

NOCC-A21 Electrician: Competence Package

Relevant Occupation/trade title: Electrician			SAQA ID: 91761		
Learning Area 5: Install wiring systems and accessories (low voltage) in domestic buildings and premises (incl. earthing and bonding)			Total Hours:	128	
Learning Project 2: Install cables and conductors into wire ways			Total Hours:	16	
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):		LA5 – LP 1			
Learning project description: Install cables and conductors into wireways and test (continuity and insulation resistance test)					
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	PM04-PS01-03, PM-05-PS01, PM-05-PS02, PM-05- PS04, PM-05-PS05, PM-05-PS06, PM-06-PS01-02 PM-07-PS01-03 PM-08-PS01-03	KM-05-KT01 KM-05-KT02 KM-05-KT03	WM-01-WE01-03 WM-02-WE01-03 WM-03-WE01-03		
Planning/ Preparation	<p><u>Provide access to (Given):</u> Work tasks/job requests and material and equipment as specified in last column;</p> <p><u>Apprentices must be able to do/perform the following (hard and soft) skills:</u></p> <p>Prepare for installation of cable and conductors</p> <ul style="list-style-type: none">Identify, obtain and understand OHS procedures for given instructionIdentify health and safety risks and follow established risk control measures and procedures in preparation for the work	<p><u>Knowledge of:</u></p> <p>General requirements applicable to the installation of wiring systems incl.:</p> <ul style="list-style-type: none">Statutory and regulatory requirements associated with the installation of electrical conductors and cablesWiring support and/or protection requirements and specificationsRelevant manufacturer requirementsSpecifications and methods for installation of	<p><u>Under supervision:</u></p> <ul style="list-style-type: none">Plan the layout of wireways as per work requirementsDraw in cables and conductorsSecure conductors and cablesPerform continuity and installation resistance tests on existing installationsReport results of testing to supervisor and discuss	<ul style="list-style-type: none">LectureGroup discussionVideosSimulationsPractical tasks	<p>Print materials, electronic files, software applications incl.:</p> <ul style="list-style-type: none">OHS ActSANS 10142-1Text booksManuals for trainers and apprentices incl. multimedia softwareSet of presentation aids for overhead or LED/LCD projectors <p>Stationary machinery, mobile plants, transport, access and lifting equipment incl.:</p>

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	<ul style="list-style-type: none"> • Prepare and sequence installation of cables and conductors in consultation with others affected by the work • Determine the scope and location of the work to be undertaken • Plan wiring within the constraints of the installed wireways and given requirements • Identify appropriate method for installing cables and conductors • Determine correct cable and conductor type, size and quality • Identify material needed for the wiring work against job requirements • Identify tools, equipment and testing devices needed for the wiring work • Check that preparatory work has not caused any damage and complies with requirements 	<p>conductors and cables</p> <ul style="list-style-type: none"> • Wiring support techniques and alternatives • Marking, tagging and labelling requirements for cables, wires, conductors and connections • Tests for wiring and connections • Cable and conductor types, sizes and quality (as per SANS 10142-1) • Calculation of estimated load and volt drop as per SANS 10142-1 • Use and application of personal protective equipment for installation of conductors and cables <p>Techniques for installing cables, conductors and wiring systems incl.:</p> <ul style="list-style-type: none"> • Types of wire ways through buildings, structures and premises (incl. maintaining fire rating integrity) • Methods of mechanical protection and support of cables and conductors • Application of wiring accessories • Drawing-in, placing and fixing of cables and conductors • Inspecting and testing installed cables and 			<ul style="list-style-type: none"> • Ladders and scaffolds <p>Hand- & power tools incl:</p> <ul style="list-style-type: none"> • Wire and cable strippers • Cable/wire cutters • Crimp tools • Soldering iron • Cable/wire pulling tools, fish tape • Cable/wire dispenser • Utility/cable knife • Hacksaw • Screw drivers • Pliers <p>PPE incl</p> <ul style="list-style-type: none"> • Hand gloves • Safety clothing <p>Measuring and testing instruments incl.: Tape measure Insulation resistance tester Continuity tester</p> <p>Training workshop and laboratory equipment incl.:</p> <ul style="list-style-type: none"> • Installation cabins/ cubicles with solid brick walls or
Implementation/Execution	<ul style="list-style-type: none"> • Follow OHSA risk control measures and procedures for carrying out the work • Install cables, conductors and accessories with sufficient excess to affect terminations • Adjust and fix all accessories (brackets, clamps, holders etc.) to specifications • Fit and secure glands and retaining devices • Prepare cable/cord and conductor end to suit 				

