Model Curriculum

1. Foreman - Electrical works (Construction)

SECTOR: Construction
SUB-SECTOR: Real Estate and Infrastructure Construction
OCCUPATION: Construction Electrical Works
REF ID: CON/Q0604, V1.0
NSQF LEVEL: 5

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

CONSTRUCTION SECTOR SKILLS COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Foreman - Electrical works (Construction)' QP No. 'CON/Q 0604 NSQF Level 5'

Date of Issuance: January 31st, 2017

Valid up to: May 23rd, 2017

* Valid up to the next review date of the Qualification Pack

Authorised Signatory
(Construction Skill Development Council)

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Foreman - Electrical works (Construction)

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a "Foreman - Electrical works (Construction)", in the "Construction" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	**Foreman - Electrical works (Construction)**		
Qualification Pack Name & Reference ID. ID	CON/Q0604, v1.0		
Version No.	1.0	**Version Update Date**	05-04-2019
Pre-requisites to Training	10th standard /Low Voltage license from any Govt. recognized licensing authority		
Experience	Desirable: 1. Non trained worker : 8 years site experience in same occupation 2. Trained worker: 3 years site experience as a certified Construction Electrician LV		
Training Outcomes	**After completing this programme, participants will be able to:** • **Monitor regular electrical works (installation, maintenance and repairing) at a construction site** –Learning and practicing monitoring of electrical works required at a construction site • **Establish electrical connections during erection of plant and heavy construction machineries** – Learning and practicing electrification of heavy construction equipments/ machineries • **Conduct permanent wiring, maintenance work in buildings –** Learning and practicing supervision of electrical works required for residential buildings and organizing resources • **Work effectively in a team to deliver desired results at the workplace** – Develop/ promote team working and coordinate with different trade personnel • **Plan and organize work to meet expected outcomes –** Introduction to preparation of work schedule, resource and manpower allocation • **Supervise, monitor and evaluate performance of subordinates at workplace –** Learn and practice method of motivating and guiding subordinates to get the assigned task done as per desired quality and productivity norms • **Manage workplace for safe and healthy work environment** – Learn and observe applicable safe work practices and environmental norms, relevant to construction electrical works.		

This course encompasses 7 out of 7 National Occupational Standards (NOS) of "Foreman - Electrical works (Construction) " Qualification Pack issued by "Construction Skill Development Council of India".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	**Introduction** **Theory Duration** (hh:mm) 16:00 **Practical Duration** (hh:mm) 32:00	**Introduction: -** • Role description/ functions of the job role • Expected personal attributes from the job role • Brief description about course content, mode of learning and duration of course • Future possible progression and career development provisions on completion of the course • Soft skills as applicable to communication, decision making and personal behavior **Theory and practical: -** • computer basics – MS Office, Internet, E-mail • Leadership development program • Model work schedule for installation and dismantling of critical construction equipments (Interpretation and preparation) • Installation guidelines for relevant equipments as provided by manufacturers (Interpretation and description)	infrastructural requirements 1. classroom having sitting capacity of 30 trainees 2. blackboard 3. LCD monitor 32'' 4. Laptop
2	**Monitor regular electrical works (installation, maintenance and repairing) at a construction site** **Theory Duration** (hh:mm) 86:00 **Practical Duration** (hh:mm) (Recommend that this practical is done in industry set up) 130:00 **Corresponding NOS Code** CON/N0611	**Theory: -** • Detailed concept of drawings, SLDs related schematics for single and three phase wiring system • Guidelines provided in Indian Standard code of practice applicable for establishing and inspecting electrical wiring works • Statutory guidelines provided for LV wiring operations • Manufacturer's details of specification/ instructions related to electrical equipments or and electrical fixtures to be used • Manufacturer's details of specification/ instructions related to electrical equipments or and electrical fixtures to be inspected • Method of calculation of load on circuit from electrical diagrams	Hand tools: - 1. screw drivers 2. wire cutters 3. wire strippers 4. pliers 5. hammers 6. hacksaws 7. chisels 8. spanners (set) 9. wrenches Measuring Instruments 10. measuring tape 11. spirit level 12. plumb-bob 13. mason's line Measuring Devices 14. multi-meter 15. voltage tester

