

NOCC-A21 Electrician: Competence Package

Relevant Occupation/trade title: Electrician				SAQA ID: 91761	
Learning Area 6: Install wiring systems and accessories for low voltage in <u>industrial & commercial</u> buildings and premises (incl. earthing and bonding)				Total Hours:	168
Learning Project 2: Install cables and conductors into wireways in industrial & commercial buildings				Total Hours:	16
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):		<ul style="list-style-type: none"> • LA 1 (LP 2, 3, 5, 7, 9, 10) • LA 2 (LP 1-7) • LA4 (LP 1-3) • LA5 (LP1-2) • LA6 (LP1) 			
Learning project description: Install cables and conductors into wire ways in industrial & commercial buildings					
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, PM04-PS02, PM04-PS03 PM-05-PS01, PM-05-PS02, PM-05-PS04, PM-05-PS05-06, PM-06-PS01-02 PM-07-PS01-03 PM-08-PS01-05	KM-05-KT01 KM-05-KT02 KM-05-KT03	WM-01-WE01-03 WM-02-WE01-03 WM03-WE01-03		
Planning/ Preparation	<p>Provide access to (Given): Work tasks/job cards, installation cubicles and materials and equipment as listed 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 a given work area 	<p>Knowledge of: General requirements applicable to the installation of wiring systems incl.:</p> <ul style="list-style-type: none"> • Safety hazards associated with the installing of cables and conductors (Glanding and Lugging) • Accident prevention & first aid • Statutory and regulatory requirements associated with the installing of cables and conductors (Glanding and 	<p>Under supervision:</p> <ul style="list-style-type: none"> • Participate in work processes to install cables and conductors into /onto wireways • Perform risk assessment before planning to install cables and conductors into /onto wireways • Inspect tools and equipment and check installation documents 	<ul style="list-style-type: none"> • Research /Desk study • Case studies / scenarios • Technical discussions • Lecture/ instructions • Textbook work • Mind mapping • Practical simulation work 	<p>Print materials, electronic files, software applications incl.:</p> <ul style="list-style-type: none"> • OHS Act • SANS 10142-1 • Text books • Manuals for trainers and apprentices incl. multimedia software • Set of presentation aids for overhead or LED/LCD projectors

