

**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

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

Food

Registered by NSB 06, Manufacturing, Engineering and Technology, publishes the following unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the unit standard. The unit standard can be accessed via the SAQA web-site at www.saqa.org.za. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the unit standards should reach SAQA at the address ***below and no later than 26 April 2004***. All correspondence should be marked **Standards Setting – SGB for Food Manufacturing** and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY**National Diploma in Maintenance of High-speed Production Processes (Fast-moving Consumer Goods): NQF Level 5**

Field: Manufacturing, Engineering and Technology

Sub-field:

Level: 5

Credit: 308

Issue date:

Review date:

Rationale for the qualification:

There is an increased sophistication in the machinery and equipment used for high-speed production processes. The management of failure in such an environment presents opportunities for qualified artisans to pursue a career in maintenance beyond NQF level 4 or artisan level.

This qualification represents a further step in a career in the science and technology of maintenance as a discipline. This qualification forms the second stage of a qualification that begins with, and includes, the credits for the National Certificate in Maintenance of High-speed Production Processes (Fast-moving Consumer Goods) Level 5.

Purpose of the qualification:

Qualified maintenance personnel (artisans) in the past had few options in pursuing formal qualifications in their field. They had a choice between becoming technicians or following a general management route.

The purpose of this qualification is to describe the skills and knowledge required in what is becoming a new discipline: the science and technology of maintenance in the context of sophisticated, high-speed production lines.

The increased sophistication is reflected in:

- greater automation
- integrated lines that combine a range of processing operations, product handling and packaging
- combinations of mechanical, electrical and electronic components
- measurement, control and communication devices
- an in-depth understanding of the production or manufacturing processes and their impact on the maintenance processes

A failure in any part of the system can have severe implications in terms of reduced output, damage to product, wastage and possible injury. Consequences of such failure can include negative impacts on the health of workers and consumers and on the profitability and reputation of the company.

The process of managing failure has implications for the maintenance of such equipment and requires new sets of skills and knowledge, representing a shift away from hand skills to the skills required to analyse data in records and make recommendations, plan and implement specific maintenance programmes and install new or updated equipment.

This and the related qualification, the National Certificate in Maintenance of High-speed Production Processes (Fast-moving Consumer Goods), will act as a framework for providers, assessors and learners to plan, implement and measure the outcomes of suitable learning programmes, or the recognition of prior learning, in this new discipline.

The specific purpose of the qualification represents the skills and knowledge required by competent practitioners to:

Plan, initiate, implement and oversee strategies that:

- ensure high-speed production lines operate continuously at optimum efficiency
- introduce new technology, equipment and product lines

- ensure that maintenance staff and contractors perform effectively
- optimise, through continuous improvements, the maintenance process

This qualification can be obtained in the context of a variety of manufacturing operations for fast-moving consumer goods.

The two qualifications, the National Certificate and the National Diploma in Maintenance of High-speed Production Processes (Fast-moving Consumer Goods): NQF Level 5, are conceptualised as an integrated qualification, which together fulfil all the requirements for a National Diploma.

Learning assumed to be in place:

The credits and the related unit standards assume that the learner has already achieved the outcomes of the National Certificate in Maintenance of High-speed Production Processes (Fast-moving Consumer Goods): NQF Level 5.

Access to the qualification:

Open access.

This qualification series recognises skills, knowledge and values relevant to the workplace. It is designed for learners who:

- Have attended courses and then apply the knowledge and skills gained to activities in the workplace or
- Are already workers and have acquired the skills and knowledge without attending formal courses or
- Are part of a learnership programme which integrates structured learning and work experience

Exit level Outcomes:

The exit level outcomes for this qualification reflect a combination of specific outcomes and critical cross-field education and training outcomes. The way in which the critical outcomes have been advanced through the learning required for this qualification is embedded in the unit standards, ie how it is reflected and assessed in the context of the specific outcomes.

Exit level outcome 1

Implement a variety of maintenance strategies

Associated Assessment Criteria

- Implemented strategy results in measurable improvement

- Maintenance meets manufacturing objectives
- An understanding of maintenance methodologies and of processes, practices and procedures involved in implementing changes is demonstrated

Exit level outcome 2

Monitor, maintain and manage assets

Range:

Assets include tools, equipment, machinery, infrastructure

Associated Assessment Criteria

- Plant availability is maximised
- Optimal and efficient use is made of spares
- Optimal use is made of funds and resources within budgetary parameters
- An understanding of factors involved in decisions to repair or replace is demonstrated

Exit level outcome 3

Plan, implement and monitor multiple projects

Range:

Typical projects: install new line, upgrade equipment, implement product and size changeovers

Associated Assessment Criteria

- The intervention is successfully commissioned
- The project is completed on time and within budget
- Project-related documentation is completed, distributed and stored
- Issues and choices related to the planning, implementation and management of projects are explained and discussed

Exit level outcome 4

Introduce continuous improvement techniques and technologies

Associated Assessment Criteria

- The most appropriate solution is implemented
- The planned results are achieved
- The choice of techniques and technologies is justified

- Issues related to quality management and work engineering systems are explained and discussed

International comparability:

A search for similar qualifications elsewhere was made. This was done in three phases:

1. Reviewing qualifications on the New Zealand Qualifications Framework
2. Conducting a search on the world-wide web
3. Liaising with respondents in the international partner sites of local companies

No comparable qualifications were found. This is not surprising since it is a relatively new and emerging discipline. Some overseas respondents expressed an interest in such a qualification for their own use.

