



Australian Government

Department of Education, Employment and Workplace Relations

CUVOPA404A Cut opal spheres and beads

Release: 1

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Modification History

Version	Comments
CUVOPA404A	This version first released with <i>CUV11 Visual Arts, Craft and Design Training Package version 1.0</i>

Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to produce opal spheres and beads, including the selection of the rough opal through to the drilling and final polishing.

Application of the Unit

Those applying the skills and knowledge in this unit produce spheres and beads to industry standards in a workshop environment and use and maintain machinery as required.

Where appropriate the outcomes of this unit could be contextualised to apply to other gemstones.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Element	Performance Criteria
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.</i>

Elements and Performance Criteria

<p>1. Set up machinery and equipment</p>	<p>1.1 Set up <i>bead mill, sphere-making equipment and drills</i> to manufacturers' specifications</p> <p>1.2 Identify the <i>maintenance areas</i> and complete the required maintenance routine</p> <p>1.3 Investigate other methods of making spheres and beads if commercial equipment is not available</p>
<p>2. Select and pre-form material</p>	<p>2.1 Select <i>materials suitable for making spheres or beads</i></p> <p>2.2 Preform opal using saw or grinder to produce required shape</p> <p>2.3 Grind shape corners to establish rounded form</p>
<p>3. Produce opal bead</p>	<p>3.1 Fill holder template with pre-formed beads (range of shapes)</p> <p>3.2 Grind pre-formed beads in bead mill using #120 silicon carbide powder until they are rounded</p> <p>3.3 Change the holder template to a small size if necessary</p> <p>3.4 Remove faulty or broken opal from the bead mill</p> <p>3.5 Remove beads from the bead mill and clean</p>
<p>4. Drill beads</p>	<p>4.1 Select beads for drilling</p> <p>4.2 Place bead in bead vice, drill half way into the bead, turn over, check alignment and drill the other half ensuring a cut hole through the bead</p>
<p>5. Polish beads</p>	<p>5.1 Place cleaned beads in tumble polisher with increasingly fine <i>grinding medium</i></p> <p>5.2 Clean tumbler and beads at every change over</p> <p>5.3 Clean beads thoroughly after the final grind, place in the tumbler with <i>polishing medium</i> and tumble to a high lustre</p> <p>5.4 Clean finished beads thoroughly with water</p>
<p>6. Produce opal spheres</p>	<p>6.1 Select opals to make spheres and pre-form the spheres</p> <p>6.2 Grind the spheres in a sphere maker with water and increasingly fine grinding medium</p> <p>6.3 Clean spheres thoroughly at each change over</p> <p>6.4 Polish cleaned sphere with polishing medium and water using leather sphere cups to desired polish</p>

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- critical thinking and analytical skills to investigate other methods of making spheres and beads where commercial equipment isn't available
- planning and organising skills to organise required materials
- problem-solving skills to deal with contingencies
- numeracy skills to use numerical features of machinery
- technical skills to:
 - use appropriate machinery and equipment
 - select appropriate material for beads and spheres.

Required knowledge

- suitability of rough for production of beads and spheres, taking into account the level of wastage and cost
- equipment and consumables needed for the process
- industry standards for opal beads and spheres
- OHS issues related to machinery.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> • identify and safely use machinery and equipment to cut and polish opal beads and spheres to meet the requirements of industry.
Context of and specific resources for assessment	<p>Assessment must ensure access to:</p> <ul style="list-style-type: none"> • machinery, equipment and consumables required to produce opal beads and spheres.
Method of assessment	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> • observation of processes and procedures • oral and/or written questioning on underpinning knowledge and skills • evaluation of the finished product • review of portfolios of evidence • review of third-party workplace reports of on-the-job performance by candidate. <p>Assessment methods should closely reflect workplace demands (e.g. literacy) and the needs of particular groups (e.g. people with disabilities, and people who may have literacy or numeracy difficulties, such as speakers of languages other than English, remote communities and those with interrupted schooling).</p>
Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector workplace and job role is recommended.</p>

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<p><i>Bead mill, sphere making equipment and drills</i> may include:</p>	<ul style="list-style-type: none"> • Arrowhead Gemcraft (USA) Sphere Machine • E & J Adams Lapidary (USA) Sphere Machine • home-made equipment • Mahashi (Japan) Bead Mill • Richardson’s (USA) Sphere Machine.
<p><i>Maintenance areas</i> may include:</p>	<ul style="list-style-type: none"> • bead mill: <ul style="list-style-type: none"> • all bearings • all electrics • bead holders and wear factor • bottom rotating disc and wear factor • rubber pad on top rotating disc • sphere makers: <ul style="list-style-type: none"> • all electrics • assorted sphere cups • polishing pads • reduction boxes.
<p><i>Materials suitable for making spheres and beads</i> may include:</p>	<ul style="list-style-type: none"> • any opal material, taking into account a yield factor or recovery rate of only 10% to 15% from a given ounce of rough opal • beads of a variety of regular or free form shapes • spheres cut from any opal material, with consideration of yield factor.
<p><i>Grinding mediums</i> may include:</p>	<ul style="list-style-type: none"> • diamond powder #80 through to #1200 • silicon carbide grit #80 through to #1200.
<p><i>Polishing mediums</i> may include:</p>	<ul style="list-style-type: none"> • cerium or tin oxide • diamond powder #3000 through to #100,000.

Unit Sector(s)

Opal cutting and polishing