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Established in terms of Act 58 of 1995

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

Plastics Manufacturing

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

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualifications and unit standards. The qualifications unit standards 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 *17* March *2005*.** **All** correspondence should be marked **Standards Setting – SGB for Plastics Manufacturing** and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Plastics Manufacturing

SAQA QUAL ID	QUALIFICATION TITLE		
49450	National Certificate: Plastics Manufacturing		
SGB NAME		**NSB 06**	**PROVIDER NAME**
SGB Plastics Manufacturing		Manufacturing, Engineering and Technology	
QUAL TYPE		**FIELD**	**SUBFIELD**
National Certificate		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET SAND	**MINIMUM CREDITS**	**NQF LEVEL**	**QUALIFICATION CLASS**
Undefinod	123	Level 2	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

> The purpose of the qualification is to provide learners, education and training providers and employers with the standards and the range of learning required to satisfy the challenges of participating effectively in the plastics manufacturing industry.

> For those who have been in the workplace for a long time, this qualification can be used in the Recognition nf Prior Learning (RPL) process to assess and recognise workplace skills acquired without the benefit of formal education ut training.

> For the new entrant, this qualification describes the learning outcomes (the skills, knowledge and values) required to effectively participate in a structured workplace.
For education and training providers, this qualification provides guidance for the development of appropriate learning programmes. For employers, this qualification enables skills gaps to be identified and programmes to close skills gaps to be developed, and acts as an external benchmark for fulfilling the criteria of national and international quality standards such as ISO 9000:2000, ISO 14 000, VDA6.
This qualification recognises the skills, knowledge and values acquired by learners involved in monitoring high-volume plastics manufacturing processes and working in enterprises which use such processes.

> The chief skills that are recognised in this qualification are recognising and responding to changes that happen during the production process. This capability requires an understanding of quality requirements and of the conversion process. Hand skills play a small role in this qualification.
Qualified learners will also understand:
> The basics of how a business functions
> Their role in the business, ie in production and related activities
> How they are affected by legislation, regulations, agreements and policies related to their particular work environment.

With this understanding, learners will be able to participate in workplace activities.
Qualifying learners will also be able to relate what they see and experience to scientific and technological principles and concepts. They will also understand how they should operate within the legislative, safety and quality systems which govern their workplace.
What learners achieve in this qualification will also serve as a basis for further learning where they will engage more directly in the production processes.

This qualification can be obtained in the context of any volume plastics manufacturing process, eg
> Injection moulding
> Blow moulding
> Various kinds of extrusion

> Variations of thermoforming
> Rotational moulding
> Calendaring
> Compression and related moulding processes
> Reaction injection moulding
> Polymer composites fabrication processes such as pultrusion, filament winding and resin injection.
The volume production process also includes the regeneration of recycled materials and the manufacture of intermediate products such as sheet, profiles, compounds and master batches.

Rationale for the qualification:

The plastics manufacturing industry is characterized by sophisticated high-volume manufacturing processes operating in a competitive and challenging environment. The manufactured products have to respond to a wide variety of exacting customer and consumer requirements. In addition, the industry has to respond to competition from exports, export markets, on-going development of new products as the result of changing customer needs, and environmental issues.
This means that people working in the industry require a range of skills and knowledge to help them respond to the exacting quality, output, safety and environmental requirements and ongoing technical and commercial changes.
This is the first qualification in a series in a career path involving high-volume plastics manufacturing processes. This series of qualifications reflects the skills, knowledge and values required to participate effectively in the plastics manufacturing industry, whether in micro, small, medium or large operations.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

The credits and the related unit standards assume that the learner has a General Education and Training Certificate at NQF Level 1 in Manufacturing, Engineering and Related Activities.

If the learner does not already have such a qualification, learning in preparation for this qualification would have to include:
> NQF 1 mathematics and communication
> Hana skills, ie use of common tools
> Basic concepts of science and technology
The credits also assume that the learner will be working towards this qualification as part of a learning programme which integrates all the required unit standards.

Recognition of prior learning:

This qualification may be obtained through a 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. The guidelines for integrated assessment should be used to develop the RPL assessment process. As with integrated assessment, while this is primarily a workplace-based qualification and the evidsnce should come from the workplace, evidence from other areas of endeavour may be introduced if pertinent to any of the exit-level outcomes.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

1. Understand the manufacturing process and the quality requirements and recognise changes in the production process which will result in reduced levels of safety, health, quality or efficiency and respond to them.
2. Understand and use appropriate tools and equipment to:
> Make simple adjustments or changes to equipment and process
> Convey (move, lift) materials or products.
3. Work effectively with others, understand own role in the organisation and understand the purpose of the organisation in the economy of the country.

ASSOCIATED ASSESSMENT CRITERIA

I.

