safe work area	<ul style="list-style-type: none"> • Follow completed job plan steps • Use company resources to identify hazards and risks found on job plan 	
b) Create a safe work environment for self, workers and the general public	<ul style="list-style-type: none"> • Follow completed job plan steps, and eliminate/control/minimize hazards found in work area • Be aware of site codes 	
c) Maintain safe work habits and a clean, orderly work area	<ul style="list-style-type: none"> • Follow completed job plan steps, and eliminate/control/minimize hazards found in work area 	

Task A.6: Demonstrate safe and proper use of required tools and equipment

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Obtain safety training	<ul style="list-style-type: none"> • As per company/government policies and procedures 	
b) Demonstrate safe and proper use of required tools and equipment	<ul style="list-style-type: none"> • Follow company/government policies and guidelines 	

Task A.7: Apply lock-out and tag-out procedures

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Identify requirements for lock-out and tag-out	<ul style="list-style-type: none"> • Obtain hazard identification training 	
b) Apply lock-out and tag-out procedures	<ul style="list-style-type: none"> • Apply appropriate company policies 	

Task A.8: Work at heights

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Use appropriate fall protection equipment and systems	<ul style="list-style-type: none"> • Complete appropriate training for specific equipment 	
b) Select and use appropriate ladders/scaffolding and other lift equipment	<ul style="list-style-type: none"> • Complete appropriate training for specific equipment 	
c) Apply appropriate material and equipment handling procedures		

Task A.9: Administer First Aid and CPR

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Participate in First Aid and CPR certification		
b) Identify the location of First Aid materials		
c) Apply First Aid and CPR procedures		
d) Identify location of qualified safety professionals	<ul style="list-style-type: none"> • For example: the location of qualified high-angle rescue personnel, hospitals, etc. 	

Area of Competence B: Plan Installation

Task B.1: Read and interpret technical drawings

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Use drawings for planning and procurement	<ul style="list-style-type: none">• Interpret and apply knowledge of appropriate drawing standards. For example: symbols and labels	

Task B.2: Estimate time, materials, tools, site requirements, and labour required

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Identify scheduling requirements	<ul style="list-style-type: none"> • Follow job plan to determine amount of time required for installation 	
b) Identify equipment and tool requirements	<ul style="list-style-type: none"> • Follow job plan to determine tools and equipment required for installation (including safety systems) 	
c) Identify labour requirements	<ul style="list-style-type: none"> • Follow job plan to determine labour requirements for installation 	
d) Identify material requirements and create procurement list	<ul style="list-style-type: none"> • Determine amount of material necessary 	
e) Determine installation sequence to optimize use of time and materials	<ul style="list-style-type: none"> • Follow job plan to co-ordinate optimal labour and material use 	
f) Estimate tools and equipment		
g) Establish power and energy needs	<ul style="list-style-type: none"> • Define application load for tool and installation functions • Define application load for tools and operational functions 	
h) Establish personal sanitation procedures		

Task B.3: Maintain installation material inventory

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Ensure availability of inventory		
b) Follow inventory system and ordering and purchasing procedures for shop and service vehicle	<ul style="list-style-type: none"> • Be aware of inventory system, ordering and purchasing procedures • Establish standard stocking levels in vehicle • Stock vehicle with site-specific materials 	

Task B.4: Organize and maintain service vehicles

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Follow company maintenance procedures for vehicles		
b) Load and organize material in vehicles	<ul style="list-style-type: none"> • Establish standard stocking levels in vehicle • Stock vehicle with site-specific materials 	

Task B.5: Coordinate activities with others

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Coordinate activities with co-workers		
b) Coordinate activities with General Contractor (GC) and sub-trades	<ul style="list-style-type: none"> • Understand communication protocols • Exchange necessary information 	
c) Coordinate activities with homeowner and/or building operator	<ul style="list-style-type: none"> • Consider impact on surrounding environment and properties 	
d) Coordinate activities with suppliers	<ul style="list-style-type: none"> • Consider logistics 	
e) Coordinate activities with inspectors	<ul style="list-style-type: none"> • Know inspection stages 	

Task B.6: Check site against plan

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Confirm that site conditions match plan	<ul style="list-style-type: none"> • Evaluate the condition of the site. For example: ensure the integrity of the roof. 	
b) Confirm address		
c) Identify changes		
d) Consult with designer, sub-trades and homeowner on possible changes		
e) Confirm and execute changes to plan		

