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GOVERNMENT NOTICE

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 722

10 July 2009



SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Retail & Wholesale

registered by Organising Field 11 - Services, publishes the following Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purposes of the Unit Standards. The full Unit Standards can be accessed via the SAQA web-site at www.saga.org.za. Copies may also be obtained from the Directorate for Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Unit Standards should reach SAQA at the address ***below and no later than 11 August 2009***. All correspondence should be marked **Standards Setting – Retail and Wholesale** addressed to

The Director: Standards Setting and Development
SAQA

Attention: Mr. E. Brown

Postnet Suite 248

Private Bag X06

Waterkloof

0145

or faxed to 012 – 431-5144

e-mail: ebrown@saqa.org.za

D. MPHUTHING

ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Explain the legal structures and requirements for a wholesale and retail business***

SAQA US ID	UNIT STANDARD TITLE		
335914	Explain the legal structures and requirements for a wholesale and retail business		
ORIGINATOR		PROVIDER	
SGB Retail and Wholesale			
FIELD		SUBFIELD	
11 - Services		Wholesale and Retail	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	5

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Explain the different legal structures relevant to the registration of a business.

SPECIFIC OUTCOME 2

Explain the obligations and consequences of entering into a legal contract.

SPECIFIC OUTCOME 3

Describe the legislation impacting on the wholesale and retail industry.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

None



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Schedule suppliers to deliver to a wholesale and retail unit

SAQA US ID	UNIT STANDARD TITLE		
335915	Schedule suppliers to deliver to a wholesale and retail unit		
ORIGINATOR		PROVIDER	
SGB Retail and Wholesale			
FIELD		SUBFIELD	
11 - Services		Wholesale and Retail	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	5

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Allocate delivery slots to suppliers.

SPECIFIC OUTCOME 2

Address defaulting suppliers.

SPECIFIC OUTCOME 3

Take action on defaulting suppliers.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

None



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Maintain product information

SAQA US ID	UNIT STANDARD TITLE		
335916	Maintain product information		
ORIGINATOR		PROVIDER	
SGB Retail and Wholesale			
FIELD		SUBFIELD	
11 - Services		Wholesale and Retail	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	4

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Explain sources of notice of change to product information in a Wholesale and Retail business.

SPECIFIC OUTCOME 2

Explain requirements for changing product information in the organisation.

SPECIFIC OUTCOME 3

Change information of stock.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

None



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Manage productivity in a Wholesale and Retail unit

SAQA US ID	UNIT STANDARD TITLE		
335917	Manage productivity in a Wholesale and Retail unit		
ORIGINATOR	PROVIDER		
SGB Retail and Wholesale			
FIELD	SUBFIELD		
11 - Services	Wholesale and Retail		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 5	8

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Identify productivity indicators in own area of responsibility in a Wholesale and Retail Unit.

SPECIFIC OUTCOME 2

Analyse productivity indicators in order to determine organisational progress.

SPECIFIC OUTCOME 3

Draft an implementation plan to improve productivity in a Wholesale and Retail Unit.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

None

**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

Manufacturing and Assembly Processes

registered by Organising Field 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 full Qualifications and Unit Standards can be accessed via the SAQA web-site at 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 Qualifications and Unit Standards should reach SAQA at the address below and **no later than 11 August 2009**. All correspondence should be marked **Standards Setting – SGB for Manufacturing and Assembly Processes** and addressed to

The Director: Standards Setting and Development
SAQA

Attention: Mr. E. Brown

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D. MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Automotive Components

SAQA QUAL ID		QUALIFICATION TITLE	
71950		National Certificate: Automotive Components	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National Certificate	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	123	Level 2	Regular-Unit Stds Based

This qualification does not replace any other qualification and is not replaced by another qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This Qualification is for any individual who is, or wishes to be, involved in an automotive components environment. The Qualification contains all the skills, knowledge, values and attitudes required by a learner who needs to be able to perform a range of activities within a specific automotive components environment to support the manufacture and assembly of automotive components. An individual acquiring this Qualification will be able to contribute towards the efficient operation of the manufacturing and assembling processes in the automotive components sector.

The main competencies in this qualification are operating and monitoring production machines, assembling or manufacturing components, reading and interpreting engineering drawings and performing handling and finishing operations, all within the ambit of health and safety legislation.

The Core component contains competencies covering, inter alia:

- Health, safety and environment legislation and procedures.
- The operation and monitoring of machines.
- Assembly and manufacture of components.
- Completion of finishing operations and dispatching of product.
- Use and care of tools and equipment.
- Reading and interpreting basic engineering drawings.
- Preparation of surfaces.

These competencies will enable the learner to work in different industries within the diverse automotive components sector.

Rationale

This is an entry level Qualification in a series of four automotive components qualifications that range from NQF Levels 2 to 5. Typical learners will be persons who are currently working in an automotive components environment who have not received any formal recognition for their

skills and knowledge or for anyone wishing to follow a career in an automotive components working environment, in a variety of contexts.

The learner will operate within either an automotive manufacturing or assembly environment. They will be able to operate machines, assemble or manufacture components, perform finishing operations, read and interpret engineering drawings and address issues of health and safety. Assembly involves either working on the assembly line at a motor assembly plant or in any environment in which already manufactured or finished components and products are assembled in a production line or process. Manufacturing occurs in an environment in which products, which will be used in an assembly environment, are made or manufactured using raw materials. The learner will also appreciate their role within the broader manufacturing/assembly environments in the automotive components sector.

The automotive components sector falls within the ambit of South Africa's large motor industry. There are huge motor assembly plants in several parts of the country, primarily in the Eastern Cape, Gauteng and Kwazulu Natal provinces. It's a sector that employs a large number of people. The automotive components sector covers two broad areas, namely, manufacturing and assembly. It is also a sector that comprises of a range of diverse but related industries and is characterised by sophisticated technological processes. Companies and/or industries within this sector operate in a global competitive and challenging environment. The products produced have to respond to a wide variety of customer requirements and safety, health, environmental, quality and risk management issues.

In terms of the learning pathway, this Qualification will allow this learner to progress from operating machines and assembling/manufacturing components at NQF Level 2 to adjusting machines performing first line maintenance by completing the National Certificate: Automotive Components at NQF Level 3 to setting-up production machines and changing and setting tooling by acquiring the Further Education and Training Certificate: Automotive Components at NQF Level 4 and to working in a coordinating and management capacity within an automotive components environment by completing the National Certificate: Automotive Components at NQF Level 5.

The highly developed automotive components sector is well-established and economically powerful. In terms of transformation in the country, learners will require skills and competencies to gain access to positions within management structures by completing other qualifications and training. It will be in the interest of the country and the sector to ensure that those who operate in the automotive components environment are trained according to this Qualification to improve productivity and efficiency.

This National Qualification and its related Unit Standards were developed to standardise the accreditation of learning programmes, resulting in improved quality management in terms of programme delivery.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED IN PLACE

Learners wishing to study towards this Qualification are assumed to be competent in:

- Mathematical Literacy at NQF Level 1.
- Communication at NQF Level 1.
- Engineering Science at NQF Level 1 or equivalent.

Recognition of Prior Learning:

This Qualification may be achieved in part (or whole) through the recognition of relevant prior knowledge and/or experience. The learner must be able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. As part of the provision of recognition of prior learning providers are required to develop a structured means for the assessment of individual learners against the Unit Standards of the Qualification on a case-by-case basis. A range of assessment tools and techniques during formative and summative assessment procedures should be used which have been jointly decided upon by the learner and the assessor. Such procedures, and the assessment of individual cases, are subject to moderation by independent assessors. The same principles that apply to assessment of this Qualification also apply to Recognition of Prior Learning (RPL).

Learners may provide evidence of prior learning for which they may receive credit towards the Unit Standards and/or the Qualification by means of portfolios or other forms of appropriate evidence as agreed to between the relevant provider and relevant ETQA or ETQA that has a Memorandum of Understanding in place with the relevant ETQA.

Recognition of Prior Learning is particularly important, as there are people in the automotive components sector with a variety of skills and competencies of differing quality and scope. It is important that an Recognition of Prior Learning process be available to assist in making sense of existing competencies and skills, and helping to standardise these competencies and skills towards a common standard.

Access to the Qualification:

There is an open access to this Qualification, keeping in mind the "Learning Assumed to be in Place".

QUALIFICATION RULES

The Qualification consists of a Fundamental, a Core and an Elective Component.

To be awarded the Qualification learners are required to obtain a minimum of 123 credits as detailed below.

Fundamental Component:

The Fundamental Component consists of Unit Standards in:

- Mathematical Literacy at NQF Level 2 to the value of 16 credits.
- Communication at NQF Level 2 to the value of 20 credits.

All Unit Standards in the Fundamental Component are compulsory.

Core Component:

The Core Component consists of Unit Standards to the value of 65 credits, all of which are compulsory.

Elective Component:

The Elective Component consists of Unit Standards that will impart a variety of competencies to the learner. Learners are to choose Elective Unit Standards totalling a minimum of 22 credits to attain a minimum of 123 credits for this Qualification.

EXIT LEVEL OUTCOMES

1. Operate and monitor machines in the automotive component or related environment.

- Outcome Range:

○ The automotive component environment includes both the manufacturing and assembly sectors. The sector has been specified, where applicable.

2. Assemble or manufacture components and perform finishing operations.

3. Demonstrate an understanding of Occupational Health, Safety and Environmental standards in the workplace.

Critical Cross-Field Outcomes:

Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made when:

- Engaging with problems related to assembly/manufacturing, surface preparation-related problems, post-production processes and finishing operations.
- Making minor adjustments to the assembly/manufacturing process.
- Recognising defective materials, products or components and managing them.
- Interpreting an engineering drawing.
- Differentiating between various concepts related to engineering drawings engaging with problems relating to marking off.
- Controlling of compliance to safety, health and environmental requirements in the workplace.
- Responding to a type of emergency.
- Determining unsafe/unserviceable tools and the corrective action to be taken.

Work effectively with others as a member of a team, group, organisation, community to:

- Assemble/manufacture components/products.
- Recognise defects and mark and remove the defective product.
- Ensure the efficient assembly/manufacturing of components.
- Perform post-production processes and finishing operations.
- Dispose of scrap materials and store surplus materials.
- Ensure that the quality of the work meets customer/client's satisfaction.
- Ensure safety of people and equipment and materials.
- Ensure that the operations run efficiently and problems are dealt with appropriately.
- Monitor, evaluate and remedy workplace safety, health and environmental practices in the workplace.

Organise and manage oneself and one's activities responsively and effectively when:

- Interpreting manufacturing/assembly schedules.
- Checking consumables, machine and tools.
- Engaging with assembly-related problems.
- Making minor adjustments to the assembly process.
- Recognising defective materials, products or components and managing them.
- Assembling/manufacturing components/products.
- Performing finishing operations.
- Interpreting an engineering drawing.
- Preparing for and performing surface preparation.
- Maintaining safety.
- Monitoring material flow and consumption of consumables and making adjustments.
- Dispatching products/components to customer or downline processes.
- Ensuring that all safety, health and environmental activities are in accordance with specific requirements.
- Responding to emergencies in the workplace.

Collect, analyse, organise and critically evaluate information to:

- Solve problems by making adjustments to machine before and during operation.
- Interpret information contained in engineering drawings.
- Assess the match between a drawing and a product/system/component/item.
- Solve assembly/manufacturing-related problems.
- Identify defective materials, products or components.
- Interpret information from production schedule to mark off materials.
- Ensure an efficient manufacturing/assembly process.
- Solve problems related to surface preparation, post production process operations.
- Control compliance to safety, health and environmental requirements in the workplace.
- Evaluate information which may be passed on to mutual aiders in the case of an emergency.

Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation to:

- Discuss job instructions/schedules.
- Record and report all relevant information pertaining to the assembly process.
- Clarify job instructions.
- Perform surface preparation activities as per standard operating procedure.
- Communicate effectively when recording and reporting deviations from specified requirements.
- Provide feedback on the progress and results of the safety, health and environmental management programmes.

Use science and technology effectively and critically, showing responsibility towards the environment and the health of others by:

- Using the equipment according to manufacturer's instructions.
- Adjust processes and procedures to suit different materials.

Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation to:

- Understand the impact of their or others' actions on health, safety, environment and productivity.
- Engage with deviations and changes during the manufacturing/assembly processes.
- Control the requirements for safety, health and environmental issues can have a negative impact on people, the organisation and the environment.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

- 1.1 Machines are prepared and operated according to standard operating procedures.
- 1.2 Machines are used in a manner that ensures the safety of all personnel in the automotive component or related environment.
- 1.3 Machines are monitored for deviations and minor adjustments are made to ensure efficient operation.
- 1.4 Consumables and materials required are checked according to quality assurance requirements.
- 1.5 Surfaces are prepared on material to be used in a manufacturing context.
- 1.6 Activities relevant to the manufacturing/assembly process are performed according to standard operating procedures.
- 1.7 Quality requirements are complied with according to standard operating procedures.

1.8 Mathematical principles and techniques are applied while performing the tasks related to manufacturing/assembly activities.

1.9 Oral and written communication is maintained and adapted as required to promote interaction, recording and reporting as per company requirements in an automotive component context.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Instructions and/or production schedules are interpreted and activities are planned to ensure correct sequence and efficiency.

2.2 Materials and consumables are monitored and used according to manufacturing and assembly schedules.

2.3 Products and components are assembled or manufactured according to job instructions and schedules.

2.4 Quality checks are conducted on incoming and finished materials, components and assembled products to ensure customer satisfaction.

2.5 Defective materials, products or components marked or removed from the production line are dealt with according to standard operating procedures.

2.6 Engineering and hand tools are selected, inspected, used and maintained according to standard operating procedure and company policy.

2.7 Finishing operations are performed according to standard operating procedures.

2.8 Completed components are dispatched according to standard operating procedure.

2.9 Mathematical calculations are utilised for the solution of common operational problems.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Occupational Health, Safety and Environmental principles are explained in accordance with workplace requirements.

3.2 The impact of risks and hazards are explained and preventative measures are applied in order to minimise risks or hazards in manufacturing and assembly activities.

3.3 Policies and procedures relevant to quality and risk management in the manufacturing or assembly environment are applied to eliminate or reduce danger and risk.

3.4 Emergencies arising from manufacturing or assembly operations are dealt with according to standard operating procedure.

Integrated Assessment:

The importance of integrated assessment is to confirm that the learner is able to demonstrate applied competence (practical, foundational and reflexive) and ensure that the purpose of this Qualification is achieved. Both formative and summative assessment methods and strategies are used to ensure that the Exit Level Outcomes and the purpose of the Qualification are achieved through achieving the Unit Standards. Learning, teaching and assessment are inextricably linked.

Learning and assessment should be integrated and assessment practices must be fair, transparent, valid and reliable. A variety of assessment strategies and approaches must be used. This could include tests, assignments, projects, demonstrations and/or any applicable method. Evidence of the acquisition of competencies must be demonstrated through the Unit Standards, which enhance the integration of theory and practice as deemed appropriate at this level.

Formative assessment is an on-going process which is used to assess the efficacy of the teaching and learning process. It is used to plan appropriate learning experiences to meet the learner's needs. Formative assessments can include a mix of simulated and actual (real) practice or authentic settings. Feedback from assessment informs both teaching and learning. If

the learner has met the assessment criteria of all the Unit Standards then s/he has achieved the Exit Level Outcomes of the Qualification.

Summative assessment is concerned with the judgement of the learning in relation to the Exit Level Outcomes of the Qualification. Such judgement must include integrated assessment(s) which test the learners' ability to integrate the larger body of knowledge, skills and attitudes, which are represented by the Exit Level Outcomes. Summative assessment can take the form of oral, written and practical examinations as agreed to by the relevant ETQA.

Integrated assessment must be designed to achieve the following:

- An integration of the achievement of the Exit Level Outcomes in a way that reflects a comprehensive approach to learning and shows that the purpose of the Qualification has been achieved. Judgement of learner performance to provide evidence of applied competence or capability.
- Assessors and moderators should make use of a range of formative and summative assessment methods. Assessors should 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 assessed. The assessment of the critical cross-field outcomes should be integrated with the assessment of specific outcomes and Embedded Knowledge.

INTERNATIONAL COMPARABILITY

The main competencies of this qualification are operating machinery, and assembling or manufacturing products for the automotive components industry.

Various car manufacturers like Daimler-Chrysler, Mazda, Honda, Toyota, Hyundai, Nissan, BMW, Nissan, VW and Ford, inter alia, were analysed to see what type of training takes place for those in assembly and in manufacturing. Little or no information could be found because most of the training for assembly lines takes place in-house, and the content of the training is not made readily available.

Car manufacturing countries like Japan, Korea, the United States, the United Kingdom, France and Germany were also checked and information was obtained from the following countries:

- Japan.
- Germany.
- Canada.
- New Zealand.
- Australia.
- United States.
- United Kingdom.

