No. 1365 **19 December 2008**

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.saqa.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 19 January 2009.*** All correspondence should be marked **Standards Setting SGB for Manufacturing and Assembly Processes**
and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Diploma: Automotive Repair and Maintenance

SAQA QUAL ID	*QUALIFICATION TITLE*		
64789	National Diploma: Automotive Repair and Maintenance		
ORIGINATOR		*PROVIDER*	
SGB Manufacturing and Assembly Processes			
QUALIFICATION TYPE	*FIELD*	*SUBFIELD*	
National Diploma	6 - Manufacturing, Engineering and Technology	Manufacturing and Assembly	
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUAL CLASS*
Undefined	144	Level 5	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
57450	National Diploma: Automotive Diagnostics and Repair	Level 5	240	Will occur as soon as 64789 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of the qualification is to provide learners with the standards and the range of learning required to work effectively in various industries making use of automotive repair and maintenance skills and to meet the challenges of the automotive industry and related environments.

The primary skill that is recognised in this qualification is the ability to apply the theory of repairing and maintenance in order to conduct advanced diagnosis and repair of vehicle systems and components, as well as to mentor apprentices in the workplace.

This capability requires an understanding of basic repairing and maintenance theory, names and functions of fluids and lubricants, automotive components and how to read and interpret workshop manuals and workshop procedures. Hand and business skills also play an important role in this qualification and successful learners will need to apply these skills in completing their tasks.

This qualification has been designed to accommodate learners from a wide area to make allowance for the wide range of vehicles currently available. This qualification can be achieved in one of the following 4 specialisation areas:

> Passenger Vehicles.
> Commercial Vehicles.
> Earthmoving Equipment.
> Motorcycles.

Training and assessment will be contextualised to the specialisation area of the learner, and the learner will be required to prove competence in the specialisation area enrolled in.

This qualification is the fourth progressive qualification for a motor mechanic and learners will be able to build on this qualification to achieve higher levels of automotive repair and maintenance in the same specialisation area.

After achieving this qualification learners will be able to:

> Communicate with customers and staff in an automotive workshop.
> Solve problems in an automotive workshop.
> Manage work activities in an automotive context.
> Diagnose and repair specialised vehicle systems.

Rationale:

This qualification in automotive repair and maintenance NQF Level 5 has been developed as a progression from qualifications in automotive repair and maintenance at NQF Levels 2, 3 and 4. The development was necessary due to expansion into advanced diagnosis and repair technology. With the advancement of technology this qualification is also needed to replace the previous segmented and aged qualifications system, improve the industry standards and prevent fraudulent qualifications. The core component has also been more closely aligned to the core skills of the person operating at this level in an automotive workshop.

The field of automotive maintenance and repair is characterised by the overall diagnosis and repair of vehicle systems as well as the reconditioning of components where required. This in turn provides support and job opportunities to a variety of small businesses in the retail motor and related industries. The qualification also equips entrepreneurs with basic business and management skills to manage a business.

This qualification recognises the skills, knowledge and values relevant in the workplace and will cater for learners who:

> Have attended courses and need to apply the knowledge gained to activities in the workplace.
> Are already workers and have acquired skills and knowledge without having attended formal training.
> Are part of a learnership programme which integrates structured learning and operational experience.

There is also a critical need in the industry to identify people who are able to conduct the essential maintenance and repair associated with the range of vehicles on the road and apply efficient and safe operational practices in at least one of the specialisation areas in which this qualification may be achieved.

This is the fourth qualification in a series for learners who want to follow a career in the field of automotive repair and maintenance. This qualification focuses on developing skills and knowledge necessary to perform as a competent person in the automotive and associated industries. People who have achieved the skills and knowledge outlined in this qualification are normally employed in the following positions:

> Earth moving master artisan.
> Motor master artisan.
> Diesel master artisan.
> Lift truck master artisan.
> Automotive workshop supervisor/foreman.

It also provides learners who have gained relevant experience in the workplace with an opportunity to obtain credits through an RPL process. The qualification also forms the basis for further learning in the management of a business.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It is assumed that learners are already competent in:

> Communication at NQF Level 4.
> Mathematical literacy at NQF Level 4.
> Automotive repair and maintenance at NQF Level 4 in the selected specialisation area.

Recognition of Prior Learning:

The structure of this qualification makes the Recognition of Prior Learning possible, if the learner is able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. Recognition of Prior Learning will be done by means of an Integrated Assessment as mentioned in the previous paragraph.

This Recognition of Prior Learning may allow:

> For accelerated access to further learning.
> Gaining of credits towards any of the Exit Level Outcomes in this qualification.

All recognition of Prior Learning is subject to quality assurance by the relevant accredited Education and Training Quality Assurance Body (ETQA) and must be conducted by a registered workplace assessor. Identified outcomes may have been acquired in a range of economic sectors and these will be considered as appropriate where the candidate provides evidence of the applicability of that learning to this qualification.

Access to the Qualification:

This qualification is open for anyone who wishes to pursue a career in automotive repair and maintenance, but prior achievement of the "Learning Assumed to be in Place" would facilitate an easier progression into learning programmes to address the outcomes of this qualification.

QUALIFICATION RULES
The core unit standards identified are applicable across the entire range of specialisation areas applicable to this qualification. Specific unit standards that are required for certain specialisation areas have been identified and listed below. Rules of combination for this qualification are as follows:

All Fundamental unit standards are compulsory (29 Credits).

All Core unit standards are compulsory (82 Credits).

All elective unit standards in the selected specialisation area as follows:

> For learners specialising in Passenger vehicles or Motorcycles, the following unit standard is compulsory (12 Credits):
> Diagnose and repair supplementary restraint systems (ID 12234).

> For learners specialising in Commercial Vehicles, the following unit standards are compulsory (18 Credits):

> Diagnose and repair supplementary restraint systems (ID 12234).
> Diagnose and repair engine and exhaust braking systems (ID 230464).

> For learners specialising in Earthmoving Equipment, the following unit standards are compulsory (16 Credits):
> Diagnose and repair engine and exhaust braking systems (ID 230464).
> Diagnose and repair hydrostatic systems (DI 230467).

Additional Elective unit standards must be selected to achieve a total of 144 credits for this qualification.

EXIT LEVEL OUTCOMES

1. Communicate with customers and staff in an automotive workshop.

2. Solve problems in an automotive workshop.

3. Manage work activities in an automotive context.

4. Diagnose and repair specialised vehicle systems.
Range: Specialised vehicle systems include engine, body and drive management systems.

Critical Cross-Field Outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the unit standards:

> Identify and solve problems and make decisions using critical and creative thinking.
> Note: The ability of the candidate to identify the type of problem and apply relevant solutions.
> Work effectively with others as a member of a team, group, organisation or community.
> Note: The ability of the candidate to manage work activities of a team.
> Organise and manage themselves and their activities responsibly and effectively.
> Note: The ability of the candidate to identify and repair system faults.
> Collect, analyse, organise and critically evaluate information.
> Note: The ability of the candidate to diagnose specialised systems and determine an appropriate action.
> Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written presentations.
> Note: The ability of the candidate to enhance the corporate image of the organisation.
> Use science and technology effectively and critically, showing responsibility towards the environment and health of others.
> Note: The ability of the candidate to use the correct tools and equipment to diagnose system faults.
> Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
> Note: The ability of the candidate to identify the cause of problems from a variety of diagnostic means.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

1.1 Oral communication is maintained and adapted as required to promote effective interaction in a work context.
1.2 Information is accessed from instructions, visual information and a range of other workplace texts and responses where required are appropriate to the context.

1.3 Written communication is clear and unambiguous and at an appropriate level for designated target audiences.
1.4 Communication enhances the corporate image of the organisation.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Problems are identified and classified by responsible person according to symptoms.
2.2 Known solutions are applied to solve the relevant problems to the satisfaction of the parties involved within an acceptable cost structure.
2.3 Problems that cannot be solved directly are escalated to relevant personnel for action.
2.4 Consequences of not solving problems in the workshop are described in terms of client satisfaction and the impact on the business.
2.5 Financial implications of actions taken are understood in relation to efficiency of business.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Organisational procedures are explained in relation to the work environment.
3.2 Financial implications of actions taken are understood in relation to efficiency of business.
3.3 Subordinates` activities are co-ordinated to achieve work targets with available resources.
3.4 Quality is ensured in accordance with workshop standards.
3.5 Time is managed in accordance with workplace requirements.
3.6 Work is conducted efficiently with a minimum of wastage.
3.7 Quality is managed in accordance with customer requirements.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1 Work area and vehicle is prepared for the work task according to vehicle specifications and workplace procedures.
4.2 Appropriate test equipment is connected according to workplace specifications.
4.3 Faulty vehicle system is identified and appropriate data collected from relevant sources.
4.4 System faults are identified and repaired according to manufacturer specifications.
4.5 Safety procedures are adhered to during diagnosing and repairing tasks.

Integrated Assessment:

Because assessment practices must be open, transparent, fair, valid, and reliable and ensure that no learner is disadvantaged in any way whatsoever, an integrated assessment approach is incorporated into the Qualification. Learning, teaching and assessment are inextricably linked. Whenever possible, the assessment of knowledge, skills, attitudes and values shown in the exit level outcomes should be integrated.

A variety of methods must be used in assessment tools and activities must be appropriate to the context in which the learner is working. Where it is not possible to assess the learner in the workplace or on-the-job, simulations, case studies, role-plays and other similar techniques should be used to provide a context appropriate to the assessment.

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

As a starting point, this qualification which is part of a series of qualifications in the field of vehicle technology including, servicing, maintenance, repairs and diagnostics, was compared to other, similar outcomes-based qualifications, certifications or skills standards in English speaking countries of the world.

It was found to be difficult to compare the New Zealand and Australian narrow focus qualifications with this broad-based qualification that also include fundamentals, however the generic core and specialisation areas` unit standards did compare favourably to both the Australian (AUR99) Automotive Industry, Service and Repair unit standards and the NVQ qualification in the United Kingdom.

An example of the exact multi specialisation area approach used in this qualification was found in Australia under Automotive Retail Service Repair Training (www.automotivetraining.org.au). The range of unit standards used in Australia that relate similarly to core unit standards in this qualification may be found at (www.ntis.gov.au).

