Demonstrate knowledge of wool scouring technology

Level 4
Credits 6

Purpose This specialised unit standard is for people working in wool scouring or a related industry. People credited with this unit standard are able to describe the technology associated with wool scouring and the treatment of wool scouring by-products and wastes.

Subfield Textiles Manufacture
Domain Wool Scouring
Status Registered
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Accreditation Evaluation of documentation and visit by NZQA and industry.

Standard setting body (SSB) Competenz

Accreditation and Moderation Action Plan (AMAP) reference 0030
This AMAP can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Special notes

1 ITWO is International Wool Textile Organisation. ASTM is American Standard Test Method.

2 Information to support the learning required for this standard can be obtained from papers and articles published by AgResearch. These may be obtained from AgResearch at http://www.agresearch.co.nz.
Elements and performance criteria

Element 1

Demonstrate knowledge of aqueous scouring and detergents.

Performance criteria

1.1 Hard and soft water are described and compared in terms of origins, properties, and treatment.

1.2 Detergent types are described and compared in terms of chemical nature and selection for use and application.

Range non-ionic, ionic.

1.3 Detergent action is described in terms of emulsion formation.

1.4 Dirt removal from wool during wool scouring is described in terms of the mechanism and the importance of the squeeze press.

Element 2

Demonstrate knowledge of chemical treatments applied to wool during wool scouring.

Performance criteria

2.1 Chemical treatments carried out in a wool scour are described in terms of the reasons for treatment.

Range reduction bleaching, oxidation bleaching, insect resist, deodorising.

2.2 Reduction and oxidation bleaching are described and compared in terms of treatment method and advantages/disadvantages.

Range hydrogen peroxide, sodium metabisulphite.

2.3 pH and pH control is defined and described in terms of effects on wool, the scouring process, and chemical treatments.

2.4 Tests carried out during hydrogen peroxide bleaching are described according to test method.

Range pH test, permanganate titration.
Element 3

Demonstrate knowledge of the use of energy in wool scouring.

Performance criteria

3.1 Energy terms are defined according to standard definitions.
Range force, Newton, pressure, Pascal, work, energy, Joule.

3.2 Energy types used in wool scouring are described and compared in terms of source and use.
Range gas, oil, coal, electricity, lanolin, wood.

3.3 Energy management programmes are described in terms of aims and factors that will lead to success of such programmes.
Range aims – efficient energy use, identify losses, implement savings; factors – staff co-operation, funding, performance measurement, audits.

3.4 Energy conservation in wool scouring is described in terms of methods and reasons.
Range methods – heat recovery, insulation and covering, minimisation/elimination of steam/hot water leaks, dryer operation, energy supply system operation/maintenance, liquor and effluent control; reasons – environmental, financial.

3.5 Scouring liquor heat recovery is described in terms of methods and reasons.
Range methods – plate heat exchanger, shell and tube heat exchanger; reasons – environmental, financial.

3.6 Dryer exhaust air heat recovery is described in terms of methods and reasons.
Range methods – heat pipe, heat wheel; reasons – environmental, financial.

3.7 Electrical energy conservation techniques are described in terms of their function and operation.
Range power factor correction, motor sizing, load shedding, variable motor drives.
Element 4

Demonstrate knowledge of wool grease and wool grease recovery.

Performance criteria

4.1 Wool grease is described in terms of origin and nature.

4.2 Scouring liquor is described in terms of component phases.
   Range upper, middle, lower.

4.3 Wool grease recovery centrifuge is described in terms of function and operation.

4.4 Wool grease recovery stages are described in terms of the process and process requirements.
   Range primary, secondary, blending/bulk storage.

4.5 Acid treatment of wool grease is described in terms of the treatment method.

4.6 Wool grease derivatives are described in terms of their end-use.

Element 5

Demonstrate knowledge of wool scour effluent and effluent treatment.

Performance criteria

5.1 Wool scouring liquor is described in terms of its components.
   Range suint, wool grease, dirt.

5.2 Restrictions on discharge of scouring liquor are discussed in terms of environmental impact.
   Range environmental, effects on aquatic life.

5.3 Mechanisms by which water conditions are affected by scour pollutants are described.
   Range solids, detergents, nutrient materials, pH, heat.

5.4 Criteria used by local authorities for charging for effluent discharge are described.
   Range volume, Biochemical Oxygen Demand, Chemical Oxygen Demand, Total Dissolved Solids, Total Suspended Solids, temperature.
5.5 Biochemical Oxygen Demand and Chemical Oxygen Demand are defined according to standard definitions.

5.6 Primary effluent treatment equipment is described in terms of function and operation.

Range settling tanks, flocculation, wedge wire screen, centrifuging, heat recovery, hydrocyclone, decanting centrifuge.

5.7 Secondary and tertiary effluent treatment equipment and systems are described in terms of function and operation.

Range chemical destabilisation, flocculation, biological processes, ultra-filtration, evaporation, incineration.

Element 6

Demonstrate knowledge of instrumentation and control.

Performance criteria

6.1 Benefits obtained from applying control systems to wool scouring process are described.

Range productivity, quality, profitability.

6.2 Process control terms are defined and described in terms of a simple wool scour control loop.

Range process, process control, process variable, controlled variable, manipulated variable, load variable.

6.3 Types of process control are described and their applications in the wool scouring process are identified.

Range on-off, proportional, integral, derivative.

6.4 Control on wool scour variables is described in terms of function and method.

Range hopper level, feed rate, bowl temperature, liquor quality, flowback, bowl draw-off, Heavy Solids Tank discharge, liquor recycle and flowdown, hydrocyclone underflow, wool regain.
Element 7

Demonstrate knowledge of wool testing.

**Performance criteria**

7.1 Greasy wool sampling equipment is described in terms of function and operation.

Range core sampling, grab sampling.

7.2 Greasy and scoured wool tests are described in terms of the reason for each test and the significance of the results.

Range dry scoured wool yield, mineral/ash content, vegetable matter base, alcohol extractable, wool base, fibre diameter, insect resistance, regain, colour, Near-Infrared Reflectance Analysis (NIRA), length after carding, residual grease, bulk.

7.3 Yield calculation methods are described in terms of their use.


**Please note**

Providers must be accredited by NZQA, or an inter-institutional body with delegated authority for quality assurance, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

**Comments on this unit standard**

Please contact Competenz info@competenz.org.nz if you wish to suggest changes to the content of this unit standard.