No. 1242

2 November 2004

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

Pulp and Paper

Registered by NSB 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 <u>www.saqa.org.za</u>. 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 28 November 2004.** All correspondence should be marked **Standards Setting – SGB for Pulp and Paper** and addressed to

The Director: Standards Setting and Development SAQA Attention: Mr. D Mphuthing Postnet Suite 248 Private Bag X06 Waterkloof 0145 or faxed to 012 – 431-5144 e-mail: dmphuthing@saga.co.za

JOE SAMUELS DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate in Pulp and Paper Technology

SAQA QUAL ID	QUALIFICATION TITLE				
49079	National Certificate in Pulp and Paper Technology				
SGB NAME	SGB Pulp and Paper				
ABET BAND		PROVIDER NAME			
Undefined					
QUALIFICATION CODE		QUAL TYPE	SUBFIELD		
MET-5-National Certificate		National Certificate	Manufacturing and Assembly		
MINIMUM CREDITS		NQF LEVEL	QUALIFICATION CLASS		
145		Level 5	Regular-ELOAC		
SAQA DECISION NUMBER REGISTRATION START DATE REGISTRATION END DATE					

PURPOSE OF THE QUALIFICATION

The qualification will equip learners with knowledge and skills that are immediately relevant in the workplace. It will enable learners to achieve the competencies required to work safely and effectively in the pulp and paper industry.

Qualifying learners will have:

> A fundamental knowledge base of the main manufacturing processes encountered in pulp and paper manufacturing.

> An understanding of pulp and paper manufacturing as a system within a wider context and in relation to society.

> The ability to effectively apply essential methods, procedures and techniques associated with pulp and paper manufacturing.

> The ability to use knowledge to identify and solve well-defined problems within pulp and paper manufacturing

> Efficient information-gathering skills.

> The ability to communicate information coherently, using basic conventions of pulp and paper manufacturing reliably, in writing and verbally

> A fundamental knowledge base of mathematics, chemistry, physics, communications

and computer skills at NQF level 5 or equivalent.

> The ability to progress to higher qualifications involving pulp and paper technology.

Rationale of the qualification

Pulp and Paper manufacturing processes involve large-scale, high-performance primary processing that require competent operational staff to operate today's plant and equipment. In addition, equipment that will be installed in the future will be increasingly complex and automated. The industry therefore needs operational staff who can adapt to the future technology and who are at the same competence level as their global competitors. The skills required by operational staff are a combination of acquired knowledge, experience and the practised ability to read and respond to changes in the environment with appropriate actions and decisions to achieve a desired end-product.

This qualification is intended as an entry-level, Higher Education Qualification for the HET band of learners who work or intend to work in pulp and paper manufacturing. The integration of academic training, practical skills and technical pulp and paper knowledge, will enable learners to develop their skills and to equip themselves to follow a career in the pulp and paper industry.

Surveys conducted in the industry have revealed that the HIV/AIDS epidemic is likely to have a big impact on some mills. In addition the current work force is aging, and a significant proportion of the current experienced work force will be retiring in the next 10 years. There has also been a steady loss of skills due to emigration. In anticipation of future job requirements and the need to uplift the competence of the current operational staff, it is estimated that the number of new employees required will vary from between 100 to 200 per year.

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The learner will be able, with some further learning, to adapt the skills and knowledge to other fields, such as engineering. The qualification therefore supports the principle of portability within the manufacturing industry as a whole in South Africa and thus provides added value to the qualifying learner (increased employability) and to society and the economy (the creation of a pool of learners with basic technological knowledge and skills).

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

Mathematical skills and a sound understanding of basic scientific concepts are required for learners to understand process descriptions, physical phenomena, process equipment and variables, and product properties, therefore an FET Certificate at NQF level 4, with mathematics and physical science at NQF level 4, or equivalent, is required. Learners are assumed to be proficient in English and able to express themselves clearly and correctly both orally and in writing in English. In addition, a positive attitude in maintaining high standards of accuracy and technical skills is required.

If the learner does not meet these assumptions, this does not preclude the learner from the qualification. It will, however, require an increase in learning time.

Recognition of prior learning

By a process of recognition of prior learning, the leaner will be able to gain credits and thus this qualification may be achieved by a learner who has completed the required credits via a combination of formal education, other learning and relevant experience at appropriate levels, which comply with the capabilities defined for this qualification.