Integrated Assessment:

The integrated assessment must be based on a summative assessment guide. The guide must spell out how the assessor will assess different aspects of the performance and will include:

- Observing (and listening to) the learner at work, both in primary activities as well as in other interactions, or in relevant simulations
- Asking questions and initiating short discussions to test understanding
- Looking at records and reports, and evaluating projects included in a portfolio of evidence

The learner may choose in which language s/he wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be presented if pertinent to any of the exit level outcomes.

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 required for installation, repair and maintenance of high-speed and integrated production equipment. The assessment process should also establish how the learning process has advanced the critical outcomes.

Assessors should also evaluate evidence that the learner has been performing consistently over a period of time

Recognition of prior learning:

This qualification may be obtained through the process of RPL. The learner should be thoroughly briefed prior to the assessment and support should be provided to assist the learner in the process of developing a portfolio. While this is primarily a work-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the exit level outcomes.

Articulation possibilities:

This qualification has been designed and structured so that qualifying learners can move from one context to another. Employers or institutions should be able to evaluate the outcomes of this qualification against the needs of their context and structure top-up learning appropriately. Equally, holders of other qualifications may be evaluated against this qualification for the purpose of RPL.

Overview of the proposed qualifications pathway and articulation possibilities:

NQF level	Manufacturing	Maintenance		Engineering	
5		Diploma: Maintenance of high-speed production processes (FMCG) 240		Engineering Diplomas, mechanical, electrical...	
5	Various Manufacturing qualifications	Certificate: Maintenance of high-speed production processes (FMCG) 120		<i>Millwright?</i> ←←←	Mechatronics ←←←
4		'Fitting'	<i>Industrial Electrical Maintenance</i>	<i>Millwright</i> <i>t</i>	Mechatronics <i>s</i>
3		'Fitting'	<i>Industrial Electrical Maintenance</i>	<i>Millwright</i> <i>t</i>	Mechatronics <i>s</i>
2		'Fitting'	<i>Industrial Electrical Maintenance</i>	<i>Millwright</i> <i>t</i>	Mechatronics <i>s</i>
1	National Certificate in Manufacturing, Engineering and Related Activities: NQF 1				

'Fitting', Industrial Electrical Maintenance and Millwright represent either trade qualifications or appropriate National Certificates in Mechanical Engineering (Fitting) or (Fitting and Machining) or any others that may still be developed. Qualifications in italics represent existing trades that are currently being transformed into NQF qualifications. There is a possibility of an NQF 5 certificate qualification being developed for the millwright qualification pathway – hence this is followed by a question mark.

Moderation options:

Moderators for the qualification should be qualified and accredited with an appropriate ETQA.

To assure the quality of the assessment process, the moderation should cover the following:

- Assessor credentials
- The assessment instrument
- The assessment process

Criteria for registration of assessors:

The following criteria should be applied by the relevant ETQA:

1. Appropriate qualification in the field of maintenance science, with a minimum of 2 years' experience in a high-speed manufacturing environment. The subject matter expertise of the assessor can be established by recognition of prior learning.
2. Appropriate experience and understanding of assessment theory, processes and practices.
3. Good interpersonal skills and ability to balance the conflicting requirements of:
 - Maintaining national standards
 - The interests of the learner
 - The need for transformation and redressing the legacies of the past
 - *The cultural background and language of the learner.*
4. Registration as an assessor with a relevant ETQA.
5. Any other criteria required by a relevant ETQA.

NOTE: Since this a new field it may be some time before there are sufficient qualified assessors. The relevant ETQAs should allow interim arrangements to be made.

NATIONAL DIPLOMA IN MAINTENANCE OF HIGH-SPEED PRODUCTION PROCESSES (FAST-MOVING CONSUMER GOODS): NQF LEVEL 5

NLRD	Fundamental	L	C
	Communication		
10622	Conduct communication within a business environment	5	8
	Mathematics		
12675	Use mathematical and statistical techniques effectively as a rubber technologist contextualised for <i>Maintenance of High-speed Production Processes</i>	5	34
	Project management		
	Manage multiple installation and maintenance projects	5	9
	Total Fundamental		51
	Core		
	Maintenance		
	Plan, develop and implement a new maintenance strategy	5	44
	People interacting, leading and developing		
	Manage installation and maintenance contractors	5	16
	Business Relations		
	Monitor, maintain and manage high-speed production assets	5	25
	Total Core		85

