



TECHNICAL DESCRIPTION
Wall and Floor Tiling



world **skills**
international

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TD12 v3.0 – WSC2011

WorldSkills International, by a resolution of the Technical Committee and in accordance with the Constitution, the Standing Orders and the Competition Rules, has adopted the following minimum requirements for this skill for the WorldSkills Competition.

The Technical Description consists of the following:

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Effective 25.06.10



Liam Corcoran
Technical Committee Chair

1. INTRODUCTION

1.1 Name and description of skill

1.1.1 The name of the skill is [Wall and Floor Tiling](#).

1.1.2 Description of skill

[Wall and floor tiling](#) refers to the laying of tiles of ceramics, mosaic and natural stone on walls, floors and staircases in houses, industrial and public buildings, churches, swimming pools, outside installations and façades to provide protective and decorative finishes. It also includes the construction of small walls and steps from bricks or blocks.

[Tilers](#) work from diagrams and instructions. First, they measure the area to be tiled and calculate the minimum number of tiles required. Next, they remove any existing covering. They then prepare the surface - levelling the floor using sand and cement, or applying plaster if they are tiling a wall. They then spread cement or adhesive with a trowel and lay the tiles in the desired pattern. They may have to cut tiles to fit around walls and obstacles.

[After the adhesive has dried](#), the joints between the tiles are filled with grouting cement. On large projects, tilers may work in teams. On smaller jobs, they often work alone.

[Experienced tilers](#) may also specialise in one area of work, such as mosaics. They can work for specialist tiling firms, firms specialising in artistic work and for some building contractors. Many tilers are self-employed sub-contractors.

[In general the work processes for the wall and floor tiler include:](#)

- [Reading plans, control materials, equipment and tools](#)
- [Install work site and take care of health and safety](#)
- [Prepare the surfaces to be covered and install blocks](#)
- [Layout, divide area, prepare quantities](#)
- [Install inside and outside corners including watertight](#)
- [Fix tiles on walls](#)
- [Fix tiles on floors](#)
- [Finishing work](#)

1.2 Scope of application

1.2.1 Every Expert and Competitor must know this Technical Description.

1.2.2 In the event of any conflict within the different languages of the Technical Descriptions, the English version takes precedence.

1.3 Associated documents

1.3.1 As this Technical Description contains only skill-specific information it must be used in association with the following:

- [WSI - Competition Rules](#)
- [WSI - Competition Manual](#)
- [WSI - Online resources as indicated in this document](#)
- [Host Country - Health and Safety regulations](#)

2. **COMPETENCY AND SCOPE OF WORK**

The Competition is a demonstration and assessment of the competencies associated with this skill. The Test Project consists of practical work only.

2.1 **Competency specification**

Safe working practices Wall and Floor Tiling. Common to all wall and floor tiling operations

Knowledge and understanding of safe working practices:

- Know the health and safety regulations
- Know the accident / first aid / fire/ emergency procedures and reporting
- Know about health and hygiene
- Know about safe handling of materials and equipment
- Know how to work with electricity
- Know how to use appropriate personal protective equipment (PPE)

The Competitor shall be able to:

- Apply health and safety regulations
- Apply accident / first aid / emergency procedures and reporting
- Implement health and hygiene
- Safely handle materials and equipment
- Work with electricity:
 - maintain hand tools and powered tools in safe condition
 - select and use Personal Protective Equipment (PPE) for each process
 - maintain a safe working environment
- Use appropriate personal protective equipment

Information, quantities and communicating common to all wall and floor tiling operations

Knowledge and understanding of information, quantities and communication:

- Know how to interpret and produce building information
- Interpretation and execution of drawings to ISO-A or ISO-E standards
- Interpret information from specifications of the products
- Measurements in millimetres

The Competitor shall to able to:

- Interpret and produce building information
- Produce basic outline drawings including elevations, plans and sections to full size
- Communicate clearly in the competition workplace where drawings, variations to the Documents, and work restrictions have been required

Setting out and wall and floor tiles, stone and other material

Knowledge and understanding of:

- Being precise when calculating quantities of materials
- Know how to lift and transport resources explain the importance of protecting completed resources and the surrounding area during transportation
- Preparing wall and floor surfaces by removing old tiles, grout, cement or adhesive
- Filling all holes and cracks, and cleaning surfaces
- Know about basic fixing methods for wall and floor tiling projects
- Using tile-cutting tools to cut and shape tiles needed for edges, corners, or around obstacles such as fittings and pipes