Sr. No.	Module	Key Learning Outcomes	Equipment Required

		• Organisational procedures to be adhered prior to commencing electrical isolation
		• Detail of electrical isolation procedure for both single and three phase electrical connections
		• Details of electrical inspections to be undertaken on existing/ faulty electrical connections
		  • Schedule/ sequence of inspection
		  • Electrical principles behind the inspection
		  • Tolerance limit of outcome from electrical tests
		  • Use of electrical measuring and testing devices
		  • Analysis of outcome of electrical test data
		• Electrical safety norms as per standard practice and organizational policy, procedure of providing CPR, first aids, use of regular and job specific PPEs as per requirement
		• how to develop electrical drawings using appropriate symbols and abbreviations as per standard practice
		• Method of Material estimation from drawing/ diagram
		• sequencing of electrical works to be carried out depending upon requirement of construction works
		• acceptance criteria of electrical materials, devices, fixtures and protective arrangements
		• how to verify authentication of ISI mark provided with electrical materials, fixtures and devices
		• principles of electrical theory as applied to electrical circuits and wiring systems
		• understand working principle of complex electrical circuits and manufacturer's guidelines/ specifications of repairing
			<u>Power Tools</u>
			16. drilling machine
			17. hand cutting machine
			
			<u>Materials and Fixtures</u>
			18. cables
			19. wires
			20. sockets
			21. switches
			22. lights
			23. conduits (flexible and rigid)
			24. raceways
			
			<u>Equipment</u>
			25. vibrators
			26. bar cutting machine
			27. bar bending machine
			28. water pumps
			
			<u>infrastructural requirements</u>
			29. classroom having sitting capacity of 30 trainees
			30. blackboard
			31. LCD monitor 32''
			32. Laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• area of application & specification of electrical protective devices • correct alternative use of electrical parts if required one is unavailable • detailed concept of 3 phase connections and its distribution at construction sites • detailed concept of AC and DC circuits, their properties and area of application • concept about safe procedure of troubleshooting in 3 phase connections • concept of working principle and components of electrical panels ,transformers and generators • operational characteristics of electrical panels and power distribution through the same • advance troubleshooting in electrical panels, transformers and generators • working principle and connection of AC single phase and AC three phase motors • submersible pumps and their maintenance • selection and use of starters such as DOL, Star Delta, Step down Transformer starter etc. • line and phase voltage, current and power in a 3 phase circuits with balanced and unbalanced load • principle of different methods of earthing. i.e. Pipe, Plate, etc. • measurement of Earth resistance by earth tester, testing of Earth Leakage by ELCB and relay, etc. • use of electrical power tools and their maintenance • use of measuring and diagnostic tools in electrical circuits • standards procedure of storing, stacking electrical tools and equipment • calibration of equipment and authorization procedures as per the organization policy	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• calibration schedule of equipment and machineries • quality control systems and site documentation procedures for electrical connections **<u>Demonstration/ Practical (D/P):-</u>** • Demonstrate type of faults in electrical connections and their method of electrical inspection • Demonstrate hazard involved in LV electrical works and safety precautions to be taken prior to undertake any inspection/ test/ installation • Demonstrate method of safe isolation for single and three phase connection • Prepare list of required consumables, tools, diagnostic devices from work schedule, for installation and inspection of electrical circuits/ equipments • Demonstrate flow diagram of sequence of electrical works and preparatory works needed for each stage of work • Estimate and justify time requirement for electrical activities involved, referring to the supplied diagrams of electrical installation to be done • Describe various electrical tests done in the circuits to ensure its conformance with specifications, requirements and applicable statutory and HSE requirements • Diagnose malfunctioning of construction equipments, cables, temporary panels and electrical fixtures • Prepare observation sheet and test reports be collating data from electrical inspections • Check calibration certificates and describe quality norms related to calibration procedure • Carry out following tasks ❖ Inspect and repair faulty electrical motors	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		❖ Join electrical cables using standard cable joining methods ❖ Inspect switchgears and Temporary electrical panels ❖ Inspect electrical transformer ❖ Inspect electrical generators ❖ Three phase electrical circuits used for construction equipments • Electrical safety devices provided with equipments such as limit switches, circuit breakers etc. • Explain method of taking quality approvals from concerned authority • Recording/ reporting procedure of daily work status as per standard procedure • Describe method of resource reconciliation and prepare of reconciliation sheet after assigned tasks	

