

<b>KPA 1</b>	<b>INSTALL AND MAINTAIN SOLAR THERMAL FACILITIES</b>		
<b>KPA Description</b>	Perform the coordination of the assembly and maintenance of solar thermal systems within the framework of the safety and quality rules in accordance with the regulations	<b>N° of ECVET credits:</b>	<b>EQF level:</b>  4
<b>Performance Criteria Description:</b>	<b>Criticality / Priority:</b>	<b>Means of verification:</b>	
<ul style="list-style-type: none"> <li>▪ Study</li> <li>▪ Preparation of implementation</li> <li>▪ Development of a solar thermal system</li> <li>▪ Setting and commissioning</li> <li>▪ Maintenance</li> <li>▪ Communication</li> </ul>			
<b>U1. Title :</b> <ul style="list-style-type: none"> <li>▪ Study</li> </ul>	<b>Description</b> <ul style="list-style-type: none"> <li>• Check the contents of the file and analyze</li> <li>• Make statements and measures</li> <li>• Check the feasibility</li> </ul>		
<b>U2. Title :</b> <ul style="list-style-type: none"> <li>▪ Preparation of implementation</li> </ul>	<b>Description</b> <ul style="list-style-type: none"> <li>• Find further technical information</li> <li>• Identify stakeholders and allocate activities within the team</li> <li>• Identify the working environment</li> <li>• Choose accessories, consumables and tools required</li> <li>• Develop site safety and identify potential risks and pollution</li> <li>• Adapt to weather conditions</li> <li>• Verify compliance of the supports</li> <li>• Check the power supplies and networks</li> <li>• Receive materials</li> <li>• Plan tasks taking into account the activities of other trades and the workload of the company</li> </ul>		

- Check accreditations and authorizations of stakeholders

	<ul style="list-style-type: none"> <li>• Check accreditations and authorizations of stakeholders</li> </ul>
<p><b>U3. Title :</b></p> <ul style="list-style-type: none"> <li>• <b>Development of a solar thermal system</b></li> </ul>	<p><b>Description</b></p> <ul style="list-style-type: none"> <li>• use and make use means of protection, safety devices</li> <li>• Organize, store, supply site</li> <li>• Identify and mark the passage of different networks</li> <li>• Implement and secure equipment and accessories</li> <li>• Shaping networks, assemble and connect components and equipment</li> <li>• Seal all</li> <li>• Provide connections to different networks (electrical, fluidic, ...)</li> <li>• Label, locate and identify circuits and networks</li> <li>• Perform sorting and disposal of waste</li> <li>• Verify compliance of work performed in relation to the work required</li> </ul>
<p><b>U4. Title :</b></p> <ul style="list-style-type: none"> <li>• <b>Setting and commissioning</b></li> </ul>	<p><b>Description</b></p> <ul style="list-style-type: none"> <li>• Perform adjustments and tests</li> <li>• Set up the installation</li> <li>• Inform commissioning documents and retrospective documentation drawings</li> <li>• Prepare the receipt of completed installation</li> </ul>
<p><b>U5. Title :</b></p> <ul style="list-style-type: none"> <li>• <b>Maintenance</b></li> </ul>	<p><b>Description</b></p> <ul style="list-style-type: none"> <li>• Perform preventive maintenance intervention</li> <li>• Perform corrective maintenance intervention</li> <li>• Check the adequacy of the performance achieved vis-à-vis the expected performance</li> </ul>
<p><b>U6. Title :</b></p> <ul style="list-style-type: none"> <li>• <b>Communication</b></li> </ul>	<p><b>Description</b></p> <ul style="list-style-type: none"> <li>• Contribute to the representation of the company</li> <li>• Identify customer complaints and argue with his requests for information</li> <li>• Collect and transmit oral and / or written information</li> <li>• Communicate the results of the intervention with the customer and the hierarchy</li> <li>• Present the operation and use of the facility to the customer</li> </ul>



