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# Test project

## *Architectural Stonemasonry*

*Category: Construction and Building Technology*

**THE WORLDSKILLS STANDARDS**

# **SPECIFICATION (WSSS)**

## **GENERAL NOTES ON THE WSSS**

The WSSS specifies the knowledge, understanding and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business ([www.worldskills.org/WSSS](http://www.worldskills.org/WSSS)).

The skill competition is intended to reflect international best practice as described by the WSSS, and to the extent that it is able to. The Standards Specification is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standards Specification is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards Specification. This is often referred to as the “weighting”. The sum of all the percentage marks is 100.

The Marking Scheme and Test Project will assess only those skills that are set out in the Standards Specification. They will reflect the Standards Specification as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme and Test Project will follow the allocation of marks within the Standards Specification to the extent practically possible. A variation of five percent is allowed, provided that this does not distort the weightings assigned by the Standards Specification.

## WORLDSKILLS STANDARDS SPECIFICATION

SECTION		RELATIVE IMPORTANCE (%)
1	<b>Work organization and management</b>	5
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>The geology, materials, processes, and building methods, new and old, that relate to the role of the stonemason</li> <li>The principles of working safely with electricity and compressed air equipment</li> <li>Health, safety, and hygiene legislation, obligations, regulations, and documentation</li> <li>Specific legislation and regulations governing vibration and noise at work within own country</li> <li>The need to monitor and log personal usage time for power tools to offset the effects of vibration</li> <li>Emergency procedures and reporting processes for accident, first-aid and fire</li> <li>The situations when personal protective equipment (PPE) must be used</li> <li>The purposes, uses, care, maintenance, storage of tools/equipment, and safe handling implications</li> <li>The purposes, uses, care, storage of materials, and safe handling implications</li> <li>The importance of keeping a tidy work area</li> <li>The ways in which working practices can minimize wastage and help to manage costs</li> <li>The importance of safe disposal of waste for re-cycling</li> <li>The significance of planning, accuracy, checking, and attention to detail in all working practices</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>Follow health, safety, and hygiene standards, rules, and regulations</li> <li>Maintain a safe working environment</li> <li>Identify and use the appropriate personal protective equipment including safety footwear, hand, ear, eye, and dust protection</li> <li>Monitor and log personal usage time for power tools to offset the effects of vibration</li> <li>Select, use, clean, maintain and store all hand and powered tools safely</li> <li>Select, use, and store all materials safely</li> <li>Examine and sign off material as falling within the acceptable range for use</li> <li>Plan the work area to maximize efficiency and maintain the discipline of regular tidying</li> <li>Measure accurately and avoid wastage</li> <li>Work efficiently and check progress and outcomes regularly</li> <li>Safely and sustainably dispose of recyclable and dangerous waste</li> </ul>	

<b>2</b>	<b>Communication and interpersonal skills</b>	<b>5</b>
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>The roles and requirements of related trades and the most effective methods of communication</li> <li>The value of building and maintaining productive working relationships</li> <li>The importance of swiftly resolving misunderstandings and conflicting demands</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>Determine requirements and manage expectations positively</li> <li>Visualize and translate wishes, making recommendations which meet design and budgetary requirements</li> <li>Recognize and adapt to the changing needs of architects and related trades</li> <li>Clearly communicate to colleagues where drawings, variations to the documents and work restrictions are required</li> <li>Challenge incorrect information to prevent problems</li> </ul>	
<b>3</b>	<b>Problem solving, innovation, and creativity</b>	<b>5</b>
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>The common types of problem which can occur within the work process</li> <li>Diagnostic approaches to problem solving</li> <li>Trends and developments in the industry within own country and more widely</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>Check work regularly to minimize problems at a later stage</li> <li>Recognize and understand problems issues swiftly and follow a self-managed process for resolving</li> <li>Demonstrate a willingness to try alternative methods and positive change</li> </ul>	
<b>4</b>	<b>Interpretation of drawings</b>	<b>5</b>
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>The essential information that must be included in construction and detail drawings</li> <li>The importance of checking for missing information or errors, anticipating problems and resolving in advance of the 'setting out' process and construction</li> <li>The role of geometry</li> <li>Mathematical processes and problem solving</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>Accurately interpret all plans, elevations, sections, and enlarged details</li> <li>Identify key dimensions and all angles</li> <li>Identify curved work</li> <li>Recognize all features, such as arch work, letters, and symbols</li> <li>Establish any features that require special equipment or templates and ensure they are available or created</li> <li>Identify items that require clarification</li> <li>Identify and follow up drawing errors to ensure their correction</li> <li>Determine and check quantities of materials required to produce specified projects</li> </ul>	