It was further difficult to undertake specific comparisons given that the New Zealand and Australian qualifications, although they are in the same field of vehicle technology and cover the same areas of specialisation (thus containing a large degree of similar content) are conceptualised as three year qualifications without exit level outcomes at the intermediate levels.

This notwithstanding, the technical content of this qualification for automotive repair and maintenance (with the various specialisations) corresponds with the equivalent level of qualification in vehicle servicing (with the various specialisations) in Australia, New Zealand and the United Kingdom.

Elements of the Institute of Motor Industry (IMI) in the UK have been used in benchmarking best practice procedures in some of the unit standards used in this qualification. The NVQ qualifications offered in the UK cover all the same objectives of this series of qualifications at various levels of complexity. The qualifications are offered as an internship wherein the learner enrols with a college or training centre for the theoretical component, and achieves the practical component in-house. The qualifications are all based on specific levels of performance, and lead to progressive levels of complexity, but are identified as separate qualifications. The learning towards these qualifications is offered through long-term learner-employer relationships, with short-term stints at a training centre. Qualification titles in the UK include:

> Vehicle Mechanical and Electronic Systems, Maintenance and Repair, Level 3: (Q1015915).
> Vehicle Mechanical and Electronic Systems, Maintenance and Repair, Level 3: (Q1015916).
> Motorcycle Mechanical and Electronic Systems, Maintenance and Repair, Level 3: (Q1015918).
> Vehicle Refinishing, Level 3: (Q1017590).
> Vehicle Body Repair, Level 3: (Q1015917).
> Vehicle Body Fitting, Level 2: (Q1015913).
> Vehicle Mechanical and Electronic Systems, unit Replacement, Level 2: (Q1015914).

The qualifications offered in other European countries, such as Germany, are also predominantly vocational qualifications with theoretical components being achieved through a specified period at a training centre. The qualifications are aimed at achieving complete competence in all aspects of vehicle maintenance through the progressive series of qualifications and includes mechanical, electrical and coach works. The training programmes are progressive qualifications of one-year duration each and include ongoing training through workbooks in which the trainee is required to complete evidence of understanding for each month of the registered year of learning. Germany has a requirement that competent people be

licensed to operate under the meister (master craftsman) programme, and this licence is valid for a period of two years. The qualification titles offered in Germany include:

> Auto Fachman, Level 1.
> Auto Fachman, Level 2.
> Auto Fachman, Level 3.
> Auto Fachman, Meister.

America uses a system of specialisation areas, with a master technician being identified as a person who is competent in all areas and will be able to perform on almost any part of a vehicle. The learning is conducted through apprenticeships and has specialisation areas for engine technicians, transmission technicians, steering and suspension technicians, brake technicians, electrical system technicians, heating and air-conditioning technicians, driveability and performance technicians and lubrication technicians.

None of the SADC countries have their own qualifications relating to vehicle maintenance, but use the British City and Guilds Standards for training learners in the automotive field. Namibia has indicated interest in the South African qualifications and may implement this qualification once it has been registered.

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

Horizontal articulation is possible with the following Qualifications:

> ID 21007: National Certificate: Automotive Component Manufacturing and Assembly, NQF Level 5.
> ID 22861: National Certificate: Autotronics, NQF Level 5.
> ID 22773: National Certificate: Mechatronics, NQF Level 5.

Vertical articulation is possible with the following qualifications:

> National Certificate: Business Management at NQF Level 6.
> National Diploma: Administrative Management at NQF Level 6.
> National Diploma: Entrepreneurship at NQF Level 6.

MODERATION OPTIONS
> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant Education and Training Quality Assurance Body (ETQA).

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor 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 ETQAs (including professional bodies).

> 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 in the ELOs of the Qualification and will include integration of skills relevant to the economic sector.

CRITERIA FOR THE REGISTRATION OF ASSESSORS
Assessors must be registered in terms of the requirements of SAQA and the relevant ETQA. In addition, assessors should have:

> A minimum of 3 (three) years' practical, relevant occupational experience.
> The ability to meet the outcomes of this qualification.

NOTES

This qualification replaces qualification 57450, "National Diploma: Automotive diagnostics and repair", Level 5, 240 credits.

The qualification National Diploma in Automotive Diagnostics and Repair, Level 5 (57450) has been revised. Even though the qualification was still current, the revision was necessary due to the inclusion of additional specialisation areas.

> Engine Fitting and lift trucks have not been catered for as a specialisation area at this level because the core component of this qualification covers all that an engine fitter or lift truck master artisan would be required to do and more. Providers of learning may select the relevant core unit standards and create a learning programme in Engine Fitting or lift trucks.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	242706	Analyse problems	Level 5	4
Fundamental	115821	Apply business financial practices	Level 5	4
Fundamental	15234	Apply efficient time management to the work of a department/division/section	Level 5	4
Fundamental	7818	Conduct on-the-job coaching	Level 5	5
Fundamental	15224	Empower team members through recognising strengths, encouraging participation in decision making and delegating tasks	Level 5	4
Fundamental	12433	Use communication techniques effectively	Level 5	8
Core	12225	Construct and test advanced electronic circuits	Level 4	16
Core	230462	Analyse failure of vehicle parts	Level 5	12
Core	244698	Demonstrate knowledge of integrating hydraulic systems to applications	Level 5	4
Core	12231	Diagnose and repair engine management systems	Level 5	20
Core	230465	Diagnose and repair hydraulic systems	Level 5	10
Core	12232	Diagnose and repair vehicle stability, traction and drive control (VSTDC) systems	Level 5	20
Elective	117701	Address safety, health and environmental requirements and hazards in a technical context	Level 5	8
Elective	120310	Apply client service techniques to improve service delivery	Level 5	6
Elective	230464	Diagnose and repair engine and exhaust braking systems	Level 5	6
Elective	230467	Diagnose and repair hydrostatic systems	Level 5	10
Elective	12234	Diagnose and repair supplementary restraint systems (SRS)	Level 5	12
Elective	10066	Establish customer needs and relationships	Level 5	16
Elective	15223	Implement training needs for teams and individuals to upgrade skills levels	Level 5	3
Elective	10053	Manage customer requirements and needs and implement action plans	Level 5	8

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Automotive Repair and Maintenance

SAQA QUAL ID	*QUALIFICATION TITLE*		
64809	National Certificate: Automotive Repair and Maintenance		
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	135	Level 3	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
58497	National Certificate: Automotive Repair and Maintenance	Level 3	120	Will occur as soon as 64809 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of the qualification is to provide learners with the standards and the range of learning required to work effectively in various industries making use of automotive repair and maintenance skills and to meet the challenges of the automotive industry and related environments.

The primary skill that is recognised in this qualification is the ability to apply the theory of repair and maintenance in order to conduct major servicing, repair and maintenance of vehicles and components.

This capability requires an understanding of basic repairing and maintenance theory, names and functions of fluids and lubricants, automotive components and how to read and interpret workshop manuals and workshop procedures. Hand skills also play an important role in this qualification and successful learners will need to apply hand skills in completing their tasks.

This qualification has been designed to accommodate learners from a wide area to make allowance for the wide range of vehicles currently available. This qualification can be achieved in one of the following specialisation areas:

> Passenger Vehicles.
> Commercial Vehicles.
> Earthmoving Equipment.
> Lift Trucks.
> Motorcycles.

Training and assessment will be contextualised to the specialisation area of the learner, and the learner will be required to prove competence in the specialisation area enrolled in.

This qualification is the second progressive qualification for a motor mechanic and learners will be able to build on this qualification to achieve higher levels of automotive repair and maintenance in the same specialisation area.

After achieving this qualification learners will be able to:

> Communicate and solve problems in an automotive workshop.
> Conduct work activities in an automotive context.
> Repair and maintain vehicles.

Rationale:

This qualification in automotive repair and maintenance NQF Level 3 has been developed as a progression from qualifications in automotive repair and maintenance at NQF Level 2. The development was necessary due to expansion into advanced repair and maintenance technology. With the advancement of technology this qualification is also needed to replace the previous segmented and aged qualifications system, improve the industry standards and prevent fraudulent qualifications.
The field of automotive maintenance and repair is characterised by the overall servicing of vehicles as well as the removal, dismantling and replacement of components and minor adjustments to vehicle systems. This in turn provides support and job opportunities to a variety of small businesses in the retail motor and related industries.

This qualification recognises the skills, knowledge and values relevant in the workplace and will cater for learners who:

> Have attended courses and need to apply the knowledge gained to activities in the workplace.
> Are already workers and have acquired skills and knowledge without having attended formal training.
> Are part of a learnership programme which integrates structured learning and operational experience.

There is also a critical need in the industry to identify people who are able to conduct the essential servicing and related operations associated with the range of vehicles on the road and apply efficient and safe operational practices in at least one of the specialisation areas in which this qualification may be achieved.

This is the second qualification in a series for learners who want to follow a career in the field of automotive repair and maintenance. This qualification focuses on developing skills and knowledge necessary to perform as a competent person in the automotive and associated industries. People who have achieved the skills and knowledge outlined in this qualification are normally employed in the following positions:

> General Motor mechanic.
> General Earth moving mechanic.
> Repair shop assistant.
> General Diesel mechanic.
> General Lift truck mechanic.
> General Motorcycle mechanic.
> Automotive mechanic CBMT level two.

It also provides learners who have gained relevant experience in the workplace with an opportunity to obtain credits through an RPL process. The qualification also forms the basis for further learning in the field of vehicle technology.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It is assumed that learners are already competent in:

> Communication at NQF Level 2.
> Mathematical literacy at NQF Level 2.
> Automotive repair and maintenance at NQF level 2 in the selected specialisation area.

Recognition of Prior Learning:

The structure of this qualification makes the Recognition of Prior Learning possible, if the learner is able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. Recognition of Prior Learning will be done by means of an Integrated Assessment as mentioned in the previous paragraph.

This Recognition of Prior Learning may allow:

> For accelerated access to further learning.
> Gaining of credits towards any of the Exit Level Outcomes in this qualification.

