



TECHNICAL DESCRIPTION  
**Jewellery**



world **skills**  
international

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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 15.04.10



Liam Corcoran  
Technical Committee Chair

## **1. INTRODUCTION**

### **1.1 Name and description of skill**

1.1.1 The name of the skill is [Jewellery](#).

1.1.2 Description of skill

[Jewellers fashion beautiful and durable jewellery out of precious metals for different types of customers. Jewellers work economically whilst maintaining quality. They are well organised and have plenty of initiative. Using the correct equipment and maintaining work safety is important.](#)

### **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**

#### Workshop management

Knowledge and understanding:

- Understand organisational requirements to undertake fabrication and operational activities
- Know procedures for checking serviceability of workshop tools and equipment
- Know procedures for storage of jewellery items

The Competitor shall be able to:

- Assess the separate tasks and operations necessary to the manufacture or repair of jewellery components and assembly of finished jewellery pieces.
- Interpret a workshop drawing of jewellery components or complete jewellery piece, including side views, cross-sections and sketches of details, and determine the following:
  - Time necessary to complete the project
  - Materials to be prepared
  - Equipment required

#### Preparation of precious metal alloys for the manufacture of jewellery components

Knowledge and understanding:

- Knowledge of precious metal types, applications and properties
- Understanding of common jewellery design features, constructions and finishes
- Understanding of metal preparation and fabrication techniques to suit different design requirements
- Knowledge of melting temperatures and preparation methods for melting applicable precious metals

The Competitor shall be able to:

- Laminate cast precious metal alloy ingots to a pre-determined sheet thickness using manual or electrically powered rolling mills.
- Mill cast precious metal alloy bars to a pre-determined square-wire gauge using manual or electrically powered rolling mills.
- Manufacture square or round wire to a pre-determined diameter/gauge using drawing bank and drawing plates.
- Manufacture *Chenier*/tube to a pre-determined diameter/gauge, from metal sheet of an appropriate size/thickness using drawing bank and drawing plates and precious metal solder.

#### Manufacture of precious metal alloys

Knowledge and understanding:

- Knowledge of precious metal alloy content.

The Competitor shall be able to:

- Calculate the proportions and quantities of fine precious metals and base metals required for a predetermined quantity of any recognised precious metal alloy.
- Cast precious metal alloy ingots and bars with a minimum of residual impurities, ready to be milled/rolled in preparation for the manufacture of jewellery components.

#### Manufacture of simple jewellery components

Knowledge and understanding:

- Knowledge of jewellery components
- Knowledge of techniques and methods for forming and finishing components

The Competitor shall be able to:

- Cut or saw precious metal sheet or wire to a required set of dimensions.
- Shape or bend precious metal sheet or wire to pre-determined shape as per a workshop drawing.
- Hammer, emboss, shape or dome precious metal sheet of an appropriate thickness into low relief, as per a workshop drawing, using appropriate doming and shaping tools.

#### Manufacture of complex components and complete jewellery pieces using solder joins

Knowledge and understanding:

- Knowledge of jewellery components
- Knowledge of techniques and methods for forming and finishing components

The Competitor shall be able to:

- Manufacture complex jewellery components (such as settings and mechanisms) by uniting two or more simple jewellery components using appropriate precious metal solders and by correct use of soldering torches.
- Manufacture complete jewellery pieces by adjusting and uniting two or more simple or complex jewellery components using appropriate precious metal solders and by correct use of soldering.
- Manufacture precious settings for precious gemstones, and should have necessary knowledge of gem-setting techniques.
- Manufacture mechanisms such as articulations, hinges, clasps and pressure snaps.

### Surface finish

Knowledge and understanding:

Knowledge of typical finishing and polishing methods and techniques

Understand the effect of different types and grades of polishing media on the surface finish

Understand procedures, tools and techniques to gain the optimum finish

Understand common surface imperfections/defects and the appropriate techniques to repair them

The Competitor shall be able to:

- Produce an unpolished surface finish as appropriate to be passed onto a jewellery polisher or gem-setter
- Correctly use ASA 600 sandpaper (American Standard) or equivalent

### Health and safety

Knowledge and understanding:

• Knowledge of operation and maintenance of machines and tools.

