

No. 1161

24 November 2006

**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

In accordance with regulation 24(c) of the Regulations of 28 March 1998, the Standards Generating Body (SGB) for

**Chemical Industries**

registered by Organising Field 06, Manufacturing, Engineering and Technology, publishes the following qualification and unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualification and unit standard. The qualification and unit standard can be accessed via the SAQA web-site at [www.saqqa.org.za](http://www.saqqa.org.za). Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the qualification and unit standards should reach SAQA at the address **below and no later than 23 December 2006**. All correspondence should be marked **Standards Setting – SGB for Chemical Industries** and addressed to

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## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

### QUALIFICATION:

#### *National Certificate: Manufacturing of Surface Coatings*

SAQA QUAL ID		QUALIFICATION TITLE	
57879		National Certificate: Manufacturing of Surface Coatings	
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
Chemical Industries SGB		6	
QUAL TYPE		ORGANISING FIELD DESCRIPTION	SUBFIELD
National Certificate		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	122	Level	Regular-Unit Stds Based

#### **PURPOSE AND RATIONALE OF THE QUALIFICATION**

Purpose:

A learner acquiring this qualification will be able to manufacture surface coatings and allied products that conform to required specifications in a safe and cost-effective manner.

The learner will also be able to coordinate team performance and perform trouble-shooting and maintenance functions associated with the manufacturing of the products and the equipment used.

In the context of this qualification surface coatings and allied products include paints, varnishes, inks, surface preparation products, pigments, speciality chemicals, and related products.

The qualification also provides the basis for further learning in quality assurance, production, supervision, technical support and productivity. Following declaration of competence against this qualification, learners will be in a position to participate directly in controlling and troubleshooting the production processes.

Rationale:

This qualification will enable the learner to develop through learning to apply physical science, process specific technology and related skills. It will also create an awareness of the environmental impact of manufacturing.

Research conducted across the Surface Coatings Sector indicates that there is no such qualification in South Africa. This qualification will fill a priority identified by the Chemical Industries SETA Sector Skills Plan.

This qualification provides the flexibility to articulate to other manufacturing activities within the Chemical industries, for example, the household and personal care, and Speciality Chemicals manufacturing and packaging environments. It can also be useful in other manufacturing and packaging environments, for example, in the Food and Beverage Sector.

The qualification provides learners with some grounding for starting up a small manufacturing business.

#### **RECOGNIZE PREVIOUS LEARNING?**

Y

#### **LEARNING ASSUMED TO BE IN PLACE**

It is assumed that learners are already competent in Communication and Mathematical Literacy at NQF Level 2.

### Recognition of prior learning

This qualification recognizes the knowledge, experience and expertise of operators who do not have formal qualifications aligned to this qualification. RPL assessment may be conducted for parts or all of this qualification, and shall be based on ETQA's RPL policy and guidelines.

### Access to the qualification

> Access to this qualification is open. However, it is preferable that learners have completed the National Certificate in Chemical Manufacturing Operations at NQF Level 2.

### **QUALIFICATION RULES**

- > All the fundamental unit standards totalling 38 credits are compulsory.
- > All the core unit standards totalling 70 credits are compulsory.
- > A further 14 credits must be selected from the elective components of the qualification, so that the learner completes a minimum of 122 credits.

### **EXIT LEVEL OUTCOMES**

1. Produce surface coatings and/or related products to specification.
2. Maintain health, safety and quality assurance practices in a manufacturing environment.
3. Apply basic economic and business principles.
4. Communicate orally and in writing in order to co-ordinate the activities of people and enhance their performance.

### **ASSOCIATED ASSESSMENT CRITERIA**

1.
  - > The chemistry and process technology of surface coatings is described and explained with examples.
  - > Surface coatings and/or related products are manufactured to specification, and within the timeframes recognized as good practice.
  - > Problems encountered during the manufacturing process are identified and resolved within the scope of the job, using process chemistry and related technology.
  - > Maintenance is carried out on the machinery and equipment in accordance with set specifications.
2.
  - > The importance and interactive role of safety with regard to employer, employee and applicable legislation is explained and applied in accordance with set standards.
  - > The quality assurance system and quality objectives, standards and elements are explained and applied in accordance with set standards.
3.
  - > Allocated resources are used in a cost-effective way with a view to improving productivity and profitability.
  - > Personal actions are justified in terms of their impact on profit and loss, and cash flow.
  - > Supply and demand of products manufactured are discussed with regards to their manufacture, distribution and market/customer needs.
4.
  - > Team performance is enhanced with the use of plans and methodologies, to meet company standards.
  - > Differences of opinion are mediated in a manner that reduces conflict, and focuses on the task at hand.
  - > Ongoing oral communication is clear and suitable for different workplace audiences.
  - > Written communication is clear and to the point, and meets organizational requirements.