- Explain the characteristics of a maintenance contract

<b>Title of the LO</b>	<b>INSTALL AND MAINTAIN SOLAR THERMAL FACILITIES</b>		
<b>Title UNIT 1:</b>	<b>Study</b>		
<b>LO UNIT Reference info:</b>	Facility implementation file, drawings, diagrams, nomenclature, quotation, order, manufacturers catalogs, standards and specific regulations, organization of site, execution file, workload and resource allocation		
<b>N° of ECVET credits:</b>		<b>EQF level:</b>	4
<b>LO UNIT Performance Criteria / Success Indicators</b>	#	Criteria and indicators Description	Critical Means of verification
<b>Knowledge</b>	<p><b>Regulatory, administrative and legal knowledge</b></p> <ul style="list-style-type: none"> <li>• Stakeholders.</li> <li>• Administrative Procedure</li> <li>• Qualifications, warranties and liability</li> <li>• The thermal regulations</li> <li>• The acoustic regulations</li> </ul> <p><b>Knowledge of building and technical communication</b></p> <ul style="list-style-type: none"> <li>• Tools, standards and representation</li> <li>• Architectural drawings and drawings</li> <li>• Freehand sketch</li> <li>• Descriptive and quantitative documents</li> <li>• Talking/writing technical</li> </ul> <p><b>Scientific knowledge</b></p> <ul style="list-style-type: none"> <li>• Heat exchange</li> <li>• Identification of a facility</li> <li>• Energy performance of buildings</li> <li>• Solar energy (incident radiation, radiation and irradiance, energy received)</li> <li>• Energy recovery and transfer (conduction, convection, radiation)</li> </ul>		

<p><b>Skills</b></p>	<ul style="list-style-type: none"> <li>• Characterize the intervention site</li> <li>• Collect information specific to the intervention</li> <li>• Identify the documents</li> <li>• Identify the values to meet</li> <li>• Analyze the installation environment</li> <li>• Check the feasibility</li> <li>• Identify the risks to people and property</li> <li>• Identify potential risks of pollution</li> <li>• Identify and characterize the fluid and energy networks</li> <li>• Collect additional information on intervention</li> <li>• Identify stakeholders and their function</li> <li>• Identify equipment</li> <li>• Characterize the work environment</li> </ul>
<p><b>Means of verification</b></p>	<ul style="list-style-type: none"> <li>• The location of the intervention and the operating characteristics provided for installation are identified.</li> <li>• Parts are listed, their relevance is checked, missing data are reported, the customer is identified.</li> <li>• The surrounding environment is identified; environmental constraints are identified</li> <li>• The power and outlets are located, their characteristics are identified, supplies and evacuations expected comply</li> <li>• The missing technical information is identified, the relevant resource is identified, the information collected is recorded.</li> <li>• Stakeholders, internal and external to the company are identified.</li> <li>• The existing equipment is identified, components and sub-assemblies are identified.</li> <li>• Access is recognized cantonments are located, are marked provisional power, storage locations are located</li> <li>• Deadlines are relevant, human resources are identified, the necessary resources are mobilized, the orders of magnitude are estimated; inconsistencies are reported, the presence of administrative permits is checked.</li> <li>• Risks are identified, actions are proposed</li> </ul>

<b>Title of the LO</b>	<b>INSTALL AND MAINTAIN SOLAR THERMAL FACILITIES</b>		
<b>Title UNIT 2:</b>	<b>Preparation of implementation</b>		
<b>LO UNIT Reference info:</b>	General planning, site data, site installation drawings, available equipment, team composition, timing of intervention, weather report, execution file, drawings, diagrams, nomenclature, quotation, order		
<b>N° of ECVET credits:</b>		<b>EQF level::</b>	4
<b>LO UNIT Performance Criteria / Success Indicators</b>	#	Criteria and indicators Description	Critical Means of verification
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>• Organization, planning and monitoring of a project</li> <li>• Managing the workstation</li> <li>• Time management</li> <li>• Quality Management.</li> <li>• Environmental management and waste</li> </ul>		
<b>Skills</b>	<p><b>Quantify the needs</b></p> <ul style="list-style-type: none"> <li>• Interpret a work schedule</li> <li>• Identify the risks associated with the intervention</li> <li>• List the hardware requirements and tools</li> </ul> <p><b>Plan the intervention</b></p> <ul style="list-style-type: none"> <li>• Scheduling Tasks</li> <li>• assign tasks</li> <li>• Take into account the uncertainties</li> <li>• Check the access</li> </ul> <p><b>Organize activities</b></p> <ul style="list-style-type: none"> <li>• Receive equipment and monitor compliance</li> <li>• Store the equipment</li> </ul>		
<b>Means of verification</b>	<ul style="list-style-type: none"> <li>• Tasks are planned taking into account the activities of other trades and the workload of the company.</li> </ul>		



- The necessary approvals and authorizations are listed.
- Tasks are assigned according to qualifications
- The timing of intervention is established
- The organization of work takes into account the weather conditions to allow a safety intervention
- The provided access are acknowledged, any adjustments allow supply and security implementation

