



Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS753A Develop a non-decorative coating or ink

Revision Number: 1

PMAOPS753A Develop a non-decorative coating or ink

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the identification of the key requirements for the formulation and manufacture of non-decorative coatings and the transfer of customer needs into appropriate formulations. 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.
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Application of the Unit

Application of the unit	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: • formulating appropriate formulas for decorative coatings. • identifying and recognising application methods. • formulating to specified manufacturing parameters. • developing formulas to appropriate manufacturing methods. • ensuring that formulated products meet critical formulation parameters • understanding the functional properties of raw materials and the chemistry of their mixtures • cost variables • identifying toxic/hazardous raw materials and their relevant use • correctly selecting test procedures to ensure product conformance to required specification.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
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Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

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.	1.1. Determine the effect on performance characteristics of formulation parameters. 1.2. Specify required quality control and performance tests 1.3. Recommend appropriate raw materials 1.4. Recommend appropriate raw material suppliers 1.5. Formulate an industrial coating/ink to specified parameters. 1.6. Ensure laboratory formulations are converted to production scale.
2. Specify the relationship of pigment/binder for a coating.	2.1. Define pigment/binder relationships and their impact on coating properties. 2.2. Calculate Pigment/Binder ratio, Pigment Volume Concentration (PVC) 2.3. Specify pigment/binder relationships appropriate for a coating.
3. Recommend a method of manufacture.	3.1. Identify critical formulation parameters and the effect on manufacturing characteristics for industrial coatings/inks. 3.2. Determine dispersion, let down and mixing required. 3.3. Select the types of equipment required for coating manufacture 3.4. Recommend a method of manufacture.
4. Identify and control hazards.	4.1. Identify material hazards. 4.2. Identify regulatory requirements. 4.3. Identify other hazards from the manufacture of non-decorative coatings/inks 4.4. Recommend appropriate hazard control.
5. Recommend a coating application method.	5.1. Distinguish between common non-decorative coating/ink application methods 5.2. Recommend an application method for non-decorative coatings/ink.

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
- automotive paints requirements
- inks formulation
- powder and marine coating formulation
- costs
- PVC and optical and mechanical properties
- 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 non-decorative coating to customer requirement
- formulate to a cost benefit
- manufacture using appropriate equipment
- selection of appropriate test methods
- makes 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

EVIDENCE GUIDE	
	behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	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

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 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.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Context	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 non-decorative market.
Pigment/binder relationships	Pigment binder relationships include: • specific gravity • weight and volume solids • Pigment/Binder ratio • Pigment Volume Concentration (PVC)
Application methods	Application methods include: • brush • spray • roller • dipping • curtain coating • print roll • ink jet/bubble.
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include: • manufacturing instructions • work instructions • batch cards • OHS procedures • test methods
Problems	Typical process and product problems may include: • incorrect equipment • incorrect raw materials

RANGE STATEMENT	
	• inadequate ventilation when manufacturing • unable to meet customer's specifications • inadequate quality control tests
Variables	Key variables to be monitored include: • substrates • physical properties • cost of raw materials • application methods • curing conditions • drying times
Health, safety and environment (HSE)	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.

Unit Sector(s)

Unit sector	Operational/technical
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		
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