All recognition of Prior Learning is subject to quality assurance by the relevant accredited Education and Training Quality Assurance Body (ETQA) and must be conducted by a registered workplace assessor. Identified outcomes may have been acquired in a range of economic sectors and these will be considered as appropriate where the candidate provides evidence of the applicability of that learning to this qualification.

Access to the Qualification:

This qualification is open for anyone who wishes to pursue a career in automotive repair and maintenance, but prior achievement of the "Learning Assumed to be in Place" would facilitate an easier progression into learning programmes to address the outcomes of this qualification.

QUALIFICATION RULES
The core unit standards identified are applicable across the entire range of specialisation areas applicable to this qualification. Specific unit standards that are required for certain specialisation areas have been identified and listed below. Rules of combination for this qualification are as follows:

All Fundamental unit standards are compulsory (36 Credits).

All Core unit standards are compulsory (63 Credits).

All elective unit standards in the selected specialisation area are as follows:

For learners specialising in Passenger and Light Delivery Vehicles, the following unit standards are compulsory (32 credits):

> Construct and test basic electronic circuits (ID: 12218).
> Test and report on condition of vehicle starting and charging system (ID: 260637).
> Maintain Brakes and Clutches (ID: 13282).
> Check and adjust steering geometry (ID: 15100).
> Fit and commission air-conditioners to vehicles (ID: 11202).

For learners specialising in Commercial Vehicles, the following unit standards are compulsory (34 credits):

> Construct and test basic electronic circuits (ID: 12218).
> Test and report on condition of vehicle starting and charging system (ID: 260637).
> Maintain Brakes and Clutches (ID: 13282).
> Check and adjust steering geometry (ID: 15100).
> Install, test and maintain a fluid power system (ID: 260723).

For learners specialising in Earthmoving Equipment and Lift Trucks, the following unit standards are compulsory (30 credits):

> Construct and test basic electronic circuits (ID: 12218).
> Test and report on condition of vehicle starting and charging system (ID: 260637).
> Maintain Brakes and Clutches (ID: 13282).
> Install, test and maintain a fluid power system (ID: 260723).

For learners specialising in Motorcycles, the following unit standards are compulsory (26 credits):

> Construct and test basic electronic circuits (ID: 12218).
> Test and report on condition of vehicle starting and charging system (ID: 260637).
> Maintain Brakes and Clutches (ID: 13282).
> Demonstrate knowledge of and produce word processing documents using basic functions (ID: 7568).
> Demonstrate knowledge of and produce computer spreadsheets using basic functions (ID: 7572).

Additional Elective unit standards must be selected to achieve a minimum of 135 credits for this qualification.

EXIT LEVEL OUTCOMES

1. Communicate and solve problems in an automotive workshop.

2. Conduct work activities in an automotive context.

3. Repair and maintain vehicles.

Critical Cross-Field Outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the unit standards:

> Identify and solve problems and make decisions using critical and creative thinking.
Note: The ability of the candidate to solve routine workplace problems and tasks.

> Work effectively with others as a member of a team, group, organisation or community.
Note: The ability of the candidate to maintain and adapt oral communication for a specific context.

Organise and manage themselves and their activities responsibly and effectively.
Note: The ability of the candidate to adhere to workplace timeframes and procedures.

> Collect, analyse, organise and critically evaluate information.
Note: The ability of the candidate to identify appropriate equipment for a specific function.

> Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written presentations.
Note: The ability of the candidate to report on work conducted.

> Use science and technology effectively and critically, showing responsibility towards the environment and health of others.
Note: The ability of the candidate to use the correct tools and equipment to repair and maintain vehicles.

> Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
Note: The ability of the candidate to explain the purpose of maintaining a vehicle on a regular basis.

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

1.1 Oral communication is maintained and adapted as required to promote effective interaction in a work context.
1.2 Information is accessed from standing instructions, visual information and a range of other workplace texts and responses where required are appropriate to the context.
1.3 Written communication is conducted at an appropriate level for designated target audiences.
1.4 Mathematical functions are used correctly to solve routine workplace problems and tasks.

Associated Assessment Criteria for Exit Level Outcome 2

2.1 Organisational procedures are explained in relation to the work environment.
2.2 Financial implications of actions taken are understood in relation to efficiency of business.
2.3 Work is conducted in accordance with agreed time schedules.
2.4 Work is conducted efficiently with a minimum of wastage.
2.5 Work is conducted in accordance with workplace health and safety procedures.
2.6 Quality is managed in accordance with industry best practice.
2.7 Time is managed in accordance with workplace requirements.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Work area and vehicle is prepared for the work task according to workplace procedures.
3.2 Appropriate test equipment is connected according to workplace specifications.
3.3 Components are removed and replaced in accordance with workplace requirements.
3.4 Components are dismantled and assembled according to manufacturer recommendations.
3.5 Component replacement parts are ordered in accordance with workplace procedures.
3.6 Safety procedures are adhered to during repair and maintenance tasks.
3.7 The vehicle is repaired and maintained according to vehicle specifications.
3.8 Work conducted is reported in accordance with workplace procedures.

Integrated Assessment:

Because assessment practices must be open, transparent, fair, valid, and reliable and ensure that no learner is disadvantaged in any way whatsoever, an integrated assessment approach is incorporated into the Qualification. Learning, teaching and assessment are inextricably linked. Whenever possible, the assessment of knowledge, skills, attitudes and values shown in the exit level outcomes should be integrated.

A variety of methods must be used in assessment tools and activities must be appropriate to the context in which the learner is working. Where it is not possible to assess the learner in the workplace or on-the-job, simulations, case studies, role-plays and other similar techniques should be used to provide a context appropriate to the assessment.

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

As a starting point, this qualification which is part of a series of qualifications in the field of vehicle technology including, servicing, maintenance, repairs and diagnostics, was compared to other, similar outcomes-based qualifications, certifications or skills standards in English speaking countries of the world.

It was found to be difficult to compare the New Zealand and Australian narrow focus qualifications with this broad-based qualification that also include fundamentals, however the generic core and specialisation areas` unit standards did compare favourably to both the Australian (AUR99) Automotive Industry, Service and Repair unit standards and the NVQ qualification in the United Kingdom.

An example of the exact multi specialisation area approach used in this qualification was found in Australia under Automotive Retail Service Repair Training (www.automotivetraining.org.au). The range of unit standards used in Australia that relate similarly to core unit standards in this qualification may be found at (www.ntis.gov.au).

It was further difficult to undertake specific comparisons given that the New Zealand and Australian qualifications, although they are in the same field of vehicle technology and cover the same areas of specialisation (thus containing a large degree of similar content) are conceptualised as three year qualifications without exit level outcomes at the intermediate levels.

This notwithstanding, the technical content of this qualification for automotive repair and maintenance (with the various specialisations) corresponds with the equivalent level of qualification in vehicle servicing (with the various specialisations) in Australia, New Zealand and the United Kingdom.

Elements of the Institute of Motor Industry (IMI) in the UK have been used in benchmarking best practice procedures in some of the unit standards used in this qualification. The NVQ qualifications offered in the UK cover all the same objectives of this series of qualifications at various levels of complexity. The qualifications are offered as an internship wherein the learner enrols with a college or training centre for the theoretical component, and achieves the practical component in-house. The qualifications are all based on specific levels of performance, and lead to progressive levels of complexity, but are identified as separate qualifications. The learning towards these qualifications is offered through long-term learner-employer relationships, with short-term stints at a training centre. Qualification titles in the UK include:

> Vehicle Mechanical and Electronic Systems, Maintenance and Repair, Level 3: (Q1015915).
> Vehicle Mechanical and Electronic Systems, Maintenance and Repair, Level 3: (Q1015916).

> Motorcycle Mechanical and Electronic Systems, Maintenance and Repair, Level 3: (Q1015918).
> Vehicle Refinishing, Level 3: (Q1017590).
> Vehicle Body Repair, Level 3: (Q1015917).
> Vehicle Body Fitting, Level 2: (Q1015913).
> Vehicle Mechanical and Electronic Systems, unit Replacement, Level 2: (Q1015914).

The qualifications offered in other European countries, such as Germany, are also predominantly vocational qualifications with theoretical components being achieved through a specified period at a training centre. The qualifications are aimed at achieving complete competence in all aspects of vehicle maintenance through the progressive series of qualifications and includes mechanical, electrical and coach works. The training programmes are progressive qualifications of one-year duration each and include ongoing training through workbooks in which the trainee is required to complete evidence of understanding for each month of the registered year of learning. Germany has a requirement that competent people be licensed to operate under the meister (master craftsman) programme, and this licence is valid for a period of two years. The qualification titles offered in Germany include:

> Auto Fachman: NQF Level 1.
> Auto Fachman: NQF Level 2.
> Auto Fachman: NQF Level 3.
> Auto Fachman: Meister.

America uses a system of specialisation areas, with a master technician being identified as a person who is competent in all areas and will be able to perform on almost any part of a vehicle. The learning is conducted through apprenticeships and has specialisation areas for engine technicians, transmission technicians, steering and suspension technicians, brake technicians, electrical system technicians, heating and air-conditioning technicians, driveability and performance technicians and lubrication technicians.

None of the SADC countries have their own qualifications relating to vehicle maintenance, but use the British City and Guilds Standards for training learners in the automotive field. Namibia has indicated interest in the South African qualifications and may implement this qualification once it has been registered.

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

Horizontal articulation is possible with any of the specialisation areas within this qualification and also with the following Qualifications:

> ID 21005: National Certificate: Automotive Component Manufacturing and Assembly, NQF Level 3.
> ID 22859: National Certificate: Autotronics, NQF Level 3.
> ID 22771: National Certificate: Mechatronics, NQF Level 3.

Vertical articulation is possible with the following qualifications:

> ID 58539: National Certificate: Automotive Repair and Maintenance at NQF Level 4.

MODERATION OPTIONS
> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant Education and Training Quality Assurance Body (ETQA).

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor 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 ETQAs (including professional bodies).

> 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 in the ELOs of the Qualification and will include integration of skills relevant to the economic sector.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors must be registered in terms of the requirements of SAQA and the relevant ETQA. In addition, assessors should have:

> A minimum of 3 (three) years' practical, relevant occupational experience.
> A relevant Qualification at NQF Level 4 or higher.
> The ability to meet the outcomes of this qualification.