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<ul style="list-style-type: none"> • Identify health and safety risks and follow established risk control measures and procedures in preparation for the work • Note safety hazards that have not previously been identified and implement established risk control measures • Prepare and sequence installation of cables and conductors in consultation with other affected by the work • Determine the scope and location of the work to be undertaken from documentation or other appropriate personnel • Plan wiring within the constraints of the installed wire ways in the building structure and given requirements • Identify appropriate method for installing cables and conductors • Determine correct cable and conductor type, size and quality • Obtain and check material needed for the wiring work against job requirements • Obtain tools, equipment and testing devices needed to for the wiring work and check them for correct operation and safety • Check that preparatory work has not caused any damage and complies with requirements 	<ul style="list-style-type: none"> • Lugging) • Wiring support and/or protection requirements and specifications • Relevant manufacturer requirements • Specifications and methods for installing of cables and conductors (Glanding and Lugging) • Wiring support techniques and alternatives • Marking, tagging and labelling requirements for cables, wires, conductors • Data to be recorded/ reported • Requirements for approval to work • Use and application of standard PPE. • Building codes affecting the installation of cables and conductors in buildings, structures and premises (limitation on penetration of structural elements, maintenance of fire protection integrity, and wiring above ceilings) <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 (Glanding and Lugging) adequately - against mechanical damage, adverse temperatures, 	<ul style="list-style-type: none"> • Select the correct cables and conductor to be installed . • Install selected cables and conductors • Move cables and conductors on the work site • Engage in regular housekeeping activities, tool and equipment maintenance • Provide work documentation, verbal and written reports as required by the company 	<p>Stationary machinery, mobile plants, transport, access and lifting equipment incl.:</p> <ul style="list-style-type: none"> • Hoisting and lifting gear • Ladders and scaffolds <p>Hand- & power tools and PPE 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 • Hand gloves <p>Measuring and testing instruments incl.:</p> <ul style="list-style-type: none"> • Tape measure • Wire gauge • Continuity tester <p>Training workshop and laboratory equipment incl.:</p> <ul style="list-style-type: none"> • Heavy workbench
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		<p>humidity and corrosion and protection from magnetic fields that may affect the performance</p> <ul style="list-style-type: none"> • 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 • Types of cables and conductors (glanding and lugging) used in the industry and their application incl.: • Structural components of cables and their purpose - conductors and conductor material; insulation; sheathings and servings • Application of various cable and conductor types • Correct fitting of Glands and Lugs (types and sizes) • Cable varieties - single cables, flexible cables, flexible cords, armoured cables, shielded cable etc • Typical characteristics and use of power circuit cables and control circuit cables 			<p>with stool, power supply and assembly vice</p> <ul style="list-style-type: none"> • Bench mountable interchangeable training panel frame • Mountable punched hole frame and front panel frame • Basic panel systems for practicing wiring installation exercises • Training package for wiring components above and embedded in plaster • Installation cabins/ cubicles with solid brick walls or interchangeable plaster-/chip board walls or punched hole grid panels (potentially covering wall, ceiling and under floor installations) • Set of reusable concealed and surface mounted standard enclosures incl. distribution
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<p>Implementation / Execution/ Processing</p>	<p>Install cables and conductors</p> <ul style="list-style-type: none"> Follow OHS risk control measures and procedures for carrying out the work Determine the need to test or measure live and measure or test when necessary Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures 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 connector/lug without causing any damage to insulation or conductor Terminate cables and conductors at wiring accessories and devices Identify mark/tag and label all cables, wires, conductors, circuits and connections to specification Inspection of installed wire ways . Rectify defects revealed through inspection and tests Carry out cable and conductor installation without unnecessary waste of materials or damage to equipment, circuits or the surrounding environment and using sustainable energy practices 	<p>Installing cables in buildings, structures and premises incl.:</p> <ul style="list-style-type: none"> Building construction methods and construction sequence Prohibited cable and conductor locations and restricted zones around baths, showers, fixed water containers, pools etc. Selecting cables and conductors suitable for specific environment requirements. Selecting and fitment of glands and lugs according to specific environment requirements. Protection of cables and conductors against and from other services e.g. (Water pipes, steam pipes, etc) Cable and conductor segregation requirements <p>Techniques for installing cables, conductors and wiring systems including typical wire ways through buildings, structures and premises:</p> <ul style="list-style-type: none"> Methods of mechanical protection and support of cables and conductors Application of wiring accessories Drawing-in, placing and fixing of cables and conductors Cable and conductor fastening Maintaining fire rating integrity Inspecting of installed and 			<p>boards, switch boards, panels, junction boxes and related accessories</p> <ul style="list-style-type: none"> Set of consumables consisting of various standard types of wire enclosures and fittings e.g. PVC and metal conduits, cable trays, metal and framing channels, PVC/metal trunking and ducts, ceiling support grids, arc floor trunking, conduit clamps, box connectors, couplings etc. Set of consumables consisting of various standard types and sizes of terminals, connectors, lugs and glands Set of consumables consisting of various reels/drums of standard types and sizes of cables and conductors
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	<ul style="list-style-type: none"> Deal safely with unexpected situations and with the approval of authorised personnel 	<p>terminated cables</p> <ul style="list-style-type: none"> Work procedures and work documents related to the installation of cables and conductors 			
<p>Implementation/ Execution</p>	<p>Install cables and conductors</p> <ul style="list-style-type: none"> Follow OHS risk control measures and procedures for carrying out the work Determine the need to test or measure live and measure or test when necessary Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures Install cables, conductors and accessories with sufficient excess to affect terminations Adjust and fix all cables and conductors to wire ways (brackets, clamps, holders etc.) to specifications Fit and secure glands and retaining devices Prepare cable/cord and conductor end to suit connector/lug without causing any damage to insulation 				

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	<p>or conductor</p> <ul style="list-style-type: none"> • Terminate cables and conductors at wiring accessories and devices • Identify mark/tag and label all cables, wires, conductors, circuits and connections to specification • Undertake inspection of installed Cables and conductors on wire ways • Rectify defects revealed through inspection • Carry out cable and conductor installation and termination without unnecessary waste of materials or damage to equipment, circuits or the surrounding environment and using sustainable energy practices • Deal safely with unexpected situations and with the approval of authorised personnel 				
Evaluation/ Documentation	<p>Complete the installation work and conduct housekeeping</p> <ul style="list-style-type: none"> • Complete final job inspection in accordance with the work plan • Complete work and notify appropriate personnel • Clear, clean and restore work area • Maintain and store tools and equipment • Finalise work completion documentation 				
Total	Hours: 16				
Specialisation additions					

Assessment guidance

Criteria for assessment:

- 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 other affected by the work
- Routing, installing and securing cables and conductors in compliance with requirements
- Placing and securing accessories accurately and maintaining fire integrity
- Rectifying any defects revealed through on-going inspection.
- Correctly documenting cables/wiring and accessories
- Dealing with unplanned events
- Cleaning worksite
- Notifying completion of work using established procedures

Work in progress