Task B.7: Obtain appropriate system components

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Inspect all provided system components for damage	<ul style="list-style-type: none"> • Upon receipt, inspect system packaging to ensure all components are included and free of damage. 	
b) Ensure all materials are appropriate for their specific application	<ul style="list-style-type: none"> • Inspect all materials and ensure appropriateness for their application (i.e., suitable ratings) 	
c) Consult with designer if components are unsuitable		

Task B.8: Comply with permit requirements

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Confirm necessary permits	<ul style="list-style-type: none"> • Know jurisdictional requirements 	
b) Obtain appropriate permits	<ul style="list-style-type: none"> • Be aware of permit-issuing authorities 	
c) Post appropriate permits		

Area of Competence C: Install System

Task C.1: Install solar collector mounting system

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Consider collector piping strategy	<ul style="list-style-type: none"> • Consider pipe location and slope 	
b) Examine structures for mounting and penetration	<ul style="list-style-type: none"> • Ensure all components are secure and weather-sealed 	
c) Install roof mounts following acceptable roof mounting and penetration methods	<ul style="list-style-type: none"> • For example: follow established roofing procedures for specific roof types as per code or best practice • Recognize anchoring and ballasting methods • Consider various types of roof and pitch, including: tile, asphalt shingle and built-up gravel • Consider cases such as ICS (integrated collector storage) and thermosiphon systems which add extra weight and components • Consider seasonal effects (for example: soft or brittle shingles) 	
d) Install ground mounts following acceptable ground mounting and anchoring methods		
e) Install wall mounts following acceptable penetration methods		
f) Assemble mounting system and rails	<ul style="list-style-type: none"> • Consider drain slopes, if required 	

Task C.2: Install solar collectors

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Determine multi-collector piping strategy	<ul style="list-style-type: none"> • Consider pipe slope 	
b) Lift collectors to installation area	<ul style="list-style-type: none"> • Consider weight of collectors when calculating labour/lifting capacity • Select a proper lifting technique • Consider safety while lifting. For example: three people lifting at minimum. • Secure unattached collectors, packaging, tools and supplies on roof. • Consider weather conditions 	
c) Attach mounting bracket and struts	<ul style="list-style-type: none"> • Attach to previously installed brackets 	
d) Secure collector to mounting device	<ul style="list-style-type: none"> • Lay collectors into mounting device 	
e) Connect collector to piping	<ul style="list-style-type: none"> • Connect collectors to piping and connect control wiring 	

Task C.3: Install water heater and storage tank components

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Ensure water and power source are ready		
b) Determine tank ports to be used for plumbing lines	<ul style="list-style-type: none"> • Consider type of system being installed 	
c) Determine plumbing retrofit method	<ul style="list-style-type: none"> • Consider type of system being installed 	
d) Install drain pan	<ul style="list-style-type: none"> • Consider local building codes 	
e) Remove old conventional water heater tank where applicable	<ul style="list-style-type: none"> • Dispose of heater according to provincial/territorial regulations 	
f) Install port fittings	<ul style="list-style-type: none"> • Consider system design when choosing fittings to ensure appropriate fit • Be aware of corrosion issues (di-electric fittings) 	
g) Install tank valves (Temperature and Pressure [T and P], drain valves, isolation valves)	<ul style="list-style-type: none"> • Follow relevant codes for safety valves 	
h) Ensure cold water is going to the bottom of tank		
i) Locate solar and auxiliary tanks	<ul style="list-style-type: none"> • Consider weight and service access 	
j) Connect water heater and/or storage tank to water source	<ul style="list-style-type: none"> • Fill tank with water once connections are made 	
k) Connect water heater and/or storage tank to power source	<ul style="list-style-type: none"> • Ensure heater and tanks are installed per manufacturers' code and recommendations 	

	<ul style="list-style-type: none">• Ensure installed tank and fittings have no leaks• Seek assistance from other trades to provide necessary conventional power sources	
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Task C.4: Install mechanical/plumbing equipment