NOTES

This qualification replaces qualification 58497, "National Certificate: Automotive repair and maintenance", Level 3, 120 credits.

> The qualification National Certificate in Automotive Repair and Maintenance at NQF Level 3 (58497) has been revised. Even though the qualification was still current, the revision was necessary due to the inclusion of additional specialisation areas.
> Engine Fitting has not been catered for as a specialisation area at this level because the core component of this qualification covers all that an engine fitter would be required to do and more. Providers of learning may select the relevant unit standards and create a learning programme in Engine Fitting.

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	260679	Demonstrate knowledge of fuel supply and engine management systems	Level 3	10
Core	244053	Dismantle automotive main components	Level 3	4
Core	244048	Inspect, assess and report on external components of engines	Level 3	6
Core	260721	Perform a basic condition test on vehicle components	Level 3	8
Core	260718	Remove and install fuel system components	Level 3	6
Core	244049	Repair and assemble automotive components	Level 3	8
Core	244051	Test and repair an engine cooling system	Level 3	4
Core	244057	Test and repair an engine lubrication system	Level 3	4

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Core	260437	Trace and repair auto electrical circuit faults	Level 3	8
Core	244163	Remove, replace and set timing drive systems	Level 4	5
Elective	12212	Assemble, fit and repair automobile auxiliary harnesses	Level 2	12
Elective	12218	Construct and test basic electronic circuits	Level 2	16
Elective	7792	Maintain data in a computer system	Level 2	4
Elective	253425	Repair internal combustion engines	Level 2	5
Elective	260637	Test and report on condition of vehicle starting and charging system	Level 2	4
Elective	13234	Apply quality procedures	Level 3	8
Elective	15100	Check and adjust steering geometry	Level 3	4
Elective	116703	Check and maintain air-conditioners in vehicles	Level 3	4
Elective	10585	Describe bearing types, designs and application theories associated with process plants	Level 3	2
Elective	12457	Develop learning strategies and techniques	Level 3	3
Elective	12456	Explain and use organisational procedures	Level 3	6
Elective	11202	Fit and commission air-conditioners to vehicles	Level 3	8
Elective	13916	Identify and keep the records that a team manager is responsible for keeping	Level 3	4
Elective	15099	Install vehicle drive train components	Level 3	16
Elective	15105	Install vehicle sub-components	Level 3	8
Elective	260723	Install, test and maintain a basic fluid power system	Level 3	8
Elective	9527	Lead a team, plan, allocate and assess their work	Level 3	4
Elective	116714	Lead a team, plan, allocate and assess their work	Level 3	4
Elective	13283	Maintain bearings in machines and equipment	Level 3	8
Elective	13282	Maintain brakes and clutches	Level 3	6
Elective	242820	Maintain records for a team	Level 3	4
Elective	9526	Manage basic business finance	Level 3	6
Elective	9530	Manage work time effectively	Level 3	3
Elective	7786	Operate a Computer	Level 3	8
Elective	12455	Perform the role of a safety, health and environmental protection representative	Level 3	4
Elective	15109	Recondition vehicle undercarriage components	Level 3	10
Elective	244704	Select and fit seals in fluid power applications	Level 3	6
Elective	12220	Service and repair conventional automobile ignition systems	Level 3	6
Elective	12221	Trace and repair auto-electrical circuits on automobiles	Level 3	20
Elective	244056	Understand the fundamentals of engine technology	Level 3	4
Elective	242865	Use data entry and retrieval skills to input and retrieve computer data	Level 3	4
Elective	114598	Demonstrate an understanding of an entrepreneurial profile	Level 4	5

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
Further Education and Training Certificate: Automotive Repair and Maintenance

SAQA QUAL ID	*QUALIFICATION TITLE*		
64849	Further Education and Training Certificate: Automotive Repair and Maintenance		
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	159	Level 4	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
58539	Further Education and Training Certificate: Automotive Repair and Maintenance	Level 4	150	Will occur as soon as 64849 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of the qualification is to provide learners with the standards and the range of learning required to work effectively in various industries making use of automotive repair and maintenance skills and to meet the challenges of the automotive industry and related environments.

The primary skill that is recognised in this qualification is the ability to apply the theory of repair and maintenance in order to diagnose and repair vehicles and components.

This capability requires an understanding of basic repairing and maintenance theory, names and functions of fluids and lubricants, automotive components and how to read and interpret workshop manuals and workshop procedures. Hand skills also play an important role in this qualification and successful learners will need to apply hand skills in completing their tasks.

This qualification has been designed to accommodate learners from a wide area to make allowance for the wide range of vehicles currently available. This qualification can be achieved in one of the following 5 specialisation areas:

> Passenger Vehicles.
> Commercial Vehicles.
> Earthmoving Equipment.
> Lift Trucks.
> Motorcycles.

Training and assessment will be contextualised to the specialisation area of the learner, and the learner will be required to prove competence in the specialisation area enrolled in.

This qualification is the third progressive qualification for a motor mechanic and learners will be able to build on this qualification to achieve higher levels of automotive repair and maintenance in the same specialisation area.

After achieving this qualification learners will be able to:

> Communicate and solve problems in an automotive workshop.
> Co-ordinate work activities in an automotive context.
> Diagnose and repair mechanical vehicle systems.
> Diagnose and repair electronic vehicle systems.

Rationale:

This qualification in automotive repair and maintenance NQF Level 4 has been developed as a progression from qualifications in automotive repair and maintenance at NQF Levels 2 and 3. The development was necessary due to expansion into advanced diagnosis and repair technology. With the advancement of technology this qualification is also needed to replace the previous segmented and aged qualifications system, improve the industry standards and prevent fraudulent qualifications.

The field of automotive maintenance and repair is characterised by the overall servicing of vehicles as well as the removal, dismantling and replacement of components and minor adjustments to vehicle systems. This in turn provides support and job opportunities to a variety of small businesses in the retail motor and related industries.

This qualification recognises the skills, knowledge and values relevant in the workplace and will cater for learners who:

> Have attended courses and need to apply the knowledge gained to activities in the workplace.
> Are already workers and have acquired skills and knowledge without having attended formal training.
> Are part of a learnership programme which integrates structured learning and operational experience.

There is also a critical need in the industry to identify people who are able to conduct the essential servicing and related operations associated with the range of vehicles on the road and apply efficient and safe operational practices in at least one of the specialisation areas in which this qualification may be achieved.

This is the third qualification in a series for learners who want to follow a career in the field of automotive repair and maintenance. This qualification focuses on developing skills and knowledge necessary to perform as a competent person in the automotive and associated industries. People who have achieved the skills and knowledge outlined in this qualification are normally employed in the following positions:

> Earth moving mechanic.
> Motor mechanic.
> Diesel mechanic.
> Lift truck mechanic.
> Motorcycle mechanic.

It also provides learners who have gained relevant experience in the workplace with an opportunity to obtain credits through an RPL process. The qualification also forms the basis for further learning in the field of vehicle technology.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It is assumed that learners are already competent in:

> Communication at NQF Level 3.
> Mathematical literacy at NQF Level 3.
> Automotive repair and maintenance at NQF Level 3 in the selected specialisation area.

Recognition of Prior Learning:

The structure of this qualification makes the Recognition of Prior Learning possible, if the learner is able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. Recognition of Prior Learning will be done by means of an Integrated Assessment as mentioned in the previous paragraph.

This Recognition of Prior Learning may allow:

> For accelerated access to further learning.
> Gaining of credits towards any of the Exit Level Outcomes in this qualification.

All recognition of Prior Learning is subject to quality assurance by the relevant accredited Education and Training Quality Assurance Body (ETQA) and must be conducted by a registered workplace assessor. Identified outcomes may have been acquired in a range of economic sectors and these will be considered as appropriate where the candidate provides evidence of the applicability of that learning to this qualification.

Access to the Qualification:

This qualification is open for anyone who wishes to pursue a career in automotive repair and maintenance, but prior achievement of the "Learning Assumed to be in Place" would facilitate an easier progression into learning programmes to address the outcomes of this qualification.

QUALIFICATION RULES
The core unit standards identified are applicable across the entire range of specialisation areas applicable to this qualification. Specific unit standards that are required for certain specialisation areas have been identified and listed below. Rules of combination for this qualification are as follows:

All Fundamental unit standards are compulsory (56 Credits).

All Core unit standards are compulsory (79 Credits).

All elective unit standards in the selected specialisation area as follows:

> For learners specialising in Passenger, Commercial Vehicles, Lift Trucks or Motorcycles, the following unit standards are compulsory (19 Credits):
> ID 244143: Diagnose and Repair manual transmission.
> ID 244135: Diagnose and Repair suspension systems.
> ID 260737: Diagnose and repair vehicle ignition systems.
> ID 244144: Diagnose and repair steering system components.

> For learners specialising in Earthmoving Equipment, the following unit standards are compulsory (18 Credits):
> ID 244132: Diagnose and repair air and air over hydraulic brake systems.

> ID 244121: Diagnose and repair forced induction systems.
> ID 244170: Remove and install fuel system components.

Additional Elective unit standards must be selected to achieve a minimum of 160 credits for this qualification.

EXIT LEVEL OUTCOMES

1. Communicate and solve problems in an automotive workshop.

2. Co-ordinate work activities in an automotive context.

3. Diagnose and repair mechanical and/or electronic vehicle systems.

This qualification addresses the following Critical Cross-Field Outcomes, as detailed in the unit standards:

> Identify and solve problems and make decisions using critical and creative thinking.
> Note: The ability of the candidate to use mathematical functions to solve routine workplace problems.
> Work effectively with others as a member of a team, group, organisation or community.
> Note: The ability of the candidate to coordinate work functions of a team.
> Organise and manage themselves and their activities responsibly and effectively.
> Note: The ability of the candidate to adhere to workplace timeframes and procedures.
> Collect, analyse, organise and critically evaluate information.
> Note: The ability of the candidate to identify repair and maintenance defects and act appropriately.
> Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written presentations.
> Note: The ability of the candidate to report on work conducted.
> Use science and technology effectively and critically, showing responsibility towards the environment and health of others.
> Note: The ability of the candidate to use the correct tools and equipment to diagnose and repair complex systems.
> Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
> Note: The ability of the candidate to collect data from various sources to repair the identified faults.