Assessment for the recognition of prior learning is, as for any assessment, subject to the following principles: > The application of NQF and credible assessment principles.

> The assessment being planned and designed on the basis of understanding the requirements of the part qualification or qualification that the learner is seeking credit for.

> Collection of different types of evidence and quality of evidence.

> The application of the correct assessment process and moderation requirements.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

1. The learner will have acquired a fundamental knowledge base of mathematics, chemistry and physics and be able to use science and technology effectively and critically to operate routine pulp and/or paper processes.

2. The learner will have acquired a fundamental knowledge base of the main manufacturing processes encountered in pulp and paper manufacturing.

3. The learner will have an understanding of pulp and paper processes as a system within a wider context, and knowledge of process flows, equipment, operating principles and process variables, associated with woodyard operations, cleaning and screening, stock preparation and mechanical pulping.

4. The learner will be able to communicate effectively both orally and in writing with a variety of audiences, using appropriate language structure, style and graphical support.

5. The learner will be able to organise and manage his/her activities responsibly and effectively when applying essential methods, procedures and techniques, whilst operating and monitoring pulp and/or paper equipment, according to workplace instructions.

ASSOCIATED ASSESSMENT CRITERIA

Evidence which shows that the learner has achieved the outcome:

1.

1.1 Mathematical skills are used to perform calculations. Range: Algebraic equations, trigonometry, calculus, co-ordinate and analytic geometry and matrices

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1.2 Formulae are correctly manipulated and defined problems are solved using scientific measurements.

1.3 Principles of chemistry and chemical phenomena are explained and used during pulp and paper operations.

Range: Matter; atomic structure; chemical bonding; gases, liquids and solids; chemical formulae and stoichiometry; rates of reactions; chemical equilibrium; solutions; oxidation and reduction; electrochemistry; introduction to organic and inorganic chemistry.

1.4 Chemistry experiments are conducted using prescribed laboratory procedures.

1.5 Principles of physics and phenomena of physics are explained and used during pulp and paper operations.

Range: Vectors; motion in a straight line, in two dimensions and uniform circular; rational kinematics; Newton's laws; work and energy; impulse and momentum; elasticity; hydrostatics; buoyancy; dynamic fluids; heat transfer; ideal gas law; laws of thermodynamics; waves; light; optics; electric forces and electric field; direct current circuits.

1.6 Physics experiments are conducted using prescribed laboratory procedures.

2.1 The history, future and basic business dynamics of the pulp and paper industry are described.

2.2 With regards to the pulp and paper industry, the following are discussed and explained:

> The origin, use and properties of raw materials.

> The support systems relevant to pulp and paper production.

> The origin and supply of water and power.

> Sampling practises in pulp and paper production.

> Standard operating procedures.

> Occupational health and safety.

2.3 Basic diagrams of the process flow in a typical pulp production process and a typical paper production process are drawn.

2.4 The main components for each phase of each process of a typical pulp and paper production process are discussed and explained.

Range: Purpose and function; inputs and outputs; equipment and chemicals used.

2.5 Specific pulp and paper processes are discussed and explained.

Range: Woodyard operations, mechanical pulping, chemical pulping, bleaching, chemical recovery, stock preparation, wet end, dry end, coating, winding, finishing.

3.

3.1 The purpose of the process and how it fits into the overall process is discussed and explained.

3.2 The technological basis of typical production processes is understood.

3.3 The process flow and equipment of typical production processes are discussed and explained.

3.4 The operating principles of typical production processes are discussed and explained

3.5 The quality requirements of typical production processes are discussed and explained

3.6 The process variables of typical production processes are discussed and explained.

3.7 The use of utilities in typical production processes is understood.

3.8 Safety, health and environmental procedures relevant to typical production processes are discussed and explained.

4

4.1 The correct technical terminology is used when discussing, describing and explaining manufacturing processes.

4.2 Flow charts and block diagrams are drawn, using operational symbols and representations correctly.

4.3 Information is gathered, organised and reported.□

4.4 Readings are taken and accurately entered on log sheets.

4.5 Appropriate computer technology is used to communicate information and ideas.

4.6 Oral communication is respectful, polite and showing concern for listener's comprehension.

5.

