



Australian Government

Department of Education, Employment and Workplace Relations

MEM26014A Adjust resin chemicals for current conditions

Release: 1

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Modification History

Release 1 New unit

Unit Descriptor

This unit of competency covers the knowledge of resin chemistry, particularly catalysis and resin curing, to make adjustments to the chemistry to suit current requirements caused by weather, job specifications or other factors. It also requires knowing the limits of these adjustments and having discussions with suppliers/manufacturers regarding resin chemistry.

Application of the Unit

This unit applies to situations where the fabricator has the ability to make limited modifications to the resin composition in order to make a better product. This unit includes knowing the limits that can be made to adjustments and also when no adjustments can be made.

This unit may cover existing products, repairs or the development of new products. Decisions regarding resin chemistry adjustment may typically be undertaken by an individual in liaison with relevant stakeholders or it may be undertaken by a team and will typically occur at the worksite.

Use of the adjusted chemistry will be part of a fabrication and may be undertaken by an individual or a team. It may be undertaken in a workshop or factory environment or in the field and may be used to manufacture new products, prototypes and samples, or to make repairs.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

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.

Elements and Performance Criteria

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| 1 | Identify current conditions impacting on resin chemistry | 1.1 | Identify variables for the chemistry of resin types |
| | | 1.2 | Identify impacts on resin chemistry of environmental changes |
| | | 1.3 | Observe current environmental conditions |
| | | 1.4 | Predict impact of current conditions on resin chemistry |
| 2 | Identify adjustments which may be made to meet current conditions | 2.1 | Determine impact on resin chemistry of changing resin composition |
| | | 2.2 | Select resin composition changes to counteract impact of current conditions |
| | | 2.3 | Compare selected composition changes with adjustments allowed by manufacturer of resin system |
| | | 2.4 | Select most appropriate resin composition changes |
| | | 2.5 | Identify alternative process changes to adjust for conditions |
| | | 2.6 | Fabricate a sample using the selected adjustment |
| | | 2.7 | Conduct/organise for relevant tests |
| | | 2.8 | Evaluate process evaluation test (PET) results |
| | | 2.9 | Review match of PET results with product requirements |
| | | 2.10 | Review resin composition changes |
| | | 2.11 | Take appropriate action |

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| 3 | Fabricate product using adjusted composition/ conditions | 3.1 | Identify and control hazards |
| | | 3.2 | Make any appropriate adjustments to the resin system recipe |
| | | 3.3 | Prepare materials, as required |
| | | 3.4 | Prepare tools and equipment, as required |
| | | 3.5 | Minimise waste |
| | | 3.6 | Review product compared to requirements |
| | | 3.7 | Review chemistry modification process |
| | | 3.8 | Identify areas for improvement and take appropriate actions |
| | | 3.9 | Complete any required documentation/reporting |

Required Skills and Knowledge

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

Required skills

Required skills include:

- mixing resins
- interpreting weather/environment characteristics
- interpreting catalyst temperature
- communicating with relevant personnel
- completing documentation
- reporting outcomes

Required knowledge

Required knowledge includes:

- summer/winter catalyst
- resin chemistry
- curing/cross linking chemistry
- basic chemistry of resin manufacture
- effects of temperature (workplace and materials), humidity, air flow (wind) and concentration
- effect of adjustments in the workplace (and why)
- adjustments available from supplier

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.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that the process and equipment be understood and that the importance of critical material properties, settings and readings is known. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in
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	implementing appropriate corrective action. Consistent performance should be demonstrated. In particular look to see that: • environmental conditions are correctly interpreted • impact on resin chemistry is understood • appropriate adjustments are made • the reasons for selecting the adjustments are sound • the product meets its required performance. Competence must be demonstrated in the operation of all ancillary equipment to the level required for this unit of competency.
Context of and specific resources for assessment	Assessment will require the adjusting of resin chemistry to meet particular requirements, the justification of those changes and making products with the adjusted chemistry. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.
Method of assessment	A single assessment event is not appropriate. On-the-job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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.

Procedures	Procedures may be written, verbal, computer-based or in some other form, and may include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government regulations
Resin chemistry	Resin chemistry includes: • process of curing/cross linking of resins • rate of cure and change of properties over cure time • changes in viscosity and other flow properties during progress of cure • final properties of resin post-cure
Environmental changes	Environmental changes may include: • temperature • humidity • air flow/wind • solar/ultraviolet (UV) insolation
Resin composition	Resin composition includes: • resin/catalyst ratio • resin/promoter ratio • resin/catalyst/promoter ratios • changing temperature of resin components (e.g. using chilled catalyst or resin) • ratios of other resin system components
Most appropriate resin composition	Most appropriate resin composition changes refers to

changes	those resin system changes which: • comply with product requirements • adjust for the current conditions • have greatest ease of use in manufacture • have best financial return • have greatest sustainability contribution
Appropriate action	Appropriate action may include, but is not limited to: • making any required changes to resin composition changes • deferring the fabrication until more suitable conditions prevail
Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment – which means that an enterprise needs to manage the impact of the business to ensure the survival of the physical environment • economic viability – efficiency, cost and waste reduction and competitiveness to support survival of the business • social sustainability – an enterprise needs to manage the impact of the business to ensure its continued survival within the community and the survival of the community, including occupational health and safety (OHS)
Alternative process changes	Alternative process changes may include: • controlling the environmental conditions • moving the timing of the job to when conditions are more favourable (e.g. at night) • moving the location of the job to where conditions are more favourable (e.g. in plant, different site and in shade)
Logs and reports	Logs and reports may include: • paper or electronic based • verbal reports • items found which require action
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility

	• following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person
Typical problems	Typical problems may include: • unusually hot/cold workplace/weather • extreme humidity • very tight/unusual specification of properties required of product • high/low air flow/wind
Health, safety and environment (HSE)	All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state/territory 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)

Composites

Custom Content Section

Not applicable.