ASSOCIATED ASSESSMENT CRITERIA

Associated Assessment Criteria for Exit Level Outcome 1:

1.1 Oral communication is maintained and adapted as required to promote effective interaction in a work context.
1.2 Information is accessed from standing instructions, visual information and a range of other workplace texts and responses where required are appropriate to the context.
1.3 Written communication is conducted at an appropriate level for designated target audiences.
1.4 Mathematical functions are used correctly to solve routine workplace problems and tasks.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Organisational procedures are explained in relation to the work environment.
2.2 Financial implications of actions taken are understood in relation to efficiency of business.
2.3 Subordinates` activities are co-ordinated to achieve work targets with available resources.
2.4 Quality is ensured in accordance with workshop standards.
2.5 Time is managed in accordance with workplace requirements.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Work area and vehicle is prepared for the work task according to vehicle specifications and workshop procedures.
3.2 Test equipment is connected according to workplace specifications.
3.3 Faulty vehicle system is identified and appropriate data collected from relevant sources.
3.4 System faults are identified and repaired according to manufacturer specifications.
3.5 Safety procedures are adhered to during diagnosing and repairing tasks.

Integrated Assessment:

Because assessment practices must be open, transparent, fair, valid, and reliable and ensure that no learner is disadvantaged in any way whatsoever, an integrated assessment approach is incorporated into the Qualification. Learning, teaching and assessment are inextricably linked. Whenever possible, the assessment of knowledge, skills, attitudes and values shown in the exit level outcomes should be integrated.

A variety of methods must be used in assessment tools and activities must be appropriate to the context in which the learner is working. Where it is not possible to assess the learner in the workplace or on-the-job, simulations, case studies, role-plays and other similar techniques should be used to provide a context appropriate to the assessment.

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

As a starting point, this qualification which is part of a series of qualifications in the field of vehicle technology including, servicing, maintenance, repairs and diagnostics, was compared to other, similar outcomes-based qualifications, certifications or skills standards in English speaking countries of the world.

It was found to be difficult to compare the New Zealand and Australian narrow focus qualifications with this broad-based qualification that also include fundamentals, however the generic core and specialisation areas' unit standards did compare favourably to both the Australian (AUR99) Automotive Industry, Service and Repair unit standards and the NVQ qualification in the United Kingdom.

An example of the exact multi specialisation area approach used in this qualification was found in Australia under Automotive Retail Service Repair Training (www.automotivetraining.org.au). The range of unit standards used in Australia that relate similarly to core unit standards in this qualification may be found at (www.ntis.gov.au).

It was further difficult to undertake specific comparisons given that the New Zealand and Australian qualifications, although they are in the same field of vehicle technology and cover the same areas of specialisation (thus containing a large degree of similar content) are conceptualised as three year qualifications without exit level outcomes at the intermediate levels.

This notwithstanding, the technical content of this qualification for automotive repair and maintenance (with the various specialisations) corresponds with the equivalent level of qualification in vehicle servicing (with the various specialisations) in Australia, New Zealand and the United Kingdom.

Elements of the Institute of Motor Industry (IMI) in the UK have been used in benchmarking best practice procedures in some of the unit standards used in this qualification. The NVQ qualifications offered in the UK cover all the same objectives of this series of qualifications at various levels of complexity. The qualifications are offered as an internship wherein the learner enrols with a college or training centre for the theoretical component, and achieves the practical component in-house. The qualifications are all based on specific levels of performance, and lead to progressive levels of complexity, but are identified as separate qualifications. The learning towards these qualifications is offered through long-term learner-employer relationships, with short-term stints at a training centre.

Qualification titles in the UK include:

> Vehicle Mechanical & Electronic Systems, Maintenance and Repair - Level 3: (Q1015915).
> Vehicle Mechanical & Electronic Systems, Maintenance and Repair - Level 3: (Q1015916).
> Motorcycle Mechanical & Electronic Systems, Maintenance and Repair - Level 3: (Q1015918).
> Vehicle Refinishing - Level 3: (Q1017590).
> Vehicle Body Repair - Level 3: (Q1015917).
> Vehicle Body Fitting - Level 2: (Q1015913).
> Vehicle Mechanical & Electronic Systems, unit Replacement - Level 2: (Q1015914).

The qualifications offered in other European countries, such as Germany, are also predominantly vocational qualifications with theoretical components being achieved through a specified period at a training centre. The qualifications are aimed at achieving complete competence in all aspects of vehicle maintenance through the progressive series of qualifications and includes mechanical, electrical and coach works. The training programmes are progressive qualifications of one-year duration each and include ongoing training through workbooks in which the trainee is required to complete evidence of understanding for each month of the registered year of learning. Germany has a requirement that competent people be licensed to operate under the meister (master craftsman) programme, and this licence is valid for a period of two years.

The qualification titles offered in Germany include:

> Auto Fachman - Level 1.
> Auto Fachman - Level 2.
> Auto Fachman - Level 3.
> Auto Fachman - Meister.

America uses a system of specialisation areas, with a master technician being identified as a person who is competent in all areas and will be able to perform on almost any part of a vehicle. The learning is conducted through apprenticeships and has specialisation areas for engine technicians, transmission technicians, steering and suspension technicians, brake technicians, electrical system technicians, heating and air-conditioning technicians, driveability and performance technicians and lubrication technicians.

None of the SADC countries have their own qualifications relating to vehicle maintenance, but use the British City and Guilds Standards for training learners in the automotive field. Namibia has indicated interest in the South African qualifications and may implement this qualification once it has been registered.

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

Horizontal articulation is possible with any of the specialisation areas within this qualification and also with the following Qualifications:

> ID 21006: Automotive Component Manufacturing and Assembly, NQF Level 4.
> ID 22860: Autotronics, NQF Level 4.
> ID 22772: Mechatronics, NQF Level 4.

Vertical articulation is possible with the following qualifications:

> National Certificate: Automotive Repair and Maintenance at NQF Level 5.

MODERATION OPTIONS
> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant Education and Training Quality Assurance Body (ETQA).

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor 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 ETQAs (including professional bodies).

> 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 in the ELOs of the Qualification and will include integration of skills relevant to the economic sector.

CRITERIA FOR THE REGISTRATION OF ASSESSORS
Assessors must be registered in terms of the requirements of SAQA and the relevant ETQA. In addition, assessors should have:

> A minimum of 3 (three) years' practical, relevant occupational experience.
> A relevant Qualification at NQF Level 5 or higher.
> The ability to meet the outcomes of this qualification.

NOTES
This qualification replaces qualification 58539, "Further Education and Training Certificate: Automotive Repair and Maintenance", Level 4, 150 credits.

> The qualification National Certificate in Automotive Repair and Maintenance - Level 4 (58539) has been revised. Even though the qualification was still current, the revision was necessary due to the inclusion of additional specialisation areas. This qualification replaces qualification 58539, Further Education and Training Certificate: Automotive repair and maintenance, Level 4, 150 credits.
> Engine Fitting has not been catered for as a specialisation area at this level because the core component of this qualification covers all that an engine fitter would be required to do and more. Providers of learning may select the relevant core unit standards and create a learning programme in Engine Fitting.

UNIT STANDARDS

ID	UNIT STANDARD TITLE	LEVEL	CREDITS

	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	12429	Develop a personal financial plan	Level 3	2
Core	116714	Lead a team, plan, allocate and assess their work	Level 3	4
Core	244117	Carry out post installation checks on a remanufactured engine	Level 4	5
Core	244123	Determine causes of engine failure	Level 4	10
Core	260658	Diagnose and repair automatic transmissions	Level 4	6
Core	260657	Diagnose and repair automotive components	Level 4	10
Core	244136	Diagnose and repair cooling systems	Level 4	4
Core	244122	Diagnose and repair faults in induction and exhaust systems	Level 4	4
Core	260677	Diagnose and repair faults on advanced auto electrical circuits	Level 4	8
Core	260639	Diagnose and repair fuel system components	Level 4	8
Core	244131	Diagnose and repair hydraulic brake systems	Level 4	4
Core	244126	Diagnose and repair hydraulic systems	Level 4	6
Core	114589	Manage time productively	Level 4	4
Core	244107	Repair vehicle differentials	Level 4	4
Elective	123258	Foster and maintain customer relations	Level 3	10
Elective	260718	Remove and install fuel system components	Level 3	6
Elective	12220	Service and repair conventional automobile ignition systems	Level 3	6
Elective	244129	Book in work for an automotive business	Level 4	4
Elective	12225	Construct and test advanced electronic circuits	Level 4	16
Elective	13254	Contribute to the implementation and maintenance of business processes	Level 4	10
Elective	117499	Demonstrate entrepreneurial competence	Level 4	12
Elective	244133	Demonstrate knowledge of forced induction performance enhancing systems	Level 4	4
Elective	244132	Diagnose and repair air and air over hydraulics brake systems	Level 4	8
Elective	260678	Diagnose and repair forced induction systems	Level 4	4
Elective	244144	Diagnose and repair steering system components	Level 4	4
Elective	260737	Diagnose and repair vehicle ignition systems	Level 4	6
Elective	244134	Estimate the cost and duration of an automotive repair	Level 4	6
Elective	244118	Fit engine bearings and bushes	Level 4	6
Elective	114878	Identify and measure the factors that influence productivity	Level 4	10
Elective	244125	Inspect and balance automotive components	Level 4	6
Elective	13235	Maintain the quality assurance system	Level 4	5
Elective	242829	Monitor the level of service to a range of customers	Level 4	5
Elective	244172	Perform a pre-delivery quality assurance inspection	Level 4	4
Elective	244140	Repair and maintain vehicle air conditioning systems	Level 4	8
Elective	244143	Repair manual transmissions	Level 4	6
Elective	244165	Test a vehicle engine on a dynamometer	Level 4	4
Elective	244127	Test and adjust exhaust emission gases	Level 4	4

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Elective	12231	Diagnose and repair engine management systems	Level 5	20

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Automotive Repair and Maintenance

SAQA QUAL ID	*QUALIFICATION TITLE*		
64810	National Certificate: Automotive Repair and Maintenance		
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 2	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
49689	National Certificate: Automotive Repair and Maintenance	Level 2	120	Will occur as soon as 64810 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

The purpose of the qualification is to provide learners, education and training providers and employers with the standards and the range of learning required to work effectively in various industries making use of automotive repair and maintenance skills and to meet the challenges of the automotive industry and related environments.