The Competitor shall be able to:

- Select and checking tools and equipment to erect a project
- Attaching tiles to surfaces and floors using correct adhesive, making sure that patterned tiles match basic setting out for wall and floor tiling projects. Like floors of cement, granolithic, terrazzo or similar composition
- Prepare fixing area for building up the project
- Spacing and evening the tiles by using tools such as spirit levels and laser for level, plumb and square
- Check measurements of the wall conform to specifications and drawing
- Applying water-proofing systems
- Basic fixing methods for wall and floor tiling projects within 1mm of specification
- Preparing and applying grout, removing excess grout, cleaning and polishing tiles
- Build and maintain level, plumb and square
- Clean down after fixing wall and floor tiles

Produce complex figure and corners (inside and outside)

Knowledge and understanding of:

- Know how to interpret information for complex figures
- Know how to interpret information for inside and outside corners

The Competitor shall be able to:

- Use basic mathematics to set out the figures
- Interpret information to produce complex templates
- Produce complex templates
- Produce setting out for templates
- Produce accurate complex drawings on wood prior to make figure on the wall and/or floor 1mm of specification

Social/soft skills

Knowledge and understanding:

- Creativity
- Critical thinking
- Flexibility/adaptability
- Honesty/integrity
- Interpersonal communication
- Proactive work attitude
- Self motivation
- Teamwork
- Time management
- Work ethics skills
- Influencing skills
- Customer service & client relationship
- Ability to take, create, acknowledge and live up to personal responsibilities
- Problem-solving skills
- Working under pressure

2.2 Theoretical knowledge

2.2.1 Theoretical knowledge is required but not tested explicitly.

2.2.2 Knowledge of rules and regulations is not examined.

2.3 Practical work

The Competitor has to carry out, independently, the laying of tiles to professional standards.

Practical work includes:

- Follow instructions and safety procedures
- Select tools and equipment for the practical work
- Use specific technical skills when:
 - preparing the surfaces
 - care for accurate measuring and laying out
 - cutting tiles
 - fixing tiles
 - grouting joints
- Verify the measurements conform to the Test Project (drawings)
- Fixing, gluing tiles in conformity with work assignments and test project
 - Spread glue evenly, regularly
 - Tiles to be aligned and levelled
 - Avoid excess glue
 - Empty spaces, joints to be symmetrical and equal
- Clear joints and grout in accordance with the prescriptions
 - Empty spaces, joints to be symmetrical and equal
- Clean tiling work

3. THE TEST PROJECT

3.1 Format / structure of the Test Project

The format of the Test Project is a single Test Project assessed in stages.

Specific requirements include:

- At the end of the day 2 the Competitor must finish the main wall (A) including the 3-dimensional object, grouting and cleaning.
- At the end of day 3 the Competitor must finish the secondary wall (B) including grouting and cleaning.
- Floor tile bedding can only be laid on day 1 or day 4 of the Competition.
- Floor tiles can only be laid on day 4 of the Competition.

3.2 Test Project design requirements

The project has to be presented in colour, in digital format (Autocad). It must include detailed drawings of cutting and fitting. The project must include all the difficulties of straight, circular and diagonal cutting. It must integrate masonry work, such as straight or circular steps, and three-dimensional work.

The maximum tile area of the Test Project, including the 3-dimensional object, must be less than 7m² and the floor area must be less than 3.5 m².

Each Competitor will have a stable mounting wall made of brick/concrete of approximately 1600 mm x 1600 mm x 2000 mm. Walls are to be at an angle of 90 degrees.

Walls must be constructed of light weight concrete blocks with a tolerance of ±2mm. All Competitors are allowed the chance to fix their walls during familiarisation.

3.3 Test Project development

The Test Project MUST be submitted using the templates provided by WorldSkills International (<http://www.worldskills.org/competitionpreparation>). Use the Word template for text documents and DWG template for drawings.

