

## CONTENT FOR MODULE "Assembling thermal insulation"

Learning outcomes	Theme	Advisable content	Descriptions of acquirement levels for learning outcomes		Theory – practice ratio	
			Satisfactory	Good	Theory 236	Practice 683
<p><b>Able:</b> to prepare insulation materials according to the location of surface before insulation, the material of this surface and the type of deposition;</p> <p><b>Knows:</b> types of insulation materials, methods of preparation. Knows that there are EU standards for selecting insulation materials;</p> <p><b>Understands:</b> the mutual</p>	<p><b>1. Preparing thermal insulation materials</b></p>	1.1. Preparing insulation materials according to EU standards.	Recognizes and names insulation materials according to the location and material of the surface to be insulated and type of deposition.	Explains the employment of thermal insulation materials by the location and material of the surface to be insulated and the type of deposition.	6	12
		1.2. Preparing insulation materials according to the location of surface to be insulated in the building (interior work, outside work, roof, foundations, communications);	Differentiates between thermal insulation materials according to external features.	Explains the significance of insulation materials and the mutual compatibility of materials.	8	16
		1.3. Preparing insulation materials according to the material of surface to be insulated (wood, concrete, brick etc.);			6	16
		1.4. Preparing insulation materials			8	16



<p>compatibility of thermal insulation materials and conditions of preparation.</p>		<p>according to the type of deposition (for gluing, strewing, blowing, shell etc.);</p> <p>1.5. Calculating the consumption of insulation materials.</p>			<p>16</p>	<p>8</p>
<p><b>Able:</b> to explain the impact of climate conditions on the insulation works, mechanical resistance of the facade, use of fastenings;</p> <p><b>Knows:</b> the conditions for the forming of facade zoning and cold bridges;</p> <p><b>Understands:</b> the importance of heat conductivity coefficient in insulation operations and the significance of expansion joints</p>	<p><b>2. Significant factors in insulation operations</b></p>	<p>2.1. Preferable climatic conditions for performing operations;</p> <p>2.2. Facade zoning;</p> <p>2.3. Mechanical strength of the facade;</p> <p>2.4. Using conditions for thermal insulation fastenings;</p> <p>2.5. Heat conductivity coefficient and cold bridges, requirements for forming expansion joints.</p>	<p>Determines the preferable climatic conditions for performing operations.</p> <p>Recognizes facade zoning.</p> <p>Generally describes the necessity of thermal insulation fastenings and expansion joints. Describes the heat conductivity coefficient.</p>	<p>Explains the influence of climatic conditions on insulation operations.</p> <p>Explains the façade zoning, examines it according to types of strength.</p> <p>Characterizes and selects the correct thermal insulation fastenings, the forming of expansion joints and the principles of forming cold bridges.</p>	<p>2</p> <p>2</p> <p>4</p> <p>6</p> <p>14</p>	<p>12</p> <p>8</p>



<p><b>Able:</b> to insulate foundations, the outer walls from outside and inside, to insulate various parts of buildings and inner communications adhering to work quality requirements;</p> <p><b>Knows:</b> technological sequence of operations for insulating foundations, outer walls from inside and outside, windows and doors, attic, basement covering, roof structures and inner</p>	<p><b>3. Technologies of thermal insulation assembling and the sequence of operations</b></p>	<p>3.1. Foundation insulation technologies;</p> <p>3.2. Outer wall insulation technologies from the outside of the building. Plane assembling, choosing wall plugs and determining quantity, strengthening technologies, applying the reinforcing layer from outside of the building;</p> <p>3.3. Outer wall insulation technologies from the inside of the building. Forming the frame, depositing the thermal insulation</p>	<p>Names the main operations in stages of foundation insulation, outer wall insulation from inside and outside, window and door insulation, attic, basement covering, roof structure and inner communications insulation.</p> <p>Performs thermal insulation assembly operations in technological sequence according to supervisor's instructions, assesses the work quality and eliminates defects.</p>	<p>Characterizes the main operations in the stages of of foundation insulation, outer wall insulation from inside and outside, window and door insulation, attic, basement covering, roof structure and inner communications insulation.</p> <p>Independently plans and performs the assigned thermal insulation assembly operations in technological sequence, assesses the work quality and eliminates defects.</p>	<p>8</p> <p>12</p> <p>8</p>	<p>56</p> <p>86</p> <p>45</p>