The primary skill that is recognised in this qualification is the ability to apply the theory behind repair and maintenance to do general servicing of vehicles.

This capability requires an understanding of basic repair and maintenance theory, names and functions of fluids and lubricants, automotive components and how to read and interpret workshop manuals and workshop procedures. Hand skills also play an important role in this qualification and successful learners will need to apply hand skills in completing their tasks.

This qualification has been designed to accommodate learners from various types of vehicles to make allowance for the wide range of vehicles currently available. This qualification can be achieved in one of the following 6 specialisation areas:

> Passenger Vehicles.
> Commercial Vehicles.
> Earthmoving Equipment.
> Lift Trucks.
> Motorcycles.
> Engine Fitting.

Training and assessment will be contextualised to the specialisation area of the learner, and the learner will be required to prove competence in the specialisation area enrolled in.

This qualification is the foundational qualification for a motor mechanic and learners will be able to build on this qualification to achieve higher levels of automotive repair and maintenance in the same specialisation area.

After achieving this qualification learners will be able to:

> Demonstrate understanding of how an engine and components operate.
> Communicate with peers and supervisors in an automotive work context.
> Use and maintain automotive workshop tools and equipment.
> Conduct a general automotive service.
> Remove and install automotive components.

Rationale:

The field of automotive maintenance and repair is characterised by the overall servicing of vehicles as well as the removal, dismantling and replacement of components and minor adjustments to vehicle systems. This in turn provides support and job opportunities to a variety of small businesses in the retail motor and related industries.

This qualification recognises the skills, knowledge and values relevant in the workplace and will cater for learners who:

> Have attended courses and need to apply the knowledge gained to activities in the workplace.
> Are already workers and have acquired skills and knowledge without having attended formal training.
> Are part of a learnership programme which integrates structured learning and operational experience.

There is also a critical need in the industry to identify people who are able to conduct the essential servicing and related operations associated with the range of vehicles on the road and apply efficient and safe operational practices in at least one of the specialisation areas in which this qualification may be achieved.

This is the first qualification in a series for learners who want to follow a career in the field of automotive repair and maintenance. This qualification focuses on developing skills and knowledge necessary to begin such a career. People who have achieved the skills and knowledge outlined in this qualification are normally employed in the following positions:

> Motor service mechanic.
> Earth moving service mechanic.
> Repair shop assistant.
> Diesel service mechanic.
> Lift truck service mechanic.
> Motorcycle service mechanic.

It also provides learners who have gained relevant experience in the workplace with an opportunity to obtain credits through an RPL process. The qualification also forms the basis for further learning in the field of vehicle technology.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
Learners registering for this qualification should already have achieved a General Education and Training Certificate at NQF Level 1 or equivalent.

If the learner does not already have such a qualification, learning in preparation for this qualification should include:

> Literacy and numeracy at NQF Level 1.
> Basic concepts of engineering science and technology at NQF Level 1.

Recognition of Prior Learning:

The structure of this qualification makes the Recognition of Prior Learning possible, if the learner is able to demonstrate competence in the knowledge, skills, values and attitudes implicit in this Qualification. Recognition of Prior Learning will be done by means of an Integrated Assessment as mentioned in the previous paragraph.

This Recognition of Prior Learning may allow:

> For accelerated access to further learning.
> Gaining of credits towards any of the Exit Level Outcomes in this qualification.

All recognition of Prior Learning is subject to quality assurance by the relevant accredited Education and Training Quality Assurance Body (ETQA) and must be conducted by a registered workplace assessor. Identified outcomes may have been acquired in a range of economic sectors and these will be considered as appropriate where the candidate provides evidence of the applicability of that learning to this qualification.

Access to the Qualification:

This qualification is open for anyone who wishes to pursue a career in automotive repair and maintenance, but prior achievement of the "Learning Assumed to be in Place" would facilitate an easier progression into learning programmes to address the outcomes of this qualification.

QUALIFICATION RULES
The core unit standards identified are applicable across the entire range of specialisation areas applicable to this qualification. Specific unit standards that are required for certain specialisation areas have been identified and listed below. Rules of combination for this qualification are as follows:

All Fundamental unit standards are compulsory (36 Credits).

All Core unit standards are compulsory (76 Credits).

The elective unit standards in the selected specialisation area should be as follows:

> For learners specialising in Passenger and Light Delivery Vehicles, the following unit standards are compulsory (5 Credits):
> ID 260720: Balance a wheel.
> ID 15123: Select and use vehicle lifting equipment.

> For learners specialising in Commercial Vehicles, the following unit standards are compulsory (8 Credits):
> ID 260720: Balance a wheel.
> ID 244690: Demonstrate basic knowledge of hydraulic components.
> ID 244691: Demonstrate basic knowledge of pneumatic components.

> For learners specialising in Earthmoving Equipment and Lift Trucks, the following unit standards are compulsory (6 Credits):

> ID 244690: Demonstrate basic knowledge of hydraulic components.
> ID 244691: Demonstrate basic knowledge of pneumatic components.

> For learners specialising in Motorcycles, the following unit standards are compulsory (9 Credits):
> ID 260722: Maintain and repair motorcycle wheel components.
> ID 15123: Select and use vehicle lifting equipment.

Additional Elective unit standards must be selected for each specialisation area to achieve a total of 125 credits for this qualification. No specific additional unit standards are required for learners specialising in Engine Fitting.

EXIT LEVEL OUTCOMES

1. Demonstrate understanding of how an engine and components operate.

2. Communicate with peers and supervisors in an automotive work context.

3. Use and maintain automotive workshop tools and equipment.

4. Conduct a general automotive service.
> Range: A general service includes any aspect of servicing a vehicle as indicated in the manufacturer's service specification and does not include repairing non-service items.

5. Remove and install automotive components.
Range:
> Components include any contraption, consisting of more than one part working together, and forms part of any one or more of the following systems:
> Electrical.
> Engine.
> Drive train.
> Brakes.
> Hydraulics.
> Pneumatics.

This qualification addresses the following critical cross-field outcomes, as detailed in the unit standards:

> Identify and solve problems and make decisions using critical and creative thinking.
> Note: The ability of the candidate to identify the type of service required.

> Work effectively with others as a member of a team, group, organisation or community.
> Note: The ability of the candidate to communicate with peers and supervisors.

> Organise and manage themselves and their activities responsibly and effectively.
> Note: The ability of the candidate to adhere to workplace timeframes and procedures.

> Collect, analyse, organise and critically evaluate information.
> Note: The ability of the candidate to identify repair and maintenance defects and act appropriately.

> Communicate effectively, using visual, mathematical and/or language skills in the modes of oral and/or written presentations.
> Note: The ability of the candidate to report on work conducted.

> Use science and technology effectively and critically, showing responsibility towards the environment and health of others.
> Note: The ability of the candidate to use the correct tools and equipment to carry out a general service.

> Demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.
> Note: The ability of the candidate to repair items that can safely be repaired and replace those items that cannot be repaired.

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

1.1 The various types of automotive engines are identified by operation and fuel type.
Range:
> Types of engine include 2-stroke, 4-stroke and rotary engines.
> Fuel types include diesel and petrol.
1.2 The major parts of a typical automotive engine are explained in terms of their function and operation.
1.3 Engine performance is explained in relation to engine size and economy.
1.4 Automotive engine systems are explained in terms of their function and components.
Range:
> Automotive engine systems include computer systems, fuel systems, exhaust systems, turbo and supercharger systems, electrical systems, cooling and lubrication systems and emission control systems.
1.5 The operation of a component is described in terms of the source of power.
Range:
> Source of power includes hydraulic, pneumatic and electrical.
1.6 The manner in which the source of power is converted to mechanical power is explained using scientific principles of force, power and energy.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Oral communication is maintained and adapted as required to promote effective interaction in a work context.
2.2 Terminology used is appropriate to the situation and in accordance with normal workplace usage.
2.3 Information related to work tasks is accessed and interpreted from a range of written and oral sources to ensure that work requirements are understood.
2.4 Communication is clear and unambiguous and at an appropriate level for designated target audiences.
2.5 Information communicated is accurate and conveyed in accordance with acceptable timeframes.
2.6 Communication is effective, regular and ongoing.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Tools and equipment are selected and used according to manufacturer operating guidelines.
3.2 Tools and equipment are sourced from available supplies.
3.3 Faulty tools are identified and corrective action is taken in accordance with workplace procedures.
Range:
> Corrective action includes replacing, repairing or reporting.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1 The fundamentals of basic automotive repair and maintenance technology are applied to service vehicles.
4.2 Typical repair and maintenance defects are recognised and responded to in a manner that ensures customer satisfaction.
4.3 Minor adjustments to vehicle systems are made according to workplace and manufacturer requirements.
4.4 Work is conducted with due consideration for other team members and overall productivity.
4.5 Work conducted is reported on in accordance with workplace procedures.

Associated Assessment Criteria for Exit Level Outcome 5:

5.1 Components are removed and replaced according to manufacturer specifications.
5.2 Components are cleaned and dismantled according to organisational requirements.
5.3 Consequences of not replacing components correctly are described in terms of increased wear and vehicle reliability.
5.4 Justifications are given for when a component should be serviced or replaced.
5.5 Tools and equipment are used in accordance with their design.
5.6 Work conducted is reported according to workplace procedures.

Integrated Assessment:

Because assessment practices must be open, transparent, fair, valid, and reliable and ensure that no learner is disadvantaged in any way whatsoever, an integrated assessment approach is incorporated into the Qualification. Learning, teaching and assessment are inextricably linked. Whenever possible, the assessment of knowledge, skills, attitudes and values shown in the exit level outcomes should be integrated.