<b>5</b>	<b>Information and quantities</b>	<b>5</b>
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>The essential information that must be included in specifications</li> <li>The importance of checking for missing information or errors</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>Accurately interpret and produce building information from specifications</li> <li>Produce basic outline drawings including elevations, plans, and sections to full size</li> </ul>	
<b>6</b>	<b>Producing and setting out for complex templates</b>	<b>15</b>
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>The characteristics of materials used for templates: plastic, zinc, and aluminium sheets</li> <li>Tracery features including: trefoil, quatrefoil, foils, cusps, dead eyes, pierced eyes</li> <li>The differences between the orders of architecture: Doric, Ionic, Corinthian, Tuscan and Composite</li> <li>The members of the entablature: cornice, frieze, architrave</li> <li>Traditional and modern masonry features</li> <li>Types of developed true shapes, raking sections, and stretched mouldings</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>Select resources, including: plastic, sheet zinc, aluminium, and drawing paper</li> <li>Produce complex templates and moulds including: tracery, foils, cusps, dead eye, pedestal, cornice, column coping, plinth, capital springer, keystone, or pediment</li> <li>Apply information/identification marks to templates and moulds</li> <li>Set out work full size using standard drawing conventions</li> <li>Use complex geometry to prepare templates in various materials</li> <li>Produce templates from zinc sheet</li> <li>Produce accurate, complex drawings prior to transferring to templates materials</li> <li>Produce mouldings</li> <li>Accurately cut templates and reverse templates in plastic, zinc, or aluminium to within 1 mm of specification</li> </ul>	

<b>7</b>	<b>Produce stonemasonry components on moulded pieces</b>	<b>50</b>
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>Strategies to assist in the control of vibration</li> <li>Strategies for reducing exposure to noise</li> <li>Defects commonly found in natural stones</li> <li>Specialist surface finishes</li> <li>The characteristic and usability of the different types of stones, such as granite, sandstone, limestone, marble, etc.</li> </ul>	
	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>Recognize and check the capacity of the stone for the task in hand</li> <li>Apply complex templates to mark out the work</li> <li>Position natural bedding plane in relation to component positions in structures</li> <li>Use templates to mark out the whole of the work from the datum surface prior to commencing cutting operations to within 1 mm of specification</li> <li>Apply complex geometric shapes to prepared block of stone</li> <li>Prepare stone surfaces straight, square and out of twist various types of stones</li> <li>Transfer exactly sizes, angles, and shape from drawing to stone</li> <li>Prepare stone surfaces to complex shapes using various technical processes</li> <li>Produce various specified surface finishes to prepared stones</li> <li>Work the stones square and to give dimensions with 1 mm of specification</li> <li>Prepare a tooled finish to seen faces only</li> <li>Produce complex worked stone components using hand and power tools to within 1 mm of specification including: corners, arises and internal mitres; measurements and external mitres; profiles, profile, curved, and flat surfaces</li> </ul>	
<b>8</b>	<b>Produce letter cutting and/or ornament</b>	<b>10</b>
	<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>Different methods to transfer information onto the stone surface</li> <li>The characteristics of letters and/or ornament</li> <li>The characteristics of materials</li> <li>The different methods of carving including intaglio and bas relief</li> <li>The different techniques of applying different surface and textured finishes</li> <li>The need for all work to be presented to meet customer needs and expectations</li> </ul>	

	<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>Select resources free from damage, faults or fissures to set out lettering and carving</li> <li>Apply full size drawing to mark out the work</li> <li>Identify the required position of lettering, and/or ornament or carved motif on the stone</li> <li>Use carbon paper to transfer information to stone surface using full size drawing details</li> <li>Produce incised and letters and/or ornament in various types of stone</li> <li>Cut incised and raised letters to the specification using hand or pneumatic tools only to reduce the effects of Hand Arm Vibration Syndrome (HAVS) - or pneumatic tools</li> <li>Transfer from drawings and set out lettering in various modern or traditional styles</li> <li>Lightly clean carbon ink marks on the surface by removing with water and fine wet/dry paper</li> <li>Carve motif from given specification onto specified surface to required depth and finish using hand or pneumatic tools</li> <li>Produce straight or flowing lines which provide sharp edges and a crisp appearance</li> <li>Use texture, undercutting, and shadow effectively</li> <li>Organize any waste material in the correct way so that it can be disposed of or recycled efficiently</li> <li>Accurately interpret the client's brief/instructions</li> </ul>	
	<b>Total</b>	<b>100</b>

# THE ASSESSMENT STRATEGY AND SPECIFICATION

## GENERAL GUIDANCE

Assessment is governed by the WorldSkills Assessment Strategy. The Strategy establishes the principles and techniques to which WorldSkills assessment and marking must conform.