Japan:

The Toyota Tsusho Centre of Excellence (COE) is a Global Development Solution that offers a variety of courses in automotive assembly to prospective institutions. The courses pertinent to this Qualification include:

- Fitting.
- Fitting and Turning.
- Electrical.
- Safety, Health and Environmental Induction.

- Quality checking and Finishing of manufactured tyres.
- Quality checking of tyres and tyre components.
- Business Writing Skills.
- Time Management.

However, there are no details regarding the course contents and duration.

Germany:

The Daimler Automotive Academy Network is a global association of training centers that make available the core expertise in automobile production, thus making a valuable contribution to assisting local youth and providing support to underdeveloped regions.

The idea for the network originated in 1999, and the first training center was opened in Ulaan Baatar, Mongolia. Today, the network has accredited centers in Kabul (Afghanistan), Perm (Russia), and Kuwait, as well as more recently established centers in Hoedspruit (South Africa) and Beit Sahour (Palestine), both of which opened in 2007. The training centers offer courses in automotive repair, mechatronics, electronic systems, management, and marketing, some of which are combined with theoretical and practical internships in Stuttgart. Curricula are tailored to the conditions of each country, and the program's conceptual design focuses on ensuring that academy graduates are able to go to work immediately.

Canada:

A training organisation in Canada called Automated Learning offers training in electronic assembly within the automotive industry.

Participants successfully completing this course will be able to:

- Describe the overall circuit card assembly process.
- Identify the role of the operator in maintaining quality.
- Explain the function and use of process documents.
- Explain the differences between surface mount, through hole, and mixed technology assembly.
- Explain the key steps of surface mount assembly (SMA) including: paste print, component placement, re-flow, glue dispense and cure, inspection and rework. Explain the key steps of through hole assembly (THA) including; auto and hand component insertion, wave and hand soldering and inspection.
- Describe the main types of circuit card testing.
- Describe key processes supporting assembly including:
 - Component preparation and kitting for SMA.
 - Component preparation and kitting for THA.
 - Programmable device preparation.
 - Point of use inventory management.

New Zealand:

Regarding assembly the following Unit Standard from the New Zealand Qualifications Authority (NZQA) is applicable:

Title: Heat metal automotive components to aid disassembly and assembly in the motor and related industries, NQF Level 2, 2 Credits.

This Unit Standard is for people in the motor and related industries. People credited with this unit standard are able to prepare to heat metal automotive components, and carry out the heating operation on metal automotive components to aid disassembly and assembly. In this

unit standard metal automotive components include any metal mating components that have an interference fit. These include but are not limited to bearings, shafts, bushes, and casings.

Australia:

The Adelaide Training and Employment Centre (ATEC) offers training for a variety of machine operators. These are Engineering Production-Training options.

Production employees may set up and operate the following, which are applicable to this qualification:

- Stationary and mobile plants.
- Engines, boilers and like equipment.
- Foundry processes and automatic moulding equipment.
- Plastics extrusion, injection moulding, blow moulding and like equipment.
- Metal product machines.
- Packaging machines.
- Production welding processes.
- Electrical/electronic manufacturing.
- CNC machine processes.
- Other automotive, semi-automotive and single purpose machines e.g. coil winding machines, production lathes, multi spindle machines etc.
- Minor servicing and repair, and/or assembly of mechanical, fabrication and electrical equipment.

Entry to this field is mainly through a production apprenticeship; however other options are also available. This involves a Training Agreement between an employer and apprentice for at least 12 months. This gives both parties the chance to complete their chosen competencies. The apprenticeship is completed once it has been assessed and the minimum time requirements have been completed. Production apprenticeships are offered at three industry levels from Certificate I to III in Production Engineering.

Other institutions in Australia, SkillsTech Australia and Training Prospects TSA The Training Company Pty Ltd; Melbourne, Victorian Automobile Chamber of Commerce (VACC): Melbourne, Workplace Learning Initiatives Pty Ltd; Maribyrnong offer the Certificate II in Automotive Manufacturing. The Qualification corresponds significantly with this NQF Level 2 Qualification and forms part of the Automotive Manufacturing Training Package and provides general entry level training in the automotive manufacturing industry.

Subjects:

Monitor and maintain workplace environment; Receive and dispatch materials, equipment and tools; Prepare and process materials and components; Prepare and use/operate equipment, tools and/or machinery; Monitor and maintain continuous improvement of systems and processes; Monitor and maintain equipment, tools and machinery; Manage personal work priorities; Manage effective workplace relationships; Work effectively with others in a team. Manufacturing Stream: Body construction; Aluminium die casting; Foundry operations; Engine machining; Spray painting; Automotive plastics; Stamping and press operations; Fabrication hardware; Seat manufacture; Trim manufacture; Vehicle assembly; Warehousing; Engine assembly.

The qualification also overlaps significantly with the Certificate II in Automotive Manufacturing-Bus, Truck and Trailer offered by the Kangan Batman Institute of TAFE.

Subjects:

Contribute to workplace relationships and processes; Provide customer service; Inspect Work and Apply Company Technical Quality Standards; Read and interpret working drawings and work orders; Monitor and maintain workplace environment; Prepare and use/operate equipment, tools and/or machinery; Participate in improving workplace productivity. Common: Prepare materials for fabrication using jigs/fixtures; Conduct basic welding, thermal cutting, heating and gouging operations; Conduct mechanical cutting operations; Fabricate parts for sub-assemblies; Finish surfaces for painting; Paint chassis or panels; Assemble components.

United States:

Assembly workers in the US are trained on-the-job and there is a paucity of information about that kind of training.

The following information comes from the State of Michigan:

The most common method of becoming an Assembly Line Worker is to apply directly to employers. Contact local unions and local offices of Michigan Works for assistance.

Beginning Assembly Line Workers are usually trained on the job. Advancement opportunities are limited. A few Assemblers become inspectors or supervisors through experience, seniority, and/or additional training. Some Assemblers also advance to more skilled assembly jobs. Assembly Line Workers who take courses at technical or night schools may eventually advance to jobs as technicians or skilled trades workers.

The automotive industry uses on-the-job training for most of its workers. You can learn a semiskilled assembly job or a simpler machine operating job with a few weeks of training. For these jobs, employers generally require that you are in good health and are able to learn to do mechanical work.

To get a production or maintenance job requiring greater skill, you often need at least four years of job experience. Workers such as tool and die makers, pattern-makers, electricians, and maintenance mechanics learn their trade informally by serving as helpers to experienced workers, or they train in a formal apprenticeship program that takes three to four years to complete and combines classroom instruction with on-the-job training. Most apprenticeship programs require at least a high school degree.

Technical workers such as drafters and engineering aides are graduates of two-year technical schools. Technicians are also trained on the job. Automotive stylists attend an art institute or get a bachelor's degree in industrial design to prepare for their career.

Several colleges offer courses in automotive engineering. Many engineers and managers get this kind of specialized training. Others get a degree in mechanical or industrial engineering and are trained by the company. Some jobs require an advanced degree. Most auto companies help employees to qualify for better paying jobs by covering part or all of the cost of college courses related to the company's operations.

The Bureau of Labor Statistics gives the following information regarding those working in the automotive production process at this level:

These occupations account for about 64 percent of motor vehicle and parts manufacturing jobs. Assemblers and fabricators and metal workers and plastic workers put together various parts to form sub-assemblies, and then put the sub-assemblies together to build a complete motor vehicle. Most assemblers in this industry are team assemblers, who work in teams and perform a variety of tasks. Many manufacturing processes are highly automated; robots, computers, and programmable devices are an integral part of motor vehicle manufacturing.

Although robots perform most of the welding, welding, soldering, and brazing workers perform welds that are not easily automated and fix mistakes that occur during the manufacturing process. Grinding and polishing workers use hand tools or hand-held power tools to sand and polish metal surfaces; painting workers paint surfaces of motor vehicles; and sewing machine operators sew together pieces of material to form seat covers and other parts.

Opportunities for training and advancement vary considerably by occupation, plant size, and sector. Training programs in larger auto and light truck assembly plants usually are more extensive than those in smaller parts, truck trailer, and motor home factories. Production workers receive most of their training on the job or through more formal apprenticeship programs. Training normally takes from a few days to several months and may combine classroom with on-the-job training under the guidance of more experienced workers. Attaining the highest level of skill in some production jobs requires several years, however. Training often includes courses in health and safety, teamwork, and quality control. With advanced training and experience, production workers can advance to inspector jobs or to more skilled production, craft, operator, or repair jobs.

United Kingdom:

The focus of the National Vocational Qualifications Framework Qualifications at this level is on various aspects of the motor vehicle but not on assembly of vehicles nor on operating machinery as detailed in this qualification. The information below for the Level 2 BTEC Certificate in Engineering (Automotive) shows the emphasis.

Qualification structure:

- The units are all suitable for Engineering (Automotive). Individual learners could undertake any combination, but there are some natural groupings of the units.

The following units are all suitable for Maintenance and Repair, Fitting, Body and Paint and Motorsports groupings:

- Essential Working Practices in Vehicle Technology; Vehicle Electrical and Electronic Principles; Engineering Skills for Vehicle Repair; Vehicle Component Removal and Refitting Techniques; Vehicle Engine System Principles; Vehicle Science and Applied Mathematics.

The following units are both also suitable for Maintenance and Repair, Fitting and Body and Paint groupings:

- Vehicle Welding and Assembly Operations; Vehicle Valeting.

The following units are both also suitable for Maintenance and Repair, Fitting and Motorsports groupings:

- Vehicle Fault Diagnosis; Principles and Applications of Vehicle Electrical Systems and Components.

The following units are all also suitable for Maintenance and Repair and Fitting groupings:

- Routine Vehicle Maintenance; Vehicle Wheels, Tyres, Steering and Suspension Systems-Principles and Maintenance Systems.

The following units are only suitable for the Fitting grouping:

- Vehicle Fitting Operations-Brake Systems; Vehicle Fitting Operations-Exhaust Systems.

The following units are only suitable for the Body and Paint grouping:

- Non-welded, Non-structural Body Repair Processes; Vehicle Body Preparation and Application of Foundation Materials.

The following units are only suitable for the Motorsports grouping:

- Motorsport Vehicle Inspection; Stripping and Rebuilding Motorsport Engines (Pre-competition).

Unit Standards for this Qualification:

- Vehicle Electrical and Electronic Principles.
- Engineering Skills for Vehicle Repair.
- Vehicle Layout and Operation of Vehicle Systems.
- Vehicle Science and Applied Mathematics.
- Principles and Applications of Vehicle Electrical Systems and Components.
- Vehicle Fault Diagnosis.
- Routine Vehicle Maintenance.
- Vehicle Wheels, Tyres, Steering and Suspension Systems-Principles and Maintenance Systems.
- Vehicle Component Removal and Refitting Techniques.
- Vehicle Fitting Operations-Brake Systems.
- Vehicle Fitting Operations-Exhaust Systems.
- Vehicle Valeting.
- Non-welded, Non-structural Body Repair Processes.
- Vehicle Engine System Principles.
- Vehicle Body Preparation and Application of Foundation Materials.
- Vehicle Welding and Assembly Operations.
- Motorsport Vehicle Inspection.
- Stripping and Rebuilding Motorsport Engines (Pre-competition).
- Petrol Injection Systems for Spark Ignition Engines.

While there are some shared competencies, the focus of the UK qualification is on the vehicle's systems and not on the machines used in manufacturing or assembly of vehicles.

Conclusion:

Although the automotive component industry is one of the world's largest industries, information on training programmes, qualifications and courses for comparability purposes was not easy to find. In many cases, training is carried out at sites where manufacturing and assembly plants are located; and this happens to be in diverse countries.

However, the information obtained above reveals that training internationally is not as comprehensive as this qualification. In many countries, training constitutes short courses or on-the-job training. Details regarding the duration, level and intensity of the latter are not available. The courses/programmes identified above overlap with this qualification to varying degrees. It seems that the Qualifications from Canada and Australia bear the closest resemblance to this qualification.

ARTICULATION OPTIONS

This Qualification lends itself to both vertical and horizontal articulation possibilities.

Horizontal articulation is possible with the following Qualifications:

- ID 49402: National Certificate: Steel Tube and Pipe Manufacturing (Seamless Hot-Finished OR Welded OR Cold-Formed), NQF Level 2.
- ID 58781: National Certificate: Production Technology, NQF Level 2.
- ID 58718: National Certificate: Metals Processing, NQF Level 2.

Vertical articulation is possible with the following Qualifications:

- ID 21005: National Certificate: Automotive Components, NQF Level 3.
- ID 58785: National Certificate: Production Technology, NQF Level 3.
- ID 58719: National Certificate: Metals Processing, NQF Level 3.

MODERATION OPTIONS

- Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant Education, Training, Quality, and Assurance (ETQA) Body.
- Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
- Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQA's policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQA's (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- 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, the integrated competence described in the Qualification and will include competence within core sales and the elective standards relevant to the economic sector.
- Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

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

- A minimum of 2 (two) years' practical, relevant occupational experience.
- A relevant Qualification at NQF Level 3 or higher.
- To be registered as an assessor with the relevant ETQA.

NOTES

N/A

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119463	Access and use information from texts	Level 2	5
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
Fundamental	7480	Demonstrate understanding of rational and irrational numbers and number systems	Level 2	3
Fundamental	9008	Identify, describe, compare, classify, explore shape and motion in 2-and 3-dimensional shapes in different contexts	Level 2	3
Fundamental	119454	Maintain and adapt oral/signed communication	Level 2	5
Fundamental	119460	Use language and communication in occupational learning programmes	Level 2	5

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	7469	Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	2
Fundamental	9007	Work with a range of patterns and functions and solve problems	Level 2	5
Fundamental	119456	Write/present for a defined context	Level 2	5
Core	335855	Assemble or manufacture components	Level 2	12
Core	259737	Complete finishing operations and dispatch product	Level 2	12
Core	259597	Explain emergency preparedness and response procedures	Level 2	3
Core	10252	Identify, inspect, use, maintain and care for engineering hand tools	Level 2	6
Core	335859	Operate and monitor production machines	Level 2	14
Core	335896	Prepare surfaces	Level 2	6
Core	335860	Read and interpret engineering drawings	Level 2	8
Core	259604	Verify compliance to safety, health and environmental requirements in the workplace	Level 2	4
Elective	110075	Apply basic fire fighting techniques	Level 1	3
Elective	119567	Perform basic life support and first aid procedures	Level 1	5
Elective	115101	Address workplace hazards and risks	Level 2	4
Elective	259762	Demonstrate an understanding of HIV/AIDS and its impact on the workplace	Level 2	12
Elective	12466	Explain the individual's role within business	Level 2	4
Elective	335897	Mark off regular engineering shapes	Level 2	6
Elective	12483	Perform basic first aid	Level 2	4
Elective	119753	Perform basic welding/joining of metals	Level 2	8
Elective	9322	Work in a team	Level 2	3

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION

None



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Assemble or manufacture components

SAQA US ID	UNIT STANDARD TITLE		
335855	Assemble or manufacture components		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	12

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Plan to assemble or manufacture components in an automotive components or related environment.

SPECIFIC OUTCOME 2

Assemble or manufacture components.

SPECIFIC OUTCOME 3

Apply quality checks on materials, components and product.

SPECIFIC OUTCOME 4

Perform closing procedures for the process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

ID	QUALIFICATION TITLE	LEVEL
Core 71950	National Certificate: Automotive Components	Level 2



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Operate and monitor production machines

SAQA US ID		UNIT STANDARD TITLE	
335859		Operate and monitor production machines	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	14

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate knowledge relating to planning, operating and monitoring of machine in an automotive components or related environment.

SPECIFIC OUTCOME 2

Plan to operate machine in an automotive components or related environment.

SPECIFIC OUTCOME 3

Prepare consumables and machine for use.

SPECIFIC OUTCOME 4

Operate machine in an automotive components or related environment.

SPECIFIC OUTCOME 5

Monitor the production process.

SPECIFIC OUTCOME 6

Work safely with due care for self, fellow workers, equipment, materials and the environment.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71950	National Certificate: Automotive Components	Level 2



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Read and interpret engineering drawings***

SAQA US ID		UNIT STANDARD TITLE	
335860		Read and interpret engineering drawings	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	8

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate an understanding of engineering drawings and sketches.

SPECIFIC OUTCOME 2

Explain and apply geometry and scales.

SPECIFIC OUTCOME 3

Explain the role of isometric and orthographic views in the interpretation of engineering drawings.