A variety of methods must be used in assessment tools and activities must be appropriate to the context in which the learner is working. Where it is not possible to assess the learner in the workplace or on-the-job, simulations, case studies, role-plays and other similar techniques should be used to provide a context appropriate to the assessment.

The term 'Integrated Assessment' implies that theoretical and practical components should be assessed together. During integrated assessments the assessor should make use of formative and summative assessment methods and assess combinations of practical, applied, foundational and reflective competencies. 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 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
As a starting point, this qualification which is part of a series of qualifications in the field of vehicle technology including, servicing, maintenance, repairs and diagnostics, was compared to other, similar outcomes-based qualifications, certifications or skills standards in English speaking countries of the world.

It was found to be difficult to compare the New Zealand and Australian narrow focus qualifications with this broad-based qualification that also include fundamentals, however the generic core and specialisation areas` unit standards did compare favourably to both the Australian (AUR99) Automotive Industry, Service and Repair unit standards and the NVQ qualification in the United Kingdom.

An example of the exact multi specialisation area approach used in this qualification was found in Australia under Automotive Retail Service Repair Training (www.automotivetraining.org.au). The range of unit standards used in Australia that relate similarly to core unit standards in this qualification may be found at (www.ntis.gov.au).

It was further difficult to undertake specific comparisons given that the New Zealand and Australian qualifications, although they are in the same field of vehicle technology and cover the same areas of specialisation (thus containing a large degree of similar content) are conceptualised as three year qualifications without exit level outcomes at the intermediate levels.

This notwithstanding, the technical content of this qualification for automotive repair and maintenance (with the various specialisations) corresponds with the equivalent level of qualification in vehicle servicing (with the various specialisations) in Australia, New Zealand and the United Kingdom.

Elements of the Institute of Motor Industry (IMI) in the UK have been used in benchmarking best practice procedures in some of the unit standards used in this qualification. The NVQ qualifications offered in the UK cover all the same objectives of this series of qualifications at various levels of complexity. The qualifications are offered as an internship wherein the learner enrols with a college or training centre for the theoretical component, and achieves the practical component in-house. The qualifications are all based on specific levels of performance, and lead to progressive levels of complexity, but are identified as separate qualifications. The learning towards these qualifications is offered through long-term learner-employer relationships, with short-term stints at a training centre. Qualification titles in the UK include:

> Vehicle Mechanical & Electronic Systems, Maintenance and Repair - Level 3: (Q1015915).
> Vehicle Mechanical & Electronic Systems, Maintenance and Repair - Level 3: (Q1015916).
> Motorcycle Mechanical & Electronic Systems, Maintenance and Repair - Level 3: (Q1015918).
> Vehicle Refinishing - Level 3: (Q1017590).
> Vehicle Body Repair - Level 3: (Q1015917).
> Vehicle Body Fitting - Level 2: (Q1015913).
> Vehicle Mechanical & Electronic Systems, unit Replacement - Level 2: (Q1015914).

The qualifications offered in other European countries, such as Germany, are also predominantly vocational qualifications with theoretical components being achieved through a specified period at a training centre. The qualifications are aimed at achieving complete competence in all aspects of vehicle maintenance through the progressive series of qualifications and includes mechanical, electrical and coach works. The training programmes are progressive qualifications of one-year duration each and include ongoing training through workbooks in which the trainee is required to complete evidence of understanding for each month of the registered year of learning. Germany has a requirement that competent people be licensed to operate under the meister (master craftsman) programme, and this licence is valid for a period of two years. The qualification titles offered in Germany include:

> Auto Fachman - Level 1.
> Auto Fachman - Level 2.
> Auto Fachman - Level 3.
> Auto Fachman - Meister.

America uses a system of specialisation areas, with a master technician being identified as a person who is competent in all areas and will be able to perform on almost any part of a vehicle. The learning is conducted through apprenticeships and has specialisation areas for engine technicians, transmission technicians, steering and suspension technicians, brake technicians, electrical system technicians, heating and air-conditioning technicians, driveability and performance technicians and lubrication technicians.

None of the SADC countries have their own qualifications relating to vehicle maintenance, but use the British City and Guilds Standards for training learners in the automotive field. Namibia has indicated interest in the South African qualifications and may implement this qualification once it has been registered.

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

Horizontal articulation is possible with any of the specialisation areas within this qualification and also with the following Qualifications:

> ID 21004 - National Certificate: Automotive component manufacturing and assembly, NQF Level 2.
> ID 22858 - National Certificate: Autotronics NQF Level 2.
> ID 59689 - National Certificate: Mechanical engineering: fitting NQF Level 2.
> ID 22770 - National Certificate: Mechatronics NQF Level 2.
> ID 48969 - National Certificate: Service station operations at NQF Level 2.
> ID 61809 - National Certificate: Tyre repair and Maintenance NQF Level 2.

Vertical articulation is possible with the following qualifications:

> ID 64809 - National Certificate: Automotive Repair and Maintenance at NQF Level 3.

MODERATION OPTIONS
> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant Education and Training Quality Assurance Body (ETQA).

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor 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 ETQAs (including professional bodies).

> 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 in the ELOs of the Qualification and will include integration of skills relevant to the economic sector.

CRITERIA FOR THE REGISTRATION OF ASSESSORS
Assessors must be registered in terms of the requirements of SAQA and the relevant ETQA. In addition, assessors should have:

> A minimum of 3 (three) years' practical, relevant occupational experience.
> A relevant Qualification at NQF Level 3 or higher.
> The ability to meet the outcomes of this qualification.

NOTES
This qualification replaces qualification 49689, "National Certificate: Automotive Repair and Maintenance", Level 2, 120 credits.

The revised version was necessary due to the inclusion of additional specialisation areas and the expiry of the original qualification.

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
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	12211	Build basic auto electrical circuits	Level 2	16
Core	260719	Carry out an automotive service	Level 2	8
Core	244686	Demonstrate understanding of the principles of fluid power	Level 2	6
Core	13220	Keep the work area safe and productive	Level 2	8
Core	260717	Remove and fit automobile components	Level 2	12
Core	119744	Select, use and care for engineering hand tools	Level 2	8
Core	12476	Select, use and care for engineering measuring equipment	Level 2	4
Core	12219	Select, use and care for engineering power tools	Level 2	6
Core	260638	Service automobile batteries	Level 2	4
Core	244056	Understand the fundamentals of engine technology	Level 3	4
Elective	116932	Operate a personal computer system	Level 1	3
Elective	253440	Assemble mechanical components	Level 2	12
Elective	260720	Balance a wheel	Level 2	2
Elective	243067	Cut materials using the oxy-fuel gas cutting process (manual cutting)	Level 2	6
Elective	244690	Demonstrate basic knowledge of hydraulic components	Level 2	3
Elective	244691	Demonstrate basic knowledge of pneumatic components	Level 2	3
Elective	243769	Demonstrate knowledge of lubrication	Level 2	2
Elective	12466	Explain the individual`s role within business	Level 2	4
Elective	119750	Inspect and lubricate an automotive system	Level 2	8
Elective	253582	Lift and move a load using manual lifting equipment and tackle	Level 2	8
Elective	260722	Maintain and repair motorcycle wheel components	Level 2	6
Elective	13219	Maintain static seals in machines and / or equipment	Level 2	4
Elective	9268	Manage basic personal finance	Level 2	6
Elective	116235	Operate a pendant controlled overhead crane	Level 2	5
Elective	13258	Participate in work group activities	Level 2	4
Elective	119753	Perform basic welding/joining of metals	Level 2	8
Elective	256176	Remove and replace off-the-road (OTR) wheels and tyres	Level 2	8
Elective	253425	Repair internal combustion engines	Level 2	5
Elective	15123	Select and use vehicle lifting equipment	Level 2	3
Elective	12463	Understand and deal with HIV/AIDS	Level 2	3

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Test and report on condition of vehicle starting and charging system

SAQA US ID	*UNIT STANDARD TITLE*		
260637	Test and report on condition of vehicle starting and charging 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 2	4

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
15107	Test and report on condition of vehicle starting system	Level 3	4	Will occur as soon as 260637 is registered
15110	Test and report on condition of vehicle charging system	Level 3	4	Will occur as soon as 260637 is registered

SPECIFIC OUTCOME 1
Interpret circuit diagrams.

SPECIFIC OUTCOME 2
Differentiate between components used in starting and charging systems.

SPECIFIC OUTCOME 3
Remove and fit components.

SPECIFIC OUTCOME 4
Diagnose starting or charging problems.

SPECIFIC OUTCOME 5
Complete fault finding reports.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64809	National Certificate: Automotive Repair and Maintenance	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Service automobile batteries

SAQA US ID	*UNIT STANDARD TITLE*		
260638	Service automobile batteries		
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	4

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
119735	Remove, test, fit and service automobile batteries	Level 2	4	Will occur as soon as 260638 is registered

SPECIFIC OUTCOME 1
Remove and fit an automotive battery.

SPECIFIC OUTCOME 2
Test batteries.

SPECIFIC OUTCOME 3
Service batteries.

SPECIFIC OUTCOME 4
Remove and replace battery terminals and cables.

SPECIFIC OUTCOME 5
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64810	National Certificate: Automotive Repair and Maintenance	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Diagnose and repair fuel system components

SAQA US ID	*UNIT STANDARD TITLE*		
260639	Diagnose and repair fuel system 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 4	8

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
12230	Diagnose, test and repair electronic automobile fuel injection systems	Level 4	16	Will occur as soon as 260639 is registered
244130	Diagnose and repair faults in a carburetted fuel system	Level 4	4	Will occur as soon as 260639 is registered
244139	Diagnose and repair conventional fuel injection system faults	Level 4	6	Will occur as soon as 260639 is registered

SPECIFIC OUTCOME 1
Read and interpret the job instructions.

SPECIFIC OUTCOME 2
Prepare to conduct tests.

SPECIFIC OUTCOME 3
Test and diagnose fuel system faults.

SPECIFIC OUTCOME 4
Repair fuel system faults.

SPECIFIC OUTCOME 5
Apply safety procedures during the repair and assembly task.