Expert assessment practice lies at the heart of the WorldSkills Competition. For this reason, it is the subject of continuing professional development and scrutiny. The growth of expertise in assessment will inform the future use and direction of the main assessment instruments used by the WorldSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the WorldSkills Competition falls into two broad types: measurement and judgement. For both types of assessment, the use of explicit benchmarks against which to assess each Aspect is essential to guarantee quality.

The Marking Scheme must follow the weightings within the Standards Specification. The Test Project is the assessment vehicle for the skill competition, and also follows the Standards Specification. The CIS enables the timely and accurate recording of marks, and has expanding supportive capacity.

The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed and developed through an iterative process, to ensure that both together optimize their relationship with the Standards Specification and the Assessment Strategy. They will be agreed by the Experts and submitted to WSI for approval together, in order to demonstrate their quality and conformity with the Standards Specification.

Prior to submission for approval to WSI, the Marking Scheme and Test Project will liaise with the WSI Skill Advisors in order to benefit from the capabilities of the CIS.

# THE MARKING SCHEME

## GENERAL GUIDANCE

This section describes the role and place of the Marking Scheme, how the Experts will assess Competitors' work as demonstrated through the Test Project, and the procedures and requirements for marking.

The Marking Scheme is the pivotal instrument of the WorldSkills Competition, in that it ties assessment to the standards that represent the skill. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards Specification.

By reflecting the weightings in the Standards Specification, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill and its assessment needs, it may initially be appropriate to develop the Marking Scheme in more detail as a guide for Test Project design. Alternatively, initial Test Project design can be based on the outline Marking Scheme. From this point onwards the Marking Scheme and Test Project should be developed together.

Section 2.1 above indicates the extent to which the Marking Scheme and Test Project may diverge from the weightings given in the Standards Specification, if there is no practicable alternative.

The Marking Scheme and Test Project may be developed by one person, or several, or by all Experts. The detailed and final Marking Scheme and Test Project must be approved by the whole Expert Jury prior to submission for independent quality assurance. The exception to this process is for those skill competitions which use an independent designer for the development of the Marking Scheme and Test Project. Please see the Rules for further details.

Experts and independent designers are required to submit their Marking Schemes and Test Projects for comment and provisional approval well in advance of completion, in order to avoid disappointment or setbacks at a late stage. They are also advised to work with the CIS Team at this intermediate stage, in order to take full advantage of the possibilities of the CIS.

In all cases a draft Marking Scheme must be entered into the CIS at least eight weeks prior to the Competition using the CIS standard spreadsheet or other agreed methods.

## ASSESSMENT CRITERIA

The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived in conjunction with the Test Project. In some skill competitions the Assessment Criteria may be similar to the section headings in the Standards Specification; in others they may be totally different. There will normally be between five and nine Assessment Criteria. Whether or not the headings match, the Marking Scheme as a whole must reflect the weightings in the Standards Specification.

Assessment Criteria are created by the person(s) developing the Marking Scheme, who are free to define criteria that they consider most suited to the assessment and marking of the Test Project. Each Assessment Criterion is defined by a letter (A-I). It is advisable not to specify either the Assessment Criteria, or the allocation of marks, or the assessment methods, within this Technical Description.

The Mark Summary Form generated by the CIS will comprise a list of the Assessment Criteria.

The marks allocated to each Criterion will be calculated by the CIS. These will be the cumulative sum of marks given to each Aspect within that Assessment Criterion.

## SUB CRITERIA

Each Assessment Criterion is divided into one or more Sub Criteria. Each Sub Criterion becomes the heading for a WorldSkills marking form. Each marking form (Sub Criterion) contains Aspects to be assessed and marked by measurement or judgement, or both measurement and judgement.

Each marking form (Sub Criterion) specified both the day on which it will be marked, and the identity of the marking team.