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Determine system plumbing requirements	<ul style="list-style-type: none"> • For example: valves, air vent, check, drain, auto drain down, expansion tanks, flow control, isolation, diverting, solenoid, mixing, anti-scald, pressure relief, temperature pressure relief, vacuum relief, balancing, freeze, flow meter, temperature gauge, and pressure gauge, heat exchanger, zone valves and backflow preventers • Identify that expansion tank is necessary with backflow preventers and check valves 	
b) Install plumbing valves	<ul style="list-style-type: none"> • Consider location, orientation, application and support 	
c) Install heat exchanger	<ul style="list-style-type: none"> • Consider location, orientation, application and support 	
d) Install pump(s)	<ul style="list-style-type: none"> • Consider location, orientation, application and support 	
e) Install all other components	<ul style="list-style-type: none"> • For example: valves, air vent, check, drain, auto drain down, expansion tanks, flow control, isolation, diverting, solenoid, mixing, anti-scald, pressure relief, temperature pressure relief, vacuum relief, balancing, freeze, flow meter, temperature gauge, and pressure gauge, zone valves and backflow preventers • As specified in component manufacturer's or solar manufacturer's installation manual and schematic 	

Task C.5: Install piping

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Identify type of piping to be used	<ul style="list-style-type: none"> • For example, temperature, flow rates, pressure or compatibility • Consider application. For example: potable, non-potable, drainage, process or pool • Consider quality of water to be used 	
b) Determine type and frequency of piping supports	<ul style="list-style-type: none"> • Follow plumbing codes • Consider site factors, application and purpose. For example: drainage and slope 	
c) Install and connect pipe and fittings	<ul style="list-style-type: none"> • Follow plumbing codes • Consider site factors, application and purpose. For example, drainage and slope • Consider materials. For example: soldering, gluing, flaring, threading, taping, etc. 	
d) Create bypass valve assembly	<ul style="list-style-type: none"> • To allow solar system to be by-passed, making conventional heater the primary water heater 	
e) Make building penetrations	<ul style="list-style-type: none"> • For example: consider pipe flashing, water-proofing, maintaining pipe slope, roof boots, size of opening or fire stop 	

Task C.6: Install controls and sensors

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Install sensors	<ul style="list-style-type: none"> • Consider appropriate location, environment and sensor type 	
b) Install controls	<ul style="list-style-type: none"> • For example: system controller, zone controller, relays, monitoring/display and remote display 	
c) Connect low-voltage wiring	<ul style="list-style-type: none"> • Consider appropriate location, environment, type, grounding and shielding 	
d) Install high-voltage wiring	<ul style="list-style-type: none"> • Obtain qualified electrician for connection 	
e) Program, test and troubleshoot controls	<ul style="list-style-type: none"> • Consider type of system and type of controls, etc. 	

Task C.7: Charge solar system

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Pressure test system	<ul style="list-style-type: none"> • For example: using air, water and leak detection • Consider safety (for example: consider outdoor air temperature and sun conditions) 	
b) Clean and flush system	<ul style="list-style-type: none"> • Consider plumbing and connector method and materials Cleaning solution used must not leave residue (TSP) 	
c) Pre-charge expansion tank	<ul style="list-style-type: none"> • Be aware of operating pressures 	
d) Prepare proper heat-transfer fluid	<ul style="list-style-type: none"> • Determine proper fluid mix • Determine concentration and volumes 	
e) Charge the system with heat transfer fluid	<ul style="list-style-type: none"> • Consider type of system (for example: water versus glycol) • Consider freeze protection method • Consider system operating pressure • Consider safety (for example: outdoor air temperature and sun conditions) 	

Task C.8: Install insulation

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Determine type, diameter, and length of insulation required	<ul style="list-style-type: none"> Utilize a cutting tool and adhesive material Consider requirements of insulation type. For example: temperature rating, thickness, UV protection 	
b) Cut insulation		
c) Install over pipe	<ul style="list-style-type: none"> Ensure that insulation does not trap water or bring water into building envelope Consider requirements of what is being installed 	
d) Seal ends	<ul style="list-style-type: none"> Consider mitering or gluing, depending on type of insulation 	
e) Protect insulation	<ul style="list-style-type: none"> For example: from ultraviolet degradation, mechanical or physical damage 	

Task C.9: Install operation and identification tags/labels

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Determine components to be tagged	<ul style="list-style-type: none"> Know appropriate codes for labelling and marking 	
b) Install identification tags/labels		

Task C.10: Enable final inspection

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Call inspector(s)	<ul style="list-style-type: none"> • Be aware of local codes and authorities 	
b) Be present for inspection		
c) Remediate when necessary		

Task C.11: Clean up after solar installation

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Clean up refuse from install	<ul style="list-style-type: none"> • Recycle when possible 	
b) Dispose of hazardous and/or non-hazardous materials	<ul style="list-style-type: none"> • Be aware of proper disposal locations 	
c) Repair to original condition	<ul style="list-style-type: none"> • Obtain assistance from sub-trades • Be aware of original condition (i.e. take a photograph) 	
d) Conduct regular follow-up with client, if required	<ul style="list-style-type: none"> • To ensure that system is operating at maximum efficiency 	