<b>Title of the LO</b>	<b>INSTALL AND MAINTAIN SOLAR THERMAL FACILITIES</b>						
<b>Title UNIT 3:</b>	<b>Development of a solar thermal system</b>						
<b>LO UNIT Reference info:</b>	Execution drawings, site, measuring and control equipment, site installation drawings, available equipment, personal protective equipment, security utilities, tracing equipment, fixture tooling, equipment and materials to install, tools						
<b>Nº of ECVET credits:</b>		<b>EQF level:</b>	3- 4				
<b>LO UNIT Performance Criteria / Success Indicators</b>	#	Criteria and indicators Description	<table border="1"> <thead> <tr> <th data-bbox="920 639 1263 794">Critical</th> <th data-bbox="1263 639 1960 794">Means of verification</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Critical	Means of verification		
Critical	Means of verification						
<b>Knowledge</b>	<p>Types of systems constituents</p> <p>Organization of the workstation</p> <p>Time management</p> <p>Quality Management</p> <p>Environmental management and waste</p> <p>Prevention, knowledge of the principal risks</p> <p>Risk of accidents</p> <p>Methodology for risk management</p> <p>Risks to health</p> <p>Hygiene</p> <p>What to do in case of accident</p> <p>Manual and mechanical handling, workstation</p> <p>Protection of the workstation and the environment</p> <p>Specific risks</p>						
<b>Skills</b>	<p><b>Verify data on site</b></p> <ul style="list-style-type: none"> <li>• Measure quantities. Dimensional surveys are made</li> <li>• Identify energy, fluidic and communication networks, and check their characteristics</li> </ul> <p><b>Install workstations</b></p> <ul style="list-style-type: none"> <li>• Implement safety devices</li> <li>• Use and make use means of protection and safety devices</li> </ul>						



	<p><b>Implement hardware</b></p> <ul style="list-style-type: none"> <li>• Identify the passing of different networks.</li> <li>• Locate and secure the equipment and accessories.</li> <li>• Implement additional supports and suitable anchoring</li> <li>• Assemble and connect components and equipment</li> </ul> <p><b>Sealing the support</b></p> <ul style="list-style-type: none"> <li>• Conduct a seal between the equipment and its support</li> </ul> <p><b>Connect networks</b></p> <ul style="list-style-type: none"> <li>• Shaping networks on site or prefabrication</li> <li>• Provide connections to different networks (electrical, fluidic, ...)</li> <li>• Label, locate and identify circuits and networks</li> </ul>
<p><b>Means of verification</b></p>	<ul style="list-style-type: none"> <li>• Physical quantities required are identified.</li> <li>• The presence of networks, their characteristics and their availability is checked.</li> <li>• The markup is implemented, access and work areas are secure.</li> <li>• Accreditations and authorizations are checked.</li> <li>• The presence and use of safety devices are checked.</li> <li>• The route of networks is consistent with the implementation plan. Their path preserves the characteristics of components using (roof, wall, floor, insulation, ...).</li> <li>• The track layout is consistent with the implementation plan.</li> <li>• Handling means are present, adapted and implemented.</li> <li>• Equipment and accessories are installed in accordance with the implementation plan.</li> <li>• Safety of persons is ensured, the integrity of the equipment is maintained.</li> <li>• The realization is consistent with drawings and adapted to the elements to be put into place.</li> <li>• Equipment and components are assembled and connected in accordance with the implementation plan and / or manufacturers instructions.</li> <li>• For sensors fixed onto rails, the seal is maintained.</li> <li>• For systems for sensors integration, flashings are made either in sheet metal work or devices provided by the system.</li> <li>• Characteristics of crossed elements are preserved.</li> <li>• Networks are shaped in accordance with the implementation plan and the rules of the art.</li> <li>• Private networks are connected in accordance with the drawings.</li> <li>• The network connection of a distributor is prepared according to the regulations.</li> <li>• Circuits and networks are identified legally and in accordance with specifications.</li> </ul>

Title of the LO	INSTALL AND MAINTAIN SOLAR THERMAL FACILITIES			
Title UNIT 4:	Setting and commissioning			
LO UNIT Reference info:	Individual installation or part of an installation			
N° of ECVET credits:		EQF level::	3- 4	
LO UNIT Performance Criteria / Success Indicators	#	Criteria and indicators Description	Critical	Means of verification
Knowledge	<b>Commissioning procedures</b> <ul style="list-style-type: none"> <li>• Flushing installation</li> <li>• Filling</li> <li>• Powering</li> <li>• Presets</li> </ul>			
Skills	<ul style="list-style-type: none"> <li>• Perform a preset of a balancing device, control or safety</li> <li>• Perform leak tests and strength</li> <li>• Perform the operations planned in the installation test program</li> <li>• Complete the startup application</li> <li>• Update drawings and plans</li> <li>• Prepare the installation delivery acceptance</li> </ul>			
Means of verification	<ul style="list-style-type: none"> <li>• The work of commissioning be accepted</li> <li>• Checking presets can allow the putting into service</li> <li>• The tests are performed in accordance with protocols</li> <li>• The possibly detected faults are corrected</li> <li>• Equipment testing procedures are applied</li> <li>• The intervention approach is logical, relevant and appropriate to the context.</li> <li>• The settings to optimize system operation</li> <li>• The tests and performances are recorded</li> <li>• DOE folder is completed in accordance with the installation performed</li> </ul>			



- The elements necessary for receiving were held (facility in service, documents, ...)