3	**Establish electrical connections during erection of plant and heavy construction machineries**
	
	Theory Duration
	(hh:mm)
	96:00
	
	Practical Duration
	(hh:mm) (Recommend that this practical is done in industry set up)
	144:00
	Corresponding NOS Code
	CON/N0612
		Theory:
		• Detailed concept of drawings, SLDs related schematics for single and three phase wiring system
		• Guidelines provided in Indian Standard code of practice applicable for establishing and inspecting electrical wiring works
		• Electrical wiring, circuit details of a concrete batching plant/ hot mix plant/ crusher plant
		• Power arrangement to be done during slip-form works in silos and special structures
		• Detailed concept of electrical installation sequence of electrical panels, transformers, DGs, cables, cranes and electrification of machineries
		• Preparation of electrical work plan for installation of heavy machineries
		• Detail of electrical panels,
		  • Detailed concept of electrical components of an electrical panel
		  • Function of different components of an electrical panel
			Hand tools: -
			1. wall chasing chisel
			2. hammer
			3. hacksaw
			4. file
			5. marking tools
			6. table vice
			7. Stock and die set
			8. Pipe cutter to cut pipes
			9. Hand brooms
			10. Shovels
			11. Screw driver set
			
			Measuring Instruments
			12. measuring tape
			13. spirit level
			14. plumb-bob
			15. mason's line
			
			Power tools
			16. cutting machine
			17. drilling machine

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Method of erection of an electrical panel and connect the same to main power source? • Power rating/ specification of electrical fixtures/ materials used in an electrical panel • replacement of faulty parts/ fixtures from an electrical panel • Detail of electrical works involved in process of tower crane erection and concrete batching plant installation • Detail of common electrical installations and their specification for tower crane and batching plant • Detail of different types of electrical earthing work including material specification for the same **Demonstration/ Practical (D/P): -** • Demonstrate statutory compliances to be maintained during installation of electrical equipment/ machinery • Explain common requirements of various electrical work approving bodies/ authorities • Develop sketches for laying electrical cables and placing construction equipments/ machineries/ power sources • Preparation of work schedule for electrical inspections/ installations • Detailed electrical specifications of the equipment/ machinery • Interpret electrical safety guidelines and manufacturer's specification regarding common construction equipments/ cranes/ heavy machineries required for construction work • Explain electrical works involved and their sequence in erection procedure of concrete batching plant and tower crane in a construction site • Explain preparatory works required and their timelines of completion for different key electrical activities involved in each phase of erection	18. power source Materials 19. rigid conduits 20. flexible conduit 21. clamps for conduits 22. screws PPEs & safety equipment's 23. helmet 24. safety shoes 25. safety belt 26. cotton hand gloves 27. goggles 28. Reflective jackets 29. Safety message boards 30. Fire extinguishers 31. Sand buckets infrastructural requirements 32. classroom having sitting capacity of 30 trainees 33. blackboard 34. LCD monitor 32'' 35. Laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		procedure of equipment/ heavy construction machinery • Demonstrate nature of common faults in electrical installations of equipments and possible electrical tests/ inspections • Demonstrate method of safe electrical isolations prior to undertake inspection in electrical circuits • Prepare list of required consumables, tools, diagnostic devices from work schedule, for installation and inspection of electrical circuits/ equipments • Estimate and justify time requirement for electrical activities involved, referring to the supplied diagrams of electrical installation to be done for machineries/ equipments to be erected • Describe various electrical tests done in the circuits to ensure its conformance with specifications, requirements and applicable statutory and HSE requirements • Diagnose malfunctioning of construction equipments/ machineries, cables, electrical panels and electrical fixtures • Prepare observation sheet and test reports be collating data from electrical inspections • Check calibration certificates and describe quality norms related to calibration procedure • Explain and demonstrate electrical safety norms/ safe working practices applicable to 3 phase LV electrical works • Carry out following tasks as per equipment manufacturer's guidelines/ instructions ❖ install/ Inspect and repair (if required) electrical cable for critical construction equipments ❖ Join electrical cables using standard cable joining methods	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		❖ Inspect switchgears and Temporary electrical panels ❖ Inspect electrical transformers attached to machinery/ equipment ❖ Inspect electrical generators attached to the equipment/ machinery ❖ Install earthing system for three phase electrical circuits used for LV construction equipments • Electrical safety devices provided with equipments such as limit switches, circuit breakers etc. • Explain method of taking quality approvals from concerned authority • Recording/ reporting procedure of daily work status as per standard procedure • Describe method of resource reconciliation and prepare of reconciliation sheet after assigned tasks	
4	**Conduct permanent wiring, maintenance work in buildings** **Theory Duration** (hh:mm) 80:00 **Practical Duration** (hh:mm) (Recommend that this practical is done in industry set up) 120:00 **Corresponding NOS Code** CON/N0613	**Theory:** • Guidelines provided in Indian Standard code of practice applicable to electrical wiring works • Statutory guidelines provided by ISI for LV wiring operations • Common electrical wiring Accessories, their specifications in line with NEC – Explanation of switches, lamp holders, plugs and sockets • Concept of drawings, circuit diagrams and/or related schematics for single and three phase LV house wiring system • Method of estimation of required material quantity from electrical drawings • Applicable manufacturer's guidelines/ specifications for use of hand and power tools and measuring devices • Applicable manufacturer's guidelines/ specifications for use of electrical fittings and fixtures	Hand Tools & materials 1. trowel 2. pointing Trowel 3. Shovel 4. mortar Pan 5. spade 6. pick axe 7. GI bucket 5L capacity 8. wheel Barrow 9. lime powder 10. wooden pegs 11. hammer 12. hard broom 13. source of water 14. ladder Measuring Instruments 15. measuring tape 16. mason's line Equipment