## ASPECTS

Each Aspect defines, in detail, a single item to be assessed and marked together with the marks, or instructions for how the marks are to be awarded. Aspects are assessed either by measurement or judgement.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it. The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of the skill in the Standards Specification. This will be displayed in the Mark Allocation Table of the CIS, in the following format, when the Marking Scheme is reviewed from C-8 weeks. (Section 4.1)

	CRITERIA								TOTAL MARKS PER SECTION	WSS MARKS PER SECTION	VARIANCE	
	A	B	C	D	E	F	G	H				
STANDARDS SPECIFICATION SECTION	1	5.00								5.00	5.00	0.00
	2		2.00					7.50		9.50	10.00	0.50
	3								11.00	11.00	10.00	1.00
	4			5.00							5.00	0.00
	5				10.00	10.00	10.00			30.00	30.00	0.00
	6		8.00	5.00				2.50	9.00	24.50	25.00	0.50
	7			10.00				5.00		15.00	15.00	0.00
TOTAL MARKS	5.00	10.00	20.00	10.00	10.00	10.00	15.00	20.00	100.00	100.00	2.00	

## ASSESSMENT AND MARKING

There is to be one marking team for each Sub Criterion, whether it is assessed and marked by judgement, measurement, or both. The same marking team must assess and mark all competitors, in all circumstances. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances. (See 4.6.)

## ASSESSMENT AND MARKING USING JUDGEMENT

Judgement uses a scale of 0-3. To apply the scale with rigour and consistency, judgement must be conducted using:

- benchmarks (criteria) for detailed guidance for each Aspect (in words, images, artefacts or separate guidance notes)
- the 0-3 scale to indicate:
  - 0: performance below industry standard
  - 1: performance meets industry standard
  - 2: performance meets and, in specific respects, exceeds industry standard
  - 3: performance wholly exceeds industry standard and is judged as excellent

Three Experts will judge each Aspect, with a fourth to coordinate the marking and acting as a judge to prevent compatriot marking.

## ASSESSMENT AND MARKING USING MEASUREMENT

Three Experts will be used to assess each aspect. Unless otherwise stated only the maximum mark or zero will be awarded. Where they are used, the benchmarks for awarding partial marks will be clearly defined within the Aspect.

## THE USE OF MEASUREMENT AND JUDGEMENT

Decisions regarding the selection of criteria and assessment methods will be made during the design of the competition through the Marking Scheme and Test Project.

## COMPLETION OF SKILL ASSESSMENT SPECIFICATION

The skill assessment criteria are clear concise aspect specifications which explain exactly how and why a particular mark is awarded.

### Measurement marking

DEGREE OF TOLERANCE	POINTS AWARDED
Within tolerance < 1 mm	Full marks
Within tolerance < 2 mm	Half marks Out
of tolerance	Zero marks

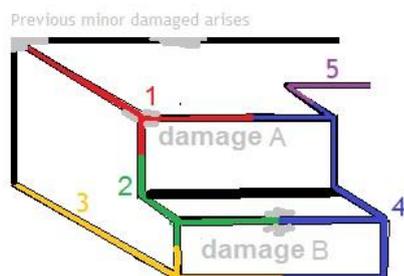
Stones must be produced in the correct hand, exactly as the drawing shows. If a stone is produced the wrong way around, then the affected areas of the Test Project, as shown in the drawing marking aspects, will be marked zero.

Numbers for Measurement to write on the Marking form:

<b>Zero Points</b> NO 0	<b>Half Points</b> 1/2	<b>Full Points</b> YES 3	grade of Measurement to write in marking form
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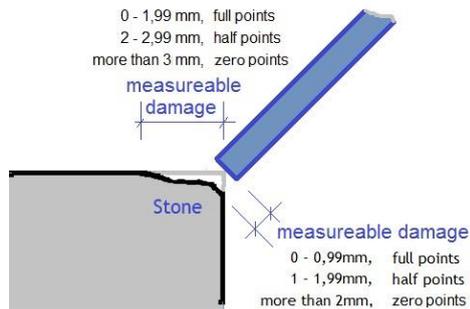
Connected Arises are including corners by this way to reduce the number of marking point aspects:

### Arises including corners



Each damage can be just one time measured on arises as shown in the pictures by the samples damage A (corner) or damage B (arise).