SPECIFIC OUTCOME 4

Discuss and apply concepts related to engineering drawing.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

ID	QUALIFICATION TITLE	LEVEL
Core 71950	National Certificate: Automotive Components	Level 2



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Prepare surfaces***

SAQA US ID	UNIT STANDARD TITLE		
335896	Prepare surfaces		
ORIGINATOR			PROVIDER
SGB Manufacturing and Assembly Processes			
FIELD			SUBFIELD
6 - Manufacturing, Engineering and Technology			Manufacturing and Assembly
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	6

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
9919	Prepare metal surfaces	Level 2	6	Will occur as soon as 335896 is registered

SPECIFIC OUTCOME 1

Demonstrate a theoretical understanding of the purposes and processes involved in preparing surfaces.

SPECIFIC OUTCOME 2

Prepare for work activity.

SPECIFIC OUTCOME 3

Conduct surface preparation procedures.

SPECIFIC OUTCOME 4

Work safely with due care for self, fellow workers, equipment, materials and the environment.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

ID	QUALIFICATION TITLE	LEVEL
Core 71950	National Certificate: Automotive Components	Level 2



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Mark off regular engineering shapes

SAQA US ID	UNIT STANDARD TITLE		
335897	Mark off regular engineering shapes		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 2	6

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
9881	Mark off basic regular engineering shapes	Level 2	6	Will occur as soon as 335897 is registered

SPECIFIC OUTCOME 1

Plan and prepare materials and equipment for marking off and use equipment to draw shapes.

SPECIFIC OUTCOME 2

Perform marking off procedures.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	71950	National Certificate: Automotive Components	Level 2



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Automotive Components

SAQA QUAL ID		QUALIFICATION TITLE	
71989		National Certificate: Automotive Components	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National Certificate	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	120	Level 3	Regular-Unit Stds Based

This qualification does not replace any other qualification and is not replaced by another qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This Qualification is for any individual who is, or wishes to be, involved in an automotive components environment. The Qualification contains all the skills, knowledge, values and attitudes required by a learner who needs to be able to perform functions within the manufacture and assembly process in a specific automotive components environment. An individual acquiring this Qualification will be able to contribute towards the smooth and efficient operation of the manufacturing and assembling processes in the automotive components sector.

The main competencies in this qualification are; monitoring and adjusting production machines, performing first line maintenance on the machines utilised in the process, handling and care of materials required for such a process and quality control.

Qualifying learners will also be able to relate what they see and experience to scientific and technological principles and concepts. They will also be able to maintain and support the various policies and procedures related to the safety, health, environment and quality systems that govern their workplace.

The Core component contains competencies that cover the following areas:

- Monitor and adjust production machines.
- Handle and care for materials.
- Prepare for maintenance in a production plant.
- Perform first line maintenance on equipment in a metal production process.
- Interpret and produce engineering drawings and sketches.
- Control workplace hazards and risks.
- Apply safety, health and environment protection procedures in a process plant.
- Monitor machining process, interpret statistical process control charts, and rectify production problems.

These competencies will enable the learner to work in different industries within the diverse automotive components sector.

The Qualification ensures progression of learning, enabling the learner to perform optimally within the automotive components field of learning and provides access to a higher Qualification within the same or a related sector.

Rationale:

This is the second Qualification in a series of four automotive components Qualifications that range from NQF Levels 2 to 5. Typical learners will be persons who are currently working in an automotive components environment who have not received any formal recognition for their skills and knowledge or for anyone wishing to follow a career in an automotive components working environment, in a variety of contexts.

The learner will operate within either an automotive manufacturing or assembly environment. At this level learners will monitor and adjust machines to ensure both optimal machine performance and products that meet customer/client specifications. They are also able to handle and care for materials that are brought into the production process to ensure quality and to perform first line maintenance. In addition, the learner will interpret information and produce engineering drawings that will increase their understanding of the production process in the automotive components or related environment. An important competence at this level is quality control. Again, health and safety matters are critical.

Assembly involves either working on the assembly line at a motor assembly plant or in any environment in which already manufactured or finished components and products are assembled in a production line or process. Manufacturing occurs in an environment in which products, which will be used in an assembly environment, are made or manufactured using raw materials. The learner will also appreciate their role within the broader manufacturing/assembly environments in the automotive components sector.

In terms of the learning pathway, this Qualification will allow this learner to progress from operating machines and assembling/manufacturing components at NQF Level 2 to adjusting machines performing first line maintenance by completing the National Certificate: Automotive Components at NQF Level 3 to setting-up production machines and changing and setting tooling by acquiring the Further Education and Training Certificate: Automotive Components at NQF Level 4 and to working in a coordinating and management capacity within an automotive components environment by completing the National Certificate: Automotive Components at NQF Level 5.

The automotive components sector falls within the ambit of South Africa's large motor industry. There are huge motor assembly plants in several parts of the country, primarily in the Eastern Cape, Gauteng and KwaZulu Natal provinces. It's a sector that employs a large number of people. The automotive components sector covers two broad areas, namely, manufacturing and assembly. It is also a sector that comprises of a range of diverse but related industries and is characterised by sophisticated technological processes. Companies and/or industries within this sector operate in a global competitive and challenging environment. The products produced have to respond to a wide variety of customer requirements and safety, health, environmental, quality and risk management issues.

The highly developed automotive components sector is well-established and economically powerful. In terms of transformation in the country, learners will require skills and competencies to gain access to positions within management structures by completing other Qualifications and training. It will be in the interest of the country and the sector to ensure that those who operate in the automotive components environment are trained according to this Qualification to improve productivity and efficiency.

This national Qualification and its related Unit Standards were developed to standardise the accreditation of learning programmes, resulting in improved quality management in terms of programme delivery.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED IN PLACE

Learners wishing to study towards this Qualification are assumed to have:

- Mathematical literacy at NQF Level 2.
- Communication at NQF Level 2.
- National Certificate: Automotive Components at NQF Level 2.

Recognition of Prior Learning:

This Qualification may be achieved in part (or whole) through the recognition of relevant prior knowledge and/or experience. The learner must be able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. As part of the provision of Recognition of Prior Learning providers are required to develop a structured means for the assessment of individual learners against the Unit Standards of the Qualification on a case-by-case basis. A range of assessment tools and techniques during formative and Summative Assessment procedures should be used which have been jointly decided upon by the learner and the assessor. Such procedures, and the assessment of individual cases, are subject to moderation by independent assessors. The same principles that apply to assessment of this Qualification also apply to Recognition of Prior Learning.

Learners may provide evidence of prior learning for which they may receive credit towards the Unit Standards and/or the Qualification by means of portfolios or other forms of appropriate evidence as agreed to between the relevant provider and relevant ETQA or ETQA that has a Memorandum of Understanding in place with the relevant ETQA.

Recognition of Prior Learning is particularly important, as there are people in the Automotive Components sector with a variety of skills and competencies of differing quality and scope. It is important that a Recognition of Prior Learning process be available to assist in making sense of existing competencies and skills, and helping to standardise these competencies and skills towards a common standard.

Access to the Qualification:

There is an open access to this Qualification, keeping in mind the "Learning Assumed to be in Place".

QUALIFICATION RULES

The Qualification consists of a Fundamental, a Core and an Elective Component.

To be awarded the Qualification learners are required to obtain a minimum of 120 credits as detailed below.

Fundamental Component:

The Fundamental Component consists of Unit Standards in:

- Mathematical Literacy at NQF Level 3 to the value of 16 Credits.
- Communication at NQF Level 3 to the value of 20 Credits.

All Unit Standards in the Fundamental Component are compulsory.

Core Component:

The Core Component consists of Unit Standards to the value of 78 Credits, all of which are compulsory.

Elective Component:

The Elective Component consists of Unit Standards that will impart a variety of competencies to the learner. Learners are to choose Elective Unit Standards totalling a minimum of 6 Credits to attain a minimum of 120 Credits for this Qualification.

EXIT LEVEL OUTCOMES

Qualifying learners will be able to:

1. Demonstrate an understanding of Occupational Health, Safety and Environmental standards in the workplace.
2. Monitor and adjust the performance of production machines.

Outcome Range:

- 'Production machines' refer to machines used in both the manufacturing and assembly sectors of the automotive component environment. The relevant sector has been specified, where applicable.
 - 'Production process' includes the assembly and manufacturing sectors.
3. Select and apply appropriate procedures to solve problems within the automotive component environment.
 4. Perform first line process maintenance to maintain efficiency.

Outcome Note:

- First line maintenance is performed at this level while minor maintenance is performed at NQF Level 2. First line maintenance is performed by operators not qualified as artisans.
5. Discuss the importance of, interpret and produce engineering drawings and sketches.

Critical Cross-Field Outcomes:

Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made when:

- Resolving problems pertaining to tooling and other equipment and instruments.
- Engaging with problems during monitoring and adjustment and reporting problems beyond scope of practice to supervisory personnel.
- Monitoring equipment and making relevant adjustments.
- Interpreting an engineering drawing.
- Identifying isometric and orthographic views, perspectives, sectioning.
- Differentiating between various concepts, conventions and symbols related to engineering drawings.
- Differentiating between metals and alloys.

- Controlling hazards and risks to maintain safety.

Work effectively with others as a member of a team, group, organisation, community to:

- Ensure that tooling is properly selected, installed, removed, cleaned and stored according to procedures.
- Prepare work activities for monitoring and adjusting machines.
- Ensure that the safety of all personnel and equipment is maintained.
- Ensure that production machines run efficiently.
- Ensure that the safety of all personnel and equipment is maintained.
- Ensure quality products, in keeping with customer requirements, are produced through quality checks.
- Ensure that engineering drawings facilitate the production process and the product meets customer's requirements.
- Interpret drawings.

Organise and manage oneself and one's activities responsively and effectively when:

- Interpreting production schedules.
- Planning preparation activities to monitor and adjust machines.
- Select, install, remove, clean and store tooling.
- Monitoring and adjusting production machines to deal with deviations.
- Discussing the theory relevant to and the relationships within the production.
- Interpret information contained in engineering drawings and make decisions.
- Preparing engineering drawings using isometric and orthographic views and perspectives.
- Explaining the implications of changing technology on engineering drawings.
- Compiling material lists and sizes from drawings.

Collect, analyse, organise and critically evaluate information to:

- Solve problems pertaining to tooling, equipment and instrumentation.
- Refer problems to appropriate personnel.
- Solve problems by making adjustments.
- Deal with changes and deviations.
- Interpret engineering drawings using all the skills acquired.
- Assess the match between a drawing and a product/system/component/item.

Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation to:

- Ensure the efficient functioning of tooling and other equipment.
- Monitor and adjust machines.
- Ensure the efficient functioning of the production machines.
- Discuss interpretation of a drawing.

Use science and technology effectively and critically, showing responsibility towards the environment and the health of others by:

- Using equipment and tooling according to manufacturer's instructions and standard operating procedure.

Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation to:

- Understand the impact of their or others' actions on health, safety, environment and productivity.
- Understand the production process as a system consisting of related activities and the impact of stoppages and delays on the system.

ASSOCIATED ASSESSMENT CRITERIA**Associated Assessment Criteria for Exit Level Outcome 1:**

- 1.1 A clean and safe work area is maintained to minimise risk to health.
- 1.2 Compliance with the governance of workplace hazardous substances is explained in terms of the impact on the organisation and the immediate environment.
- 1.3 Safety, health and environmental inspections in work area are conducted in a manner that ensures compliance.
- 1.4 Safety, health, environmental, quality and risk management policies and procedures are applied and maintained to ensure worker and workplace safety.
- 1.5 The safety, health and environmental aspects pertaining to monitoring and adjusting of specific machines and performing first line maintenance are explained in a manner that ensures compliance.

Associated Assessment Criteria for Exit Level Outcome 2:

- 2.1 Preparatory activities are discussed and completed according to standard operating procedures.
- 2.2 Tooling is selected, set-up, stored and transported as per standard operating procedure and production requirements in the manufacturing sector.
- 2.3 Machines are monitored and adjusted within defined parameters to maintain the production process.
- 2.4 Information relevant to monitoring and adjusting machines is recorded and reported to relevant personnel in accordance with organisational procedures.
- 2.5 The production process is discussed in terms of materials utilisation and the relationships and systems within the process.
- 2.6 Materials are laid out and material stock levels are checked to ensure continuity in the production process.
- 2.7 Statistical process control charts are interpreted to rectify production problems and maintain quality.
- 2.8 Basic mathematical principles and techniques are applied while performing the tasks related to monitoring and adjusting activities.
- 2.9 Oral and written communication is maintained and adapted as required to promote effective interaction in a manufacturing or assembly context.

Associated Assessment Criteria for Exit Level Outcome 3:

- 3.1 Problems are identified and assessed so that the relevant steps can be taken to solve the problem.
- 3.2 Appropriate procedures are selected and applied to solve problems within area of expertise in an efficient and effective manner.
- 3.3 Mathematical calculations are utilised for the solution of common operational problems.
- 3.4 Unfamiliar problems are reported to appropriate personnel to take action as per workplace procedures.

Associated Assessment Criteria for Exit Level Outcome 4:

- 4.1 Planning for maintenance is conducted in accordance with plant-specific requirements so that production requirements are achieved.
- 4.2 First line maintenance is performed regularly and consistently on production machines or on a production line.

- 4.3 Tools and equipment are identified, verified and examined to ensure an efficient manufacturing or assembly process.
- 4.4 Relevant procedures are used to perform maintenance in accordance with organisational procedures.
- 4.5 Health and safety requirements are complied with and hazards and risks are considered in the performance of first line maintenance.
- 4.6 Problems and potential problems are identified and solutions prepared to ensure the efficiency of the manufacturing or assembly process.

Associated Assessment Criteria for Exit Level Outcome 5:

- 5.1 An understanding of mathematics, symbols and dimensions is demonstrated in interpreting engineering drawings.
- 5.2 Measuring instruments, scaling, sequencing and numbering systems in engineering drawings are used to develop a deeper understanding of engineering drawings.
- 5.3 Engineering drawings and their conventions are explained and interpreted to appreciate their role in the production process.
- 5.4 The design development cycle is explained to show how a product or customer's request begins with a drawing/sketch and emerges as the final product.

Integrated Assessment:

The importance of Integrated Assessment is to confirm that the learner is able to demonstrate applied competence (practical, foundational and reflexive) and ensure that the purpose of this Qualification is achieved. Both Formative and Summative Assessment methods and strategies are used to ensure that the Exit Level Outcomes and the Purpose of the Qualification are achieved through achieving the Unit Standards. Learning, teaching and assessment are inextricably linked.

Learning and assessment should be integrated and assessment practices must be fair, transparent, valid and reliable. A variety of assessment strategies and approaches must be used. This could include tests, assignments, projects, demonstrations and/or any applicable method. Evidence of the acquisition of competencies must be demonstrated through the Unit Standards, which enhance the integration of theory and practice as deemed appropriate at this level.

Formative Assessment is an on-going process which is used to assess the efficacy of the teaching and learning process. It is used to plan appropriate learning experiences to meet the learner's needs. Formative Assessments can include a mix of simulated and actual (real) practice or authentic settings. Feedback from assessment informs both teaching and learning. If the learner has met the Assessment Criteria of all the Unit Standards then s/he has achieved the Exit Level Outcomes of the Qualification.

Summative Assessment is concerned with the judgement of the learning in relation to the Exit Level Outcomes of the Qualification. Such judgement must include Integrated Assessment(s) which test the learners' ability to integrate the larger body of knowledge, skills and attitudes, which are represented by the Exit Level Outcomes. Summative assessment can take the form of oral, written and practical examinations as agreed to by the relevant ETQA.

Integrated Assessment must be designed to achieve the following:

- An integration of the achievement of the Exit Level Outcomes in a way that reflects a comprehensive approach to learning and shows that the Purpose of the Qualification has been achieved.
- Judgement of learner performance to provide evidence of applied competence or capability.

Assessors and moderators should make use of a range of Formative and Summative Assessment methods. Assessors should 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 assessed. The assessment of the Critical Cross-Field Outcomes should be integrated with the assessment of Specific Outcomes and Embedded Knowledge.

INTERNATIONAL COMPARABILITY

The main competencies of this Qualification are monitoring and adjusting machines in an automotive components environment and performing first line maintenance.

Various car manufacturers like Daimler-Chrysler, Mazda, Honda, Toyota, Hyundai, Nissan, BMW, Nissan, VW and Ford, inter alia, were analysed to see what type of training takes place for those in assembly and in manufacturing. Little or no information could be found because most of the training for assembly lines takes place in-house, and the content of the training is not made readily available.

Car manufacturing countries like Japan, Korea, the United States, the United Kingdom, France and Germany were also checked and information was obtained from the following countries:

- United States.
- United Kingdom.
- Norway.
- Australia.

United States:

Effective Training Incorporated (ETI) offers training workshops in engineering drawings for those already in the field.