<b>Title of the LO</b>	<b>INSTALL AND MAINTAIN SOLAR THERMAL FACILITIES</b>						
<b>Title UNIT 5:</b>	<b>Maintenance</b>						
<b>LO UNIT Reference info:</b>	Installation running Installation malfunctioning Installation failed Necessary equipment and tools Information from the client or user. Technical resources, surveys sheet						
<b>N° of ECVET credits:</b>		<b>Niveau du CEC:</b>	3- 4				
<b>LO UNIT Performance Criteria / Success Indicators</b>	#	Criteria and indicators Description	<table border="1" style="width: 100%;"> <thead> <tr> <th data-bbox="920 729 1263 877">Critical</th> <th data-bbox="1263 729 1960 877">Means of verification</th> </tr> </thead> <tbody> <tr> <td style="height: 40px;"></td> <td></td> </tr> </tbody> </table>	Critical	Means of verification		
Critical	Means of verification						
<b>Knowledge</b>	<b>Procedures for preventive and corrective maintenance</b>						
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Implement ways to protect people and property</li> <li>• Perform maintenance operations specified in the contract</li> <li>• Record maintenance, measurements and settings in the installation monitoring file</li> <li>• Perform tests, adjustments and corrections</li> <li>• Clean the site, recover sort and store waste</li> <li>• Diagnose the cause of a malfunction</li> <li>• Troubleshoot an installation</li> <li>• Implement remedial or precautionary solutions</li> <li>• Inspect the work</li> <li>• Monitor the performance of the installation</li> <li>• Control work commissioned by a third party</li> </ul>						

## Means of verification

- Means of protection in place are adequate and allow the realization of the intervention without risk to stakeholders and third parties.
- Operations are performed under the contract, the anomalies are corrected and / or recorded.
- The various operations are logged and can monitor the installation.
- The measurements are carried out safely (temperature, voltage, current, ...).
- The settings are adapted for the operation of the installation.
- Waste management respects regulations and the environment.
- The diagnostic approach is logical and appropriate to the context, it takes into account the operation of the system and information from the client.
- The proposed intervention is made wisely.
- Troubleshooting allows operation according to the installation.
- Remedial and / or precautionary actions allow a degraded mode operation.
- Control is methodical, the work conform to the specifications
- The anomalies are listed and / or corrected
- The expected performance is compared to the performance provided.
- Gaps are identified

<b>Title of the LO</b>	<b>INSTALL AND MAINTAIN SOLAR THERMAL FACILITIES</b>		
<b>Title UNIT 6:</b>	<b>Communication</b>		
<b>LO UNIT Reference info:</b>	Individual installation or part of an installation		
<b>N° of ECVET credits:</b>		<b>Niveau du CEC:</b>	3- 4
<b>LO UNIT Performance Criteria / Success Indicators</b>	#	Criteria and indicators Description Critical	Means of verification
<b>Knowledge</b>	<b>Administrative and legal environment of the company Building and technical communication</b>		
<b>Skills</b>	<b>Talk with the customer and with the hierarchy</b> <ul style="list-style-type: none"> <li>• Present operation and manual installation</li> <li>• Argument with the customer's requests for information</li> <li>• Explain the characteristics of a maintenance contract</li> <li>• Ask the customer dysfunctions observed</li> <li>• Transmit the results of the intervention with the client and its hierarchy</li> </ul> <b>Fill documents</b> <ul style="list-style-type: none"> <li>• Fill commissioning documents</li> <li>• Control retrospective documentation</li> </ul>		
<b>Means of verification</b>	<ul style="list-style-type: none"> <li>• The presentation is done with a clear and appropriate, by referring to key points of the manual. The general principle of operation is described.</li> <li>• The description reflects the facility provided.</li> <li>• The answers are relevant.</li> <li>• Presentation of other solutions to improve energy efficiency is correct.</li> <li>• Different types of maintenance contracts, their characteristics and advantages are explained.</li> <li>• Known faults are taken into account.</li> <li>• The written or oral presentation is clear and precise.</li> <li>• The documents are filled and usable.</li> </ul>		



- Traceability of interventions is ensured
- Receiving documentation of the installation is completed.
- Retrospective documentation drawings are modified in accordance with the schematic