No. 1034 **21 October *2005***

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with regulation 24(c) of the National Standards Bodies Regulations of *28* March 1998, the South African Qualifications Authority, publishes the following qualification and unit standards for public comment:

Manufacturing and Assembly Processes

This notice contains the title, NQF level, credit, and purpose of the qualification and unit standards. The qualification and 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 qualification and unit standards should reach SAQA at the address **below *and no later than* 20 November 2005.** All correspondence should be marked **Standards Setting** and addressed to

The Director: Standards Setting and Development
SAQA
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ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

Further Education and Training Certificate: Optical Manufacturing Processes

SAQA QUAL ID	QUALIFICATION TITLE		
50040	Further Education and Training Certificate: Optical Manufacturing Processes		
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
SGB Manufacturing and Assembly Processes		6	
QUAL TYPE		ORGANISING FIELD DESCRIPTION	SUBFIELD
Further Ed and Training Cert		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	154	Level 4	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This qualification provides learners with access to such employment opportunities through providing them with the required applied competencies that are formalised and recognised in the optical manufacturing sector, and to remain nationally and internationally comparable. Through the achievement of this qualification qualified learners can contribute to this sector in fhe manufacturing of lenses and optical appliances. This qualification reflects the need of the sector to provide formal, recognised and registered qualifications and unit standards where this was not available previously. The qualification also provides the learner with the essential skills needed at a technical level and will facilitate a pathway for further learning and will give recognition for existing skills and knowledge. This qualification aims to promote professionalism and work ethics in the sector whilst providing portable skills into other areas and areas of specialisation. It provides learners with opportunities for further education and training at higher levels as well as continued professional development.

A person acquiring this qualification will be able to:

> Communicate effectively using a range of strategies to identify and solve optical manufacturing related problems.
> Use optical materials and instruments to manufacture lenses.
> Apply thin films and coating processes to ophthalmic lenses.
> Fit ophthalmic lenses and/or optical appliances into spectacle frames.
> Contribute to quality practices during optical manufacturing through tolerance and troubleshooting activities.
> Promote, implement and maintain procedures that support safety, health and the environment.

Rationale:

The current optometrist/technician ratio of 2:1 falls far short of the ideal of 1:3 resulting in the need for learners who are qualified and have the necessary applied competencies to operate as an optical technician. This growing demand for qualified, competent optical technicians is evident as a result of a number of important factors. Firstly, optical manufacturing has become a scarce skill. Secondly, the development and implementation of new technologies that have a current and future impact on the discipline. Thirdly, exploring the export potential of the discipline. Fourthly, the need to align this discipline with other related sectors thereby creating opportunities for portability and career opportunities for qualifying learners through improved employability.

The range of typical learners that will benefit from this qualification are ophthalmic/optical technicians, precision opticians and employees working behind the scenes that are responsible for surfacing, glazing,

coating and repair of lenses, repair and manufacture of spectacle frames; metrology, optical metrology; as well as those who apply mechanical knowledge of optical components and who work with optical materials and instruments, etc.

Since this optical discipline has not previously had formal qualifications or training, people who have worked in this field require validation by being given access to formal qualifications and standards. The qualification will therefore be able to affirm the experiences of optical technicians through the recognition of prior learning, credit accumulation and achievement of competencies.

The qualification aims at developing a competent and professional sector for the effective delivery of services. The applied competencies demonstrated within this qualification are essential for a positive impact on ophthalmic, social, economic and political transformation within the South African democracy.

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 3.

Recognition of prior learning:

The structure of this unit standards-based qualification makes the Recognition of Prior Learning possible. If the learner is able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this qualification the appropriate credits should be assigned to the learner. Recognition of Prior Learning will be done by means of Integrated Assessment.

This Recognition of Prior Learning may allow for:

> Accelerated access to further learning at this or higher levels on the NQF.
> Gaining of credits towards a unit standard.
> Obtaining of this Qualification in part or in whole.

Access to the Qualification

Open access bearing in mind learning assumed to be in place.

QUALIFICATION RULES

The Qualification is made up of *a* planned combination of learning outcomes that have a defined purpose and will provide qualifying learners with applied competence and a basis for further training. The Qualification is made up of unit standards that are classified as Fundamental, Core and Elective in achieving its purpose. A minimum of **154** credits is required to complete the Qualification.