> Manufacture of scrap or faulty products is minimised
> Responses are appropriate to the nature of the change
> Changes and responses are reported accurately and clearly (orally or in writing)
> Can respond to questions and discuss issues related to the manufacturing process relevant to the outcomes

2.
> Adjustments or changes are appropriate
> Downtime is minimised
> No material or product is damaged or its quality compromised
> Quality, safety and environmental procedures are followed

3.
> Receives and acts on information or decisions
> Reports or passes on relevant information
> Responds to questions and discusses issues at the level of the qualification related to own role and purpose of the organisation

Integrated Assessment:

To achieve the aims of integrated assessment it is recommended that the assessor assesses all components of the learning for this qualification simultaneously and that credits are awarded for the unit standards during this assessment.
It is recommended that learning components (ie fundamental and core) are combined into assignments and projects which are then included in the portfolio of evidence. This will form the basis for the bulk of the assessment. The assessor can then focus on specific areas for further probing and verification.

The assessment process should:
> Cover both the explicit **tasks** required for the qualification as well ***as*** the understanding of the concepts and principles which underpin the activities and the manufacturing process
> Establish how the critical outcomes have been advanced by the learning process.

The integrated assessment must be based on a summative assessment guide. The guide will spell out how the assessor will assess different aspects of the perrorrnance and will include:
> Looking at records and reports in the portfolio and reviewing previous assessments
> Asking questions and initiating short discussions to test understanding
> Observing the learner at work (in the primary activity ***as*** well ***as*** in other interactions)

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 introduced if pertinent to any of the exit-level outcomes.
Assessors should also evaluate evidence that the learner has been psrforming consistently over a period of time.

INTERNATIONAL COMPARABILITY

The 2002 version of this series of qualifications was largely based on the qualifications developed by the Plastics Industry Training Board in 1995. These had been benchmarked against the German trade qualification Kunstoffformber/in in terms of duration, training content and occupational competency but had been broken down into three stages corresponding eventually to NQF levels 2, 3 and **4** which mapped to the three year duration of the apprenticeship. The German qualifications were chosen as a result of a survey of qualifications in the plastics industry in the early 1990s. The South African industry had, however, identified a need for one further NQF level which represented a further development of the occupational competencies (ie level 5).

The original German qualification was subsequently revised in 1997 and was extended by a further year and contained some of the elements contained in the NQF level 5 qualification. The German qualification is now called Kunststoffverfahrersmechaniker/in.

The German qualification has also subsequently become a benchmark for many other European countries, except the United Kingdom.

The NQF qualifications also broadly correspond to other occupational profiles in Germany which represent other skill sets related to plastics manufacturing (occupations not based on extended apprenticeships).
Table: a comparison between NQF levels, German occupational qualifications, and South African occupational titles.
NQF 5-Kunststoff-Kautschuktechiker/in-Process technician, Setter/supervisor
NQF 4-Kunststoffwarenmacher/in-Setter
NQF 3--
NQF 2-Kunststoffpresser/in or Kunststoffspritzer/in-Operator

The NQF level 3 represents a learning stage between NQF 2 and NQF 4 and does not map to a specific occupation or to a formal job designation in industry. Level 3 practitioners are variously referred to as 'senior operator' or 'trainee setter'.

A search for qualifications in other countries has revealed little useful information. While there are hints of qualifications in India and the mid- and far-eastern countries, very little concrete information can be obtained. India appears, in part, to be making use of NVQs from the United Kingdom. Most of the other certifications appear to be based on short courses and occupational competence is not described.

No evidence of African qualifications was found. There is some evidence of qualifications in South America (Brazil & Mexico) but there is no concrete information.

There are no formal national qualifications in the United States of America, but there is evidence of regional qualifications of the apprenticeship type and some voluntary qualifications from the major employer association. These have a skew towards engineering and machine maintenance rather than manufacturing processes. The SGS therefore used:
> The occupational profile generated by the Bureau of Labor Statistics within the **U.S.** Department of Labor for Machine Setters, Operators, and Tenders-Metal and Plastics
> The generic manufacturing skills standards produced by the Manufacturing Skills Standards Council.
> The National Certification in Plastics (NCP), the NCP Body of Knowledge (BOK) and the NCP Study Guide of the Society of Plastics Industry Inc, (SPI).
The SPI programme for operators is a voluntary certification programme.

The Canadian Plastics Sector Council commissioned a project in 2001 to develop occupational standards but there are no published results yet.

The qualifications were therefore compared to:
> NVQ/SVQ Levels 1, 2 and 3 and modern apprenticeship qualifications in the United Kingdom, Polymer Technology Higher National Certificate (STEC), National Certificate in Polymer Technology
> National Certificate in Plastics Processing Technology Levels 1 - 4 and National Certificate in Plzstics Engineering (Level **4)** both the unit standards and the modern apprenticeship (Plastics Process Technician and Plzstics Engineer)
> Certificate II, III in Plastics and Certificate IV in Polymer Technology and some of the training materials in Australia
> United States Manufacturing Skills Standards.