The training is for design, layout, assembly, checking and inspection teams. The interpretation of an engineering drawing has a direct impact on the final product. Effective Training Incorporated's one-day course explains how to correctly interpret engineering drawings. It will improve a student's understanding of print reading and result in more effective communication on the job.

This course is designed for anyone who interprets engineering drawings: product, manufacturing, and quality engineers; inspectors; machinists; production personnel; purchasing agents etc.

Working with engineering drawings involves analyzing, making decisions, and processing data. The Engineering Drawing Requirements course is based on practical application of print interpretation. It will provide a better understanding of the view representation, dimensions, tolerances, and symbols used on prints. Candidates will learn:

- The definition and uses of engineering drawings.
- Types of engineering drawings.
- Appropriate standards and documents specified on engineering drawings.
- Standard engineering drawing formats.
- Interpreting general notes, flag notes and general tolerances on engineering drawings.
- How revisions are specified on engineering drawings.
- Identifying and interpreting line conventions used on engineering drawings.
- Interpreting the various views shown on engineering drawings.
- Basic part definition required on engineering drawings.

- Common terms, symbols and abbreviations used on engineering drawings.

The Bureau of Labour Statistics gives the following information regarding those working in the automotive production process at this NQF Level.

Throughout the manufacturing process, "statistical process control" (teamwork and quality control) is emphasized. From initial planning and design to final assembly, numerous tests and inspections ensure that vehicles meet quality and safety standards. Modern manufacturing facilities also integrate interchangeable tools on the assembly line so that they can quickly be changed to meet the needs of various models and specifications.

Production workers receive most of their training on the job or through more formal apprenticeship programs. Training normally takes from a few days to several months and may combine classroom with on-the-job training under the guidance of more experienced workers. Attaining the highest level of skill in some production jobs requires several years, however. Training often includes courses in health and safety, teamwork, and quality control. With advanced training and experience, production workers can advance to inspector jobs or to more skilled production, craft, operator, or repair jobs.

United Kingdom:

S.W. Durham Training Ltd. Offers training in first line maintenance. The course description below has many different aspects than the work anticipated in first line maintenance Unit Standards in this Qualification but there are overlaps and this comparison is a helpful guideline.

Mechanical Maintenance:

Target Audience:

- First line maintenance workers or single skilled electrical workers wishing to enhance their current skill base to include mechanical maintenance skills.

Experience Required:

- Engineering background or contact with mechanically operated equipment in their day to day duties.

Course Duration:

- 5 days with practical elements, or 2 days without practical.

Course Aims:

- To provide practical skills and knowledge for those lacking formal training in these areas, or to enhance current skills by provision of maintenance elements.

Course Content:

- Engineering basics.
- Forces.
- Newton's laws of motion.
- Engineering Units and standards.
- Material properties and identification.
- Health and Safety.
- HASWA, PUWER, Manual Handling, PPE, COSHH, RIDDOR.
- Machine guarding.

- Electrical safety.
- Practical/theory.
- Hand skills/bench fitting techniques.
- Speed/Feed Charts and Tapping drill charts.
- Use of drills and taps producing holes.
- Drives (Chain, Belt and Gears).
- Measuring instruments.
- Bearings (fitting and application).
- Mechanical systems/function testing.
- Basic Fault finding techniques.
- Half split and input output fault finding methods.
- Use of adhesives.

The National Vocational Qualifications Framework reveals that the focus of their Qualifications at this level is on various aspects of the motor vehicle but neither on assembly of vehicles nor on operating machinery as detailed in this Qualification. The information below is from the Level 3 BTEC Diploma in Engineering (Automotive). This is a step up from the Level 2 NVQ outlined in the International Comparability section in the NQF Level 2 National Certificate: Automotive Components.

Qualification Structure:

The units are all suitable for Engineering (Automotive). Individual learners could undertake any combination, but there are some natural groupings for some of the units.

The following units are only suitable for the Vehicle Repair and Technology (excluding Motorsports) grouping:

- Diesel Fuel Injection Systems for Compression Ignition Engines, Heavy Vehicle Braking Systems, Heavy Vehicle Transmission Systems, Heavy Vehicle Steering and Suspension Systems.

The following units are only suitable for the Motorsports grouping:

Motorsport Workshop Practices, Motorsport Vehicle Preparation and Inspection, Professional Practice and Logistics for Motorsports.

Unit Standards for this Qualification:

- Operation and Testing of Vehicle Electronic Ignition Systems.
- Operation of Vehicle Systems.
- Light Vehicle Transmission Systems.
- Vehicle Electronic Ancillary and Information Systems.
- Light Vehicle Suspension, Steering and Braking Systems.
- Heavy Vehicle Braking Systems.
- Heavy Vehicle Transmission Systems.
- Heavy Vehicle Steering and Suspension Systems.
- Vehicle Engine Principles, Operation, Service and Repair.
- Fabrication Processes and Technology.
- Applications of Welding Technology.
- Motorsport Workshop Practices.
- Motorsport Vehicle Preparation and Inspection.
- Professional Practice and Logistics for Motorsports.
- Vehicle Fault Diagnosis and Rectification.
- Applications of Vehicle Science and Mathematics.

- Vehicle Electrical and Electronic Principles.
- Engine Electrical Charging and Starting Systems.
- Petrol Injection Systems for Spark Ignition Engines.
- Diesel Fuel Injection Systems for Compression Ignition Engines.

While there are some shared competencies the focus of the UK Qualification is on the vehicle's systems and not on the machines used in manufacturing or assembly of vehicles.

Norway:

The company called DNV of Norway offers training in quality within the automotive industry.

The course is based on ISO/TS16949 which was developed by the world's leading automotive manufacturers, and is based on ISO 9001 and national quality standards within the automotive industry. It can be applied to manufacturers worldwide-for cars, their parts, components or systems.

Purpose:

Accredited certification to the ISO/TS 16949 quality management system demonstrates both commitment to product quality and compliance to customer specific requirements. The system is an ongoing process that helps find and report areas of improvement of your management system and relevant processes in your business.

ISO/TS 16949 can easily be integrated with standards already in use as it is based on ISO 9001.

Within your organisation it will assist in reducing production variations and improve manufacturing efficiency, both factors important to bottom line results. Other benefits include:

- Improved process and product quality.
- Reduced need for multiple second and third party audits.
- Increased confidence when bidding for global sourcing contracts.
- A necessary step to gain work with many of the world's largest automotive manufacturers.

Benefits to the automotive industry at large include:

- Application of common and consistent international quality system requirements.
- Improved supply chain product and process quality.
- Increased confidence in global supplier quality.
- Introduction of process-based audits focusing on customer satisfaction.

Certification to ISO/TS 16949 helps create a common quality system approach to the entire supply chain and facilitates access to the industry's best practices.

Australia:

Some of the competencies in the Australian Unit Standards (production Specialisation) below resonate with some of the competencies in this Qualification, especially those about controlling, rectifying production or assembly processes, tooling, monitoring and maintaining plant operations:

- Rectify faults in vehicle metal components.
- Rectify paintwork.
- Control paint line production processes.
- Conduct engine hot test.

- Rework production engines.
- Rectify mechanical faults on production vehicles.
- Rectify electrical faults on production vehicles.
- Rectify assembly faults in assembled vehicles.
- Conduct die coating.
- Conduct structural rectification of vehicle bodies.
- Test welds ultrasonically.
- Conduct tool setting.
- Monitor and maintain metals treatment plant operations.

Conclusion:

Although the automotive component industry is one of the world's largest industries, information on training programmes, Qualifications and courses for comparability purposes was not easy to find. In many cases, training is carried out at sites where manufacturing and assembly plants are located and this happens to be in diverse countries.

However, the information obtained above reveals that training internationally is not as comprehensive as this Qualification. In many countries, training constitutes short courses or on-the-job training. Details regarding the duration, level and intensity of the latter are not available. The courses/programmes identified above overlap with this qualification to varying degrees. The UK Qualification entitled 'Mechanical Maintenance' is closest to this Qualification.

ARTICULATION OPTIONS

This Qualification lends itself to both vertical and horizontal articulation possibilities.

Horizontal articulation is possible with the following Qualifications:

- ID 64190: National Certificate: Metals Production, NQF Level 3.
- ID 57877: National Certificate: CNC Product Machining, NQF Level 3.
- ID 58785: National Certificate: Production Technology, NQF Level 3.

Vertical articulation is possible with the following Qualifications:

- ID 64209: Further Education and Training Certificate: Metals Production, NQF Level 4.
- ID 71949: Further Education and Training Certificate: Automotive Components, NQF Level 4.
- ID 58779: Further Education and Training Certificate: Production Technology, NQF Level 4.
- ID 48915: Further Education and Training Certificate: Manufacturing and Assembly Operations Supervision, NQF Level 4.

MODERATION OPTIONS

- Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant Education, Training, Quality, and Assurance (ETQA) Body.
- Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
- Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQA's policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQA's (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- 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, the integrated

competence described in the Qualification and will include competence within Core sales and the Elective standards relevant to the economic sector.

- Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

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

- A minimum of 2 (two) years' practical, relevant occupational experience.
- A relevant Qualification at NQF Level 4 or higher.
- To be registered as an assessor with the relevant ETQA.

NOTES

N/A

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	9010	Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations	Level 3	2
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Core	259624	Control workplace hazards and risks	Level 2	4
Core	259722	Handle and care for materials	Level 2	4
Core	244108	Apply safety, health and environment protection procedures in a process plant	Level 3	6
Core	335854	Interpret and produce engineering drawings and sketches	Level 3	12
Core	335900	Monitor and adjust production machines	Level 3	18
Core	243025	Monitor machining process, interpret statistical process control charts, and rectify production problems	Level 3	7
Core	259723	Perform first line maintenance on equipment in the metals production process	Level 3	10
Core	259724	Prepare for maintenance in a production plant	Level 3	5
Core	335901	Prepare to monitor and adjust production machines	Level 3	12
Elective	13912	Apply knowledge of self and team in order to develop a plan to enhance team performance	Level 3	5
Elective	116534	Carry out basic first aid treatment in the workplace	Level 3	2
Elective	335862	Coat materials and components	Level 3	4
Elective	253656	Communicate with clients	Level 3	3
Elective	13915	Demonstrate knowledge and understanding of HIV/AIDS in a workplace, and its effects on a business sub-sector, own organisation and a specific workplace	Level 3	4
Elective	242814	Identify and explain the core and support functions of an organisation	Level 3	6
Elective	8039	Operating cranes	Level 3	10
Elective	8038	Operating lift trucks	Level 3	6
Elective	335864	Use marking-off equipment for routine shapes	Level 3	8

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION

None



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Interpret and produce engineering drawings and sketches***

SAQA US ID		UNIT STANDARD TITLE	
335854		Interpret and produce engineering drawings and sketches	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	12

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate an understanding of mathematics, symbols and dimensions.

SPECIFIC OUTCOME 2

Use measuring instruments, scaling, sequencing and numbering systems in engineering drawings.

SPECIFIC OUTCOME 3

Explain, interpret and produce drawings.

SPECIFIC OUTCOME 4

Explain the functions and importance of materials and cutting lists.

SPECIFIC OUTCOME 5

Explain the design development cycle.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

ID	QUALIFICATION TITLE	LEVEL
Core 71989	National Certificate: Automotive Components	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Coat materials and components***

SAQA US ID	UNIT STANDARD TITLE		
335862	Coat materials and components		
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	4

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Plan and prepare for coating.

SPECIFIC OUTCOME 2

Coat materials and components.

SPECIFIC OUTCOME 3

Discuss quality procedures pertaining to coating.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	71989	National Certificate: Automotive Components	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:*Use marking-off equipment for routine shapes*

SAQA US ID		UNIT STANDARD TITLE	
335864		Use marking-off equipment for routine shapes	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	8

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Plan and prepare for the marking-off of materials using templates.

SPECIFIC OUTCOME 2

Perform marking-off.

SPECIFIC OUTCOME 3

Ensure quality control.

SPECIFIC OUTCOME 4

Care for and store marking-off tools and equipment.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	71989	National Certificate: Automotive Components	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Monitor and adjust production machines***

SAQA US ID		UNIT STANDARD TITLE	
335900		Monitor and adjust production machines	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	18

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Monitor the machine in the production process.

SPECIFIC OUTCOME 2

Adjust machines in the production process.

SPECIFIC OUTCOME 3

Operate and monitor test procedures for quality purposes.

SPECIFIC OUTCOME 4

Record and report information relevant to monitoring and adjusting machines.

SPECIFIC OUTCOME 5

Discuss material utilisation.

SPECIFIC OUTCOME 6

Explain the theory of the production process.

SPECIFIC OUTCOME 7

Explain the relationships and systems within the production process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71989	National Certificate: Automotive Components	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Prepare to monitor and adjust production machines***

SAQA US ID		UNIT STANDARD TITLE	
335901		Prepare to monitor and adjust production machines	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 3	12

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Explain the safety, health and environmental aspects pertaining to the monitoring and adjusting of specific machines.

SPECIFIC OUTCOME 2

Prepare for work activities.

SPECIFIC OUTCOME 3

Select and set-up tooling.

SPECIFIC OUTCOME 4

Explain and apply tooling preservation and transportation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

ID	QUALIFICATION TITLE	LEVEL
Core 71989	National Certificate: Automotive Components	Level 3



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:**Further Education and Training Certificate: Automotive Components**

SAQA QUAL ID	QUALIFICATION TITLE		
71949	Further Education and Training Certificate: Automotive Components		
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
QUALIFICATION TYPE	FIELD	SUBFIELD	
Further Ed and Training Cert	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	138	Level 4	Regular-Unit Stds Based

This qualification does not replace any other qualification and is not replaced by another qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This Qualification is for any individual who is, or wishes to be, involved in an automotive components environment, either within the manufacturing or assembly sector. The Qualification contains all the skills, knowledge, values and attitudes required by a learner who needs mainly to be able to perform functions within one of many contexts in the diverse automotive components environment. An individual acquiring this Qualification will be able to contribute towards the efficient operation of the production line.

The main skills that are recognised in this Qualification are: setting-up production machines, changing and setting tooling, anticipating and troubleshooting machine functioning in order to maintain the production process and leading teams in the performance of their tasks within this process.

Qualifying learners will also be able to relate what they see and experience to scientific and technological principles and concepts. They will also be able to maintain and support the various policies and procedures related to the safety, health, environment and quality systems that govern their workplace.

The Core component contains competencies that cover the following areas:

- Setting-up production machines.
- Anticipating and troubleshooting machine functioning.
- Changing and setting tooling.
- Leading a team.
- Demonstrating understanding of the implementation of occupational health, safety and environmental legislation in the work place.
- Managing safety and emergency incidences.

The Qualification ensures progression of learning, enabling the learner to perform optimally within the automotive components field of learning and provides access to a higher Qualification within the same or a related sector.

Rationale:

This is the third Qualification in a series of four qualifications that ranges from NQF Levels 2-5. Typical learners will be persons who are currently working in an automotive components environment and who have not received any formal recognition for their skills and knowledge. It is also for anyone wishing to follow a career in an automotive components environment, in a variety of contexts.

The learner will either operate within an automotive manufacturing or assembly environment. At this level, learners will be involved in the complex operation of setting-up production machines to ensure optimal performance and changing and setting tooling in order to ensure that the production continues as planned. These competencies are critical to ensure that production meets customer deadlines and requirements without compromising on the quality of the products. Setting-up machines requires in-depth knowledge of the entire production process, of the machines in terms of their functions, components, capabilities, parameters and of their role in ensuring production efficiencies. Depending of the context, the learner could be involved in setting-up a number of machines in a production line. The learner will also develop leadership skills to manage a production team. Health and safety legislation and requirements must be adhered to.

Assembly involves either working on the assembly line at a motor assembly plant or in any environment in which already manufactured or finished components and products are assembled in a production line or process. Manufacturing occurs in an environment in which products, which will be used in an assembly environment, are made or manufactured using raw materials. The learner will also appreciate their role within the broader manufacturing/assembly environments in the automotive components sector.

In terms of the learning pathway, this Qualification will allow this learner to progress from operating machines and assembling/manufacturing components at Level 2 to adjusting machines performing first line maintenance by completing the National Certificate: Automotive Components at NQF Level 3 to setting-up production machines, trouble shooting machine functioning and changing and setting tooling by acquiring the Further Education and Training Certificate: Automotive Components at NQF Level 4 and to working in a coordinating and management capacity within an automotive components environment by completing the National Certificate: Automotive Components at NQF Level 5.

The automotive components sector falls within the ambit of South Africa's large motor industry. There are huge motor assembly plants in several parts of the country, primarily in the Eastern Cape, Gauteng and KwaZulu Natal provinces. It's a sector that employs a large number of people. The automotive components sector covers two broad areas, namely, manufacturing and assembly. It is also a sector that comprises of a range of diverse but related industries and is characterised by sophisticated technological processes. Companies and/or industries within this sector operate in a global competitive and challenging environment. The products produced have to respond to a wide variety of customer requirements and safety, health, environmental, quality and risk management issues.