In this Qualification the credits are allocated as follows:

> Fundamental: **56** credits - 36%
> Core: **78** credits - **51%**
> Electives (minimum): 20 credits - 13%
> Total: **154** credits - 100%

Note that **51%** of the credits, therefore, relate directly to optical manufacturing. The elective component allows the learner to select unit standards that are:

> Related to the work done by the learner **in** an organisation.
> Related to specialist areas in promoting optical manufacturing skills that the learner might be interested in.

This is to ensure that while there is a strong optical manufacturing practice focus, there is scope for learners to select additional unit standards that are relevant to their own situations and cement articulation **and** portability opportunities for the learner.

The elective unit standard category is open ended to allow the learner to choose the 20 credits associated

to the elective unit standards from any discipline that would add value to the purpose of the qualification or the learners own development on a learning pathway within the optical disciplines.

Motivation for number of credits assigned to fundamental, core and elective

Allocation of Fundamental credits:

Unit standards to the value of **20** credits in Communication in the First Language, **20** credits in Communication in the Second Language and 16 credits in Mathematical Literacy have been selected for the Fundamental component. These unit standards will add value to learners both socially and economically in terms of their ability to operate **as** literate and numerate workers in a global economy. **All** the Fundamental unit standards are compulsory.

Allocation of Core credits:

78 credits have been allocated to unit standards in the Core component of this qualification. This is to ensure that the qualification has a strong optical manufacturing focus. The unit standards classified **as** Core reflect the compulsory aspects in optical manufacturing that the learner needs to be fully competent in. The Core component covers competencies related to optical manufacturing, quality assurance, health and safety, administration, ethics and lifeskills. The unit standards provide the basic knowledge, values and skills that all learners require for optical manufacturing. They also encourage the application of that knowledge, values and skills in real situations. All Core unit standards are compulsory.

Allocation of Elective credits:

There are unit standards totalling **212** credits in **this** component. Learners are required to select electives totalling a minimum of 20 credits. It is intended that the selected electives should allow learners **to** develop alternative career paths; or gain additional skills and knowledge that relate directly to the work of the learner and which will enhance the learner's work performance or introduce a learner to areas of specialisation in the optical sector.

EXIT LEVEL OUTCOMES

Qualifying learners are able to:

1. Communicate effectively using a range of strategies to identify and solve optical manufacturing related problems.
2. Use optical materials and instruments to manufacture lenses.
3. Apply thin films and coating processes to ophthalmic lenses.
4. Fit ophthalmic lenses and/or optical appliances into spectacle frames.
5. Contribute to quality practices during optical manufacturing through tolerance and troubleshooting activities.
6. Promote, implement and maintain procedures that support safety, health and the environment.

ASSOCIATED ASSESSMENT CRITERIA

1.
> Verbal and non-verbal communication skills are used effectively in the work environment.
> Text and subtext of verbal and non-verbal communication is identified and interpreted correctly.
> Communication is used during the process of learning as an individual or in a group situation.
> Calculations and statistics are used correctly and accurately in managing an optical manufacturing process.
> A range of communication strategies are identified and utilised in solving optical related problems.

2.
> Lens types and materials are identified for selection purposes.
> Lens blank is selected in accordance with the prescription.
> Lens is layered out and surfaced to a prescribed specification.
> Optical lenses are cleaned and inspected in accordance with standard operating procedures.

3.
> Industrial hardening methods are used in coating processes.
> The required protection is applied against ultra-violet and infrared radiation.
> Tint and coating processes are applied to ophthalmic lenses.
> Surface reflection methods are applied during coating processes.

> Coating processes are quality assure in accordance with industry quality and safety standards.

4.
> The lens to be fitted is prepared in accordance with the requirements of the spectacle frame.
> The lens is fitted in accordance with shape and mounting of frame.
> The appropriate quality assurance measures are applied in accordance with industry quality and safety standards.

5.
> Knowledge and comprehension of optical manufacturing concepts and its effects on quality optical products and materials are applied according to manufacturing principles.
> Quality control practices are performed during optical manufacturing processes according to standard operating procedures.
> Quality assurance procedures are monitored and controlled according to standard operating procedures.
> Tolerance and troubleshooting activities are undertaken to ensure quality assurance procedures are followed.

6.
> Monitor the application of procedures to ensure personal safety, health and environmental protection according to the organisation's quality management and safety policy.
> Validate and verify data and specifications obtained during manufacturing procedures according to applicable legislation and company specifications.
> Monitor and control the quality system of prescription interpretation in accordance with the organisation's quality management policy.

Integrated assessment:

> Assessment practices must be open, transparent, fair, valid, and reliable and ensure that no learner is disadvantaged in any way whatsoever, so that an integrated approach to assessment is incorporated into the qualification.