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Method of determining use of 3 phases, single phase connections as per electrical drawing, specifications • Concept of specification, color coding of cables to be used in wiring system according to load on circuit • Concept of properties of different components used in electrical earthing work ❖ Size and shape of battens ❖ Size and shape of raceways ❖ Size of conduits (Flexible/rigid) ❖ Standard practices of cable laying through conduits • Concept of different methods of earthing i.e. pipe, plate, etc. • Method of measurement of Earth resistance by earth tester • Method to test of Earth Leakage by ELCB and relay • Concept of area of application & specification of protective devices like fire alarm, MCB, ELCB, MCCB • Planning method of lighting arrangement which may enable maximum use of natural lights • Idea of current tentative market rate of common electrical items • Information about common electrical brands and their products • Concept of standard house wiring procedure and best practices • Right procedure of handling of electrical fixtures • Use of ladders, scaffolds, PPEs, shock resistance gloves during working/ performing tests in a live circuit • Use of power drill machine and selection of drill bit for drilling works • Use of different common electrical hand and power tools like different pliers, earth tester, tong tester, voltage tester, multimeter, etc. • Standard procedure of storing, stacking electrical material, tools and equipment at workplace	17. hand roller 18. plate vibrator 19. power source <u>PPEs & safety equipment's</u> 20. helmet 21. safety shoes 22. cotton hand gloves 23. goggles 24. Reflective jackets 25. Safety message boards <u>infrastructural requirements</u> 26. classroom having sitting capacity of 30 trainees 27. blackboard 28. LCD monitor 32'' 29. laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		Demonstration/ Practical: • Practice cable laying through conduits • Practice installation of conduits, race ways, switch boards, distribution boards, lights, fans and lighting fixtures • Carry out electrical isolations to the circuit prior to undertake • Carry out inspections on installed electrical circuits to trace out leakage in the circuits, resistance in the circuits, short circuit (if any), • Carry out earthing of the installed electrical circuit as per standard practice	
5	**Work effectively in a team to deliver desired results at the workplace** **Theory Duration** (hh:mm) 10:00 **Practical Duration** (hh:mm) (Recommend that this practical is done in industry set up) 14:00 **Corresponding NOS Code** CON/N8001	**Theory: -** • Introduction to leadership development program • Effective communication skill during guiding/ instructing subordinate • Productivity norms related to activities to be performed • Promoting organisational safety and quality norms within the workplace • Safety awareness to be created within workplace and safe work method to be followed • Clarify confusions among subordinates and provide clear instruction • Reporting procedure to the seniors in oral/ written format as applicable to the organisational norms • Coordinate with different trade personnel to obtain/ pass on work information • Ensure safety of subordinates by completing all necessary safety formalities **Demonstration/ Practical (D/P): -** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition • Briefing about work targets, scopes and timelines to be achieved	infrastructural requirements 1. Classroom having sitting capacity of 30 trainees 2. Blackboard 3. LCD monitor 32'' 4. Laptop