The highly developed automotive components sector is well-established and economically powerful. In terms of transformation in the country, learners will require skills and competencies to gain access to positions within management structures by completing other qualifications and training. It will be in the interest of the country and the sector to ensure that those who operate in the automotive components environment are trained according to this Qualification to improve productivity and efficiency.

This national Qualification and its related Unit Standards were developed to standardize the accreditation of learning programmes, resulting in improved quality management in terms of programme delivery.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED IN PLACE

Learners wishing to study towards this Qualification are assumed to have:

- Mathematical Literacy at NQF Level 3.
- Communication at NQF Level 3.
- National Certificate: Automotive Components at NQF Level 3.

Recognition of Prior Learning:

This Qualification may be achieved in part (or whole) through the recognition of relevant prior knowledge and/or experience. The learner must be able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. As part of the provision of recognition of prior learning providers are required to develop a structured means for the assessment of individual learners against the Unit Standards of the Qualification on a case-by-case basis. A range of assessment tools and techniques during Formative and Summative assessment procedures should be used which have been jointly decided upon by the learner and the assessor. Such procedures, and the assessment of individual cases, are subject to moderation by independent assessors. The same principles that apply to assessment of this Qualification also apply to Recognition of Prior Learning.

Learners may provide evidence of prior learning for which they may receive credit towards the Unit Standards and/or the Qualification by means of portfolios or other forms of appropriate evidence as agreed to between the relevant provider and relevant ETQA or ETQA that has a Memorandum of Understanding in place with the relevant ETQA.

Recognition of Prior Learning (RPL) is particularly important, as there are people in the Automotive Components sector with a variety of skills and competencies of differing quality and scope. It is important that an Recognition of Prior Learning (RPL) process be available to assist in making sense of existing competencies and skills, and helping to standardize these competencies and skills towards a common standard.

Access to the Qualification:

There is an open access to this Qualification, keeping in mind the "Learning Assumed to be in Place".

QUALIFICATION RULES

The Qualification consists of a Fundamental, a Core and an Elective Component.

To be awarded the Qualification learners are required to obtain a minimum of 138 credits as detailed below.

Fundamental Component:

The Fundamental Component consists of Unit Standards in:

- Mathematical Literacy at NQF Level 4 to the value of 16 Credits.
- Communication in First Language at NQF Level 4 to the value of 20 Credits.
- Communication in Second Language at NQF Level 3 to the value of 20 Credits.

All Unit Standards in the Fundamental Component are compulsory.

Core Component:

- The Core Component consists of Unit Standards to the value of 77 Credits, all of which are compulsory.

Elective Component:

- The Elective Component consists of Unit Standards that will impart a variety of competencies to the learner. Learners are to choose Elective Unit Standards totalling a minimum of 5 Credits to attain a minimum of 138 Credits for this Qualification.

EXIT LEVEL OUTCOMES

1. Promote, implement and maintain procedures that support safety, health, the environment, quality and risk management.
2. Prepare for and set-up production machines in an automotive or related environment.
 - Outcome Range:
 - 'Production machines' refer to machines used in both the manufacturing and assembly sectors of the automotive component environment. The sector has been specified, where applicable.
 - 'Production process' includes the assembly and manufacturing sectors.
3. Troubleshoot machine functioning in an automotive components environment.
4. Discuss the importance of changing and setting tooling for production machines.

Critical Cross-Field Outcomes:

Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made when:

- Adjusting tooling.
- Identifying non-conformances in tooling.
- Engaging with product faults related to setting and undertake appropriate actions.
- Correcting conditions or practices which will damage or reduce the life of the machines and equipment.
- Applying problem solving techniques.
- Engaging with problems related to setting-up the machine or a range of machines.
- Engaging with product faults related to equipment functioning and undertake appropriate actions.
- Correcting conditions or practices which will damage or reduce the life of the equipment.

Work effectively with others as a member of a team, group, organisation, community to:

- Prepare, select, collect, transport and preserve tooling.
- Change, adjust and set tooling.
- Interact with work group members to effect efficient and problem free tooling changeovers and set ups.
- Ensure the efficient operation of the production process.
- Interact with maintenance specialists to troubleshoot and determine most effective ways of repairing problems/improving machine efficiency.
- Work and communicate effectively in team processes.

Organise and manage oneself and one's activities responsively and effectively to:

- Prepare, select, collect, transport and preserve tooling.
- Change, adjust and set tooling.
- Identify non-conformances in tooling.
- Ensure quality in tooling.
- Set-up production machines.
- Perform line inspections.
- Analyse machine data.
- Apply problem-solving techniques.
- Plan and executing monitoring, diagnostic and troubleshooting activities without interference with production.
- Follow-up with maintenance personnel.

Collect, analyse, organise and critically evaluate information to:

- Adjust tooling.
- Engage with non-conformances.
- Record, categorise and explain problems, faults and down times related to settings.
- Collect and record changes to settings for repeatability.
- Apply problem-solving techniques.
- Perform line inspections.
- Gather and analyse information on equipment functioning and troubleshoot on potential solutions to problems.

Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation to:

- Record and report all aspects pertaining to tooling.
- Request or instruct work group members and associated people to co-ordinate and effect settings.
- Record and report to improve the production process.
- Consult with maintenance personnel and report on discussions and decisions taken.

Use science and technology effectively and critically, showing responsibility towards the environment and the health of others by:

- Using tools and equipment according to manufacturer's instructions.
- Using a methodical approach to diagnosing and troubleshooting equipment problems.

Demonstrate an understanding of the world as a set of related systems by recognising that the problem-solving contexts do not exist in isolation when:

- Engaging with problems during setting-up the production process.
- Troubleshooting potential machine problems which can impact on product quality, machine repair requirements and overall costs as well as on safety, health and the environment.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

1.1 Occupational health, safety, environmental, quality and risk management policies and procedures are explained and applied in area of responsibility and are implemented and updated where required.

1.2 A safe environment is maintained for team members to work.

1.3 Safety, health, environmental, quality and risk management practices are investigated systematically and suggestions for improvement made as appropriate.

1.4 All actions related to maintaining safety, health, environmental, quality and risk management procedures are documented.

Associated Assessment Criteria for Exit Level Outcome 2:

- 2.1 Knowledge and theory pertaining to the production process and to production machines are discussed in terms of the context in which the process and the machines are located.
- 2.2 Knowledge and theory pertaining to products and materials are discussed in relation to the impact of materials and design on the final products.
- 2.3 The plan to set-up machines is explained with regards to the production schedule, customer requirements and the availability of materials, tooling and tools.
- 2.4 Production machines are discussed in terms of operation procedures, production time and the sustainability of stable production conditions.
- 2.5 Production machines are set-up according to production line specifications to manufacture/assemble quality products.
- 2.6 The importance of quality control procedures is discussed in terms of calibration, verification and product specifications.
- 2.7 Line inspections are performed to analyse anomalies and deviations and take corrective action.
- 2.8 Techniques for data analysis are used to interpret the data collected to maintain efficiency in the production process.
- 2.9 Mathematical principles and techniques are applied while performing the tasks related to monitoring and adjusting activities.
- 2.10 Oral and written communication is maintained and adapted as required to promote effective interaction in a manufacturing/assembly context.

Associated Assessment Criteria for Exit Level Outcome 3:

- 3.1 Production machines are discussed in terms of their capabilities, parameters and common failures.
- 3.2 The specifications of products and machines are discussed in relation to optimal machine performance and the correlation between actual performance and optimum performance of machines.
- 3.3 The techniques to monitor machines are discussed to ensure that machines work within their parameters as shown by their indicators.
- 3.4 Data obtained through monitoring is analysed using various techniques.
- 3.5 Problems are identified and assessed and appropriate problem-solving techniques are used to find solutions that will maintain the production process.
- 3.6 The importance of troubleshooting and early diagnosis of problems is explained to ensure production efficiencies and save costs.
- 3.7 Maintenance and repair specialists are informed about machine problems and regular follow-ups conducted to ensure that machines have been attended to.
- 3.8 Mathematical calculations are utilised for the solution of common operational problems.
- 3.9 Unfamiliar problems are reported to appropriate personnel to take action as per procedure.

Associated Assessment Criteria for Exit Level Outcome 4:

- 4.1 Theoretical concepts regarding tooling within a manufacturing/assembly context are explained in relation to the different types of tooling and their applications.
- 4.2 Tooling is selected, collected, prepared, transported and stored according to standard operating procedure.
- 4.3 Tooling techniques are applied according to standard operating procedure.
- 4.4 Tooling is changed and adjusted with due regard for time and production schedule.
- 4.5 Non-conformances in tooling are identified and reported to appropriate personnel according to company procedure.

4.6 The importance of quality in tooling is discussed to ensure that final product is according to production and customer requirements.

Integrated Assessment:

The importance of integrated assessment is to confirm that the learner is able to demonstrate applied competence (practical, foundational and reflexive) and ensure that the Purpose of this Qualification is achieved. Both Formative and Summative assessment methods and strategies are used to ensure that the Exit Level Outcomes and the purpose of the Qualification are achieved through achieving the Unit Standards. Learning, teaching and assessment are inextricably linked.

Learning and assessment should be integrated and assessment practices must be fair, transparent, valid and reliable. A variety of assessment strategies and approaches must be used. This could include tests, assignments, projects, demonstrations and/or any applicable method. Evidence of the acquisition of competencies must be demonstrated through the Unit Standards, which enhance the integration of theory and practice as deemed appropriate at this level.

Formative Assessment is an on-going process which is used to assess the efficacy of the teaching and learning process. It is used to plan appropriate learning experiences to meet the learner's needs. Formative Assessments can include a mix of simulated and actual (real) practice or authentic settings. Feedback from assessment informs both teaching and learning. If the learner has met the assessment criteria of all the Unit Standards then s/he has achieved the Exit Level Outcomes of the Qualification.

Summative Assessment is concerned with the judgement of the learning in relation to the Exit Level Outcomes of the Qualification. Such judgement must include Integrated Assessment(s) which test the learners' ability to integrate the larger body of knowledge, skills and attitudes, which are represented by the Exit Level Outcomes. Summative Assessment can take the form of oral, written and practical examinations as agreed to by the relevant ETQA.

Integrated assessment must be designed to achieve the following:

- An integration of the achievement of the Exit Level Outcomes in a way that reflects a comprehensive approach to learning and shows that the Purpose of the Qualification has been achieved.
- Judgement of learner performance to provide evidence of applied competence or capability.

Assessors and moderators should make use of a range of Formative and Summative Assessment methods. Assessors should 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 assessed. The assessment of the Critical Cross-Field Outcomes should be integrated with the assessment of Specific Outcomes and Embedded Knowledge.

INTERNATIONAL COMPARABILITY

The main competencies at this level are setting-up production machines, troubleshooting and problem resolution, changing and setting tooling and leading a team.

The websites of various car companies like Daimler, Mazda, Honda, Toyota, Hyundai, Nissan, BMW, Nissan, VW and Ford, inter alia, were scanned to see what type of training takes place for those in assembly and in manufacturing. Little or no information could be found because

most of the training for assembly lines and manufacturing takes place in-house, and the content of the training is not made readily available.

The websites of car manufacturing countries like Japan, Korea, the United States, the United Kingdom, France and Germany were also checked but information was sparse.

Information was obtained from the following countries:

- United States.
- United Kingdom.
- Australia.

United States:

Chrysler in the United States offers a course entitled Production Worker Training.

One of the courses is called Production Set-Up Procedures (PSP 200).

Course Description:

This course describes the tasks and procedures of a Team Member/Team Leader with a special emphasis on quality, leadership, and communication. Participants will be given the opportunity to apply their knowledge during practical hands-on activities as a way to increase their effectiveness as a Team Member/Team Leader.

Learning Outcome:

Upon completion of this course, participants should be able to:

- Describe the production Team, Team Members and Team Leaders.
- Communicate effectively with co-workers.
- Understand Quality through Leadership.
- Work safely.
- Understand differences between measurement and gaging (gauging).
- Measure and gage work pieces accurately by applying basic math skills, and properly selecting and using several measurement devices.
- Understand the basics operation of machining process and the production line.
- Read CMM and other graphic reports.
- Use troubleshooting techniques.

Major Topics Covered:

- Teamwork.
- Measurement and gaging.
- Metric system.
- Troubleshooting.
- Reading CMM reports.
- Job setting safety.
- Math review.
- Machining.
- CNCs.

Course Duration: 40 hours.

Another Qualification that is very relevant to this Qualification is the Overview of the Manufacturing Process (OMP 100).

Course Overview:

Participants will gain an understanding of the automotive manufacturing process from vehicle design to manufacturing. The purpose, layout, jobs, processes, and technologies used in Chrysler manufacturing plants will be explored. This course will also focus on the role that the Production worker has in increasing quality and customer satisfaction.

Learning Outcome:

Upon completion of this course, participants will understand:

- The role and importance of Production workers in producing a quality product and the interrelationship of various operations performed throughout the manufacturing process.
- The definition and importance of quality and customer satisfaction.
- The history of automotive production and how it has evolved into the present system.
- The entire automotive production and manufacturing process including operations, jobs, and technologies.
- The different types of equipment used at Chrysler plants.
- The systems used in the plants that promote quality and reduce errors, such as Performance Feedback System (PFS) and MQAS.
- Plant standard operating procedures, and how following these procedures directly impacts quality and the customer satisfaction.
- The importance of teamwork and communication within the plants, and how they can improve product quality; and
- How just-in-time (JIT) production methods play a role in plant organization.

Major Topics Covered:

- Automotive manufacturing.
- The purpose, layout, jobs, processes, and technologies used in Chrysler manufacturing plants.
- Production worker responsibilities in product quality.

There is one Unit Standard in this Qualification regarding Preparing surfaces. It closely resembles the following course called Metal Finishing (MFP 100).

Course Description:

This course provides Reprocess Production workers with the knowledge and ability to detect and repair defects in sheet metal to a high level of quality. When completing this course, training participants should be able to locate defects, select and use tools appropriately, and remove various types of defects to create a paintable surface.

Learning Outcome:

Upon completion of this course, participants should be able to:

- Understand the properties of sheet metal.
- Identify and classify different types of damage.
- Identify sheet metal tools and understand their uses.
- Understand and perform damage removal techniques and procedures.
- Demonstrate correct soldering processes.
- Understand and perform correct sanding and blocking techniques.

Course Objective:

To provide the participant with the ability to accurately locate, analyze, access, repair, fill and sand panels to create a paintable surface.

Major Topics Covered:

- Safety and definitions.
- Types of steel used in automotive exterior sheet metal panels.
- Working properties of steel.
- Locating, analyzing, and repairing damage.
- Proper identification and use of hand and power tools.
- Types of solder.
- Correct soldering, sanding, and blocking techniques.

Course Duration: 40 hours.

Another course offered by Chrysler is called Production CNC Overview (CNP 100).

Course Description:

This CNC course for the production operators will cover basic CNC technology, program structure, and M and G code descriptions.

Learning Outcome:

The successful completion of this course should give workers a basic understanding of CNC machines and their functions as it relates to production requirements.

Major Topics Covered:

- Basic blueprint reading and shop level GD and T as it relates to machine movement and holding part size.
- CNC machine offsets for cutting tools and work fixtures.
- Basic SPC.
- Decimal and metric systems for offset adjustments in thousandths, tenths or microns.
- The importance of accurate inspection records and how they are used to control the manufacturing processes.

Course Duration: 40 hours:

Fullerton College in the United States offers a Qualification that partially resembles this Level 4 Qualification. It is the Machine Technology-Level I Certificate. It requires a total of 17-18 units with a minimum Grade of "C" in each course taken.

MACH 86 CNC Machine Set Up and Operation.

MACH 91 Introduction to Machine Tools OR MACH 116AB Machine Tools.

MACH 92 Intermediate Machine Tools.

MACH 93 Advanced Machine Tools.

A somewhat similar course is their CNC Operator Certificate Program requires a total of 14 units of which 14 units are in required courses with a minimum grade of "C" in each course taken.

MACH 91 Introduction to Machine Tools.

MACH 86 CNC Machine Set Up and Operation.
 MACH 87 CNC Parts Programming.
 MACH 88 Advanced CNC Set Up and Operation.

The Bureau of Labor Statistics gives the following information regarding those working in the automotive production process at this level:

Skilled production and maintenance workers-such as tool and die makers, industrial machinery mechanics, millwrights, machinists, pipe-fitters, and electricians-normally are hired on the basis of previous experience, education, and a good score on a competitive examination. Alternatively, the company may train inexperienced workers in apprenticeship programs that combine on-the-job training with classroom instruction. Typical courses include mechanical drawing, tool designing and programming, blueprint reading, shop mathematics, hydraulics, and electronics. Training also includes courses on health and safety, teamwork, quality control, computers, and diagnostic equipment. With training and experience, workers who excel can advance to become supervisors or managers.