<p>communications . Innovations in the field of building insulation;</p> <p><b>Understands:</b> the importance of insulation in ensuring power efficiency in sustainable construction</p>		<p>material, forming vapor isolation, assembling paneling materials;</p>			18	64
		<p>3.4. Assembling windows and doors;</p> <p>technologies for insulating openings;</p>			4	28
		<p>3.5. Insulating attic coverings with blowable and strewable insulation materials, rolls and sheets;</p> <p>technological requirements;</p>			10	48
		<p>3.6. Insulating roof structures from inside and outside (flat roofs);</p>			4	26
		<p>3.7. Technologies for insulating inner communications in buildings;</p> <p>3.8. Options for insulating basement</p>			4	32
					4	26



		<p>covering, technologies and insulation operations;</p> <p>3.9. Mistakes and defects in insulating façade, determining and eliminating them. Operating conditions and eliminating defects;</p> <p>3.10. Innovations in technologies for building insulation.</p>			3	
<p><b>Able:</b> to determine details highlighted in building structure drawings, employ them in performing insulation operations, to sketch insulation structure details;</p> <p><b>Knows:</b> the denominations of surfaces and</p>	<p><b>4. Employing drawings in surface insulation operations</b></p>	<p>4.1. Building structure drawings;</p> <p>4.2. Sections of building structural details and surfaces to be insulated; sketching details.</p>	<p>Differentiates between building structure drawings.</p> <p>Recognizes objects, indications, denominations in drawing details.</p>	<p>Employs drawings in performing operations.</p> <p>Understands indications and denominations in surface insulation drawings' details, is able to sketch them.</p>	8 16	44



<p>insulation materials in the drawing;  <b>Understands:</b> drawing as an instrument of visual communication.</p>						
<p><b>Able:</b> to employ construction materials in insulation operations;  <b>Knows:</b> insulation materials for insulating outer walls from inside and outside, insulating windows and doors, insulating attic, basement coverings, roof structures and inner communications, the use of auxiliary materials.  <b>Understands:</b> main</p>	<p><b>5. Construction materials for insulation and applying thermal insulation</b></p>	<p>5.1. Compatibility between materials;                      5.2. Materials for building structures to be insulated;                      5.3. Adhesives, reinforcing mortars;                      5.4. Polymer materials (wall plugs profiles);                      5.5. Reinforcing nets;                      5.6. Construction films.</p>	<p>Recognizes and names insulation materials for foundation insulation, outer wall insulation from inside and outside, window and door insulation, attic, basement covering, roof structure and inner communications insulation, reinforcing nets, construction films, wall plugs. Able to select and employ them.</p> <p>Differentiates construction materials by external features.</p>	<p>Explains and employs insulation materials for foundation insulation, outer wall insulation from inside and outside, window and door insulation, attic, basement covering, roof structure and inner communications insulation, reinforcing nets, construction films, wall plugs. Able to select and employ them.</p> <p>Characterizes differences between construction materials employed in insulation operations.</p>	<p>8 10 8 6 4 4</p>	<p>10 24 16 10 4 12</p>

circumstances influencing the mutual importance and interaction of insulation materials during insulation operations.						
<p><b>Able:</b> to select mechanical, electrical work tools and mechanisms according to the required type of insulation work, to employ them;</p> <p><b>Knows:</b> the types and use of mechanical, electrical work tools and mechanisms;</p> <p><b>Understands:</b> the methods for using specific mechanical, electrical work tools and mechanisms for</p>	<p><b>6. Tools and accessories for surface insulation operations</b></p>	<p>6.1. Mechanical, electrical hand tools, preparing them for work and using them;</p> <p>6.2. Tools and mechanisms, measuring instruments for insulating surface. Preparing them for work and using them.</p> <p>6.3. Small mechanization in the operations of gluing, blowing, strewing thermal insulation materials; working with it.</p>	<p>Recognizes mechanical, electrical work tools and mechanisms used for surface insulation, employs them.</p>	<p>Compares and selects the appropriate mechanical, electrical work tools and mechanisms for surface insulation according to the required type of insulation operations, employs them.</p>	<p>4</p> <p>4</p> <p>8</p>	<p>10</p> <p>16</p> <p>24</p>