5.1 Work-place induction and operational safety training are successfully completed.

5.2 The company's safety, health and environmental procedures and objectives are understood and explained.

5.3 Plant and equipment are inspected and flow diagrams of plants and piping systems are produced, using the correct symbols and specifications.

5.4 Quality criteria for the proper operation of plant and equipment are explained and adhered to.

5.5 Readings are taken and the plant is monitored against standard operating conditions.

5.6 Consistent competence in operating machinery/equipment with due care for occupational and environmental safety is shown.

5.7 Well-defined problems, relating to routine operations are identified and solved. 49079

- 5.8 Housekeeping tasks are successfully carried out.
- 5.9 The ability to work effectively with others as a member of a team is demonstrated.

Integrated Assessment

Integrated assessment methods and tools for this qualification must allow the learner to demonstrate the acquired knowledge and the safe and efficient competencies required.

For summative assessment the tools include:

- > Written and/or oral tests to determine level of knowledge and
- > On-the-job observation to determine applied competence.

The tools used for formative assessment during the learning programme include:

- > Written tests
- > Oral testing
- > On-the-job observation
- > Role-play situations

For each learner a portfolio of evidence of all these assessments must be built up for record-keeping purposes. This portfolio may include, inter alia:

- > Production reports
- > Journals/logbooks, records of work performance.
- > Work samples
- > Supervisor and peer reports
- > Relevant awards or certificates.
- > Previous assessment records.

INTERNATIONAL COMPARABILITY

Pulp and paper industry vocational training programs in a number of European countries have been investigated. The following countries and programs, all of which are at the forefront of pulp and paper technology, have been evaluated:

> Sweden: Swedish Forest Industries Education and Training Centre: Certified Operator Training and University Vocational Technical program

- > Finland: South Carelia Polytechnic: Degree program in paper technology.
- > Austria: Austrian paper industry training centre: "Meister" training program.
- > Germany: German vocational training programs: Operator and "Meister" programs.

The above countries do not have a National Qualification Framework, but this qualification compares favourably to programs in Europe.

ARTICULATION OPTIONS

There is horizontal articulation with existing and future Certificates at NQF level 5 in an engineering or manufacturing discipline.

There is vertical articulation with National Diploma in Pulp and Paper Technology at NQF level 6.

MODERATION OPTIONS

> Anyone assessing a learner against this qualification must be appropriately accredited for the particular sub-field and hold a recognised qualification (at or above this level) in this sub-field and be registered as an assessor with the relevant ETQA.

> Any institution offering learning that will enable achievement of this qualification or will assess this qualification must be accredited as a provider with the relevant ETQA.

> Moderation of assessment will be overseen by the relevant ETQA according to its moderation guidelines and agreed procedures. Moderators must be accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors should keep the following general principles in mind when designing and conducting assessments:

> Special note of the need for integrated assessment should be taken.

> Evidence should be gathered across the entire range, wherever it applies. Assessment activities should be as close as possible to the real performance. Where simulations are used, there should be supporting evidence to show the learner is able to perform in the real situation.

> All assessments should be conducted in line with the following well documented principles of assessment as defined below:

> Appropriate: The method of assessment is suited to the performance being assessed.

> Fair: The method of assessment does not present any barriers to achievements, which are not related to the evidence.

> Manageable: The methods used make for easily arranged, cost-effective assessments that do not unduly interfere with learning.

> Integration into work or learning: Evidence collection is integrated into the work or learning process where this is appropriate and feasible.

> Valid: The assessment focuses on the requirements laid down i.e. the assessment is fit for purpose.

> Direct: The activities in the assessment mirror the conditions of actual performance as closely as possible.
> Authentic: The assessor is satisfied that the work being assessed is attributable to the learner being assessed.

> Sufficient: The evidence collected establishes that all criteria have been met and that performance to the required Standard can be repeated consistently.

> Systematic: Planning and recording is sufficiently rigorous to ensure that assessment is fair.

> Open: Learners can contribute to the planning and accumulation of evidence. Learners understand the assessment process and the criteria that apply.

> Consistent: The same assessor would make the same judgement again in similar circumstances. The judgement made is similar to the judgement that would be made by other assessors.

NOTES

N/A

UNIT STANDARDS

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