• Knowledge of risks in the use of natural and propane gas, electricity, acids and chemical products.

The Competitor shall be able to:

- Apply correct health and safety requirements and procedures.
- Use appropriate protective equipment and clothing as required.

## **2.2 Theoretical knowledge**

2.2.1 Theoretical knowledge is required but not tested explicitly.

- Interpretation of drawings, which include side views, cross-sections and sketches of details.
- Knowledge of the adequate processing of precious metals, their alloys and solders.
- Operation and maintenance of machines and tools.
- Knowledge of risks in the use of natural and propane gas, electricity, acids and chemical products.

2.2.2 Knowledge of rules and regulations is not examined.

## **2.3 Practical work**

- Making a piece of jewellery or several components in accordance with a technical drawing. Refer to Appendices for example of the drawings from WSC2009.
- Applying jewellery skills and manufacturing techniques
- Executing to the dimensions given
- Using only the material supplied

## **3. THE TEST PROJECT**

### **3.1 Format / structure of the Test Project**

The format of the Test Project is a single Test Project with separately assessed sub-projects or components.

### **3.2 Test Project design requirements**

Drawing must be available in at least JPG or PDF. For drawing projections refer to ISO 128, either first or third angle projection. Projections shall be on one sheet of A4 paper, scale 1:1, per module. If necessary, cross-sections and three dimensional representations may also be included.

In each module a minimum of one, and a maximum of five dimensions, must be clearly identified on the drawing for marking purposes.

Test Project proposals must include a full materials list, as well as marking forms - Objective Marking, Subjective Marking and Mark Summary.

### 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 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/modules are developed before the previous Competition.  
See also 3.6 Test Project selection below.

### 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 presenting an example of the completed Test Project proposal in metal](#).

### 3.6 Test Project selection

The Test Project is selected as follows:

- **At the previous Competition**  
Experts select five Test Project proposals from those submitted by Experts.
- The five Test Project proposals receiving the most votes will be immediately submitted to the WorldSkills International Secretariat and posted on the website for the next Competition.

#### **At the current Competition**

On arrival at the Competition, the Test Project for the Competition is selected by random draw from the five selected Test Project proposals.

### 3.7 Test Project circulation

The Test Project is circulated via WorldSkills International website as follows:

- Submitted to Secretariat at previous Competition for immediate circulation.

### 3.8 Test Project coordination (preparation for Competition)

Coordination of the Test Project will be undertaken by [the Chief Expert, Deputy Chief Expert and the nominated Expert from the Member country who's Test Project was selected](#).

### 3.9 Test Project change at the Competition

The selected Test Project must be changed by a minimum of 30% at the Competition.

[Any of the following alterations may be made to the selected Test Project at the Competition site in order to eliminate the possibility of any Competitor bringing ready-made components for evaluation.](#)

- Enlargement/reduction of **≤30%**, in a given XYZ axis, to the size of components or to the size of stone for which a setting is conceived, in the selected Test Project drawing.
- Enlargement/reduction of **≤30%** to the number of times a specific technical element is repeated (ex. Number of holes) in the selected Test Project drawing.
- Alteration of the shape of the stone for which a setting is conceived, maintaining its volume within **≤30%** of that defined in the selected Test Project drawing.
- Any alterations, including combinations of the above, which maintain the technical elements to be completed in the selected Test Project, and respect the general aesthetics, and which do not require an enlargement or reduction of the amount of metal to be provided, in excess of **30%**.

### **3.10 Material or manufacturer specifications**

Refer to 7.4 materials and equipment to be supplied in the skill area.