### Integrated Assessment

For formative and summative assessment, the Assessor should look for opportunities to maximise integration of the various outcomes in the qualification. The final assessment must be based on a summative assessment guide. Such a guide needs to indicate how the assessor will assess different aspects of the performance and will include:

- > Observing (and listening to) the learner at work.
- > Asking questions and initiating short discussions to test understanding.
- > Looking at records, reports, logbooks, handover books, and other relevant workplace documentation.
- > Using simulation, where this is appropriate.
- > Speaking to and obtaining written evidence of competence from supervisors and managers.

The learner may choose in which languages/he wants to be assessed provided that it falls within the scope

of the assessor. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

The assessment process should cover the explicit tasks required for the qualification as well as the understanding of the concepts and principles that underpin the activities needed in order to manufacture surface coatings products, solve operating problems, understand safety legislation and quality principles, apply basic business and economic principles, and lead and co-ordinate people and activities.

Assessors need to ensure that the 12 principles of assessment have been met, and this includes the evaluation of evidence to verify that the learner has been performing consistently over a period of time.

### **INTERNATIONAL COMPARABILITY**

Benchmarking took into account the following:

- > Countries who have a Qualifications Framework, such as the United Kingdom (NVQ and SVQ), Australia and New Zealand.
- > Countries who are reputed to be leaders in manufacturing, such the United States of America and Canada.
- > SADEC countries, which are in geographical proximity to South Africa.
- > Countries who have shown significant progress in their manufacturing practices in the last five years, such as India, China and Malaysia.

In each of the countries considered, special attention was paid to Best Practices, and cognizance was taken of content of qualifications, entry requirements and vertical articulation options.

#### The United Kingdom

According to the Department of Trade and Industry, chemical manufacturing has one of the highest growth rates in comparison with other *manufacturing* industries. As in South Africa, the United Kingdom says that **88%** of employers report skills gaps because of new working practices, use of new technology, stricter regulation, and the need for increased productivity.

UK Qualifications that can be compared to the proposed National Certificate in Manufacturing of Surface Coatings, in terms of entry level and vertical articulation, are:

- > Certificate in Coatings Technology (TASC Sector Body) Qualification No. 100/2058/5
- > Producing Surface Coatings, NVQ Levels 2 and 3: Scheme No. 0776, where Level 2 is targeted at Operators and concentrates on technology and operations, and Level 3 at senior operator/team leaders, with a strong leadership component.
- > Process Operations (Chemical) Levels 1 (IDQ1016461) Level 2 (IDQ1019729) and Level 3 (IDQ1016463).
- > Performing manufacturing Operations Level 1 (IDQ1025204) and Level 2 (ID1025205).
- > Process manufacture (Chemicals) Level 2 (Q1026616) and Level 3 (Q1026617) - as above.

Each of the abovementioned qualifications focuses on process technology, and the theory and practice of manufacturing. In the case of the Surface Coatings-specific qualifications, learners are able to select modules related to the technology used in their own work places. There is also emphasis on working in teams, and on using hand tools to perform basic maintenance and changeovers on production machinery.

#### New Zealand

The New Zealand Qualifications Framework (NZQF) has registered the National Certificate in Materials Processing, Level 3 - Reference No. 1074. This qualification has a strand in paints. It is similar to the proposed qualification in terms of level, entry requirements, and competencies. The strand in paints has 14 compulsory credits and 33 elective credits, out of a total of 58 credits.

#### Australia

Surface Coatings Association Australia Inc. does not advertise courses, although seminars are held regularly and discuss new technological developments in the sub-sector. Several TAFE Colleges offer a Diploma at the equivalent of NQF Level 5.

#### The United States of America

The Manufacturing Skills Standards Council (MSSC) has researched and presented a set of manufacturing

skills with descriptors and performance indicators. These skills may be selected according to needs, and appear to reflect best practice in manufacturing, but do not specify Surface Coatings. The proposed qualification may be favourably compared to the list of manufacturing skills listed by the MSSC in terms of generic chemical technology, but not specifically in surface coatings.

Other courses found advertised on United States Professional Associations are limited to seminars or post graduate studies, and do not describe outcomes.

#### Canada

Seminars and short courses are offered through the various Surface Coatings and Allied Professional Institutes, and post-graduate studies were found. However, there was no equivalent of the proposed qualification on any Canadian website.

#### Europe

As Europe is known for its Best Practices, a search across a number of countries revealed professional Surface Coatings Associations and Institutes in Denmark, Belgium, France, Hungary, Poland and Greece, amongst others. Once again, short courses and seminars lead the way at Professional Development level, and Surface Coatings specific qualifications appear to be at Post Graduate level, for example: (Post Graduate) Diploma in Industrial Chemistry - Paint Technology/Surface Finishing Specialization: Greece.