The United Kingdom:

JPD Training in England offers a course in Root Cause Analysis to assist in troubleshooting. Troubleshooting is a critical competence in this Level 4 Qualification. The following is a description of the short course:

A one-day workshop on how to use and apply the 7-basic quality problem solving tools that is suitable for:

- Any employee, or group of caring employees, at any level in any type of industry who want to improve their work situation and the products or services supplied.

The Course:

- Understanding the improvement tools available.
- Tools application and use.
- A suggested RCS/improvement process.
- The 7-basic tools:
 - Cause and effect method.
 - Flow chart.
 - Run (trend) chart.
 - Control chart.
 - Pareto chart.
 - Histogram.
 - Scatter chart.

Australia

The Certificate IV in Competitive Manufacturing offered by TAFE gives the learner the opportunity of becoming a team leader within the manufacturing sector. While the Qualification has no direct automotive component competencies, it does have a number of manufacturing competencies which can easily be applied to automotive manufacturing at this level.

The following courses have relevance:

- Implement a Competitive Manufacturing System.
- Analyse Manual Handling Processes.
- Lead 5s in a Manufacturing Environment.
- Mistake Proof a Production Process.

- Apply Statistics to Processes in Manufacturing.
- Undertake Proactive Maintenance Analyses.
- Use Structured Problem Solving Tools.

Conclusion

Although the automotive component industry is one of the world's largest industries, information on training programmes, qualifications and courses for comparability purposes was not easy to find. The websites of car manufacturing and assembly countries were checked but revealed little information, and so did the websites of car manufacturers themselves. In many cases, training is carried out at sites where manufacturing and assemble plants are located; and this happens to be in diverse countries. Many of the websites are in the language of those countries.

However, the information obtained above reveals that training internationally is not as comprehensive as this Qualification. In many countries, training constitutes short courses or on-the-job training. Details regarding the duration, level and intensity of the latter are not available. The courses/programmes identified above overlap with this Qualification to varying degrees. Some of the courses offered by Chrysler best resemble this qualification in terms of competencies.

ARTICULATION OPTIONS

This Qualification lends itself to both Vertical and Horizontal articulation possibilities.

Horizontal articulation is possible with the following Qualifications:

- ID 64209: Further Education and Training Certificate: Metals Production, NQF Level 4.
- ID 58779: Further Education and Training Certificate: Production Technology, NQF Level 4.
- ID 48915: Further Education and Training Certificate: Manufacturing and Assembly Operations Supervision, NQF Level 4.

Vertical articulation is possible with the following Qualifications:

- ID 48634: Diploma: Production Technology, NQF Level 5.
- ID 64789: National Diploma: Automotive Repairs and Maintenance, NQF Level 5.

MODERATION OPTIONS

- Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant Education, Training, Quality, and Assurance (ETQA) Body.
- Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
- Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQA's policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQA's (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- 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, the integrated competence described in the Qualification and will include competence within core sales and the elective standards relevant to the economic sector.
- Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

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

- A minimum of 2 (two) years' practical, relevant occupational experience.
- A relevant Qualification at NQF Level 5 or higher.
- To be registered as an Assessor with the relevant ETQA.

NOTES

N/A

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5
Fundamental	9015	Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	6
Fundamental	119462	Engage in sustained oral/signed communication and evaluate spoken/signed texts	Level 4	5
Fundamental	119469	Read/view, analyse and respond to a variety of texts	Level 4	5
Fundamental	9016	Represent analyse and calculate shape and motion in 2- and 3-dimensional space in different contexts	Level 4	4
Fundamental	119471	Use language and communication in occupational learning programmes	Level 4	5
Fundamental	7468	Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	6
Fundamental	119459	Write/present/sign for a wide range of contexts	Level 4	5
Core	335856	Change and set tooling	Level 4	15
Core	335863	Identify and solve problems pertaining to production machines	Level 4	15
Core	242821	Identify responsibilities of a team leader in ensuring that organisational standards are met	Level 4	6
Core	243301	Manage safety and emergency incidences	Level 4	6
Core	14586	Monitor and control quality control practices in a manufacturing/engineering environment	Level 4	8
Core	335874	Prepare to set-up production machines	Level 4	11
Core	335865	Set-up production machines	Level 4	16
Elective	242815	Apply the organisation's code of conduct in a work environment	Level 4	5
Elective	242816	Conduct a structured meeting	Level 4	5
Elective	242822	Employ a systematic approach to achieving objectives	Level 4	10
Elective	242813	Explain the contribution made by own area of responsibility to the overall organisational strategy	Level 4	5
Elective	114877	Formulate and implement an action plan to improve productivity within an organisational unit	Level 4	8
Elective	335875	Implement and maintain business processes	Level 4	8
Elective	110009	Manage administration records	Level 4	4
Elective	11473	Manage individual and team performance	Level 4	8
Elective	254596	Manage time keeping records	Level 4	5
Elective	114589	Manage time productively	Level 4	4
Elective	242819	Motivate and Build a Team	Level 4	10
Elective	335861	Perform marking-off for non-routine shapes	Level 4	8
Elective	242811	Prioritise time and work for self and team	Level 4	5
Elective	118028	Supervise customer service standards	Level 4	8
Elective	15234	Apply efficient time management to the work of a department/division/section	Level 5	4

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION**None**



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Change and set tooling

SAQA US ID	UNIT STANDARD TITLE		
335856	Change and set tooling		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
9905	Change and set tooling	Level 4	16	Will occur as soon as 335856 is registered

SPECIFIC OUTCOME 1

Demonstrate an understanding of the theoretical concepts regarding tooling within a manufacturing and assembly context.

SPECIFIC OUTCOME 2

Apply safety, health and environmental (SHE) factors in tooling.

SPECIFIC OUTCOME 3

Prepare and select tooling.

SPECIFIC OUTCOME 4

Apply tooling techniques.

SPECIFIC OUTCOME 5

Change and adjust tooling.

SPECIFIC OUTCOME 6

Identify non-conformances in tooling.

SPECIFIC OUTCOME 7

Ensure quality in tooling.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

ID	QUALIFICATION TITLE	LEVEL
Core 71949	Further Education and Training Certificate: Automotive Components	Level 4



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Perform marking-off for non-routine shapes

SAQA US ID	UNIT STANDARD TITLE		
335861	Perform marking-off for non-routine shapes		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	8

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
9892	Select, use and care for marking off/out equipment: non routine shapes	Level 4	8	Will occur as soon as 335861 is registered

SPECIFIC OUTCOME 1

Plan and prepare for the marking-off of materials using templates.

SPECIFIC OUTCOME 2

Perform the marking-off.

SPECIFIC OUTCOME 3

Explain the importance of quality control and quality workmanship.

SPECIFIC OUTCOME 4

Use, care and store different tools and equipment.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	71949	Further Education and Training Certificate: Automotive Components	Level 4



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:*Identify and solve problems pertaining to production machines*

SAQA US ID	UNIT STANDARD TITLE		
335863	Identify and solve problems pertaining to production machines		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
9890	Anticipate and troubleshoot machine functioning	Level 4	16	Will occur as soon as 335863 is registered

SPECIFIC OUTCOME 1

Discuss production machines in terms of troubleshooting.

SPECIFIC OUTCOME 2

Discuss the specifications for the product and the machine.

SPECIFIC OUTCOME 3

Discuss monitoring techniques in the production process.

SPECIFIC OUTCOME 4

Compile and analyse information or data.

SPECIFIC OUTCOME 5

Apply problem solving techniques.

SPECIFIC OUTCOME 6

Monitor, conduct maintenance and follow up in a production process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71949	Further Education and Training Certificate: Automotive Components	Level 4



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Set-up production machines

SAQA US ID	UNIT STANDARD TITLE		
335865	Set-up production machines		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	16

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
9889	Set up production machines	Level 4	30	Will occur as soon as 335865 is registered

SPECIFIC OUTCOME 1

Demonstrate knowledge of setting-up production machines.

SPECIFIC OUTCOME 2

Implement quality control procedures.

SPECIFIC OUTCOME 3

Perform line inspections.

SPECIFIC OUTCOME 4

Analyse machine data.

SPECIFIC OUTCOME 5

Explain safety, health, environment and quality requirements.

SPECIFIC OUTCOME 6

Record, report and communicate to improve the production process.

SPECIFIC OUTCOME 7

Discuss the theory regarding maintenance within the context of setting-up production machines.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71949	Further Education and Training Certificate: Automotive Components	Level 4



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Prepare to set-up production machines***

SAQA US ID		UNIT STANDARD TITLE	
335874		Prepare to set-up production machines	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	11

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1

Demonstrate knowledge and theory of the production environment.

SPECIFIC OUTCOME 2

Explain process performance.

SPECIFIC OUTCOME 3

Discuss knowledge and theory of product and materials.

SPECIFIC OUTCOME 4

Discuss knowledge and theory of the machines.

SPECIFIC OUTCOME 5

Explain safety, health, environment and quality requirements.

SPECIFIC OUTCOME 6

Plan to set-up machines.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71949	Further Education and Training Certificate: Automotive Components	Level 4



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Implement and maintain business processes

SAQA US ID	UNIT STANDARD TITLE		
335875	Implement and maintain business processes		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 4	8

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
13254	Contribute to the implementation and maintenance of business processes	Level 4	10	Will occur as soon as 335875 is registered

SPECIFIC OUTCOME 1

Demonstrate understanding of procedure related to legislation.

SPECIFIC OUTCOME 2

Explain the company's vision, mission and values.

SPECIFIC OUTCOME 3

Discuss company processes.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	71949	Further Education and Training Certificate: Automotive Components	Level 4



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:**National Certificate: Automotive Components**

SAQA QUAL ID		QUALIFICATION TITLE	
71969		National Certificate: Automotive Components	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National Certificate	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	125	Level 5	Regular-Unit Stds Based

This qualification does not replace any other qualification and is not replaced by another qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION**Purpose:**

This Qualification is for any individual who is, or wishes to be, involved in an automotive components environment, either within the manufacturing or assembly sector. The Qualification contains all the skills, knowledge, values and attitudes required by a learner who needs mainly to be able to perform coordinating and junior level management functions within one of many contexts in the diverse automotive components environment. An individual acquiring this Qualification will be able to contribute towards the efficient operation of the entire production process.

The main competencies in this Qualification are about coordinating, managing and optimising processes, procedures and efficiencies in the production environment. The qualification offers the learner a number of competencies and skills that will enable the learner to acquire a thorough understanding of the production environment predictive and preventive maintenance, leading a work group to produce products, maintaining business processes and manufacturing efficiencies, managing an inventory and optimising manufacturing processes and the quality assurance system, all within the ambit of health and safety legislation.

Qualifying learners will also be able to maintain and support the various policies and procedures related to the safety, health, environment and quality systems that govern their workplace.

The Fundamental and Core component contains competencies that cover the following areas:

- Analysing work requirements.
- Communication techniques.
- Mathematical and statistical techniques.
- Coordinate a work group to produce products.
- Coordinating predictive and preventive maintenance.
- Maintain business processes.
- Maintain manufacturing efficiencies.
- Manage an inventory and the supply chain of resources.
- Optimise manufacturing processes.

- Optimise the quality assurance system.
- Health and safety.

Rationale

This is the fourth Qualification in a series of four qualifications that ranges from Levels 2-5. Typical learners will be persons who are currently working in an automotive components environment and who wish to follow a career in coordinating and management in an automotive components environment, in a variety of contexts.

The learner will either operate within an automotive manufacturing or assembly environment. At this level learners will be involved in the complex operation of coordinating and managing a production process to ensure increased efficiency and professionalism. The learner will coordinate a range of functions and processes that will enhance the level of operation across all the systems within their scope of operation. Through this qualification the learner will acquire higher level leadership skills in order to perform at this level.

Assembly involves either working on the assembly line at a motor assembly plant or in any environment in which already manufactured or finished components and products are assembled in a production line or process. Manufacturing occurs in an environment in which products, which will be used in an assembly environment, are made or manufactured using raw materials. The learner will also appreciate their role within the broader manufacturing/assembly environments in the automotive components sector.

In terms of the learning pathway, this Qualification will allow this learner to progress from operating machines and assembling/manufacturing components at NQF Level 2 to adjusting machines performing first line maintenance by completing the National Certificate: Automotive Components at NQF Level 3 to setting-up production machines, trouble shooting machine functioning and changing and setting tooling by acquiring the Further Education and Training Certificate: Automotive Components at NQF Level 4 and to working in a coordinating and management capacity within an automotive components environment by completing the National Certificate: Automotive Components at NQF Level 5.

The automotive components sector falls within the ambit of South Africa's large motor industry. There are huge motor assembly plants in several parts of the country, primarily in the Eastern Cape, Gauteng and Kwa Zulu Natal provinces. It's a sector that employs a large number of people. The automotive components sector covers two broad areas, namely, manufacturing and assembly. It is also a sector that comprises of a range of diverse but related industries and is characterised by sophisticated technological processes. Companies and/or industries within this sector operate in a global competitive and challenging environment. The products produced have to respond to a wide variety of customer requirements and safety, health, environmental, quality and risk management issues.

The highly developed automotive components sector is well-established and economically powerful. In terms of transformation in the country, learners will require skills and competencies to gain access to positions within management structures by completing other qualifications and training. It will be in the interest of the country and the sector to ensure that those who operate in the automotive components environment are trained according to this Qualification to improve productivity and efficiency.

This national Qualification and its related unit standards were developed to standardise the accreditation of learning programmes, resulting in improved quality management in terms of programme delivery.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED IN PLACE

Learners wishing to study towards this Qualification are assumed to be competent in:

- Communication at NQF Level 4.
- Mathematical Literacy at NQF Level 4.

Recognition of Prior Learning:

This Qualification may be achieved in part (or whole) through the recognition of relevant prior knowledge and/or experience. The learner must be able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. As part of the provision of recognition of prior learning providers are required to develop a structured means for the assessment of individual learners against the Unit Standards of the Qualification on a case-by-case basis. A range of assessment tools and techniques during formative and summative assessment procedures should be used which have been jointly decided upon by the learner and the assessor. Such procedures, and the assessment of individual cases, are subject to moderation by independent assessors. The same principles that apply to assessment of this Qualification also apply to Recognition of Prior Learning.

Learners may provide evidence of Recognition of Prior Learning for which they may receive credit towards the Unit Standards and/or the Qualification by means of portfolios or other forms of appropriate evidence as agreed to between the relevant provider and relevant ETQA or ETQA that has a Memorandum of Understanding in place with the relevant ETQA.

Recognition of Prior Learning is particularly important, as there are people in the Automotive Components sector with a variety of skills and competencies of differing quality and scope. It is important that a Recognition of Prior Learning process be available to assist in making sense of existing competencies and skills, and helping to standardise these competencies and skills towards a common standard.

QUALIFICATION RULES

The Qualification consists of a Fundamental, a Core and an Elective Component.

To be awarded the Qualification learners are required to obtain a minimum of 125 Credits as detailed below.

Fundamental Component:

The Fundamental Component consists of Unit Standards to the value of has 32 Credits, all of which are compulsory.

Core Component:

The Core Component consists of Unit Standards to the value 85 Credits, all of which are compulsory.

Elective Component:

The Elective Component consists of Unit Standards that will impart a variety of competencies to the learner. Learners are to choose Elective Unit Standards totalling a minimum of 8 Credits to attain a minimum of 125 Credits for this Qualification.

EXIT LEVEL OUTCOMES

Qualifying learners will be able to:

1. Explain the role of maintenance and quality assurance in maintaining production efficiency.
Range: Production involves both manufacturing and assembly contexts.
2. Improve the production process by optimising manufacturing processes and efficiencies and managing inventory.
3. Explain and apply business processes.
4. Coordinate teams to maintain efficiency in production.

Critical Cross-Field Outcomes:

Identify and solve problems in which responses display that responsible decisions using critical and creative thinking have been made when:

- Identifying root causes of problems in maintenance and finding solutions.
- Identify and solve problems related to the work of the team in the process.
- Identify and correct work practices which impact on production flow.
- Identifying barriers to communication and resolving these problems.
- Taking corrective action after conducting an internal audit.
- Identifying problems and using mathematical and statistical techniques to resolving them.
- Distinguishing between types of indicators and detecting non-conformances.
- Identifying opportunities for performance improvement in a complex process with several inter-related variables.
- Applying a range of problem identification and solving principles and a range of techniques to achieve improved performance.