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	<p>connector/lug without causing any damage to insulation or conductor</p> <ul style="list-style-type: none"> Identify mark/tag and label all cables, wires, conductors, circuits and connections to specification Carry out cable and conductor installation without unnecessary waste of materials or damage to equipment, circuits or the surrounding environment 	<p>conductors to ensure they comply with continuity and insulation resistance and are safe to connect to the supply</p> <p>Cable and conductor protection and support methods and accessories incl.:</p> <ul style="list-style-type: none"> Requirements to protect and support cables and conductors adequately - against mechanical damage, adverse temperatures, humidity and corrosion and protection from magnetic fields that may affect the performance Cable support and protection devices, accessories and typical applications - metallic and non-metallic conduits, duct and trunking, cable ladder and tray, cable clips and ties and related accessories <p>Types of cables and conductors used in the industry and their application incl.:</p> <ul style="list-style-type: none"> Structural components of cables and their purpose - conductors and conductor material; insulation; 			<p>interchangeable plaster-/chip board walls or punched hole grid panels (potentially covering wall, ceiling and under floor installations)</p> <ul style="list-style-type: none"> Set of reusable concealed and surface mounted standard enclosures incl. distribution boards, switch boards, panels, junction boxes and related accessories Set of consumables consisting of various standard types of wire enclosures and fittings e.g. PVC and metal conduits, (RMC/GRC/IMC/EMT) cable trays, metal and fibreglass framing channels, PVC/metal trunking and ducts, ceiling support grids, arc floor trunking, Pipe tube and conduit clamps, box connectors, couplings etc. Set of consumables consisting of various standard types and sizes of connectors, lugs and glands Set of consumables
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		sheathings and servings <ul style="list-style-type: none"> • Application of various cable and conductor types • Cable varieties - flexible cables, flexible cords, shielded cables, armoured cables, etc. • Typical characteristics and use of power circuit cables and control circuit cables 			consisting of various reels/drums of standard types and sizes of cables and conductors
Evaluation/ Documentation	<ul style="list-style-type: none"> • Conduct continuity and installation resistance tests on installed wiring systems and conductors • Rectify defects revealed through inspection and tests • Perform housekeeping on completion of task 	Installing cables in buildings, structures and premises incl.: <ul style="list-style-type: none"> • Prohibited cable and conductor locations and restricted zones around baths, showers, fixed water containers, pools etc. • Selecting equipment suitable for installation in damp locations • Protection of cables and conductors against and from other services • Cable and conductor separate circuit requirements Circuit purpose incl.: <ul style="list-style-type: none"> • Consumers mains • Sub-mains • Alternative supply • Lighting • Socket outlets Single phase fixed appliance <ul style="list-style-type: none"> • Single phase motor • Three phase motor 			

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		<ul style="list-style-type: none"> • Controls <p>Terminal connector types:</p> <ul style="list-style-type: none"> • Screw • Stud <p>Terminal lug types:</p> <ul style="list-style-type: none"> • Crimp and compression • Soldering • Solder-less 			
Total	Hours: 16				
Specialisation additions					
Assessment guidance					
<p>Criteria for assessment:</p> <ul style="list-style-type: none"> • Reading and interpreting drawings related to cable and conductor layouts, cable schedules and equipment locations • Planning cable and conductor routes • Selecting and obtaining appropriate tools, cables, conductors and accessories • Sequencing the installation effectively with others affected by the work • Routing, installing and securing cables and conductors in compliance with requirements • Placing and securing accessories accurately and maintaining fire integrity • Glanding of cables to comply with requirements • Undertaking inspection and testing of installed cables and conductors • Rectifying any defects revealed through on-going inspection and testing • Cleaning worksite • Notifying completion of work using established procedures 					