

NOCC-A21 Electrician: Competence Package

<b>Relevant Occupation/trade title:</b> Electrician			<b>SAQA ID:</b> 91761		
<b>Learning Area 6: Install wiring systems and accessories for low voltage in industrial &amp; commercial buildings and premises (incl. earthing and bonding)</b>			<b>Total Hours:</b>	<b>168</b>	
<b>Learning Project 1: Design and install wireways/trunking, cable trays, surface and flush mounted enclosures in industrial buildings and premises</b>			<b>Total Hours:</b>	<b>32</b>	
<b>Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):</b>		<ul style="list-style-type: none"> <li>• LA 1 (LP 2, 3, 5, 7, 9, 10)</li> <li>• LA 2 (LP1-7)</li> <li>• LA4 (LP 1-3)</li> <li>• LA5 (LP1-7)</li> </ul>			
<b>Learning project description: Design and install wire ways/trunking, cable trays (concealed &amp; surface mounted, wall, ceiling &amp; floor) and surface and flush mounted enclosures in industrial buildings and premises</b>					
Activity phase	Practical Skills Modules Content	Underpinning Knowledge Module Content	Work Experience Module Content	Didactical-methodological advice	Learning Materials / Tools and Equipment
<b>Reference to QCTO Curriculum</b>	PM04-PS01, PM04-PS02, PM04-PS03 PM-05-PS01, PM-05-PS02 PM-08-PS01	KM-05-KT01 KM-05-KT02 KM-05-KT03	WM-01-WE01-03 WM-02-WE01-03 WM03-WE01-03		
<b>Planning/ Preparation</b>	<p><b><u>Provide access to (Given):</u></b> Work tasks/job cards with drawings, installation cubicles for simulation as well as material and equipment as listed in the last column;</p> <p><b><u>Apprentices must be able to do/perform the following (hard and soft) skills:</u></b></p> <p><b>Plan and prepare for wire way installation</b></p> <ul style="list-style-type: none"> <li>• Identify work requirements from request/ work orders or equivalent and clarify/</li> </ul>	<p><b><u>Knowledge of:</u></b></p> <ul style="list-style-type: none"> <li>• Occupational health and safety requirements (OHS Act)</li> <li>• Accident prevention &amp; first aid</li> <li>• Installation standards (SANS)</li> <li>• Schematic drawings and manufacturers specifications</li> <li>• Design methodologies for the installation of wireways</li> <li>• Definition and purpose of wireways</li> <li>• Different types of wire ways</li> </ul>	<p><b><u>Under supervision:</u></b></p> <ul style="list-style-type: none"> <li>• Participate in work processes to design and install wireways for industrial buildings</li> <li>• Perform risk assessments before planning to install wireways</li> <li>• Inspect tools and equipment and check installation documents</li> <li>• Select the correct wire ways work tasks at hand</li> <li>• Assemble and install selected wireways</li> <li>• Chase walls for steel and PVC wireways to be</li> </ul>	<ul style="list-style-type: none"> <li>• Research /Desk study</li> <li>• Case studies /scenarios</li> <li>• Technical discussions</li> <li>• Lecture/ instructions</li> <li>• Textbook work</li> <li>• Mind mapping</li> <li>• Practical simulation work</li> </ul>	<p><b>Print materials, electronic files, software applications incl.:</b></p> <ul style="list-style-type: none"> <li>• OHS Act</li> <li>• SANS 10142-1</li> <li>• Text books</li> <li>• Training manuals for trainers and apprentices incl. multimedia software</li> <li>• Set of presentation aids (videos, slides) for overhead or LED/LCD projector</li> </ul> <p><b>Stationary machinery, mobile plants, transport,</b></p>

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	<p>confirm with appropriate parties or by site inspection</p> <ul style="list-style-type: none"> <li>Identify, apply and monitor Occupational Health and Safety standards, statutory requirements, relevant SANS standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures</li> <li>Conduct risk assessment by identifying potential hazards and select prevention and/or control measures</li> <li>Install wire ways in consultation with other affected by the work and sequence appropriately</li> <li>Identify and plan wire ways within the constraints of the building structure</li> <li>Determine and obtain correct size, type and quantity of materials/ components and inspect for compliance with the job specifications</li> <li>Compile tool list required for installation</li> <li>Obtain tools, equipment, materials and measuring devices needed to carry</li> </ul>	<p>and their application e.g. PVC and Bosal conduits, cable trays, Unistrat, PVC/metal trunking</p> <ul