- 3.3.1 Who develops the Test Project / modules
The Test Project / modules are developed by:
The Test Project/modules are developed and must be validated by all Experts.
- 3.3.2 How and where is the Test Project / modules developed
The Test Project/modules are developed independently.
- 3.3.3 When is the Test Project developed
The Test Project is developed:
The Test Project/modules are developed before the previous Competition.
- 3.4 Test Project marking scheme**
Each Test Project must be accompanied by a marking scheme proposal based on the assessment criteria defined in Section 5.
- 3.4.1 The marking scheme proposal is developed by the person(s) developing the Test Project. The detailed and final marking scheme is developed and agreed by all Experts at the Competition.
- 3.4.2 Marking schemes should be entered into the CIS prior to the Competition.
- 3.5 Test Project validation**
It must be demonstrated that the Test Project/modules can be completed within the material, equipment, knowledge and time constraints. This will be demonstrated by a photograph of the completed project/module and a technical drawing provided by the designing Expert.
- 3.6 Test Project selection**
The Test Project is selected by vote of Experts at the previous Competition.
- 3.7 Test Project circulation**
The Test Project is circulated via WorldSkills International website 3 months before the current Competition.
- 3.8 Test Project coordination (preparation for Competition)**
Coordination of the Test Project will be undertaken by the Chief Expert.
- 3.9 Test Project change at the Competition**
Under the supervision of the Chief Expert, the group of Experts make a 30% change to the Test Project. The changed Test Project will be circulated to Competitors during the briefing session on day 1 of the Competition.
- Experts can present their ideas or drawings developed prior to the Competition and brought with them. All Experts discuss these suggestions and the Chief Expert conducts a vote to approve the accepted 30% change.
- Change may be made to any 30% of the following:
- Measurement of radials or other details
 - Construction changes
 - Number of tiles
 - Design modification
- 3.10 Material or manufacturer specifications**
The Host Country will provide the list of manufacturer specifications to the equipment and materials as listed on the Infrastructure List with respect to the particularities of the Host Country. The list will be provided three months prior to the Competition.

4. SKILL MANAGEMENT AND COMMUNICATION

4.1 Discussion Forum

Prior to the Competition, all discussion, communication, collaboration and decision making regarding the skill must take place on the skill-specific Discussion Forum (<http://www.worldskills.org/forums>). All skill-related decisions and communication are only valid if they take place on the forum. The Chief Expert (or an Expert nominated by the Chief Expert) will be moderator for this forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

4.2 Competitor information

All information for registered Competitors is available from the Competitor Centre (<http://www.worldskills.org/competitorcentre>).

This information includes:

- Competition Rules
- Technical Descriptions
- Test Projects
- Other Competition-related information

4.3 Test Projects

Circulated Test Projects will be available from [worldskills.org](http://www.worldskills.org) (<http://www.worldskills.org/testprojects>) and the Competitor Centre (<http://www.worldskills.org/competitorcentre>).

4.4 Day-to-day management

The day-to-day management is defined in the Skill Management Plan that is created by the Skill Management Team led by the Chief Expert. The Skill Management Team comprises the Jury President, Chief Expert and Deputy Chief Expert. The Skill Management Plan is progressively developed in the six months prior to the Competition and finalised at the Competition (agreed by Experts and submitted to the Chair/Vice Chair of the Technical Committee). The Chief Expert is to regularly share updates of the Skill Management Plan via the Forum.

5. ASSESSMENT

This section describes how the Experts will assess the Test Project / modules. It also specifies the assessment specifications and procedures and requirements for marking.

5.1 Assessment criteria

This section defines the assessment criteria and the number of marks (subjective and objective) awarded. The total number of marks for all assessment criteria must be 100.

Section	Criterion	Marks		
		Subjective (if applicable)	Objective	Total
A	Overall appearance	10	0	10
B	Cutting	8	0	8
C	Level	0	10	10
D	Plumb	0	10	10
E	Square	0	10	10
F	Surface alignment	0	15	15
G	Measurements	0	27	27
H	Fully completed to drawings	0	10	10
Total =		18	82	100

5.2 Subjective marking

Scores are awarded on a scale of 1 to 10.

5.3 Skill assessment specification

Objective (tolerance):

- 0 mm = 10 points
- 1 mm = 9 points
- 2 mm = 8 points
- 3 mm = 7 points
- 4 mm = 6 points
- 5 mm = 5 points
- more than 5 mm = 1 point

A - Overall appearance

- Cleaning of tiles
- Regular joints
- Cleaning the area around the project

B - Cutting

- No chipping on tile edges
- Regular size joints
- Sanded edges of tiles

C - Level

- Put the level on the tiles and adjust until it is level. Place the marking wedge in the maximum gap.

D - Plumb

- Put the level on the tiles and adjust until it is plumb. Place the marking wedge in the maximum gap.

E - Square

- The square must be used in conjunction with 2 screeds. Place the marking wedge in the maximum gap.