the required operations.						
<p><b>Able:</b> to perform surface insulation operations complying with work protection requirements, to act responsibly in dangerous situation, to inform about accidents in complicated situations, to provide first aid;</p> <p><b>Knows:</b> requirements for electrical and fire safety and environmental protection at the object, requirements for work safety while working at heights, performing disassembling operations, working with chemicals and</p>	<p><b>7. Work protection during surface insulation</b></p>	<p>7.1. Work protection, fire and electrical safety during surface insulation;</p> <p>7.2. Work hazards in surface insulation operations, during work at heights, with lifting devices and dust;</p> <p>7.3. Individual and communal work protection devices.</p> <p>7.4. Providing first aid in case of accidents at the object.</p>	<p>Recognizes hazards involved in insulation operations.</p> <p>Employs individual and communal protection devices during surface insulation operations.</p> <p>Follows fire and electrical safety requirements for insulation operations.</p>	<p>Characterizes hazards involved in insulation operations and their impact on the safety and health of workers.</p> <p>Selects and employs individual and communal protection devices during insulation operations.</p> <p>Follows fire and electrical safety requirements in the work place and acts accordingly in case of emergency.</p>	<p>6</p> <p>1</p> <p>6</p>	<p>12</p>

<p>dust. Diagrams for performing first aid at the construction object;</p> <p><b>Understands:</b> hazards in the work place, the significance of employing individual protection devices and the significance of mutual collaboration of the team, the necessity of work methods that are safe for the employee and preserve the environment in order to create a safe work environment.</p>						
<p><b>Able:</b> to find and employ information;</p> <p><b>Knows:</b> the types and methods of acquiring</p>	<p><b>8. Information space</b></p>	<p>8.1. Mass communications;</p> <p>8.2. Using information technologies.</p>	<p>Knows the basic steps for selecting information.</p>	<p>Employs the available methods for selecting information.</p>	<p>2</p> <p>4</p>	

<p>information; <b>Understands:</b> the possibilities of employing information for work.</p>					
<p>After mastering this model the student plans and performs insulation operations and organizing the work place according to the insulation technology of the surface to be insulated – foundations, outer walls from the outside, outer walls from the inside, window and door openings, attic coverings, basement coverings, roof structures, communications. Prepares instruments, mechanisms and insulation materials for work, employs them.</p>					
<p>At the module conclusion the student takes an exam consisting of a theoretical and practical part. Theory consists of a test which includes knowledge of:</p> <ul style="list-style-type: none"> <li>• Selecting thermal insulation materials according to the location of surface to be insulated, the material of this surface and type of deposition;</li> <li>• Calculating insulation materials;</li> <li>• Climatic conditions for performing insulation operations;</li> <li>• Facade zoning;</li> <li>• Requirements for strengthening thermal insulation;</li> <li>• Heat conductivity coefficient, the impact and significance of expansion joints and cold bridges;</li> <li>• Innovations in building insulation technologies;</li> <li>• Indications and denominations in building insulation drawings;</li> <li>• Recognizes and describes materials employed in building insulation technologies;</li> <li>• Tools, mechanisms and small mechanization for applying thermal insulation;</li> <li>• Nature and environment protection, fire safety, electrical safety in surface insulation operations;</li> <li>• Mutual social relations.</li> </ul> <p>Practical part is passed by performing the following operations individually or in a work group while complying with work safety requirements:</p> <ul style="list-style-type: none"> <li>• Correct selection of thermal insulation materials according to the location of surface to be insulated, the surface material and type of deposition;</li> <li>• Insulating foundations, outer walls from the outside, outer walls from the inside, windows and doors, attic coverings, roof structures, communications, basement coverings, eliminating defects in insulation operations;</li> <li>• Interpreting and sketching sections of building structural details and surfaces to be insulated;</li> <li>• Selecting insulation materials and auxiliary materials according to the location of surface to be insulated, the surface material and type of deposition;</li> </ul>					



- Working with mechanical, electrical tools and small mechanisms;
- Providing first aid in case of emergency at the object.