style="list-style-type: none"> <li>OHS Act</li> <li>SANS codes and standards</li> <li>SANS 10142-1. Sec 6.5</li> <li>Bonding as per SANS 10142-1 Sec 6.5.2.2</li> <li>Local Authority requirements</li> <li>PPE for the installation of wire ways</li> <li>Risk assessment methods for wire ways</li> <li>Safety precautions regarding wire ways installation</li> <li>Hazard and risk procedures</li> <li>Wire way installation methods and techniques</li> <li>Tools for wire way installations</li> <li>Manufacturer specifications for different wire ways</li> <li>Earthing and Bonding methods</li> </ul> <p><b>Types of wireways may include:</b></p> <ul style="list-style-type: none"> <li>PVC conduit</li> <li>Steel conduit</li> <li>Flexible conduit</li> <li>Trunking</li> <li>Busbar trunking</li> <li>Unistrut</li> <li>Power skirting</li> <li>Cable trays</li> </ul>	<p>concealed in walls</p> <ul style="list-style-type: none"> <li>Move electrical equipment/materials on industrial work sites</li> <li>Conduct final inspection of wireway installations in industrial buildings and premises</li> <li>Record and report any work problems and rectified defects</li> <li>Store tools and equipment</li> <li>Record and report any defects on tools and equipment</li> <li>Conduct regular housekeeping activities</li> </ul>		<p><b>access and lifting equipment incl.:</b></p> <ul style="list-style-type: none"> <li>Hoisting and lifting gear</li> <li>Ladders and scaffolds</li> </ul> <p><b>Hand- &amp; power tools and PPE incl.:</b></p> <ul style="list-style-type: none"> <li>Hand conduit benders</li> <li>Bending springs</li> <li>PVC Pipe cutter</li> <li>Hacksaw, Jigsaw, Hole saw, Hammers, Set of chisels, Chalk line, Screw drivers, Spanners</li> <li>Electrical drilling machine(hammer) with set of drill bits and chisels</li> <li>Electrical grinder</li> <li>Electrical wall chaser</li> <li>Safety gloves</li> <li>Protective goggles</li> </ul> <p><b>Measuring and testing instruments incl.:</b></p> <ul style="list-style-type: none"> <li>Measuring tape</li> <li>Steel ruler</li> <li>Steel combination square</li> <li>Spirit level</li> </ul> <p><b>Training workshop and laboratory equipment incl.:</b></p>
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	<p>out the installation work</p> <ul style="list-style-type: none"> <li>• Check for compliance, use and safety of tools, equipment and measuring devices</li> <li>• Prepare work area for installation</li> <li>• Identify the teams and individuals roles and responsibilities within the team where appropriate</li> </ul> <p><b>Prepare to install enclosures(s) and related accessories</b></p> <ul style="list-style-type: none"> <li>• Identify, obtain and understand OHS procedures for a given work area</li> <li>• Identify health and safety risks and follow established risk control measures in preparation for the work</li> <li>• Identify the correct way of installing different types of enclosures ( e.g. correct sizes embedded/ flush and surface mount, metal/ PVC, external/ internal installation)</li> <li>• Determine the equipment weight and necessity to get assistance</li> <li>• Determine the size/capacity of the enclosure according to the number or required</li> </ul>	<ul style="list-style-type: none"> <li>• Cable ladders</li> </ul> <p><b>Types of PVC and Steel Conduit bends incl.:</b></p> <ul style="list-style-type: none"> <li>• 90° Bend</li> <li>• 45° Bend</li> <li>• Off Sets</li> <li>• Double Offset</li> <li>• Over obstruction</li> </ul> <p><b>Types of accessories for PVC and Steel conduit incl.:</b> Couplings, Adaptors, Round Boxes, inspection Boxes etc.</p> <ul style="list-style-type: none"> <li>• Work procedures and work documents related to design and installing wire ways</li> </ul>			<ul style="list-style-type: none"> <li>• Installation cabins/cubicles with solid brick walls or plaster-/chip board walls or punched hole grid panels (potentially covering wall, ceiling and under floor installations)</li> <li>• Set of reusable concealed and surface mounted standard enclosures incl. distribution boards, switch boards, panels, junction boxes and related accessories</li> <li>• Set of consumables consisting of various types of wireways and fittings e.g. PVC and metal conduits, Accessories, cable trays, metal and framing channels, PVC/metal trunking and ducts, ceiling support grids, arc floor trunking Accessories ( saddles) etc.</li> </ul>