## **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	Similarity to drawing/ Function	20		20
B	Sawing - ajour work	20		20
C	Soldering	20		20
D	Surface finish	10		10
E	Dimensions		20	20
F	Piece completed on time		10	10
Total =		70	30	100

### 5.2 **Subjective marking**

Scores are awarded on a scale of 1 to 10.

### 5.3 **Skill assessment specification**

**Criterion A:** For **similarity to drawing**, the Experts will subjectively assess the degree to which the Competitor's work reflects the general shapes and proportions described in the Test Project drawing(s). For **function**, the Experts will subjectively assess the degree to which any mechanisms or clasps in the Competitor's work function correctly.

**Criterion B:** The Experts will subjectively assess detailed positions, shape's dimensions and internal surface finish of technical elements involving removal of metal (sawing, milling, drilling, filing etc) in the Competitor's work.

**Criterion C:** The Experts will subjectively assess the degree to which Competitors unite, by means of solder joints, components implicitly or specifically defined as touching in the Test Project drawing(s), without discoloration or incorrect application of solder.

**Criterion D:** The Experts will subjectively assess the degree to which the Competitor's work demonstrates a uniform, unpolished finish (equivalent to ASA 600 sandpaper finish. A sample piece of 18 kt gold will be displayed in the workshop area and clearly show the desired surface finish) without marks, scratches or discoloration on all surfaces not assessed for criterion B.

**Criterion E:** The Experts will objectively assess whether the Competitor's work respects clearly marked dimensions on the Test Project drawing, within defined tolerances.

**Criterion F:** The Experts will objectively assess whether the components and technical elements specified in the Test Project drawing(s) are present and connected to the others by means of at least one solder joint.

### 5.4 **Skill assessment procedures**

- The Experts that attend the Competition will be divided into marking groups to deal with each section of the marking criteria.
- If modular, every completed module/task/section will be marked on the same day in which it was completed.



- To ensure transparency, each Competitor is provided the same evaluation sheet as used by the Experts.
- Experts will maintain supervision of the Competitors during the Competition, but must not look at Competitors' work, or have any knowledge of progress.
- At the end of each day of the Competition, the incomplete test pieces shall be collected, by the Workshop Supervisor, in opaque boxes, sealed and signed, marked with the Competitor's workstation number and country code, and locked in a safe or strong cabinet. The key or combination to the safe or strong cabinet should be kept only by a neutral person, nominated by the Experts.
- At the end of each day of the Competition, photographs may be taken of all Competitors' metal, by a neutral person nominated by the Experts, to assure that no parts may be replaced or added. These photographs shall be kept in a safe or strong cabinet.
- At the end of each Competition module the test pieces for marking shall be sealed in opaque envelopes, inscribed with the Competitor's name, workstation number and country code.
- For marking, the test pieces will be anonymously labelled by 2 neutral persons (including the Workshop supervisor) and will be marked without the Experts having any knowledge of the Competitors' identity.

## 6. **SKILL-SPECIFIC SAFETY REQUIREMENTS**

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

Competitors must wear transparent eye protection when required.

## 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**

#### Toolbox Size

Toolboxes greater than 0.25m<sup>3</sup> will not be allowed within the workshop area during the Competition.

Non-consumable materials, equipment and tools to be supplied by the Competitor

Qty*	Description
1	Set of Hand files
1	Set of Needle-point files
1	Rounding hammer
1	Steel block
1	Saw frame
1	Set of Pliers
1	Marking tool
1	Square
1	Measuring rule
1	Compass, dividers
1	Bench pin
1	Soldering tweezers
1	Soldering torch
1	Soldering block
1	Clear protection glasses
1	Chisel/ scorpers/ graver
1	Scraper
1	Magnifying glass
1	Magnet