SPECIFIC OUTCOME 6
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64849	Further Education and Training Certificate: Automotive Repair and Maintenance	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Diagnose and repair automotive components

SAQA US ID	*UNIT STANDARD TITLE*		
260657	Diagnose and repair automotive 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 4	10

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
230463	Diagnose and repair drive train systems	Level 5	8	Will occur as soon as 260657 is registered
244135	Repair suspension systems	Level 4	5	Will occur as soon as 260657 is registered

SPECIFIC OUTCOME 1
Read and interpret the job instructions.

SPECIFIC OUTCOME 2
Prepare to conduct tests.

SPECIFIC OUTCOME 3
Test and diagnose faults.

SPECIFIC OUTCOME 4
Repair the faults.

SPECIFIC OUTCOME 5
Apply safety procedures during the repair and assembly task.

SPECIFIC OUTCOME 6
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64849	Further Education and Training Certificate: Automotive Repair and Maintenance	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Diagnose and repair automatic transmissions

SAQA US ID	*UNIT STANDARD TITLE*		
260658	Diagnose and repair automatic transmissions		
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	6

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
244120	Test automatic transmissions	Level 4	6	Will occur as soon as 260658 is registered

SPECIFIC OUTCOME 1
Read and interpret the job instructions.

SPECIFIC OUTCOME 2
Select and connect the required test equipment.

SPECIFIC OUTCOME 3
Test and adjust automatic transmissions.

SPECIFIC OUTCOME 4
Check the operational condition after adjustment.

SPECIFIC OUTCOME 5
Apply safety procedures during the repair and assembly task.

SPECIFIC OUTCOME 6
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64849	Further Education and Training Certificate: Automotive Repair and Maintenance	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Diagnose and repair faults on advanced auto electrical circuits

SAQA US ID	*UNIT STANDARD TITLE*		
260677	Diagnose and repair faults on advanced auto electrical circuits		
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
12227	Trace and repair faults on advanced auto electrical circuits	Level 4	16	Will occur as soon as 260677 is registered

SPECIFIC OUTCOME 1
Interpret advanced auto electric circuit diagrams.

SPECIFIC OUTCOME 2
Locate faults on advanced auto electric circuits.

SPECIFIC OUTCOME 3
Remove and fit components.

SPECIFIC OUTCOME 4
Complete fault finding documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64849	Further Education and Training Certificate: Automotive Repair and Maintenance	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Diagnose and repair forced induction systems

SAQA US ID	*UNIT STANDARD TITLE*		
260678	Diagnose and repair forced induction systems		
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	4

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
244121	Diagnose, service and repair forced induction systems	Level 4	4	Will occur as soon as 260678 is registered

SPECIFIC OUTCOME 1
Read and interpret the job instructions.

SPECIFIC OUTCOME 2
Inspect system components for condition.

SPECIFIC OUTCOME 3
Diagnose faults.

SPECIFIC OUTCOME 4
Repair the faults.

SPECIFIC OUTCOME 5
Apply safety procedures during the repair and assembly task.

SPECIFIC OUTCOME 6
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64849	Further Education and Training Certificate: Automotive Repair and Maintenance	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate knowledge of fuel supply and engine management systems

SAQA US ID	*UNIT STANDARD TITLE*		
260679	Demonstrate knowledge of fuel supply and engine management systems		
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	10

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
244044	Demonstrate knowledge of diesel fuel injection and engine management systems	Level 3	7	Will occur as soon as 260679 is registered
244046	Demonstrate knowledge of mechanical fuel injection systems	Level 3	5	Will occur as soon as 260679 is registered
244050	Demonstrate knowledge of petrol fuel injection and engine management systems	Level 3	7	Will occur as soon as 260679 is registered
244054	Demonstrate knowledge of electronic fuel injection and engine management systems	Level 3	10	Will occur as soon as 260679 is registered

SPECIFIC OUTCOME 1
Demonstrate knowledge of fuel supply principles.

SPECIFIC OUTCOME 2
Demonstrate knowledge of carburetted system.

SPECIFIC OUTCOME 3
Demonstrate knowledge of throttle body injection (TBI) system.

SPECIFIC OUTCOME 4
Demonstrate knowledge of continuous fuel injection system.

SPECIFIC OUTCOME 5
Demonstrate knowledge of pulsed fuel injection system.

SPECIFIC OUTCOME 6
Identify the components of engine management systems and their functions.

SPECIFIC OUTCOME 7
Demonstrate knowledge of air pollution and vehicle exhaust emissions.

SPECIFIC OUTCOME 8
Demonstrate knowledge of emission control.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64809	National Certificate: Automotive Repair and Maintenance	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Remove and fit automobile components

SAQA US ID	***UNIT STANDARD TITLE***		
260717	Remove and fit automobile 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 replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
12214	Remove and fit automobile mechanical and electrical components	Level 2	12	Will occur as soon as 260717 is registered
119738	Remove automotive components	Level 2	4	Will occur as soon as 260717 is registered
119748	Install Automotive components	Level 2	6	Will occur as soon as 260717 is registered

SPECIFIC OUTCOME 1
Prepare to remove or fit automobile components.

SPECIFIC OUTCOME 2
Remove and fit components.

SPECIFIC OUTCOME 3
Inspect and test fitted components.

SPECIFIC OUTCOME 4
Apply safety procedures during the removal and fitting process.

SPECIFIC OUTCOME 5
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64810	National Certificate: Automotive Repair and Maintenance	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Remove and install fuel system components

SAQA US ID	*UNIT STANDARD TITLE*		
260718	Remove and install fuel system 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	6

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
244170	Remove and install fuel system components	Level 4	6	Will occur as soon as 260718 is registered

SPECIFIC OUTCOME 1
Demonstrate knowledge of the functions of fuel system components.

SPECIFIC OUTCOME 2
Prepare to remove and fit fuel system components.

SPECIFIC OUTCOME 3
Remove and fit fuel system components.

SPECIFIC OUTCOME 4
Conduct post operation functions.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64849	Further Education and Training Certificate: Automotive Repair and Maintenance	Level 4
Core	64809	National Certificate: Automotive Repair and Maintenance	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Carry out an automotive service

SAQA US ID	*UNIT STANDARD TITLE*		
260719	Carry out an automotive service		
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 replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
119739	Take fluid samples	Level 2	2	Will occur as soon as 260719 is registered
119745	Conduct an inspection	Level 2	4	Will occur as soon as 260719 is registered
119751	Carry out a service	Level 2	8	Will occur as soon as 260719 is registered

SPECIFIC OUTCOME 1
Plan and prepare for servicing a vehicle.

SPECIFIC OUTCOME 2
Perform the service on the vehicle.

SPECIFIC OUTCOME 3
Apply quality checks on a completed service.

SPECIFIC OUTCOME 4
Apply safety procedures during the service.

SPECIFIC OUTCOME 5
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64810	National Certificate: Automotive Repair and Maintenance	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Balance a wheel

SAQA US ID	*UNIT STANDARD TITLE*		
260720	Balance a wheel		
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	2

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
119746	Balance a wheel	Level 2	4	Will occur as soon as 260720 is registered

SPECIFIC OUTCOME 1
Plan and prepare for wheel balancing.

SPECIFIC OUTCOME 2
Prepare the wheel-balancing machine.

SPECIFIC OUTCOME 3
Balance the wheel.

SPECIFIC OUTCOME 4
Apply safety procedures during the work activity.

SPECIFIC OUTCOME 5
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64810	National Certificate: Automotive Repair and Maintenance	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Perform a basic condition test on vehicle components

SAQA US ID	*UNIT STANDARD TITLE*		
260721	Perform a basic condition test on vehicle 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	8

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
244055	Check an engine for condition using hand held test equipment	Level 2	4	Will occur as soon as 260721 is registered
244109	Perform a basic condition test on an engine	Level 3	8	Will occur as soon as 260721 is registered

SPECIFIC OUTCOME 1
Prepare to test vehicle components.

SPECIFIC OUTCOME 2
Perform a visual inspection.

SPECIFIC OUTCOME 3
Perform an operational test.

SPECIFIC OUTCOME 4
Apply safety procedures during the testing process.

SPECIFIC OUTCOME 5
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64809	National Certificate: Automotive Repair and Maintenance	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Maintain and repair motorcycle wheel components

SAQA US ID	*UNIT STANDARD TITLE*		
260722	Maintain and repair motorcycle wheel 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	6

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

SPECIFIC OUTCOME 1
Demonstrate knowledge of tyre theory.

SPECIFIC OUTCOME 2
Remove and fit wheel bearings.

SPECIFIC OUTCOME 3
Fit a tyre and tube.

SPECIFIC OUTCOME 4
Re-spoke and true a wheel.

SPECIFIC OUTCOME 5
Balance and align a wheel.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64810	National Certificate: Automotive Repair and Maintenance	Level 2

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Install, test and maintain a basic fluid power system

SAQA US ID	*UNIT STANDARD TITLE*		
260723	Install, test and maintain a basic fluid power 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 3	8

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
13117	Install, test and maintain a basic hydraulic system	Level 3	10	Will occur as soon as 260723 is registered

SPECIFIC OUTCOME 1
Interpret fluid power circuit diagrams and symbols.

SPECIFIC OUTCOME 2
Identify and select fluid power components.

SPECIFIC OUTCOME 3
Install basic fluid power circuits.

SPECIFIC OUTCOME 4
Test basic fluid power circuits.

SPECIFIC OUTCOME 5
Maintain basic fluid power circuits.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64809	National Certificate: Automotive Repair and Maintenance	Level 3

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Diagnose and repair vehicle ignition systems

SAQA US ID	*UNIT STANDARD TITLE*		
260737	Diagnose and repair vehicle ignition systems		
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	6

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
12228	Service and repair electronic automobile ignition systems	Level 4	12	Will occur as soon as 260737 is registered

SPECIFIC OUTCOME 1
Read and interpret the job instructions.

SPECIFIC OUTCOME 2
Prepare to conduct tests.

SPECIFIC OUTCOME 3
Test and diagnose faults.

SPECIFIC OUTCOME 4
Repair faults.

SPECIFIC OUTCOME 5
Apply safety procedures during the repair and assembly task.

SPECIFIC OUTCOME 6
Restore work area, complete and process documentation.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64849	Further Education and Training Certificate: Automotive Repair and Maintenance	Level 4