Work effectively with others as a member of a team, group, organisation, community to:

- Ensure health and safety in maintenance.
- Coordinate maintenance schedules.
- Set team goals and monitor team performance.
- Confirm and check customer specifications.
- Plan, prepare and conduct an internal audit.
- Build relationships to maintain efficiencies.
- Improve team and individual performance by implementing changes to procedure and practice.

Organise and manage oneself and one's activities responsively and effectively to:

- Identify root causes of problems in the production process and find solutions.
- Ensure health and safety in maintenance.
- Coordinate maintenance schedules.
- Plan a production process.
- Allocate tasks to team members according to their competencies.
- Co-ordinate work group performance during a production process.
- Recommend improvements to the company using appropriate communication skills.
- Collect and analyse data.
- Prepare a budget.
- Check customer specifications.
- Planning, preparing and conducting an internal audit and evaluate and report findings.
- Performing mathematical and statistical calculations to obtain a better understanding of the process and resolve problems.
- Conceptualise, develop and implement plans to generate improvements.

Collect, analyse, organise and critically evaluate information to:

- Identify constraints.
- Collect and analyse information on team performance to identify performance problems where coaching/training is required.
- Maintain and improve business processes.
- Evaluate company's information systems.
- Ensure effective implementation of corrective action by auditee.
- Interpret data and information.
- Resolve problems related to a variety of aspects in production.
- Analyse process-related information, maintain records, summarise information and generate reports related to efficiency.
- Identify deviations.
- Apply data analysis techniques.

Communicate effectively using visual, mathematical and/or language skills in the modes of oral and/or written presentation to:

- Coordinate maintenance schedule.
- Collect and analyse information on team performance to identify performance problems where coaching/training is required.
- Recommend improvements.
- Report findings to auditees and clients.
- Provide feedback to appropriate personnel.
- Explain, discuss and motivate change.
- Negotiate for resources and time.

Use science and technology effectively and critically, showing responsibility towards the environment and the health of others by:

- Using the equipment and software according to manufacturer's instructions.

Demonstrate an understanding of the world as a set of related systems by recognising that the problem-solving contexts do not exist in isolation when:

- Dealing with a variety of process-related problems that impact on all the sub-systems in the entire production process.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcomes 1:

- The purpose of predictive and preventative maintenance is explained in terms of their benefit to the production process.
- Root-causes of break-downs in the production process are identified and solutions are proposed.
- The resources that contribute to the production process are appraised to identify challenges for maintenance and propose solution.
- Safety, health and environmental (SHE) factors pertaining to maintenance are discussed to ensure safety of self and others.
- The coordination of maintenance schedules with production schedules is discussed in relation to production scheduling systems and maintenance scheduling.
- The reasons why quality is important to a modern business are explained through discussion on the concepts pertaining to it and the theories of quality experts.
- The elements that make up an effective Quality Assurance system are described by discussing the Transformation System, the Quality Delivery System (QDS) and the Quality Information System (QIS).

- Quality audits of a department/customer/supplier related to the production environment are conducted to identify non-conformances and optimise the quality assurance system.

Associated Assessment Criteria for Exit Level Outcomes 2:

- Process-related information and data is collected and processes are analysed to identify potential problems.
- The root cause of the problem is investigated and options are generated and tested to achieve improvement.
- Objectives are set, a plan is developed and improvements are implemented to optimise the process.
- Changes are monitored and evaluated and the optimisation process is reviewed and adjusted until objectives are achieved.
- Production standards are adjusted and updated and improvements reported.
- Targets and levels of efficiency are set and agreed upon to improve efficiency of the system.
- Deviations, problems and incidents pertaining to efficiency are identified and addressed to improve production efficiencies.
- Production activities, safety, product quality and housekeeping are monitored and evaluated.
- Issues pertaining to continuous improvement are discussed with the workgroup and relevant people to maintain production efficiency.
- Materials are positioned to maintain the production flow.
- Material movement is monitored and documented to ensure sufficient supply.
- Logistics are changed and inventory updated to respond to production and engineering changes.
- A Safety, Health and Environment management system is developed, implemented and maintained to SHE awareness and compliance at all levels.

Associated Assessment Criteria for Exit Level Outcomes 3:

- Business processes are discussed in terms of the need to improve them.
- Data collection processes and methods of analysis that companies/organisations could use to achieve a better understanding of their processes are explained.
- Customer satisfaction is measured using the data obtained.
- Improvements to the Supplier Evaluation Program are recommended to enhance the relationship between company and supplier.
- Relationships with internal and external customers are discussed to find ways of improving these relationships.
- Mathematical and statistical calculations are performed to achieve a deeper understanding of business processes.
- Mathematical and statistical techniques are applied to a variety of business process factors.
 - Range: Business process factors include but are not limited to teams and staff, safety in the workplace, production, costing and pricing, inventory and stock, budgets.

Associated Assessment Criteria for Exit Level Outcomes 4:

- A production process is planned in order to coordinate the activities of the various stages involved in the process.
- Work requirements of different positions in the workplace are identified and tasks are allocated to team members according to their competencies.
- Company policies, procedures and regulations pertaining to staff are discussed to ensure compliance with health and safety legislation.
- Work group performance during a production process is coordinated to deal with deviations and make adjustments.
- Information is collected and feedback is given on the production process to the work group.
- Communication channels in business and everyday life are identified in order to respect diversity and deal with barriers to communication.

- Written and verbal communication is conducted using appropriate communication aids and language within the business environment.
- Analysis of work requirements is compared with the relevant business plan and macro environment.

Integrated assessment:

The importance of integrated assessment is to confirm that the learner is able to demonstrate applied competence (practical, foundational and reflexive) and ensure that the purpose of this Qualification is achieved. Both formative and summative assessment methods and strategies are used to ensure that the Exit Level Outcomes and the purpose of the Qualification are achieved through achieving the Unit Standards. Learning, teaching and assessment are inextricably linked.

Learning and assessment should be integrated and assessment practices must be fair, transparent, valid and reliable. A variety of assessment strategies and approaches must be used. This could include tests, assignments, projects, demonstrations and/or any applicable method. Evidence of the acquisition of competencies must be demonstrated through the Unit Standards, which enhance the integration of theory and practice as deemed appropriate at this level.

Formative assessment is an on-going process which is used to assess the efficacy of the teaching and learning process. It is used to plan appropriate learning experiences to meet the learner's needs. Formative assessments can include a mix of simulated and actual (real) practice or authentic settings. Feedback from assessment informs both teaching and learning. If the learner has met the Assessment Criteria of all the Unit Standards then she/he has achieved the Exit Level Outcomes of the Qualification.

Summative assessment is concerned with the judgement of the learning in relation to the Exit Level Outcomes of the Qualification. Such judgement must include integrated assessment(s) which test the learners' ability to integrate the larger body of knowledge, skills and attitudes, which are represented by the Exit Level Outcomes. Summative assessment can take the form of oral, written and practical examinations as agreed to by the relevant ETQA.

Integrated assessment must be designed to achieve the following:

- An integration of the achievement of the Exit Level Outcomes in a way that reflects a comprehensive approach to learning and shows that the purpose of the Qualification has been achieved.
- Judgement of learner performance to provide evidence of applied competence or capability.

Assessors and moderators should make use of a range of formative and summative assessment methods. Assessors should 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 assessed. The assessment of the critical cross-field outcomes should be integrated with the assessment of specific outcomes and embedded knowledge.

INTERNATIONAL COMPARABILITY

The following constitute the set of competencies in this NQF Level 5 Qualification are as follows:

- Analysing work requirements.
- Communication techniques.
- Mathematical and statistical techniques.

- Coordinate a work group to produce products.
- Coordinating predictive and preventive maintenance.
- Maintain business processes.
- Maintain manufacturing efficiencies.
- Manage an inventory and the supply chain of resources.
- Optimise manufacturing processes.
- Optimise the quality assurance system.
- Health and safety.

This Qualification mainly speaks to coordinating, optimising processes within the production environment; hence, it speaks to many junior management competencies while calling for a thorough knowledge of the production environment. It was a challenge to find a Qualification similar to this one; mostly short and very short courses were located.

Information was obtained from the following countries:

- The United States.
- The United Kingdom.
- Australia.
- New Zealand.

A separate category entitled Europe (except the UK) has been used to indicate relevant courses in other parts of this region.

Other countries scanned included France, Germany, Japan, India and Korea but little or no information was obtained.

United Kingdom

Perhaps the course that comes closest to that which is envisaged by the Unit Standard on maintenance in this Qualification is the course offered by Strategic Maintenance Planning Ltd. The following is a course description:

- Planned Preventive Maintenance Implementation Training.
- Planned Preventive Maintenance Intensive: One week.

The course leaves the classroom environment in order to follow a 'real-life' implementation of a limited number of factory assets. Delegates are taken step-by-step through the implementation procedure for site assets.

The course covers the following:

- Development of a Structured Asset Register.
- To Draft: Process Map.
- To Define: Site, Area, Location, Main Asset, Sub Asset.
- To Define: System, Sub-System.
- To Define: Groups, Sub-Groups.
- To Define: Basic Asset details.
- FMEA analysis on the main and sub-assets identified.
- Compilation of appropriate maintenance instructions.
- Scheduling the maintenance instructions.
- Generation of Work Lists.
- Completion of a one-off PPM work flow sign-off.
- Generation of reports.
- Set up of one or two supplier details as an example.

- Implementation of the above data within HolisTech.

The advantages of Strategic Maintenance Planning Maintenance courses include:

- Companies can reap the benefits of implementing using on-site resources, yet be sure that they are following tested and proven methodologies to ensure optimum effectiveness and minimise implementation time.
- Customer organisation's staff gain the necessary skills to set up an effective planned maintenance system, and as importantly, are able to continuously improve and refine the system as changes in the working environment occur.
- Implementation costs are reduced with most of the time consuming work being completed on-site, rather than through outside contractors.
- Companies benefit through association with Strategic Maintenance Planning who can provide assistance suited to customer needs-help can be from complete implementation through to periodical audit and review, ensuring the on-going effectiveness of the system.

Management/Leadership competencies:

If one considers that this NQF Level 5 Qualification has a number of management skills, then the following management courses could be considered.

The School of Management of Cranfield University offers a series of two to three week intensive short courses that cover a number of competencies offered by this Qualification. The Developing General Management Potential programme is designed to accelerate the early development of promising managerial careers and allows a manager to develop his/her visibility, credibility and maturity. The manager will make a wider business contribution through personal development and the acquisition of managerial knowledge. Managerial knowledge is translated into action through a powerful development process emphasising personal contribution, style and impact.

The programme challenges the manager to:

- Realise her/his own organisational leadership capability and influence.
- Add managerial value without formal authority and power.

Some of the specific competencies that a learner will acquire during the course are:

- Make the transition from an operational into a managerial role.
- Develop a wider perspective on management and business.
- Become better informed about management thinking.
- Understand the politics and social dynamics of organisations.
- Challenge the status quo in constructive ways.
- Differentiate between good and bad managerial practice.
- Creating change through pockets of good practice.

Some of the specific areas of focus that overlap with this Qualification are:

- Developing managerial potential: Understanding managerial roles distinguishing between managerial and operational contributions assessing and developing individual management style and impact.
- Organisational culture and change: Exploring how different ways of thinking affect managerial contribution determining the role of individual managers in organisational change creating change through pockets of good practice.
- Leadership and teamwork: Understanding the roles of leadership and management applying the concept of leadership at all levels understanding how to develop as a leader from within the organisation, appraising the use of teams in organisations exploring the role of the individual in teams.

- Finance and management accounting: Understanding and using financial information ratio analysis managing the budgetary process investment appraisal interpreting corporate finance issues.
- Operations management: Defining the role of manufacturing and service operations managing the relationship between operations and marketing management improving operational processes.
- Strategic management of people: Identifying strategic people processes and the implications for design and implementation examining the role and relevance of the HR function in the strategic management of people.

Cranfield University also offers a series of short courses under 'leadership', which covers most of the leadership and people management competencies of this Qualification. The course explores the many diverse issues that need to be addressed so that the manager can be an effective and successful leader. The personal awareness programmes assist one in understanding own leadership style, drivers, successes and the challenges one faces.

The management development programmes stimulate the learner to think about his/her contribution as a strategic leader. In addition the course assists the learner to lead and influence teams, lead through change and understand organisational politics to aid her/his your leadership contribution.

Some of the short courses that constitute the Leadership module are:

- High Performance Leadership (duration 10 days full-time):
 - It provides a unique, sustainable pathway to high performance and also provides a vision and motivation for others.
- The Director as Strategic Leader (duration 5 days full-time):
 - It addresses the question of an effective leader by understanding strategic leadership and one's role in the process.

In Ireland, Europa Academy is one of Europe's most advanced training campus for motor industry professionals. They offer high level course within the automotive environment. However, none of their courses focus on the manufacturing and assembly sectors of the automotive industry.

However Europa Academy also offers generic Leadership and Management Courses.

To remain both competitive and profitable, in any business today, it is essential to focus on how the business is managed and in particular the quality of our managers and leaders. Europa Academy delivers leadership and management programmes which are critical in today's competitive market. The ability to manage effectively and to make good decisions is essential to continued growth and the achievement of acceptable levels of performance.

The content of Europa Academy Leadership and Management Training Programmes is based on the practical and essential topics relevant to managers and the real challenges they face. The key objective of our management programmes is to equip managers with the skills needed to perform in a confident and professional way. The success of any business is dependant on the ability of its managers to achieve targeted levels of performance. Successful managers, therefore, need to be trained, developed and motivated.

The course entitled 'Provocative Leadership' consists of the following key components:

- Leadership & Learning.
- Personality Assessment & Personal leadership.
- 360° Leadership Practices Review.
- Values in Practice.

- Relationships & Behaviours in Team Environments.
- Coping with the Stress of leading.
- Understanding & Enhancing Emotional Intelligence.

New Zealand.

Although the following Unit Standards on the NZQA are confined to preventive maintenance in the automotive service industries, the competencies are applicable to a learner coordinating maintenance activities in an automotive components assembly or manufacturing plant.

Title: Implement a schedule for an automotive preventive maintenance programme at NQF Level 5, 2 Credits.

Purpose:

This Unit Standard is for people in the automotive service industries. People credited with this unit standard are able to determine the extent of and prepare to implement a preventive maintenance programme, and implement a preventive maintenance programme to suit a particular vehicle or machine.

Definition:

Company requirements refer to instructions to staff on policy and procedures which are documented in memo or manual format and are available in the workplace. These requirements include but are not limited to company specifications and procedures, work instructions, manufacturer specifications, product quality specifications, and legislative requirements.

This Unit Standard may be assessed against in relation to a single vehicle or machine, or a fleet of similar vehicles or machines used for a similar purpose.

Elements and performance criteria:

Element 1:

Determine the extent of and prepare to implement a preventive maintenance programme.

Performance criteria:

Vehicle and driver information is obtained that will help determine the type and extent of the preventive maintenance programme.

The preventive maintenance schedule to be implemented is selected in accordance with company requirements.

A decision on the programme to be established for a particular vehicle or machine is made in accordance with company requirements.

Element 2:

Implement a preventive maintenance programme to suit a particular vehicle or machine.

Performance criteria:

A preventive maintenance programme is implemented in accordance with company requirements.

Another helpful Unit Standard is entitled 'Analyse automotive preventive maintenance programmes', which is at NQF Level 5 and carries 2 Credits.

This theory-based unit standard is for people in the automotive service industries. People credited with this unit standard are able to analyse automotive preventive maintenance programmes.

Elements and performance criteria.

Element 1:

Analyse automotive preventive maintenance programmes.

Performance criteria:

- The reasons for periodic servicing and preventive maintenance schedules are explained in accordance with company requirements.
 - Range: Manufacturer design criteria, prevention of major repairs, customer, convenience, fleet requirements, down time.
- The importance of adhering to manufacturer recommendations is explained in terms of impact on warranty and service limits.
- The need to vary service schedules from manufacturer recommendations is justified, and variations are explained in terms of the vehicle's usage.
 - Range: Usage includes but is not limited to-when abnormal driving and operating conditions apply, when distance travelled is very high and very low.
- Factors to take into account when researching programmes for a particular vehicle or machine are explained in accordance with company requirements.
 - Range: Includes but is not limited to-manual systems, computer database; vehicle or machine needs, vehicle or machine operation, cost, availability for service, servicing equipment and facilities.
- The analysis of driver operating logs, and vehicle or machine servicing history data is explained in terms of identifying potential vehicle or machine defects and unsuitable operating conditions.
- The types of preventive maintenance programmes are evaluated and compared to determine the best option for a particular application.
 - Range: Includes but is not limited to-manufacturer schedules, oil company schedules, transport operator's in-house schedules.

United States:

Probably one of the most comprehensive set of modules that cover a number of competencies in this Qualification is offered by JH Berks and Associates in the US. The following is a description of the Lean Manufacturing modules.