Area of Competence D: Commission and/or Maintain Solar Thermal System

Task D.1: Interpret documentation

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Interpret written materials to plan maintenance or repair work	<ul style="list-style-type: none"> • Including installation manuals, wiring diagrams, drawings and other specifications and notes or documents from original installation • Determine original installation date and company 	

Task D.2: Verify overall system operation and functionality

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Determine evaluation points for system monitoring, maintenance and troubleshooting	<ul style="list-style-type: none"> • For example: sensor calibration, heat exchanger fluid integrity and pump orientation 	
b) Determine that system plumbing is correctly installed	<ul style="list-style-type: none"> • As per schematics and manufacturers' installation requirements 	
c) Determine that electrical and controls are correctly installed	<ul style="list-style-type: none"> • As per schematics and manufacturers' installation requirements 	
d) Verify system start-up and shut-down functionality		
e) Verify overall system operation and functionality		

Task D.3: Perform trouble-shooting activities

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Identify problem(s)	<ul style="list-style-type: none"> Evaluate level of repairs necessary to restore system to manufacturer's or operator's specifications 	
b) Use trouble-shooting chart in system or component manual		
c) Use past experience	<ul style="list-style-type: none"> Call on others with experience 	
d) Access other sources of information	<ul style="list-style-type: none"> For example: access online references, textbooks, online technical support and information from manufacturers, etc. 	

Task D.4: Measure and document system performance and operation

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Observe system operation	<ul style="list-style-type: none"> • For example: observe weather conditions, gauge or instrument readings (thermometers, pressure gauges), glycol testing and controller indications • Utilize all senses 	
b) Document observations	<ul style="list-style-type: none"> • Compare to manufacturers' and expected specifications 	
c) Record system settings and specifications	<ul style="list-style-type: none"> • For example: date, controller set points, heat transfer fluid volume, pressure, concentration and pH, etc. 	
d) Complete and transfer documentation package to owner	<ul style="list-style-type: none"> • For example: manual, warranties, commissioning report and documentation for government funding, etc. 	

Task D.5: Demonstrate system to owner

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Demonstrate operation and functionality		
b) Demonstrate start-up and shut-down procedures, including emergency shut-down procedures		
c) Demonstrate simple maintenance and diagnostic procedures		
d) Demonstrate expected operating parameters	<ul style="list-style-type: none"> • Including expected performance and trouble-shooting 	
e) Identify all markings and labels		
f) Identify safety issues	<ul style="list-style-type: none"> • For example: discharge points, temperature pressures and glycol leaks 	
g) Review system and component warranties and requirements with owner		
h) Obtain sign-off	<ul style="list-style-type: none"> • Provide contact information 	

Area of Competence E: Demonstrate Personal Competencies

Task E.1: Demonstrate professionalism

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Work safely	<ul style="list-style-type: none"> Follow company safety rules and regulations Follow Occupational Health and Safety Act 	
b) Conduct self in professional manner	<ul style="list-style-type: none"> Show respect for job and others Dress appropriately Use appropriate language and behaviour 	
c) Honour company and personal privacy policies		
d) Follow a code of ethics	<ul style="list-style-type: none"> Be aware of codes of ethics (for example: CANSIA, trade/business organizations, and company codes) 	

Task E.2: Read, comprehend and apply technical information

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Interpret materials to plan and maintain solar thermal system	<ul style="list-style-type: none"> For example, installation manuals, wiring diagrams, technical drawings, schematics and other specifications 	
b) Find applicable information in manufacturer's materials	<ul style="list-style-type: none"> Including installation manuals, wiring diagrams, drawings, plumbing diagrams and other specifications 	

Task E.3: Be a self starter

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Look for methodologies to assigned tasks	<ul style="list-style-type: none"> • Utilize practical experience 	
b) Recognize problems and search for solutions	<ul style="list-style-type: none"> • Familiarize self with equipment • 	
c) Recognize work system shortcomings and suggest improvements	<ul style="list-style-type: none"> • Know work system expectations 	