Arises (including corners) will be measured by this way:



**The largest error will be measured!**

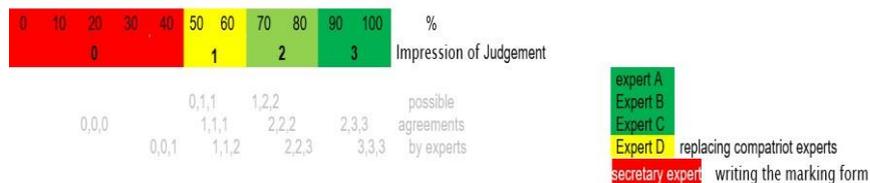
When a corner is damaged the three adjacent arises will be considered as damaged

Rubbing stones is not allowed whatsoever, especially not rubbing on arises (to prevent hiding of mistakes). When arises are rubbed the relevant arises will be marked with zero points.

### Judgement marking

Judgement marking must be carried out before measurement marking can take place, with 3 + 1 (to coordinate) Experts:

The marking will be a judgement on the subsections layout and craftsmanship.



No compatriot marking is allowed.

## SKILL ASSESSMENT PROCEDURES

- The Experts will decide together on the Test Projects, the marking criteria and the dimensional tolerances on Subjective Marking Forms, Objective Marking Forms and Mark Summary Sheets;
- The drawings will indicate the actual positions where the assessment criteria are to be marked;
- The Chief Expert will divide the Experts into groups of three/four to mark;
- Every completed module will be marked as soon as possible;
- The pieces of stone are checked by the Experts before the arrival of the Competitors. The Workshop Manager places approved stones in the working areas;
- The working areas are divided among the Competitors by lottery. Stones will only be replaced when hidden faults occur during the working process;
- At least two hours are available to set up the working stations, especially to make the air connection. The Workshop Manager must be available for support if necessary;
- When the Competition starts the Chief Expert will give the Competitors verbal instructions. If necessary, these will be translated in other languages;
- Prior to module one the Competitors will have an hour at their disposal to study the Test Projects;
- It is possible to give one or two hours' extra time on module three, but only if decided by minimum 80% of the Experts. This has to be announced to the Competitor before the start of the third day of the Competition.

## **Criterion**

A. Any Module: Work organization, communication, and problem solving\* B.

Module 1: Production of templates

C. Module 2: Produce letter cutting and/or Ornament

D. Module 3: Arises including corners, E.

Module 3: Measurements,

F. Module 3: Internal and external angles,

G. Module 3: Flat surface, Straight profile-surfaces, curved surfaces, H.

Module 3: Fitting of templates to moulded piece.

I. Module 3: General impression, surface finishing

\* Aspects will be marked as YES (full points) or NO (zero points)

The use of aspects to assess "Work organization, communication, and problem solving"

Each aspect below is to discuss as a YES or NO decision.

### **Module 1 Produce Templates**

1. Did the Competitor wear all in the instructions requested health and safety items during the template drawing and cutting?
2. Did the Competitor require extra zinc for templates?
3. In the case of a false start, the competitor will lose this aspect point for replacing extra zinc.
4. Do all templates have the correct identification marks to each template on the correct side in accordance to the drawing?
5. Did the Competitor complete the templates in the time as stated in the project? (not the maximum time)

### **Module 2 Produce Letter Cutting/Carving:**

1. Did the Competitor wear all in the instructions requested health and safety items during the chiselling?
2. Did the Competitor complete the Letter Cutting and/or ornament in the time as stated in the project? (not the maximum time)

### **Module 3 Produce the moulded pieces**

1. Did the Competitor not cause unnecessary dust by blowing with air hose (with air hammer is allowed)
2. Did the Competitor clean his workshop and remove the stone chips and waste in bins after the end of day C1 till C3?
3. Day 4: Did the Competitor wear all in the instructions requested health and safety items during the chiselling?
4. modules)?
5. Did the Competitor produce all building information in accordance with the specification on the drawings.

### General for all modules

1. Did the Competitor start before the scheduled time? No false start.
2. Did the Competitor not change his required templates or produce a new required template, after module 1 is finished (additional template may be produced during all modules)?
3. The Competitor didn't ignore any other ban or break any additional rule which is written in the Technical Description.

Procedures must be made to make clear in written (signed) versions to the competitors and the experts when points will be scored. These will be given to the competitors before the competition starts.

### Judgement Marking

The use of aspects to assess produce module 2 "Letter Cutting/Carving"

Each aspect below is to discuss as a judgement decision.

#### Generally

Did the Competitor

1. produce free from pencil and handling marks (cleanliness of the finished product)?
2. produce the background finishing (chiselling) in accordance with the instructions and drawing?

