

NOCC-A21 Electrician: Competence Package

Relevant Occupation/trade title: Electrician				SAQA ID: 91761	
Learning Area 9: Design, install, wire, maintain and troubleshoot electrical motors and associated control systems - Advanced t				Total Hours:	176
Learning Project 3: Test DC circuit (DC Motors, DC lighting circuits, batteries, regulated DC power supplies)				Total Hours:	8
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):		LA 9 LP2			
Learning project description: Test the required DC circuit to locate a fault by using portable electrical measuring and testing equipment					
Activity phase	Practical Skills Modules Content	Underpinning Knowledge Module Content	Work Experience Module Content (Exposure to be given)	Didactical-methodological advice	Learning materials/Tools and Equipment
Reference to QCTO Curriculum	PM06	KM-06-KT02	WM-03		
Planning/ Preparation/ Sourcing	<p><u>Provide access to (Given):</u> Electrical testing- and measuring instruments and a variety of DC circuits as per last column;</p> <p><u>Apprentices must be able to do/perform the following (hard and soft) skills:</u></p> <p>Prepare to test DC circuits</p> <ul style="list-style-type: none">Identify, obtain and understand OHS procedures for the given work assignmentFollow OHS risk control work preparation measuresEstablish the scope of the testing/measuring to be undertaken from documentation or from appropriate personnelSeek advice from the appropriate	<p><u>Knowledge of:</u></p> <ul style="list-style-type: none">Different types of testing and measuring instruments and their usesCommon faults (e.g. open circuit, short circuit,, continuity, voltage supply)Basic techniques of fault findingVarious electrical tests to be carried out on DC CircuitsPPE in the use of testing and measuring equipment	<p><u>Under supervision:</u></p> <ul style="list-style-type: none">Be actively involved where DC circuits are testedPerform risk assessment on DC circuit testingEnsure that test instruments are in working conditionPerform lock out procedures in DC circuits installation systemConduct testing / measurement in DC circuits and equipmentInterpret results of DC testing/measuring and report findingsStore test and measuring	<ul style="list-style-type: none">Research /Desk studyCase studies /scenariosTechnical discussionsLecture/ instructionsPresentationsTextbook work	<p>Print materials, electronic files, software applications incl.:</p> <ul style="list-style-type: none">OHS ActText booksManufacturer catalogues and manualsTraining manuals for trainers and apprentices incl. multimedia softwareSet of presentation aids (videos, slides) for overhead or LED/LCD projectors <p>Stationary machinery,</p>

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	<p>personnel to ensure the work is coordinated effectively with others</p> <ul style="list-style-type: none"> Identify and access electrical installations, circuits and equipment that may be required for the work Obtain tools and equipment to carry out the work and check them for correct operation and safety Identify and select correct measuring instrument needed for testing a variety of DC circuits Test functionality of testing/measuring instruments and report malfunctions to appropriate personnel Observe warnings relating to working with precision testing/measuring instruments and devices Select and correctly fit personal protective equipment (PPE) 	<ul style="list-style-type: none"> Statutory requirements in relation to testing instruments Standard operating procedures for testing instruments OHSA, Mining Act, Municipal By-laws Test procedures on DC Circuits Lock out procedures Reporting requirements and work documents related to DC circuit testing Housekeeping procedures 	<p>equipment, record and report any defects</p>		<p>mobile plants, transport, access and lifting equipment incl.:</p> <ul style="list-style-type: none"> Ladders and scaffolds <p>Hand- & power tools and PPE incl.:</p> <ul style="list-style-type: none"> Standard electrician's toolbox Safety helmet Safety shoes <p>Measuring and testing instruments incl.:</p> <ul style="list-style-type: none"> Insulation resistance tester True RMS Digital Multimeter DC Clamp meter <p>Training workshop and laboratory equipment incl.:</p> <ul style="list-style-type: none"> Heavy workbench with stool, power supply and assembly vice Bench mountable interchangeable training panel frame Basic panel systems for practicing measuring and testing of fixed installations and electrical appliances with built in fault
Implementation/ Execution/ Processing	<p>Test and identify DC circuit problems</p> <ul style="list-style-type: none"> Follow risk control measures and procedures for carrying out the work Correctly use appropriate personal protective equipment (PPE) Ensure that the circuit /installation is isolated and locked out Determine the need to test or measure under power on 				

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	<p>conditions in exact accordance with OHSA</p> <ul style="list-style-type: none"> • Conduct measurements/ testing (under power on – with supervision/power off conditions) according to given instructions and safety procedures • Conduct testing/ measurement without damage to testing/ measurement instruments, circuits, the surrounding environment or services • Use established methods to measure, calculate and interpret values as they apply to DC electrical circuits and identify circuit problems • Deal safely with unexpected situations with the approval of appropriate personnel 				<p>simulator exercises</p> <ul style="list-style-type: none"> • Modular experimental box system with industrial machines, appliance simulators, lighting circuits and systems, socket outlet circuits, equipped distribution boards and control panels for testing/ measuring and fault finding exercises • Training packages for the use of measuring instruments • Set of various components / circuits & equipment for testing including: <ul style="list-style-type: none"> – DC motors – DC lighting circuits – Batteries – Regulated DC power supplies
Evaluation/ Documentation/ Housekeeping	<p>Complete DC testing and document activities</p> <ul style="list-style-type: none"> • Clean up work place • Record test results accurately • Complete and process relevant work documentation • Report malfunctions or deficiencies in the operation of DC circuits to appropriate personnel • Inspect and clean testing/ measuring instruments • Record and report any defects and malfunctions of test instruments to appropriate personnel 				

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	<ul style="list-style-type: none"> Store tools and equipment in assigned, secure and safe location 				
Total	Hours: 8				
Specialisation additions	Equipment that requires authorisation				
Assessment guidance					
<ul style="list-style-type: none"> Self assessment Observation Checking documentation and conclusion Theory test <p>Criteria for assessment:</p> <ul style="list-style-type: none"> Interpreting work assignments correctly and determining sequence of operation Selecting portable measuring and testing equipment correctly according to the task Checking portable electrical measuring instruments for correct operation and functionality Identifying and marking unsafe and faulty measuring equipment for repair Setting up portable measuring instruments correctly for application Reading portable measuring instruments correctly and recording the readings as per requirement Recording results on the appropriate documentation Using electrical measuring instruments in accordance with their specifications Placing and storing electrical measuring instruments in accordance with specifications 					