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Demonstrate advantages of team working and effective communication procedure within the team • Seeking information/ updates from subordinates at regular interval • Reporting to senior or other trade personnel in appropriate reporting procedure • Analyze problems identified within team and take necessary action • Motivate subordinate to increase productivity • Allocate manpower for assigned task according to their personal attributes/ expertise (as applicable)	
6	**Plan and organize work to meet expected outcomes** **Theory Duration** (hh:mm) 19:00 **Practical Duration** (hh:mm) (Recommend that this practical is done in industry set up) 29:00 **Corresponding NOS Code** CON/N8002	**Theory: -** • Method of resource planning and ascertaining timelines for assigned task • Organising resources and quality checks to be performed as per current/ voltage rating of the materials and fixtures to be used for electrical works • Method of preparation of work schedule • Method of estimation of resources from drawings/ schedules • Monitoring procedure of ongoing works and inspection of completed works to ensure compliance with all electrical safety and quality parameters • Method of preparation of observation data sheet, inspection report • Method of reconcile material used for assigned task • Method of preparation of budget for domestic electrification work **Demonstration/ Practical (D/P) :-** • Prepare work schedule as per planning • Arrange material and required tools/ fixtures prior to start any work • Explain deviation in works and justify the same • Suggest alternative arrangement/ use of equipment in case of emergency situation	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Coordinate with subordinates and different trade personnel • Minimize wastage as per standard working method	
7	**Supervise, monitor and evaluate performance of subordinates at workplace** **Theory Duration** (hh:mm) 19:00 **Practical Duration** (hh:mm) 29:00 **Corresponding NOS Code** CON/N8003	**Theory: -** • Setting up timelines for completion of activities as per resource deployed and productivity norms • Managing manpower and allocation of manpower as per deadline provided for assign task • Critical quality aspects to be checked in the ongoing/ completed electrical installations • How to provide timely instructions to the subordinates during ongoing electrical works • How to evaluate strengths and weakness of subordinate workers and utilize them appropriately as per job requirement • Method of supervising activities to increase productivity of workers and achieving set quality and safety standards for the electrical works **Demonstration/ Practical (D/P): -** • Instruct subordinates for applicable working methods and safety norms for assigned electrical works • Seek work related clarifications from subordinates and provide support/ guidance as per requirement of the job • Observe each subordinate as per their strength and weaknesses and deploy them as per criticality/ emergency of the job • Implement organizational/ quality / safety work methods while undertaking any job and ensure compliance to the same by subordinates	PPEs & safety equipment's 1. helmet 2. safety shoes 3. safety belt 4. cotton rubber gloves 5. ear plugs 6. reflective jackets 7. safety message boards 8. message board displaying Do's and Don'ts at construction sites 9. Fire extinguishers 10. Sand buckets infrastructural requirements 11. Classroom having sitting capacity of 30 trainees 12. Blackboard 13. LCD monitor 32'' 14. Laptop
8	**Manage workplace for safe and healthy work environments** **Theory Duration** (hh:mm) 10:00	**Theory:-** • Housekeeping Standard procedures • Handling and stacking of materials at workplace/stores	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) (Recommend that this practical is done in industry set up) 14:00 **Corresponding NOS Code** CON/N9002	• Various kind of Hazards associated with reinforcement work and in general in construction sites • Safety, its importance and protective measures • Correct uses of tools and tackles • Personal Protective Equipments (PPE's) ❖ Head protection (Helmets) ❖ Ear protection ❖ Fall protection ❖ Foot protection ❖ Face and Eye protection ❖ Hand & body protection ❖ Respiratory protection • Organizational Policies related to Health, environment and Safety: ❖ Methods of receiving or sourcing information ❖ Dealing with accidents and emergencies associated with the work and environment ❖ Reporting ❖ Emergency evacuation ❖ Fire risks and safe exit procedures • Reporting procedure to the concerned authority in emergency situations • Fire protection equipments, their type and uses based on requirement and type of fire **Demonstration/ Practical :-** • Demonstrate methods for safe handling and stacking of electrical materials, fixtures, different equipment's/machinery along with its parts and consumables. • Selection of PPEs and their appropriately usage as per working need during electrical works. • Demonstrate safe handling of tools and tackles relevant to different electrical works. • Analysis of hazards involved in electrical works or informing/reporting to seniors regarding hazardous conditions	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Identification of locations, situations/ circumstances, malpractices which can be hazardous for works • Reporting in case of emergency • Selection of fire extinguisher based on classification of fire, standard practice of storing & stacking firefighting equipment/ materials at work locations • Disposal of waste materials as per their nature and effects on weather Reporting in case of emergency	
	Total Duration **Theory Duration 336:00** **Practical Duration 512:00**	**Unique Equipment Required:** Hand Tools, Materials and Fixtures Screw drivers, wire cutters, wire strippers, pliers, hammers, Hacksaws, Chisels, Spanners (Set), Wrenches, File, Marking tools, table vice, Stock and die set, Pipe cutter to cut pipes, Wire cutters, Wire strippers, Spanners (set), wrenches, Trowel, pointing Trowel, Shovel, mortar Pan, spade, pick axe GI bucket 5L capacity, wheel Barrow, lime powder, wooden pegs, hammer, hard broom, source of water, ladder, Cables, wires, sockets, switches, lights, conduits (flexible and rigid), raceways, clamps for conduits, screws Measuring Instruments measuring tape, mason's line, sprit level, plumb bob Power tools cutting machine, drilling machine, power source Equipment Vibrators, Bar cutting machine, Bar bending machine, water pumps,hand roller, plate vibrator, power source PPEs & safety equipment's helmet , safety shoes , cotton hand gloves, goggles, Reflective jackets, Safety message boards infrastructural requirements classroom having sitting capacity of 30 trainees, blackboard LCD monitor 32'', laptop	