#### **Letter cutting**

Did the Competitor

1. produce the position of lettering in accordance with the drawings?
2. produce the consistent depth of the letters planes in "V" intersect at 80° to 100° degrees?
3. produce the exterior letter arises, lines are straight and curves with consistent shapes?
4. produce the internal surfaces of the letters and interior arises smooth without missing chips or ridges?

#### **Ornament**

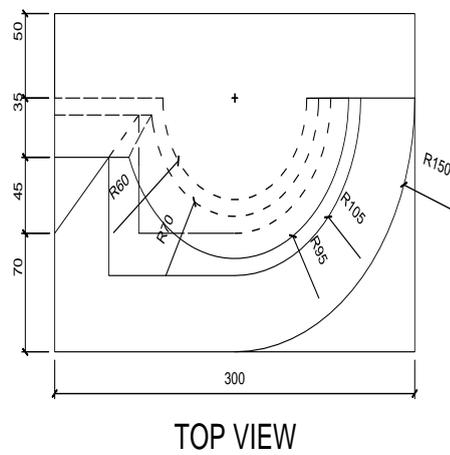
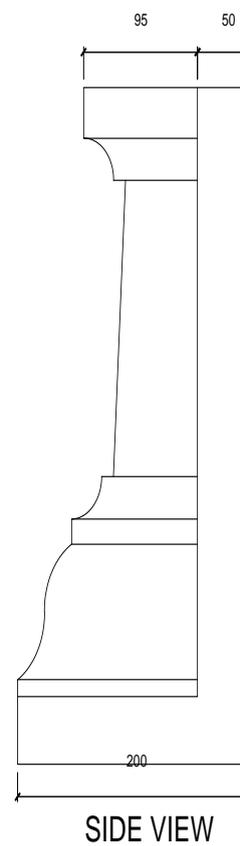
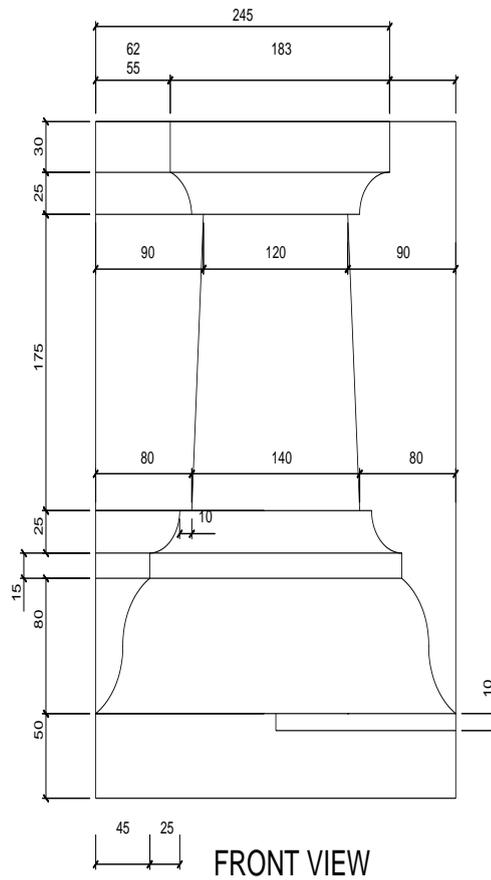
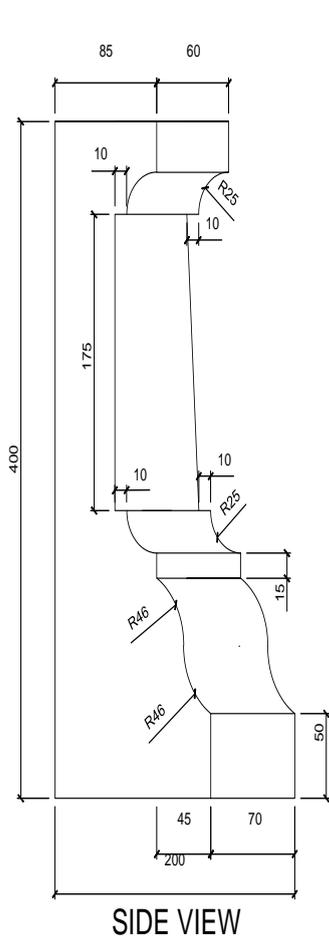
Did the Competitor:

1. produce the position of ornament in accordance with the drawing?
2. produce the depth of the ornament across the design?
3. produce the exterior ornament arises lines produce straight and curves produce with consistent shapes?
4. interpret the internal surfaces of the ornament in professional stile?
5. The use of aspects to assess module 3 "Surface finishing on moulded piece" (Section 4)

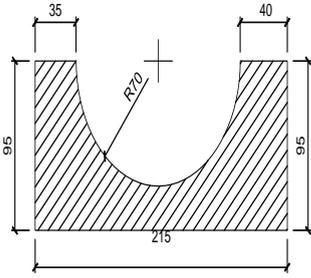
Each aspect below is to discuss as a judgement decision. Did

the Competitor:

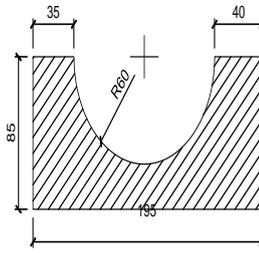
1. produce free from pencil and handling marks, (cleanliness of the finished product)?
2. produce (finish) all requested sides in accordance with the instructions and drawing to full size?
3. produce the flat surfaces, profiles and curved surfaces in consistently and professional smooth stile, produce without missing chips or ridges?
4. Constantly chisel all the surfaces with professional stile?



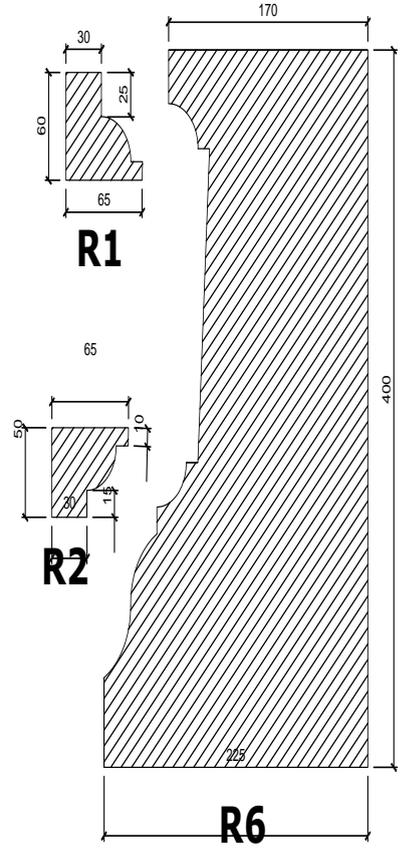
**Dimensions in MM**



**Column Base R4**



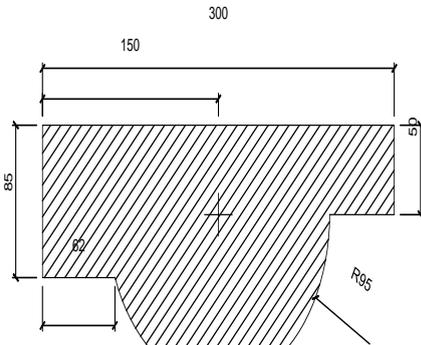
**Column Top R5**



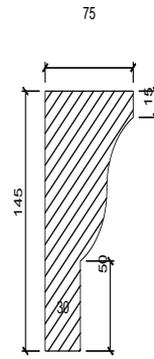
**R1**

**R2**

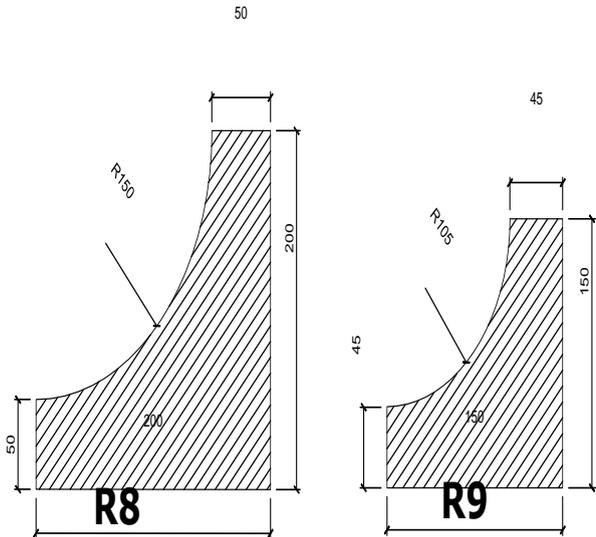
**R6**



**Top Bed**



**R3**



**R8**

**R9**

**Bottom Reverse**

**All templates in zinc  
Templates require**

# MATERIALS AND EQUIPMENT

## INFRASTRUCTURE LIST

The Infrastructure List details all equipment, materials and facilities provided by the Competition Organizer.