- Module 1; Introductory Lean Manufacturing Concepts: Manufacturing management challenges. Manufacturing Requirements Planning and Just-In-Time manufacturing management concepts. Lean Manufacturing overview. Pull production and cellular manufacturing. Robust processes and quality improvement. Eliminating lost time. Setup time reduction. Phased inventory. Work-in-Process reduction. The Toyota system. Case studies. Group discussion.
- Module 2; Finding and Eliminating Lost Time. Lost time definitions: Production time versus lost time. Lost time causes. Plant layout, inventory location, and process limitation factors. Delay ratio analysis overview. Preparing the delay ratio analysis. Delay ratio analysis results interpretation. Acting on delay ratio analysis findings. The power of recovering lost time. Conquering lost time. Case studies and delay ratio analysis example.

- Module 3; Takt Time, Capacity and Load Considerations: Takt time definition and implications. Takt time versus cycle time. Capacity definitions. Load definitions. Capacity versus load considerations. The relationship between takt time, capacity, and load, and how these factors affect efficiency and the ability to deliver products on schedule. Determining takt time, capacity and load. Capacity versus load analysis. Finding and using hidden capacity. Case studies.
- Module 4; Lean Production Flow: Defining the existing process. Flow charting. Identifying and eliminating unnecessary steps. Optimizing the process flow. Identifying and eliminating redundant work. Defining optimized quality assurance points. Identifying tooling and material requirements at each step. Plant layout considerations. Advantages and disadvantages of straight line versus cellular flows. Balancing the operation. Lost time considerations. Sample layouts. Case studies.
- Module 5; Setup Time Reduction: Setup time definition, philosophies, and reduction approaches. Setup as a lost time driver. Setup reduction advantages. Setup reduction approaches. Instilling operator, manufacturing engineer, numerically-controlled-machine programmer, engineer and supervisor teamwork in reducing setup times. Fixturing, tooling, procedural and storage considerations. Prekitting. Minimizing walking, fastening, and adjustment. Internal versus external setup considerations. Case studies.
- Module 6; Process and Product Robustness. Robustness definition: Objectively identifying non-conformance history and potential non-conformance causes. Quality measurement systems. Unearthing failure causes in simple and complex systems. Using failure mode assessment and assignment matrices. Corrective action options and order of precedence. Corrective action boards. Nonconforming material management. Using the material review function as a vehicle for forcing corrective action. Evaluating corrective action efficacy. Case studies.
- Module 7; Visual Manufacturing. Visual manufacturing definitions: The case for quality measurement and production status transparency throughout the organization. Shop floor practices, including work-in-process inventory locations and levels. Tooling shadow boards. The 5S Program: Sorting, simplifying, scrubbing, stabilizing, and maintaining self-discipline. The "Mr. Clean" approach. Dashboard reports and recommended dashboard metrics. Case studies.
- Module 8; Integrating Purchasing Activities. Integrating supplier load versus capacity factors into your lean manufacturing philosophy. Managing the external factory. Timing supplier deliveries. Assuring purchase order due dates support your manufacturing need times. The "Wonder Bread" approach. Reducing in-house supplier inventories in your facility. Implementing and using a supplier quality and delivery rating program to drive supplier selection and performance. Case studies.
- Module 9; The Six Sigma Approach. Six Sigma program definitions: Quality program evolution into the Six Sigma concept. Statistical considerations underlying the Six Sigma approach. The Motorola and General Electric experience. Six Sigma statistical methods. Continuous improvement. Process design and management. Statistical process control. Variability reduction. Voice of the customer. Design of experiments. Case studies.
- Module 10; Putting It All Together: Selling the Lean Manufacturing philosophy internally and externally. Recommended overall implementation approach. Targeting quick initial successes. Likely risk and conflict issues. Recommended conflict resolution strategies. Recommendation risk management strategies. Overcoming resistance to change. Course review and program conclusions.

Training in Predictive and Preventive Maintenance by US auto assembly plants.

Regarding preventive and predictive maintenance within an automotive components environment, training is conducted in-house in many assembly and manufacturing plants. An article published in the US says the following:

The high levels of efficiency automation brings to auto manufacturing brings new dimensions to the maintenance process as well. Experts say maintaining the mechanical, hydraulic and pneumatic components of robotic equipment is similar to that of non-automated equipment, but diagnosing these problems can be tricky. So many take advantage of advanced troubleshooting procedures, as well as high-tech predictive methods to simplify the job.

At GM, these types of specialized tasks are crucial elements in the quality program for maintenance. The company has employed a program of planned maintenance tasks for equipment that is deemed critical, which includes performing scheduled checks and using high-tech equipment like infrared, thermography and ultrasound for predictive maintenance activities.

As equipment and troubleshooting techniques become more advanced, maintenance workers are faced with the challenges of learning how to pinpoint problems and fix them, which demands intensive training. This means that the education and training of skilled tradesmen needs to be more sophisticated.

The General Physics Corporation in Maryland, US, offers courses to help learners optimize and align a company's people, processes and technologies.

GP offers a wide range of training and consulting services that include:

- Product processes, troubleshooting, teardown, and repair.
- Operational excellence and quality systems.
- Safety compliance and assurance.
- Automation system controls, operation, troubleshooting, and repair.
- Maintenance training.
- Equipment documentation, procedures, and visual tools.
- Training outsourcing.

The above are offered as individual courses and not as part of a complete Qualification. However, the courses share many of the competencies of the National Certificate: Automotive Components at NQF Level 5, as will be seen.

The Cincinnati Workforce Development Center offers professional, managerial and leadership courses and training for a wide variety of industries, such as Automotive Supervision and Management.

Programs for professional, managerial, and leadership training at The Workforce Development Center (WDC) at Cincinnati State mean business all the way: from business basics and quality improvement to leadership training and communication skill-building.

Europe (excepting the UK):

Manage Inventory Training:

The Central European University (CEU) offers a short course in inventory management. The course is entitled 'Managing the extended Supply Chain (SCM)'. The objective of this module will be to deliver an overview of Supply Chain Management principles, tools and techniques for the purpose of helping companies reduce supply chain related costs and improve customer service. The course will take a holistic view while simultaneously looking at methods, tools and techniques. The training will focus primarily on the interactions between suppliers and

customers and how collaboration produces benefits for all partners in the chain. A variety of industry perspectives will be examined including the Automotive business. Key topics include:

- Managing complexity.
- Valuing inventory performance.
- Inventory management.
- Network optimization.
- Design for Logistics.
- Delayed differentiation.
- Forecasting.
- Demand amplification.
- Customer collaboration.
- Leveraging technology.
- Postponement strategies.
- E-procurement.
- Purchasing/strategic sourcing.

While this course has many more competencies than the inventory management in this qualification, the Unit standard compares well with this course.

Management/Leadership competencies:

If one considers that this NQF Level 5 Qualification has a number of management skills, then the following management courses could be considered.

Insead, which has campuses in Europe (Paris) and Singapore, offers several management programmes of a short duration. Many of the management competencies in this Qualification resonate with those in the Management Acceleration Programme (MAP).

The Management Acceleration Programme (MAP) is for those who are in their early stages of their careers as managers, with approximately five years of work experience. The programme is to help high-potential executives and future leaders move up the chain of authority and responsibility.

Acting as a navigation tool for early career high-potential executives, MAP equips them with a general management perspective. It broadens their general business knowledge, deepens competence in key functional disciplines and expands leadership skills through coaching. Framed by the crucial concept of value-based management, participants learn how to create- and capture-value while forging a community with international like-minded high potentials.

Key benefits:

- Acquire a thorough knowledge of all the major management disciplines, leading to greater awareness of how the organisation operates and resulting in better decision-making skills.
- Test newly-learned skills by "running the business" in a real-life simulation.
- Increase and accelerate career potential while broadening perspectives to take on greater responsibilities in the future.
- Build their competences in managing and leading people and strategy.

Insead also offers a number of Leadership Programmes whose competencies are reflected in the National Certificate: Automotive Components at NQF Level 5. Some of the components of the Leadership Programme are:

- Consulting and Coaching for Change-Creating reflective change agents. The purpose is to build the psychoanalytical dimension into organisational change initiatives or coaching and gain new approaches to resolving issues of human behaviour.

- The Leadership Transition: Becoming a leader is within your reach. The purpose is to personalise leadership style to influence and inspire those one leads as a senior manager.
- Leadership for Creativity: Build high performance organisations. The purpose is to address the challenges senior leaders face and to understand the importance of emotional intelligence, creativity and innovation to successful leadership.
- Learning to Lead: The transition from "Doing" to "Getting it done" through others. The purpose is to develop people skills and learn how to manage your own team of subordinates as you progress from an individual contributor to a new manager.

Australia:

Monash University in Australia has a similar programme called Executive Certificate in Management. This course has been designed for experienced managers without a first degree to enable them to obtain an introductory qualification in management. The course content focuses on an appreciation of the management role and the crucial contribution that managers make to organisational effectiveness. The course examines major theories and concepts concerning the behaviour and performance of individuals and groups in organisations. Moreover, it explores the importance of self-awareness, learning and learning styles, self-management and specific managerial competencies.

Course structure:

- Students must complete two core units (12 points):
 - Managing people and organisations.
 - Managerial effectiveness.

Conclusion:

This NQF Level 5 is a hybrid between a management qualification and competencies that are firmly rooted in the production/manufacturing environment. It represents the culmination of a series of Qualifications in automotive components that start at Level 2. The series gradually builds up competencies directly related to the production line in NQF Levels 2 and 3 and moves towards leadership at NQF Level 4 while still emphasising manufacturing and production competencies. NQF Level 5 represents a greater shift towards management even while imparting production related skills to the learner.

Hence, the international comparability yielded short courses with regards to the production competencies but more substantial learning programmes in the management aspect.

ARTICULATION OPTIONS

This Qualification lends itself to both vertical and horizontal articulation possibilities.

Horizontal articulation is possible with the following Qualifications:

- ID 48634: Diploma: Production Technology, NQF Level 5.
- ID 22773: National Certificate: Mechatronics, NQF Level 5.
- ID 49448: National Certificate: Plastics Manufacturing, NQF Level 5.

Vertical articulation is possible with the following Qualifications:

- ID 48639: Higher Diploma: Production Technology, NQF Level 6.

MODERATION OPTIONS

- Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant Education, Training, Quality, and Assurance (ETQA) Body.

- Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
- Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQA's policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQA's (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- 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, the integrated competence described in the Qualification and will include competence within core sales and the elective standards relevant to the economic sector.
- Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

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

- A minimum of 2 (two) years' practical, relevant occupational experience.
- A relevant Qualification at NQF Level 6 or higher.
- To be registered as an assessor with the relevant ETQA.

NOTES

N/A

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	9405	Analyse work requirements and plan ahead	Level 5	4
Fundamental	335876	Apply mathematical and statistical techniques in a production environment	Level 5	20
Fundamental	10622	Conduct communication within a business environment	Level 5	8
Core	335898	Coordinate predictive and preventative maintenance (PPM)	Level 5	12
Core	335895	Coordinate work group to produce product	Level 5	8
Core	335899	Discuss and maintain business processes	Level 5	10
Core	244283	Facilitate the development, implementation and maintenance of a Safety Health and Environment management system	Level 5	10
Core	119159	Maintain manufacturing efficiencies	Level 5	12
Core	9897	Manage inventory	Level 5	3
Core	119166	Optimise manufacturing processes	Level 5	24
Core	335894	Optimise the quality assurance system	Level 5	6
Elective	252026	Apply a systems approach to decision making	Level 5	6
Elective	243267	Apply and continuously improve company policies and procedures	Level 5	10
Elective	115821	Apply business financial practices	Level 5	4
Elective	15234	Apply efficient time management to the work of a department/division/section	Level 5	4
Elective	15236	Apply financial analysis	Level 5	4
Elective	252042	Apply the principles of ethics to improve organisational culture	Level 5	5
Elective	252037	Build teams to achieve goals and objectives	Level 5	6
Elective	252189	Deal with sub standard performance in a team	Level 5	5
Elective	252033	Demonstrate ways of dealing with the effects of dreaded diseases and in particular HIV/AIDS	Level 5	8
Elective	9406	Manage a team	Level 5	4

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION**None**



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Apply mathematical and statistical techniques in a production environment***

SAQA US ID		UNIT STANDARD TITLE	
335876		Apply mathematical and statistical techniques in a production environment	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 5	20

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
12432	Use mathematical and statistical techniques effectively	Level 5	20	Will occur as soon as 335876 is registered

SPECIFIC OUTCOME 1

Perform mathematical calculations.

SPECIFIC OUTCOME 2

Perform statistical calculations.

SPECIFIC OUTCOME 3

Access and organise information or data.

SPECIFIC OUTCOME 4

Apply mathematical and statistical techniques to manage teams and staff.

SPECIFIC OUTCOME 5

Use mathematical and statistical techniques to manage safety in the workplace.

SPECIFIC OUTCOME 6

Implement mathematical and statistical techniques to manage production and related elements.

SPECIFIC OUTCOME 7

Apply mathematics and statistical techniques to manage costing and pricing and related elements.

SPECIFIC OUTCOME 8

Apply mathematical and statistical techniques to manage inventory and stock.

SPECIFIC OUTCOME 9

Use mathematical and statistical techniques to budget and analyse budgets.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71969	National Certificate: Automotive Components	Level 5



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Optimise the quality assurance system

SAQA US ID	UNIT STANDARD TITLE		
335894	Optimise the quality assurance system		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 5	6

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
13237	Optimise the quality assurance system	Level 5	6	Will occur as soon as 335894 is registered

SPECIFIC OUTCOME 1

Explain why quality is important to a modern business.

SPECIFIC OUTCOME 2

Describe the elements that make up an effective Quality Assurance system.

SPECIFIC OUTCOME 3

Conduct a quality audit of a department/customer/supplier related to the production environment.

SPECIFIC OUTCOME 4

Optimise the quality assurance system.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71969	National Certificate: Automotive Components	Level 5



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Coordinate work group to produce product***

SAQA US ID		UNIT STANDARD TITLE	
335895		Coordinate work group to produce product	
ORIGINATOR		PROVIDER	
SGB Manufacturing and Assembly Processes			
FIELD		SUBFIELD	
6 - Manufacturing, Engineering and Technology		Manufacturing and Assembly	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 5	8

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
9904	Coordinate work group to produce product	Level 5	8	Will occur as soon as 335895 is registered

SPECIFIC OUTCOME 1

Plan a production process.

SPECIFIC OUTCOME 2

Allocate tasks to team members according to competencies to produce a product.

SPECIFIC OUTCOME 3

Demonstrate understanding of and adherence to company policies, procedures and regulations.

SPECIFIC OUTCOME 4

Co-ordinate work group performance during a production process.

SPECIFIC OUTCOME 5

Collect information and give feedback to the work group on the production process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71969	National Certificate: Automotive Components	Level 5



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:***Coordinate predictive and preventative maintenance (PPM)***

SAQA US ID	UNIT STANDARD TITLE		
335898	Coordinate predictive and preventative maintenance (PPM)		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 5	12

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
9895	Coordinate predictive and preventive maintenance	Level 5	12	Will occur as soon as 335898 is registered

SPECIFIC OUTCOME 1

Explain the purpose of predictive and preventative maintenance.

SPECIFIC OUTCOME 2

Identify root-causes of break-downs and identify solutions.

SPECIFIC OUTCOME 3

Appraise the resources for effective coordination with production.

SPECIFIC OUTCOME 4

Discuss the safety, health and environmental (SHE) factors in maintenance.

SPECIFIC OUTCOME 5

Explain the principles of production scheduling systems.

SPECIFIC OUTCOME 6

Discuss the principles of maintenance scheduling.

SPECIFIC OUTCOME 7

Coordinate maintenance schedules with production schedules.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71969	National Certificate: Automotive Components	Level 5



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Discuss and maintain business processes

SAQA US ID	UNIT STANDARD TITLE		
335899	Discuss and maintain business processes		
ORIGINATOR	PROVIDER		
SGB Manufacturing and Assembly Processes			
FIELD	SUBFIELD		
6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 5	10

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
13256	Maintain business processes	Level 5	10	Will occur as soon as 335899 is registered

SPECIFIC OUTCOME 1

Discuss the importance of focussing on business processes.

SPECIFIC OUTCOME 2

Explain data collection processes and methods/tools of analysis that companies/organisations could use to achieve a better understanding of their processes.

SPECIFIC OUTCOME 3

Explain how data is used to measure customer satisfaction.

SPECIFIC OUTCOME 4

Recommend improvements to the Supplier Evaluation Program.

SPECIFIC OUTCOME 5

Discuss the importance of improving relationships with internal customers.

SPECIFIC OUTCOME 6

Demonstrate the ability to improve business processes.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	71969	National Certificate: Automotive Components	Level 5