F - Surface alignment

G - Measurements

- H - Fully completed to drawing
- Missing tiles
 - Wrong tiles
 - Project not completed to drawing
 - Tile bedding not finished to edge of tiles

5.4 Skill assessment procedures

The Experts that attend the Competition will be divided into marking groups according to their WorldSkills experience, language and culture to deal with each section of the marking criteria.

- Groups of Experts assess the same aspects for all Competitors
- Experts use specific points. Experts use drawings for the right position of the specific points, they use measurement tools like a level, screed, a square, and length measurement tool.
- Three groups of Experts decide on the assessment criteria and give the specific points into the drawing of the Test Project.
- The three Expert groups are as follows: 1 = floor, 2 = wall A, 3 = wall B
- Where possible Experts judge the same percentage of the Test Project.

Progressive marking will be used for each module. To enable Experts to assess progressively Competitors are required to complete the following tasks at the documented times.

- At the end of the second day the Competitor must finish the main wall (A) including the 3-dimensional object, grouting and cleaning.
- At the end of the third day the Competitor must finish wall B including grouting and cleaning.
- Floor tile bedding can only be laid on day 1 and day 4 of the Competition.
- Floor tiles can only be laid on day 4 of the Competition.

6. SKILL-SPECIFIC SAFETY REQUIREMENTS

Refer to Host Country Health & Safety documentation for Host Country regulations.

- All Competitors must use safety glasses when using any hand, power or machine tools or equipment likely to cause or create chips or fragments that may injure the eyes.
- A first-aid kit must be available throughout the Competition.
- Experts will use the appropriate personal safety equipment when inspecting, checking or working with a Competitor's project.

7. MATERIALS & EQUIPMENT

7.1 Infrastructure List

The Infrastructure List lists all equipment, materials and facilities provided by the Host Country.

The Infrastructure List is online (<http://www.worldskills.org/infrastructure/>).

The Infrastructure List specifies the items & quantities requested by the Experts for the next Competition. The Host Country will progressively update the Infrastructure List specifying the actual quantity, type, brand/model of the items. Host Country supplied items are shown in a separate column.

At each Competition, the Experts must review and update the Infrastructure List in preparation for the next Competition. Experts must advise the Technical Director of any increases in space and/or equipment.

At each Competition, the Technical Observer must audit the Infrastructure List that was used at that Competition.

The Infrastructure List does not include items that Competitors and/or Experts are required to bring and items that Competitors are not allowed to bring – they are specified below.

7.2 Materials, equipment and tools supplied by Competitors in their toolbox

The Competitor must bring the following tools in a toolbox:

- Gauging trowels
- Steel trowels
- Spirit levels
- Calculator
- Cutters
- Scribes
- Pick hammers
- Pinchers
- Ruler
- Pencil
- Sand paper
- Wooden float
- Hammer
- Builder's square (600 mm approx.)
- Try square
- Bevel
- Compass (with radius extension)
- Safety equipment (protective clothing)

The Competitors may bring other tools that they use in the tiling industry for the execution of the Test Project. Exceptions are listed in paragraph 7.4.

7.3 Materials, equipment and tools supplied by Experts

None

7.4 Materials & equipment prohibited in the skill area

The following equipment is prohibited for use by Competitors.