Task E.4: Work independently

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Choose best methods to complete assigned tasks	<ul style="list-style-type: none"> • Be self-motivated 	
b) Respond to emergencies	<ul style="list-style-type: none"> • Identify trouble and diagnose if further resources are required 	
c) Manage time	<ul style="list-style-type: none"> • Complete and utilize time management training • Rely on past history and work experience 	
d) Ask for help when needed	<ul style="list-style-type: none"> • Know when and who to call 	

Task E.5: Be a team player

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Work with others	<ul style="list-style-type: none"> • For example: coworkers, other trades, owner/operators, general contractors and inspectors • Communicate effectively 	

Task E.6: Demonstrate leadership

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Accept challenges	<ul style="list-style-type: none"> • Use problem-solving skills 	
b) Show initiative		
c) Exhibit confidence		
d) Inspire and motivate		

Task E.7: Participate in continuous learning

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Attend courses offered by manufacturers and others	<ul style="list-style-type: none"> Exhibit a willingness to learn about new equipment and techniques 	
b) Choose appropriate courses based on job description	<ul style="list-style-type: none"> Recognize courses required for present and future proficiency 	
c) Complete in-house training	<ul style="list-style-type: none"> Recognize and participate in courses applicable to present and future proficiency 	

Task E.8: Be accountable

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Be on time		
b) Take responsibility for your actions	<ul style="list-style-type: none"> Know responsibilities 	

Task E.9: Demonstrate confidence

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Move ahead with decisions made by self or others	<ul style="list-style-type: none"> • Acquire correct documentation to support decisions 	
b) Recognize when to step back and consult others before continuing	<ul style="list-style-type: none"> • Rely on past history and work experience 	
c) Have knowledge of subject matter	<ul style="list-style-type: none"> • Rely on work experience, training and knowledge from peers or supervisors 	
d) Recognize scope of personal abilities	<ul style="list-style-type: none"> • Rely on past history and work experience • Follow company safety rules • Follow Occupational Health and Safety Act 	

Task E.10: Demonstrate organizational skills

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Multi-task effectively		
b) Demonstrate time-management skills	<ul style="list-style-type: none"> • Rely on past history and work experience 	
c) Organize materials, tools and documents		

Task E.11: Train and mentor others

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Train new workers	<ul style="list-style-type: none"> • Utilize good communication skills 	
b) Recognize when others are in need of assistance	<ul style="list-style-type: none"> • Share knowledge with others 	
c) Demonstrate patience and respect		
d) Develop mentoring skills	<ul style="list-style-type: none"> • Demonstrate effective technical and mentoring skills with peers and trainees 	

Task E.12: Communicate

Subtasks:	Supporting knowledge and abilities:	Comments:
a) Speak clearly	<ul style="list-style-type: none"> • Use effective interpersonal skills • Understand operational limitations and protocols of cell phones and two-way radios, etc. 	
b) Speak at audience level	<ul style="list-style-type: none"> • Be aware of who you are speaking to 	
c) Be concise when speaking	<ul style="list-style-type: none"> • Use effective interpersonal skills 	
d) Be assertive	<ul style="list-style-type: none"> • Follow through 	
e) Listen	<ul style="list-style-type: none"> • Listen and respond to audience response 	
f) Ask questions to ensure understanding	<ul style="list-style-type: none"> • Utilize good listening and questioning skills • Listen and respond to audience response 	
g) Follow company policies and procedures regarding cell phone use	<ul style="list-style-type: none"> • Practice safe cell phone use • For example: pull off to the side of the road or use a hands-free set • Be aware of the information being transmitted over the telephone 	
h) Write clearly	<ul style="list-style-type: none"> • Be concise and to the point 	
i) Apply basic grammar skills		
j) Write detailed technical reports	<ul style="list-style-type: none"> • Use proper format for report writing • Adhere to company policy and procedures 	

General Knowledge and Skills

- Basic electrical knowledge
- Basic piping knowledge
- Basic sheet metal knowledge
- Basic solar knowledge
- Climbing skills
- Time management skills
- Basic rigging skills
- Basic construction knowledge
- Interpersonal skills
- HVAC knowledge
- _____
- _____
- _____
- _____
- _____

Future Trends and Concerns

- Need for continued emphasis on quality of workmanship
- Dealing with an under-educated client relative to solar thermal technology
- Rising energy prices will increase demand for solar thermal energy
- Need for innovation to reduce costs
- Need for financing options for customers
- Need for defined career paths for solar thermal installation techs
- Need for more educational opportunities for solar thermal installation techs
- Need for solar thermal installation licensing
- Need for energy conservation and education
- _____
- _____