> Learning, teaching and assessment are inextricably interwoven. Whenever possible, the assessment of knowledge, skills, attitudes and values shown in the unit standards should be integrated.

> Assessment of communication and mathematical literacy should be integrated as far as possible with other aspects and should use practical administration contexts wherever possible. A variety of methods must be used in assessment and tools and activities must be appropriate to the context in which the learner is working or will work. Where it is not possible to assess the learner in the workplace or on-the-job, simulations, case studies, role-plays and other similar techniques should be used to provide a context appropriate to the assessment.

> The term 'Integrated Assessment' implies that theoretical and practical components should be assessed together. During integrated assessments, the assessor should make use of a range of formative and summative assessment tools methods and assess combinations of practical, applied, foundational and reflective competencies.

> Assessors must assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

> Assessment should ensure that all specific outcomes, embedded knowledge and critical cross-field outcomes are evaluated in an integrated manner.

INTERNATIONAL COMPARABILITY

The qualification has been compared with the following similar ABDO (Association of British Dispensing Opticians) Training courses and qualifications offered in the United Kingdom and the USA.

> The Contact Lens Certificate covers anatomy, visual optics, and contact lens practice.
> The Dispensing Diploma is a three year course enabling the learners to use the title FBDO (Fellow of the Association of British Dispensing Opticians) and has been divided into first, second and third year levels of study.
> A range of dispensing revision courses cover anatomy and physiology, ophthalmic lenses, optics and visual optics.
> The Contact Lens Certificate (Advanced Course) has both the theoretical and practical examination at the end of the course and candidates use FDBOCL after their name or ABDO CL if thev hold a different optical

qualification to FBDO.

No such a qualification exists in Optical Manufacturing Processes in Africa and the relevant providers may adopt this qualification.

The qualification contains more mechanical competencies than clinical when compared with the above-mentioned qualifications. This is because the Further Education and Training Certificate in Optical Manufacturing Processes is a more specialised qualification aimed specifically for Optical Laboratory Technicians.

ARTICULATION OPTIONS

This Qualification articulates horizontally and vertically with the following proposed and registered Qualifications:

Horizontally:

> FETC in Mechanical Engineering: Tool Manufacturing
> FETC in Metrology

Vertically:

> National Certificate in Clinical Engineering: NQF Level 5
> National Diploma in Dispensing: NQF Level L6

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 ETQA's 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

Assessors registered with the relevant ETQA must carry out the assessment of candidates for any of the unit standards that make up this qualification. The following criteria are specified for an applicant to register as an assessor for this Qualification, the applicant should:

> Hold a similar qualification at NQF level 5 or above or equivalent.
> Be experienced in the fields of optical manufacturing for a minimum of number of 3 years.
> Be registered as an assessor with the relevant ETQA.

NOTES

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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	7791 Display cultural awareness in dealing with customers and colleagues	Level 4	4	Reregistered
core	10022 Comply with organisational ethics	Level 4	4	Reregistered