*Quantities specified are the minimum – Competitors may bring more than one.*

Consumable materials to be supplied by the Competitor

Qty	Description
1	Saw blades
1	Modelling clay
1	Soldering fluid/flux
1	Heat resistant paste
1	Set of sanding paper – assorted grit
1	Frazers/ milling cutters/ burrs
1	Drills assorted sizes
1	Plaster
1	Pumice-stone powder
1	Cleaning products
1	0.25 mm binding wire (60 cm)
1	1 mm copper sheet (15 cm x15 cm)
1	600 Emery Paper (American Standard) or equivalent / 20 sheets

*Quantities specified are the minimum – Competitors may bring more than one.*

Final Finishing Paper

Final finishing paper will be provided by the Host Country in addition to that brought by the Competitor. Two sheets of the sample finishing paper to be used in the Competition, will be sent to each Competitor by the Host 6 months prior to the Competition.

**7.3 Materials, equipment and tools supplied by Experts**

Not applicable

**7.4 Materials & equipment prohibited in the skill area**

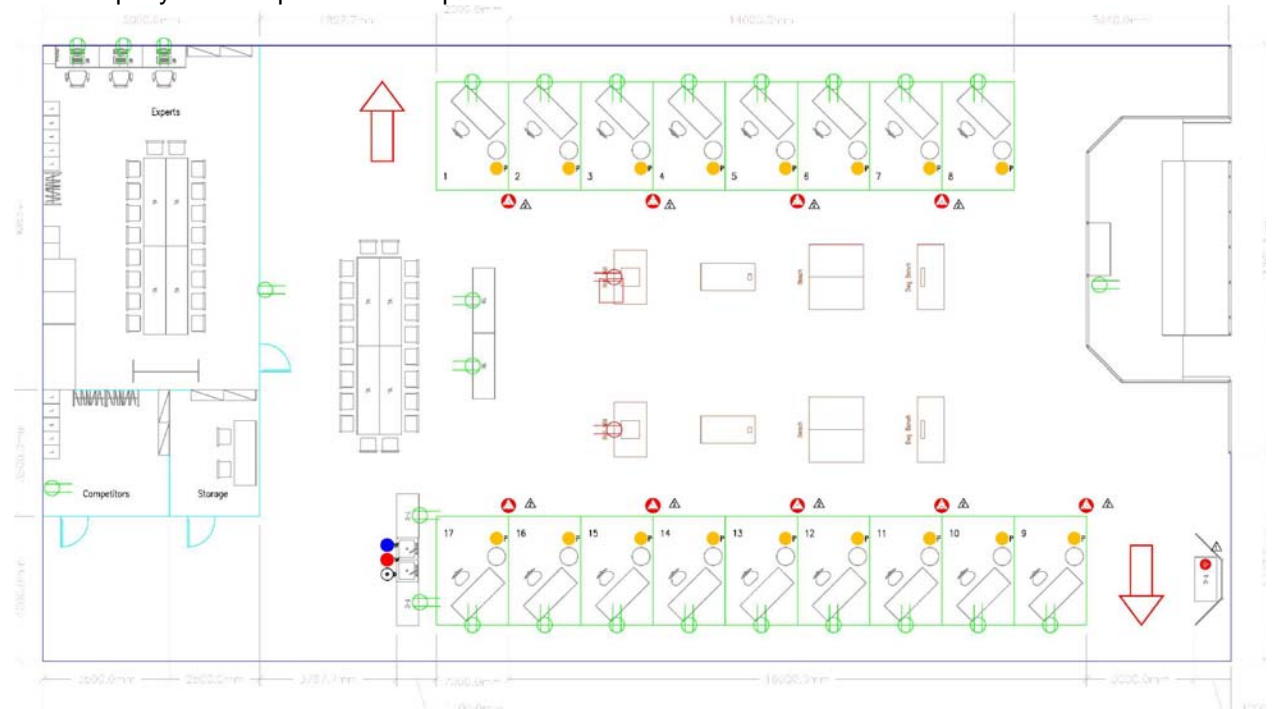
- Material used in the Test Project: au 750/00 (18kt) yellow or white gold and their solders.
- Tools pre-formed for the selected Test Project.
- Any yellow or white gold coloured metals.