The Infrastructure List is available at [www.worldskills.org/infrastructure](http://www.worldskills.org/infrastructure).

The Infrastructure List specifies the items and quantities requested by the Experts for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Items supplied by the Competition Organizer 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 Director of Skills Competitions 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.

## COMPETITOR'S TOOLBOX

The external size of the toolboxes must not be bigger than 0.32m<sup>3</sup> with a maximum weight of 100 kg.

## MATERIALS, EQUIPMENT, AND TOOLS SUPPLIED BY COMPETITORS IN THEIR TOOLBOX

Advice and proposed tools and equipment for the Competitor toolbox:

ITEM	QUANTITY	PICTURE
Various Air Guns or similar	5 maximum	
(for detail only, Air Gun)		
Four tooth 20mm claw tool with tungsten tip and air gun shank	1	

ITEM	QUANTITY	PICTURE
5 tooth 25mm claw tool with tungsten tip and air gun shank	1	
50mm claw tool with tungsten tips and air gun shank	1	
12mm round nose chisel with tungsten tips and air gun shank	1	
20mm round nose chisel with tungsten tips and air gun shank	1	
25mm round nose chisel with tungsten tips and air gun shank	1	
40mm round nose chisel with tungsten tips and air gun shank	1	
50mm round nose chisel with tungsten tips and air gun shank	1	
6mm punch chisel with tungsten tips and air gun shank	2	
8mm flared chisel with tungsten tips and air gun shank	1	
12mm flared chisel with tungsten tips and air gun shank	1	
12mm chisel with tungsten tips and air gun shank	2	
20mm chisel with tungsten tips and air gun shank	2	
18mm chisel with tungsten tips and air gun shank	1	
25mm chisel with tungsten tips and air gun shank	2	

ITEM	QUANTITY	PICTURE
40 mm chisel with tungsten tips and air gun shank	1	
50mm chisel with tungsten tips and air gun shank	1	
6mm punch with hammer headed shank	1	
50mm pitching tool hammer headed shank	1	
6mm mallet headed chisel	1	
12mm mallet headed chisel	1	
25mm mallet headed chisel	1	
40mm mallet headed chisel	1	
50mm mallet headed chisel	1	
12mm round nose mallet headed chisel	1	
20mm round nose mallet headed chisel	1	
25mm round nose mallet headed chisel	1	

ITEM	QUANTITY	PICTURE
40mm round nose mallet headed chisel	1	
1.0 kg Bronze dummy hammer for lettering/carving	1	
1.5kg Hammer for pitching and punching	1	
Compasses/dividers for scribing zinc for templates		
Tungsten tipped dividers 150mm		
Brass sliding bevel for marking on angles	1	
600mm square; 450mm Steel square and 300mm combination square	1 of each	
300mm and 150mm try squares	1 of each	
150mm; 300mm, 600mm, 1000mm steel rulers	1 of each	
Scissors	1	
Box trammel for marking out parallel lines on stones x1	1	

ITEM	QUANTITY	PICTURE
Tungsten tipped scriber for marking lines on stone x1	1	
4Set of 10 lettering and carving chisels (gouges; various round nose and straight chisels) 10H pencils		
A selection of pencils, coloured marker pens for marking templates etc (NO RED PENS ALLOWED)		 (NO RED PENS ALLOWED)
Ruler and width/thickness gauge x1	1	
Beam compass for scribing large curves on zinc and stone x1	1	
<del>In-line Regulator for compressed air feed x1</del>	<del>1</del>	
Drafting Tape		
<del>Brushes various sizes and shapes</del>		
4no Bar grips for securing straight edges/squares when drawing templates on zinc		
Safety knife		
Calculator		

## **MATERIALS, EQUIPMENT, AND TOOLS SUPPLIED BY EXPERTS**

- Measuring equipment for checking tolerances – 1 mm and 2 mm shims
- Lubricant

## **MATERIALS AND EQUIPMENT PROHIBITED IN THE SKILL AREA**

The use of the following machines, fixtures and materials is NOT allowed:

- Grinding and cutting machines;
- Handsaws;
- Rasps and file (only for templates);
- Grinding stones: it is not allowed to rub arises. However, sandpaper may be used to clean the surface of the letter piece;
- All red marker pens

The use of any kind of adhesive for attaching or re-attaching any material is not allowed.