#### Countries of the Southern African Development Community

A search for qualifications in the SADC countries has revealed little useful information. Most of the certifications appear to be based on short courses and occupational competence is not described, or linked to international professional Associations.

#### India and other Far East Countries

India is a prolific advertiser of Surface Coatings and related products. The country appears to use the City and Guilds qualifications at Operator Level (see United Kingdom above). There is one Post Graduate Diploma in Paint Coatings Technology from the Institute of Cheminformatics Studies, but only one out of six modules of the aforementioned diploma is dedicated to production and manufacturing technology.

#### Conclusions

An observation is that reviewed international qualifications are more generic in nature, and do not include components of problem-solving, basic maintenance and quality control. The UK qualifications concentrate on generic chemical process technology, with some insight in surface coatings, team work, and the operation of process equipment. New Zealand's qualification is similar to the SA Certificate because of its focus on surface coatings-specific processes as well as quality control and basic maintenance. All countries reviewed mentioned that professional skills needed to be developed against best practices.

### **ARTICULATION OPTIONS**

Horizontal articulation is possible with the following Level 3 qualifications:

- > National Certificate: Manufacturing of Household and Personal Care Products (undevelopment).
- > National Certificate: Food and Beverage Packaging Operations Level 3 ID: 57694.

Vertical articulation is possible with the following Level 4 qualifications:

- > Further Education and Training Certificate: Manufacturing and Assembly Operations Supervision Level 4 ID: 48915.
- > Further Education and Training Certificate: Laboratory Practice Level 4 (undevelopment).
- > Further Education and Training Certificate: Surface Coatings Technology Level 4 (undevelopment).

### **MODERATION OPTIONS**

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with an appropriate Education, Training, Quality Assurance (ETQA) Body or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Moderation of assessment will be overseen by the relevant ETQA or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQAs policies and guidelines for assessment and moderation.

> Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards as well as in the exit level outcomes described in the Qualification.

### CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the applicant needs:

- > To be registered as an assessor with the relevant ETQA.
- > To have a similar qualification at one level higher than the level of the qualification and a minimum of 12 months relevant experience.

### NOTES

N/A

### UNIT STANDARDS

(Note: A blank space after this line means that the qualification is not based on Unit Standards.)

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
core	13221 Perform routine maintenance	Level 2	8	Registered
core	14784 Apply sampling theory and practice in the chemical industry	Level 2	5	Registered
Core	243034 Demonstrate understanding of basic surface coatings technology and its applications	Level 2	10	Draft - Prep for P Comment
core	8000 Applying basic business principles	Level 3	9	Reregistered
core	14801 Solve operating problems using process chemistry and related technology	Level 3	10	Registered
core	113852 Apply occupational health, safety and environmental principles	Level 3	10	Registered
core	243011 Disperse powders in liquids in a batch process	Level 3	4	Draft - Prep for P Comment
core	242821 Identify responsibilities of a team leader in ensuring that organisational standards are met	Level 4	6	Recommended
Elective	116938 Use a Graphical User Interface (GUI)-based word processor to create and edit documents	Level 1	4	Registered
Elective	10252 Identify, inspect, use, maintain and care for engineering hand tools	Level 2	6	Reregistered
Elective	12202 Package products in a manual or semi-automated packaging operation	Level 2	6	Registered
Elective	12219 Select, use and care for engineering power tools	Level 2	6	Reregistered
Elective	14340 Maintain an existing information system in a business environment	Level 2	4	Reregistered
Elective	117924 Use a Graphical User Interface (GUI)-based word processor to format documents	Level 2	5	Registered
Elective	243021 Shift loads using lifting equipment	Level 2	4	Draft - Prep for P Comment
Elective	12319 Perform change overs in a production or packaging environment	Level 3	7	Reregistered
Elective	13234 Apply quality procedures	Level 3	8	Registered
Elective	116942 Use a GUI-based word processor to create merged documents	Level 3	3	Registered
Elective	119078 Use a GUI-based word processor to enhance a document through the use of tables and columns	Level 3	5	Registered
Elective	243012 Tint and match pigmented surface coatings	Level 3	10	Draft - Prep for P Comment
Elective	114600 Apply innovative thinking to the development of a small business	Level 4	4	Registered
Elective	117927 Use a Graphical User Interface (GUI)-based database application to solve a given problem	Level 4	6	Registered
Fundamental	7456 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5	Reregistered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Reregistered
Fundamental	9013 Describe, apply, analyse and calculate shape and motion in 2- and 3-dimensional space in different contexts	Level 3	4	Reregistered