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	<p>circuits</p> <ul style="list-style-type: none"> <li>• Plan the location(s) and position of enclosures(s) and related asserories within the limits of the building structure and applicable regulations</li> <li>• Obtain material needed for the enclosure installation work and check against job requirements</li> <li>• Prepare installation of enclosure in consultation with others affected by the work, and sequence appropriately</li> <li>• Obtain tools, equipment and measuring devices needed to for the installation work and check for correct operation and safety</li> <li>• Prepare work area in accordance with work requirements and site procedure</li> </ul>				
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Work in progress

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<p><b>Implementation/ Execution</b></p>	<p><b>Install wireways and support systems</b></p> <ul style="list-style-type: none"> <li>• Confirm required isolations where appropriate</li> <li>• Set out/ chase/cut out wire ways or prepare them appropriately otherwise</li> <li>• Assemble/ bend/ position and fasten/secure wiring enclosures/ trunking /support systems</li> <li>• Install wireways and accessories to comply with manufacturers specifications</li> <li>• Install wireways/ support systems in conjunction with others involved in or affected by the work</li> <li>• Earth and bond metal conductive parts</li> <li>• Inspect wiring enclosures/ support systems for defects and damages</li> <li>• Rectify all identified defects and damages</li> <li>• Carry out wireway installation in an effective way without unnecessary waste of materials or damage to the surrounding environment or services</li> </ul>				
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	<p><b>Install enclosure(s) and related accessories</b></p> <ul style="list-style-type: none"> <li>• Follow OHS risk control measures and procedures for carrying out the work</li> <li>• Install enclosure(s) and associated equipment allowing sufficient access to affect terminations, adjustments and maintenance</li> <li>• Earth and bond metal conductive parts</li> <li>• Discuss established methods for dealing with unexpected situations with appropriate personnel</li> <li>• Deal with unexpected situations safely and with the approval of appropriate personnel</li> <li>• Undertake checks of the quality of enclosure(s) installation(s)</li> <li>• Rectify all identified defects and damages in accordance with manufacturer specifications</li> <li>• Carry out enclosure(s) installation in an effective way without unnecessary waste of materials or damage to the wireways or the surrounding environment or services</li> </ul>				
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<b>Evaluation/ Documentation</b>	<b>Complete the installation work and conduct housekeeping</b> <ul style="list-style-type: none"> <li>• Complete final job inspection in accordance with the work plan</li> <li>• Complete work and notify appropriate personnel</li> <li>• Clear, clean and restore work area</li> <li>• Maintain and store tools and equipment</li> <li>• Finalise work completion documentation</li> </ul>				
<b>Total</b>	Hours: 32				
<b>Specialisation additions</b>					
<b>Assessment guidance</b>					
<p><b>Criteria for assessment:</b></p> <ul style="list-style-type: none"> <li>• Installing and bending conduit correctly to the correct radius as prescribed in SANS 10142-1</li> <li>• Installing cable racks, ladders and trays correctly as prescribed by the manufacturer's specifications</li> <li>• Installing trunking and ducting correctly as prescribed by the manufacturer's specifications</li> <li>• Using the correct methods for terminating and joining wireways in accordance with the installation requirements</li> <li>• Following specific fastening and support requirements for the installation of wireways</li> <li>• Using specific inspection points and accessories for the installation of wireways required according to SANS 10142-1</li> <li>• Selecting the correct methods for the installation of wireways that fully comply with SANS 10142-1</li> <li>• Installing the wire ways neatly (vertically, horizontally and offsets parallel and similar) and complying with industry acceptable standards</li> <li>• Inspecting of enclosures for defects, replacing or repairing of damaged components or whole enclosures where necessary</li> <li>• Mounting of enclosures in accordance with specified requirements.</li> </ul>					