**7.5 Sample workshop layouts**

Workshop layouts from Calgary are available at:

[http://www.worldskills.org/index.php?option=com\\_halls&Itemid=540](http://www.worldskills.org/index.php?option=com_halls&Itemid=540)

Workshop layout from previous Competition:



## 8. **MARKETING THE SKILL TO VISITORS AND MEDIA**

### 8.1 **Maximising visitor and media engagement**

To maximise visitor and media engagement for Jewellery the following ideas will be considered:

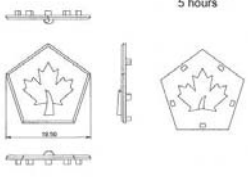
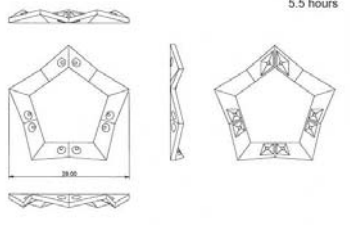
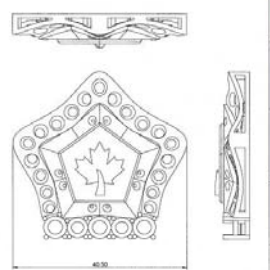
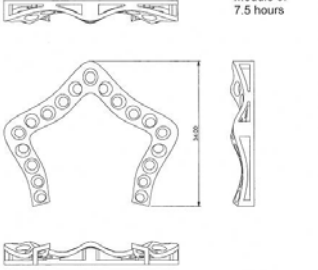
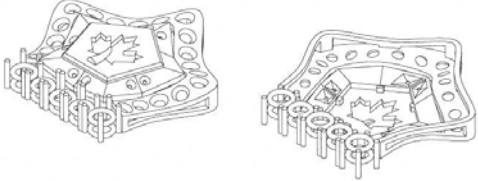
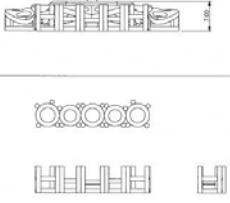



- Try a trade (benches with tools for visitors to try basic Jewellery techniques)
- “Competitor Cam” – a fixed camera on each Competitor’s workstation with a central viewing monitor
- Test Project descriptions
- Enhanced understanding of Competitor activity
- Competitor profiles – interests, training and education, eg duration of training
- Career opportunities – may differ for each member country
- Daily reporting of Competition status – progressive marking would allow for increased spectator interest
- Precious metal art history – an educational brochure detailing the history of jewellery manufacture and how this aligns with current industry practice, in particular, techniques that the competitors are currently using

### 8.2 **Sustainability**

- Recycling
- Use of ‘green’ materials
- Use of completed Test Projects after Competition

## 9. APPENDIX

### 9.1 Sample technical drawings

<p>Material: 18K AU (Y)          Sheet: 1.5 x 40 x 90          Round wire: <math>\odot</math> 1.0 x 250          Square wire: 1.0 x 1.0 x 180          Solder: Easy 1g          Medium 1g          Hard 1g</p>		<p>Module 1: 5 hours</p> 		<p>Module 2: 5.5 hours</p> 					
<p>Module 3: 7.5 hours</p> 		<p>All dimensions in millimeters</p>		<p>Module 4: Assembly 4 hours</p> 					
					<p>Test Project for the 40th WorldSkills Competition - Calgary, Canada 2009</p>			 <p>worldskills international</p>	
					<p>Skill: 27 - Jewellery</p>				
<p>Scale 1:1</p>		<p>Date: 2009</p>		<p>Paper: A4</p>					
<p>Drawn by: Kang Kau (Vincent) Kong</p>					<p>Drawing: TP27_40CA_01</p>				
<p>Description : 22h Test Project</p>					<p>Rev.</p>		<p>Page 1/1</p>		