		Elective		
	Maintenance			
13114	Install, test and maintain a complex computer integrated manufacturing system <i>if not selected for the Certificate qualification</i>	5		20
	Quality Assurance			
10144	Identify, suggest and implement corrective actions to improve quality <i>if not selected for the Certificate qualification</i>	4		6
	Business Relations			
9897	Manage inventory	5		3
	People interacting, leading and developing			
10147	Supervise a project team of a technical project to deliver project objectives	5		14
14710	Manage and develop the performance of work group members in fabrication activities <i>contextualised for Maintenance of High-speed Production Processes</i>	4		6
	Minimum elective credits required for qualification			12
	Credits from National Certificate Maintenance Of High-Speed Production Processes (Fast-Moving Consumer Goods)			160
	Total for qualification			308

**UNIT STANDARDS AND SPECIFIC OUTCOMES IN
NATIONAL DIPLOMA IN MAINTENANCE OF HIGH-SPEED PRODUCTION PROCESSES
(FAST-MOVING CONSUMER GOODS): NQF LEVEL 5**

UNIT STANDARDS ON NQF LEVEL 5

- Title 1:** Plan, develop and implement a new maintenance strategy
Title 2: Manage installation and maintenance contractors
Title 3: Monitor, maintain and manage high-speed production assets

Title 1: Manage multiple installation and maintenance projects

- Specific outcome 1.1: Demonstrate the use of methods and tools to plan, co-ordinate and monitor activities in multiple projects
- Specific outcome 1.2: Manage conflicting priorities, respond to issues and delays and optimise the use of resources
- Specific outcome 1.3: Schedule and co-ordinate the resources, activities and interactions of internal teams, contractors and manufacturing personnel who are affected by the projects
- Specific outcome 1.4: Collect information on progress, and compile and present reports on multiple projects to a variety of interested parties
- Specific outcome 1.5: Evaluate the effectiveness of the project implementation

Title 2: Plan, develop and implement a new maintenance strategy

- Specific outcome 2.1: Plan, implement and conduct the annual maintenance review
- Specific outcome 2.2: Develop, propose and obtain approval for appropriate changes to maintenance strategies
- Specific outcome 2.3: Plan and organise overall plan, schedules, documentation and changes to systems
- Specific outcome 2.4: Organise resources; brief, prepare and train maintenance personnel and pilot the new strategies
- Specific outcome 2.5: Obtain feedback and evaluate, modify and update roll out plans
- Specific outcome 2.6: Monitor roll out and evaluate, adjust and report impact of changes made

Title 3: Manage installation and maintenance contractors

- Specific outcome 3.1: Scope the work and develop specifications, tenders and selection criteria
- Specific outcome 3.2: Notify preferred suppliers and request quotations
- Specific outcome 3.3: Select the most suitable contractor, create the order and obtain authorisation
- Specific outcome 3.4: Verify that plant and safety inductions have been completed
- Specific outcome 3.5: Monitor the work and safety practices of the contractors and provide feedback
- Specific outcome 3.6: Resolve issues of non-compliance and poor performance by the contractors
- Specific outcome 3.7: Compile progress reports, verify completion of contract and authorise payments

Title 4: Monitor, maintain and manage high-speed production assets

- Specific outcome 4.1: Analyse equipment and spares reports; identify and investigate problem areas
- Specific outcome 4.2: Evaluate economic feasibility options and make recommendations on options and choices
- Specific outcome 4.3: Monitor changes in availability, reliability and operability of equipment
- Specific outcome 4.4: Compile reports on findings, make recommendations and present these to appropriate meetings
- Specific outcome 4.5: Maintain asset registers, develop budgets and monitor and report on expenditure

National Diploma in Maintenance of High-speed Production Processes (Fast-moving Consumer Goods): NQF Level 5											
NLRD	Fundamental		Core		Elective		L	C	NLRD	L	C
	Communication		Maintenance		Maintenance						
10622	5	8	Plan, develop and implement a new maintenance strategy		5	44	13114	5	20	Install, test and maintain a complex computer integrated manufacturing system if not selected for the Certificate qualification	
	Mathematics		People interacting, leading and developing							Quality Assurance	
12675	5	34	Manage installation and maintenance contractors		5	16	10144	4	6	Identify, suggest and implement corrective actions to improve quality if not selected for the Certificate qualification	
	Project management		Business Relations							Business Relations	
	5	9	Monitor, maintain and manage high-speed production assets		5	25	9897	5	3	Manage inventory	
										People interacting, leading and developing	
							10147	5	14	Supervise a project team of a technical project to deliver project objectives	
							14710	4	6	Manage and develop the performance of work group members in fabrication activities contextualised for Maintenance of High-speed Production Processes	
										Choice of additional unit standards suitable to the purpose of the qualification	
	Total Fundamental		Total Core							Elective credits required for qualification	
		51				85					12
										Credits from National Certificate in Maintenance Of High-Speed Production Processes (Fast-Moving Consumer Goods)	
										Total for qualification	
										308	