



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **PMAOPS752A Develop a decorative coating**

**Revision Number: 1**

## PMAOPS752A Develop a decorative coating

### Modification History

Not applicable.

### Unit Descriptor

|                        |                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <b>Unit descriptor</b> | <p>This competency covers the identification of the key requirements for the formulation and manufacture of decorative coatings and the transfer of customer needs into appropriate formulations.</p> <p>This competency would typically be required by a person with a technical background needing to acquire knowledge and skills in the surface coatings manufacture and applications area.</p> |
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### Application of the Unit

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <b>Application of the unit</b> | <p>This competency applies to technicians, senior technical officers, laboratory supervisors and research and development personnel requiring a firm foundation in the correct use of raw materials for surface coatings. It includes:</p> <ul style="list-style-type: none"><li>• formulating appropriate formulas for decorative coatings.</li><li>• identifying and recognising application methods.</li><li>• formulating to specified manufacturing parameters.</li><li>• developing formulas to appropriate manufacturing methods.</li><li>• ensuring that formulated products meet critical formulation parameters</li><li>• understanding the functional properties of raw materials and the chemistry of their mixtures</li><li>• cost variables</li><li>• identifying toxic/hazardous raw materials and their relevant use</li><li>• correctly selecting test procedures to ensure product conformance to required specification.</li></ul> |
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### Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

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| <b>Prerequisite units</b> |  |
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## Employability Skills Information

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| <b>Employability skills</b> | This unit contains employability skills. |
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## Elements and Performance Criteria Pre-Content

|                                                                   |                                                                                                                                                                                                                                                                                                                  |
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| Elements describe the essential outcomes of a unit of competency. | 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. |
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## Elements and Performance Criteria

| ELEMENT                                                      | PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Formulate a decorative coating.                           | <ul style="list-style-type: none"><li>1.1. Determine the effect on performance characteristics of formulation parameters.</li><li>1.2. Specify required quality control and performance tests</li><li>1.3. Recommend appropriate raw materials</li><li>1.4. Recommend appropriate raw material suppliers</li><li>1.5. Formulate a decorative coating to specified parameters.</li><li>1.6. Ensure laboratory formulations are converted to production scale.</li></ul> |
| 2. Specify the relationship of pigment/binder for a coating. | <ul style="list-style-type: none"><li>2.1. Define pigment/binder relationships and their impact on coating properties.</li><li>2.2. Calculate Pigment/Binder ratio, Pigment Volume Concentration (PVC)</li><li>2.3. Specify pigment/binder relationships appropriate for a coating.</li></ul>                                                                                                                                                                          |
| 3. Recommend a method of manufacture.                        | <ul style="list-style-type: none"><li>3.1. Identify critical formulation parameters and the effect on manufacturing characteristics for decorative coatings.</li><li>3.2. Determine dispersion, let down and mixing required.</li><li>3.3. Select the types of equipment required for coating manufacture</li><li>3.4. Recommend a method of manufacture.</li></ul>                                                                                                    |
| 4. Identify and control hazards.                             | <ul style="list-style-type: none"><li>4.1. Identify material hazards.</li><li>4.2. Identify regulatory requirements.</li><li>4.3. Identify other hazards from the manufacture of decorative coatings</li><li>4.4. Recommend appropriate hazard control.</li></ul>                                                                                                                                                                                                      |
| 5. Recommend a coating application method.                   | <ul style="list-style-type: none"><li>5.1. Distinguish between common decorative coating application methods</li><li>5.2. Recommend an application method for decorative coatings.</li></ul>                                                                                                                                                                                                                                                                           |

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

#### Required skills

This competency includes the following skills:

- analysis
- selection
- discrimination
- maths

#### Required knowledge

Competence in this unit includes the following knowledge:

- select appropriate raw materials and have knowledge of their chemistry
- select appropriate manufacturing equipment based on their principles of operation
- formulation parameters
- flow point curves
- MSDSs
- toxicity and other hazards of raw materials
- other OHS requirements
- maintenance of records to substantiate and justify chosen formulations
- the role of the formulator
- the function of raw materials
- selection of appropriate raw materials
- impact of differing raw material suppliers
- principles of dispersion, let down and mixing
- identify the different types of equipment used for coating manufacture
- establishment of the specification of the product to be formulated
- establishment of the manufacturing procedure that will convert the selected raw materials into the specified product on a production scale.

## Evidence Guide

### EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

#### Overview of assessment

Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.

Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Competence must be demonstrated in the ability to formulate an appropriate surface coating using correct raw materials. In particular:

- formulate a decorative coating to customer's requirement
- formulate to a cost benefit
- manufacture using appropriate equipment
- select appropriate test methods
- make recommendations to improve formula

#### Context of and specific resources for assessment

Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning

| <b>EVIDENCE GUIDE</b>                      |                                                                                                                                                                               |
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|                                            | behind the observable actions.                                                                                                                                                |
| <b>Method of assessment</b>                | In all plants it may be appropriate to assess this unit concurrently with other relevant units.                                                                               |
| <b>Guidance information for assessment</b> | Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed. |

## Range Statement

| <b>RANGE STATEMENT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p>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 italicized wording, if used in the Performance Criteria, is detailed below. Add any 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.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Codes of practice/ standards</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   | Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.                                                                                                                                                                                                                                                                                                           |
| <b>Context</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        | This competency applies to the practical techniques used by the formulator in the selection of raw materials and their correct combination to develop a new product for the decorative market.                                                                                                                                                                                                                                               |
| <b>Pigment/binder relationships</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>Pigment binder relationships include:</p> <ul style="list-style-type: none"> <li>• specific gravity</li> <li>• weight and volume solids</li> <li>• Pigment/Binder ratio</li> <li>• Pigment Volume Concentration (PVC)</li> </ul>                                                                                                                                                                                                          |
| <b>Application methods</b>                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>Application methods include:</p> <ul style="list-style-type: none"> <li>• brush</li> <li>• spray</li> <li>• roller.</li> </ul>                                                                                                                                                                                                                                                                                                            |
| <b>Procedures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>All operations are performed in accordance with procedures.</p> <p>Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:</p> <ul style="list-style-type: none"> <li>• manufacturing instructions</li> <li>• work instructions</li> <li>• batch cards</li> <li>• OHS procedures</li> <li>• test methods.</li> </ul> |
| <b>Problems</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Typical process and product problems may include:</p> <ul style="list-style-type: none"> <li>• incorrect equipment</li> <li>• incorrect raw materials</li> <li>• inadequate ventilation when manufacturing</li> <li>• inability to meet customer specifications</li> <li>• inadequate quality control tests</li> </ul>                                                                                                                    |

**RANGE STATEMENT**

|                                             |                                                                                                                                                                                                                                                                                                                                                               |
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| <b>Variables</b>                            | <p>Key variables to be monitored include:</p> <ul style="list-style-type: none"> <li>• substrates</li> <li>• physical properties</li> <li>• cost of raw materials</li> <li>• application methods</li> <li>• curing conditions</li> <li>• drying times</li> </ul>                                                                                              |
| <b>Health, safety and environment (HSE)</b> | <p>All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.</p> |

**Unit Sector(s)**

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| <b>Unit sector</b> | Operational/technical |
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**Competency field**

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| <b>Competency field</b> |  |
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**Co-requisite units**

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| <b>Co-requisite units</b> |  |  |
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