core	13224 Monitor the application of safety, health and environmental protectron procedures	Level 4	4	Registered
core	13235 Maintain the quality assurance system	Level 4	5	Registered
Core	110023 Present information in report format	Level 4	6	Registered
core	120262 Layout and surface a lens to a prescribed specification	Level 4	20	Draft - Prep for P Comment
core	120265 Select appropnate lens material and lens blank as prescribed	Level 4	10	Draft - Prep for P Comment
core	120267 Cut and fit lens according to frame shape	Level 4	7	Draft - Prep for P Comment
core	120269 Apply different lens treatments/Tinted and protective lenses	Level 4	18	Draft - Prep for P Comment
Elective	116714 Lead a team, plan, allocate and assess their work	Level 3	4	Registered
Elective	117877 Perform one-to-one training on the job	Level 3	4	Registered
Elective	9749 Quantify analyte concentrations in samples by means of X-Ray Fluorescence Spectrometry	Level 4	9	Reregistered
Elective	9905 Change and set tooling	Level 4	16	Reregistered
Elective	13254 Contribute to the implementation and maintenance of business processes	Level 4	10	Registered
Elective	13305 Produce complex comoonents using milling machines	Level 4	29	Registered
Elective	13314 Produce complex components using lathes	Level 4	20	Registered
Elective	13331 Diagnose and repair faults on tooling during the production run	Level 4	24	Registered
Elective	110009 Manage administration records	Level 4	4	Registered
Elective	114586 Manage finances of a new venture	Level 4	5	Registered
Elective	114591 Implement an action plan for business operations	Level 4	4	Registered
Elective	114600 Apply innovative thinking to the development of a small business	Level 4	4	Registered
Elective	9904 Coordinate work group to produce product	Level 5	8	Reregistered
Elective	10631 Demonstrate an understanding of manufacturing, principles, methodologies and processes	Level 5	7	Reregistered
Elective	12665 Control production and resource scheduling and planning in a manufacturing environment	Level 5	8	Reregistered
Elective	110464 Monitor the quality system in the laboratory	Level 5	8	Registered
Elective	115753 Conduct outcomes-based assessment	Level 5	15	Registered
Elective	117874 Guide learners about their learning. assessment and recognition opportunities	Level 5	6	Registered
Elective	10604 Manage skills, training and development within a team in a manufacturing unit	Level 6	8	Reregistered
Fundamental	8968 Accommodate audience and context needs in oral mmmunication	Level 3	5	Reregistered
Fundamental	8969 interpret and use information from texts	Level 3	5	Reregistered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Reregistered
Fundamental	8972 Interpreta variety of literary texts	Level 3	5	Reregistered
Fundamental	7468 Use mathematics to investigate and monitor the financial aspects of personal, business, national and internationalissues	Level 4	6	Reregistered
Fundamental	8974 Engage in sustained oral communication and evaluate spoken texts	Level 4	5	Reregistered
Fundamental	8975 Read analyse and respond to a variety of texts	Level 4	5	Reregistered
Fundamental	8976 Write for a wide range of contexts	Level 4	5	Reregistered
Fundamental	8979 Use language and communication in occupational learning programmes	Level 4	5	Reregistered
Fundamental	9015 Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	6	Reregistered
Fundamental	9016 Represent analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 4	4	Reregistered

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UNIT STANDARD:

Layout and surface a lens to a prescribed specification

SAQA US ID	*UNIT STANDARD TITLE*		
120262	Layout and surface a lens to a prescribed specification		
SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Manufacturing and Assembly Processes		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	20	Level 4	Regular

SPECIFIC OUTCOME 1

Identify, mark and centrate the vertex power of the lens.

SPECIFIC OUTCOME 2

Perform different surfacing processes.

SPECIFIC OUTCOME 3

Apply the appropriate quality assurance measures.

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UNIT STANDARD:

Select appropriate lens material and lens blank as prescribed

SAQA US ID	*UNIT STANDARD TITLE*
120265	Select appropriate lens material and lens blank as prescribed

SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Manufacturing and Assembly Processes		*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	10	Level 4	Regular

SPECIFIC OUTCOME 1

Interpret prescriptions by analysing the physical characteristics of ophthalmic lenses.

SPECIFIC OUTCOME 2

Select a lens blank appropriate for the prescription and type of frame fitting.

SPECIFIC OUTCOME 3

Calculate the lens power and lens thickness by using the appropriate formulas.

SAQA US ID	UNIT STANDARD TITLE		
120267	Cut and fit lens according to frame shape		
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
SGB Manufacturing and Assembly Processes		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	7	Level 4	Regular

SPECIFIC OUTCOME 1

Prepare the lens *to* be fitted into spectacle frame.

SPECIFIC OUTCOME 2

Fit lens in accordance with shape, mounting of frame.

SPECIFIC OUTCOME 3

Apply the appropriate quality assurance measures.

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UNIT STANDARD:

SAQA US ID	*UNIT STANDARD TITLE*		
120269	Apply different lens treatments/Tinted and protective lenses		
SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Manufacturing and Assembly Processes		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	**18**	Level **4**	Regular

SPECIFIC OUTCOME 1

Apply industrial hardening methods.

SPECIFIC OUTCOME 2

Apply the required protection against ultra-violet and infrared radiation.

SPECIFIC OUTCOME 3

Apply tint and coating processes to lenses.

SPECIFIC OUTCOME 4

Apply surface reflection methods.

SPECIFIC OUTCOME 5

Quality assure the coating processes.

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UNIT STANDARD:

SAQA US ID	*UNIT STANDARD TITLE*		
120270	Identify and select semi-finished lens material and blanks		
SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Manufacturing and Assembly Processes		6	
UNIT STANDARD		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPT*
Regular		Manufacturing, Engineering and Technology	Manufacturing and Assembly
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 4	Regular

SPECIFIC OUTCOME 1

Interpret prescriptions.

SPECIFIC OUTCOME 2 .

Identify and select appropriate lens blank to be used.

SPECIFIC OUTCOME 3

Calculate the lens power and thickness.