The comparison was done in the following ways:
> Entry requirements
> Duration
> Occupational profile, duties, responsibilities
> Course content or essential knowledge

Findings: There is an overall pattern to the occupational roles, the occupational levels and hence the qualifications, both those based on an apprenticeship and those based on assessment against competency standards. Each country has small areas that are different but by-and-large the levels, occupational roles and course content is similar. This is not surprising since the machinery and the processes are very similar around the world and so the demands on people would also be similar. What is interesting since the last comparison in 2001 is the constant review and continuous improvement in the level and quality of certifications exhibited. Increasingly sophisticated processes require higher-order skills and greater knowledge.

The South African qualifications correspond very closely to this overall pattern. The only exceptional areas were:
> NQF level 3: the qualification and some of the skills are not significantly reflected elsewhere - this is generally an invisible transition

> NQF level 5: The outcomes in this level of learning are beyond the normal qualification exit points, ie the level of those who have recently completed training - the South African qualification represents additional learning and experience and forms a transition to the national certificates or diplomas in polymer technology, generally offered by institutions of higher education in most countries
> Mathematics and communication: No other qualification elsewhere in the world requires the levels of communication and mathematics that are imposed on these qualifications by SAQA policies.

ARTICULATION OPTIONS

> The qualification has been designed and structured so that qualifying learners can move from one manufacturing context to another. They will have to acquire the specific knowledge related to the new context and adjust their skills and values accordingly.

> 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.

> Holders of other qualifications may be evaluated against this qualification for purpose of RPL and placement in learning programmes.

MODERATION OPTIONS

Moderators for the qualification should be qualified and accredited with an appropriate Education, Training Quality Assurance Body (ETQA) and have a qualification in manufacturing, preferably in plastics manufacturing.
To assure the quality of the assessment process, the moderation should cover one of more of the following:
> Assessor credentials
> The assessment instrument
> The assessment process (including preparation and post-assessment feedback)

CRITERIA FOR THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:
> Appropriate qualification in the field of plastics manufacturing at NQF Level 4.

> A minimum of 12 months' experience in a plastics manufacturing environment. The subject matter expertise of the assessor can be established by racognition of prior learning.

> Be active in the industry and be familiar with the materials, machinery, products and level of technology in which the learner has contextualised hislher skills and knowledge.

> Assessed successfully against a nationally recognised unit standard/s reflecting experience and understanding of assessment theory, processes and practices

> Good interpersonal skills and the 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
> An understanding of outcomes-based education and training methodologies and the principles and policies related to the National Qualifications Framework
> Registration as an assessor with a relevant ETQA.
> Any other criteria required by a relevant ETQA.

NOTES

This qualification replaces qualification 20888, "National Certificate: Plastics Manufacturing: NQF Level 2", 122 credits.

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	12466 Explain the individual's role within business	Level 2	4	Registered
core	13220 Keep the work area safe and productive	Level 2	8	Registered
Core	13258 Participate in work group activities	Level 2	4	Registered

Core	119139 Monitor the quality of the input materials and the manufactured plastic product	Level 2	12	Draft - Prep for P Comment
Core	119146 Prepare manufactured plastics product for the next stage or for storage	Level 2	10	Draft - Prep for P Comment
Core	119156 Respond to changes in plastics manufacturing processes	Level 2	8	Draft - Prep for P Comment
Core	119172 Use and care for services, tools and equipment required for plastics manufacturing	Level 2	12	Draft - Prep for P Comment
Elective	14445 Frame and implement an individual action plan to improve productivity within an omanisational unit	Level 1	3	Registered
Elective	9909 Identify and process waste	Level 2	4	Registered
Elective	12207 Operate moving equipment to stack, de-stack and position materials	Level 2	4	Registered
Elective	12483 Perform basic first aid	Level 2	4	Reregistered
Elective	12484 Perform basic fire fighting	Level 2	4	Reregistered
Elective	13202 Apply study and learning techniques	Level 2	3	Registered
Elective	13221 Perform routine maintenance	Level 2	8	Registered
Elective	14342 Manage time and work processes within a business environment	Level 2	4	Registered
Elective	114957 Contribute to the health, safety and security of a financial services workplace	Level 2	2	Registered
Fundamental	7469 Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	2	Reregistered
Fundamental	8963 Access and use information from texts	Level 2	5	Reregisterec
Fundamental	8964 Write for a defined context	Level 2	5	Reregistered
Fundamental	9007 Work with a range of patterns and functions and solve problems	Level 2	5	Reregistered
Fundamental	9008 Identify, describe, compare; classify, explore shape and motion in 2-and 3-dimensionalshapes in different contexts	Level 2	3	Reregistered
Fundamental	9009 Apply basic knowledge of statistics and probability to influence the use of data and procedures in order to investigate life related problems	Level 2	3	Reregistered
Fundamental	10718 Use a personal budget to manage own money	Level 2	3	Registered
Fundamental	12461 Communicate at work	Level 2	5	Registered
Fundamental	12463 Understand and deal with HIV/AIDS	Level 2	3	Registered
Fundamental	12465 Develop a learning plan and a portfolio for assessment	Level 2	6	Registersd
Fundamental	13217 Collect and use information	Level 2	5	Registered