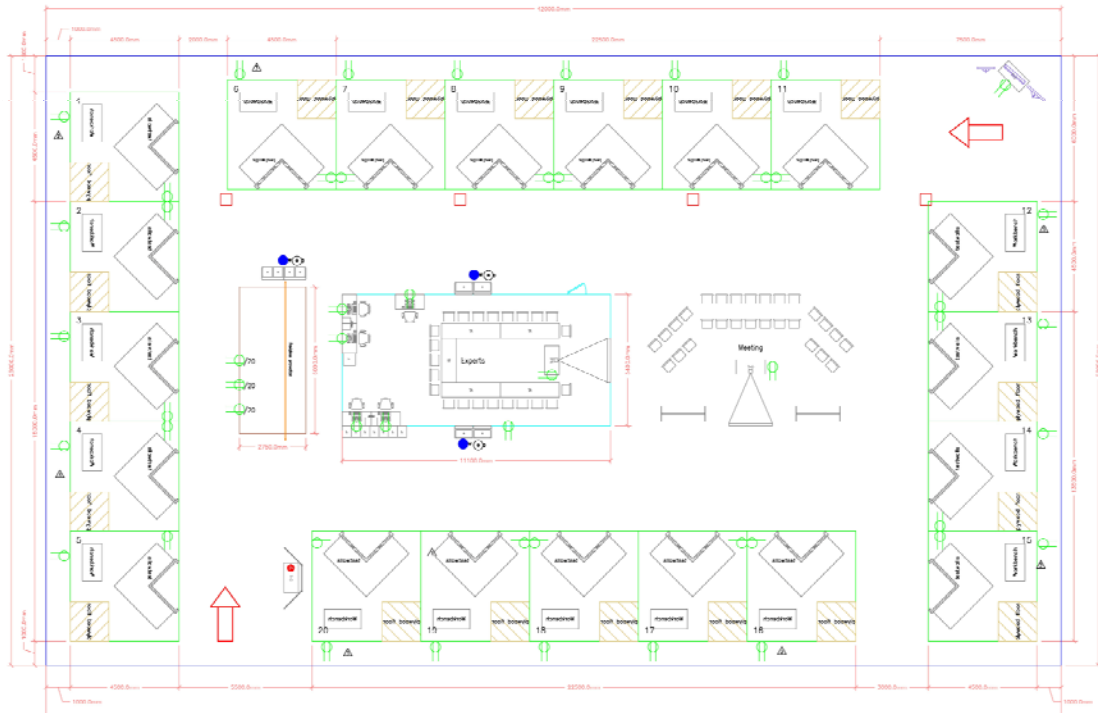
- Templates
- Laser cutting machines
- Automatic CNC cutting machines
- Water jet machines
- Dry cutting machines (with the exception of machines which meet the Health and Safety regulations of the Host and have a dust suction component)

7.5 Sample workshop layouts

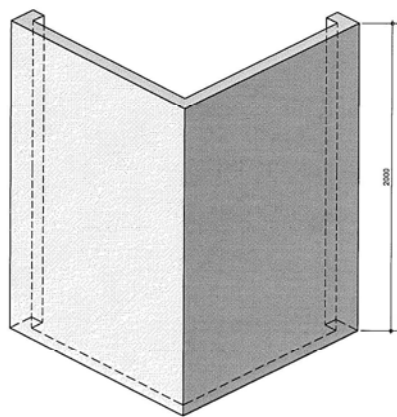
Workshop layouts from Calgary are available at:

http://www.worldskills.org/index.php?option=com_halls&Itemid=540

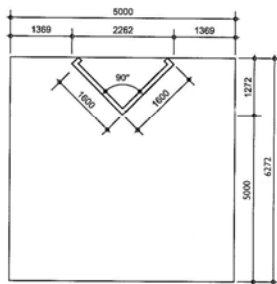
Workshop layout from previous Competition:



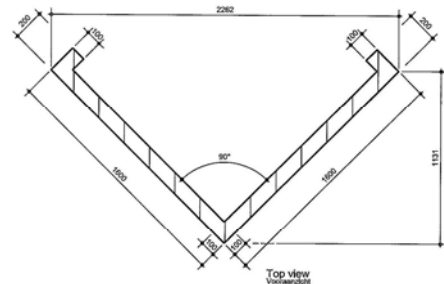
Workstation layout required for WSC2010:



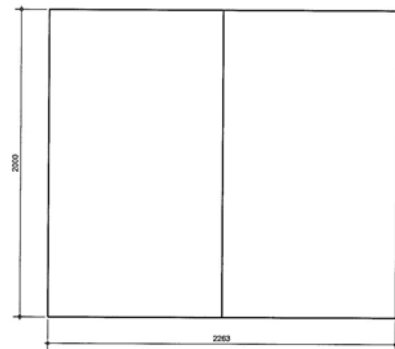
Oblique projection
Scheve projectie



Workplace competitor
Werkzulte deelhamer



Top view
Voorzichtsicht



Front view
Voorzichtsicht

Internationale Bouwkampioenschappen Tegeltellen 2009

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C	Plotschaal	20	Date	11-11-08

INB-09-Wand opstelling

8. MARKETING THE SKILL TO VISITORS AND MEDIA

8.1 Maximising visitor and media engagement

The following ideas may be considered to maximise the engagement of visitors and media.

- Display screens showing the progress of Competitors work.
- Each Competitor designs and completes one wall, specifications are made by Experts before Competition. This could be used for a public award for the Competitor.
- Marketing of the Test Project by a regional vocational education school with logo's of the local sponsors and specification of the assessment and good wall and floor tiling.
- Features of displays and support for students of the Test Project in 3D animation and print.
- Interviews of the Experts and Competitors.

8.2 Sustainability

- Recycling
- Use of 'green' materials
- Use of completed Test Projects after Competition