

<b>Domain</b>	<b>AUTOMOTIVE MECHANICS</b>	<b>Unit ID: 73</b>
<b>Title:</b>	<b>Apply knowledge of basic mathematical and engineering science related to automotive mechanics</b>	
<b>Level: 2</b>		<b>Credits: 3</b>

### Purpose

This unit standard specifies the competencies required to apply basic mathematical and engineering science principles related to automotive mechanics. It includes the conversion of common metric units and performing basic engineering science calculations. This unit standard is intended for those who work as automotive mechanics.

### Special Notes

1. This unit standard is to be delivered and assessed in the context of automotive mechanic operations and should be assessed in conjunction with other relevant technical unit standards selected from this domain.
2. To demonstrate competence, at a minimum, requires evidence of applying mathematical procedures for converting common metric units; performing engine related calculations, gear transmission ratio related calculations and calculations associated with basic engineering science in automotive mechanics. Perform these tasks ensuring correct identification of requirements and finishing of the tasks, correct selection and use of appropriate processes, tools and equipments and completing all work to specification.
3. Assessment evidence may be collected from a real workplace or a simulated real workplace or an appropriate simulated realistic environment in which automotive mechanics operations are carried out.
4. Glossary of terms
  - '*calculation*' means determining the dimensions, quantity or capacity of an object by applying mathematical methods.
5. All inspection, operation and maintenance procedures associated with the use of tools and equipment shall comply with manufacturers' and company guidelines, instructions and reasonable flat rate time.
6. '*Specifications*' refers to any, or all of the following: manufacturers' specifications and recommendations, workplace specific requirements.
7. The metric system used in Namibia is based on the International System of units, referred to by its abbreviation 'SI'.
8. Regulations and legislation relevant to this unit standard include the following:
  - Labour Act, No. 6, 1992
  - Occupational Health and Safety Regulations No. 18, 1997 and all subsequent amendments.
9. Resources for this unit standard are to include formula book and calculator.

## **Quality Assurance Requirements**

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority on and the Namibia Training Authority on [www.nta.com.na](http://www.nta.com.na)

## **Elements and Performance Criteria**

### **Element 1: Demonstrate basic knowledge of base and derived units used in the SI system of measurement applicable to automotive mechanics**

#### **Range**

Base and derived units may include and are limited to metre, kilogram, second, ampere, kelvin and/or celsius, newton, joule, pascal, watt, volt, ohm and hertz.

Conversion of common metric base and derived units to imperial units and vice versa may include and is limited to length, mass, area, volume, volume liquids, speed, force, torque, pressure energy, vacuum, power and temperature.

#### **Performance Criteria**

- 1.1 Base and derived units are identified.
- 1.2 The meaning of base and derived units is explained.
- 1.3 Appropriate calculation method to convert base and derived units to imperial units and vice versa is selected and applied.
- 1.4 Results of calculations are confirmed and recorded.

### **Element 2: Demonstrate basic knowledge of engineering science terms and calculations associated with automotive mechanics**

#### **Range**

Engineering science terms are limited to force, mechanical work, power, torque, friction, bore, stroke, piston displacement, engine capacity, compression ratio, engine power, engine torque, and engine efficiency.

Calculations related to basic engineering science are limited to force, work, power, torque, hydraulic pressure.

Calculations related to engine performance are limited to bore, stroke, piston displacement, engine capacity, compression ratio, power output, mechanical engine efficiency, transmission ratio.

### **Performance Criteria**

- 2.1 Basic engineering science terms are defined.
- 2.2 Basic engineering science terms are explained in the context of automotive mechanics.
- 2.3 Calculations related to basic engineering science terms are identified and applied.
- 2.4 Calculations related to engine performance, basic hydraulic and gear transmission ratio are identified and applied.
- 2.5 Results of calculations are explained.
- 2.6 Results of calculations are confirmed and recorded.

### **Registration Data**

<b>Subfield:</b>	Automotive Engineering
<b>Date first registered:</b>	28 September 2006
<b>Date this version registered:</b>	28 September 2006
<b>Anticipated review:</b>	2010
<b>Body responsible for review:</b>	Namibia Training Authority