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Fundamental	<b>13912</b> Apply knowledge of <b>self</b> and team in order to develop a plan to enhance team performance	Level 3	5	Reregistered
Fundamental	14106 Demonstrate understanding of real and <i>imaginary</i> numbers and real number systems	Level 3	2	Reregistered
Fundamental	<b>114952</b> Apply problem-solving techniques to make a decision or solve a problem in a real life context	Level 3	2	Registered
Fundamental	<b>119457</b> Interpret and <b>use</b> information from texts	Level 3	5	Registered
Fundamental	<b>119465</b> Write/present/sign <b>texts</b> for a <b>range</b> of communicative contexts	Level 3	5	Registered
Fundamental	<b>119467</b> Use language and communication in occupational learning programmes	Level 3	5	<b>Registered</b>

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## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

1

## Disperse powders in liquids in a batch process

SAQA US ID	UNIT STANDARD TITLE		
243011	Disperse powders in liquids in a batch process		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
Chemical Industries SGB	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	4	Level 3	Regular

**SPECIFIC OUTCOME 1**

Prepare to disperse.

**SPECIFIC OUTCOME 2**

Disperse powders.

**SPECIFIC OUTCOME 3**

Conduct dispersing support activities.





## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

<b>SAQA US ID</b>	<b>UNIT STANDARD TITLE</b>		
243012	Tint and match pigmented surface coatings		
<b>SGB NAME</b>		<b>ORGANISING FIELD ID</b>	<b>PROVIDER NAME</b>
Chemical Industries SGB		6	
<b>UNIT STANDARD TYPE</b>		<b>ORGANISING FIELD DESCRIPTION</b>	<b>SUBFIELD DESCRIPTION</b>
Regular		Manufacturing, Engineering and Technology	Engineering and Related Design
<b>ABET BAND</b>	<b>CREDITS</b>	<b>NQF LEVEL</b>	<b>UNIT STANDARD TYPE</b>
Undefined	10	Level 3	Regular

**SPECIFIC OUTCOME 2**

Prepare to tint.

**SPECIFIC OUTCOME 3**

Mix, tint, and match pigmented coatings.

**SPECIFIC OUTCOME 4**

Conduct tinting support activities.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

3

<b>SAQA US ID</b>	<b>UNIT STANDARD TITLE</b>		
243013	Apply in process quality control in the manufacturing of surface coatings products		
<b>SGB NAME</b>	<b>ORGANISING FIELD ID</b>	<b>PROVIDER NAME</b>	
Chemical Industries SGB	6		
<b>UNIT STANDARD TYPE</b>	<b>ORGANISING FIELD DESCRIPTION</b>	<b>SUBFIELD DESCRIPTION</b>	
Regular	Manufacturing, Engineering and Technology	Manufacturing and Assembly	
<b>ABET BAND</b>	<b>CREDITS</b>	<b>NQF LEVEL</b>	<b>UNIT STANDARD TYPE</b>
	8		

**SPECIFIC OUTCOME 1**

Prepare to conduct quality control testing.

**SPECIFIC OUTCOME 2**

Conduct quality control testing.

**SPECIFIC OUTCOME 3**

Conduct quality control support activities.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

4

## Shift loads using lifting equipment

SAQA US ID	UNIT STANDARD TITLE		
243021	Shift loads using lifting equipment		
SGB NAME	ORGANISING FIELD ID	PROVIDER NAME	
Chemical Industries SGB	6		
UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	4	Level 2	Regular

**SPECIFIC OUTCOME 1**

Select lifting equipment.

**SPECIFIC OUTCOME 2**

Prepare the selected lifting equipment for lifting, securing, transferring and positioning of loads.

**SPECIFIC OUTCOME 3**

Operate the selected lifting equipment.



## SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

5

<b>SAQA US ID</b>	<b>UNIT STANDARD TITLE</b>		
243034	Demonstrate understanding of basic surface coatings technology and its applications		
<b>SGB NAME</b>		<b>ORGANISING FIELD ID</b>	<b>PROVIDER NAME</b>
Chemical Industries SGB		6	
<b>UNIT STANDARD TYPE</b>		<b>ORGANISING FIELD DESCRIPTION</b>	<b>SUBFIELD DESCRIPTION</b>
Regular		Manufacturing, Engineering and Technology	Manufacturing and Assembly
<b>ABET BAND</b>	<b>CREDITS</b>	<b>NQF LEVEL</b>	<b>UNIT STANDARD TYPE</b>
Undefined	10	Level 2	Regular

**SPECIFIC OUTCOME 1**

Demonstrate knowledge of the basic principles of surface coatings technology.

**SPECIFIC OUTCOME 2**

Demonstrate knowledge of the processes in the manufacturing of surface coatings.

**SPECIFIC OUTCOME 3**

Demonstrate knowledge of the GMP principles applied in the manufacture of surface coatings.

**SPECIFIC OUTCOME 4**

Demonstrate knowledge of different types of surface coatings systems and substrates which are normally painted.

**SPECIFIC OUTCOME 5**

Demonstrate knowledge of the procedures and processes used in the preparation and painting of substrates.