Grand Total Course Duration: **848 Hours, 0 Minutes**
Recommended **480 hours of OJT**

(This syllabus/ curriculum has been approved by ***Construction Skill Development Council of India)***

Trainer Prerequisites for Job role: "Foreman- Electrical works (Construction)" mapped to Qualification Pack: "CON/Q0604, v1.0"

Sr. No.	Area	Details
1	**Description**	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "CON/Q0604".
2	**Personal Attributes**	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field
3	**Minimum Educational Qualifications**	ITI/12th
4a	**Domain Certification**	Trainer/Assessor-80% in each NOS of Qualification Pack "MEP/Q0102" or "MEP/Q0104" and Lead trainer/Lead Assessors- 90% in each NOS of Qualification Pack "MEP/Q0101" or "MEP/Q0103"
4b	**Platform Certification**	Trainer/Assessor-50% in each NOS of Qualification Pack "MEP/Q0101" or "MEP/Q0103"& 80% overall, Lead trainer/ Lead Assessors- 50% in each NOS of Qualification Pack "MEP/Q0101" or "MEP/Q0103"and overall 90%
5	**Experience**	Technical Degree holder with minimum five years of Field experience and preferably two years of teaching experience, or, ii. In case of a Diploma Holder seven years of field experience and preferably two years of teaching experience or, iii. In case of ITI/12th minimum ten years of field experience and preferably two years of teaching experience.

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role	Foreman – Electrical Works (Construction)
Qualification Pack	CON/Q0604
Sector Skill Council	Construction

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the knowledge part will be based on knowledge bank of questions created by Assessment Bodies subject to approval by SSC
3. Individual assessment agencies will create unique question papers for knowledge/theory part for assessment of candidates as per assessment criteria given below
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on assessment criteria.
5. The passing percentage for each QP will be 70%. To pass the Qualification Pack, every trainee should score a minimum of 70% individually in each NOS.
6. The Assessor shall check the final outcome of the practices while evaluating the steps performed to achieve the final outcome.
7. The trainee shall be provided with a chance to repeat the test to correct his procedures in case of improper performance, with a deduction of marks for each iteration.
8. After the certain number of iteration as decided by SSC the trainee is marked as fail, scoring zero marks for the procedure for the practical activity.
9. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack within the specified timeframe set by SSC.
10. Minimum duration of Assessment of each QP shall be of 4hrs/trainee.

				Marks Allocation	
Assessment outcomes	Assessment Criteria for outcomes	**Total Mark**	**Out Of**	**Theory**	**Skills Practical**
CON/N0611: Monitor regular electrical works (installation, maintenance and repairing) in a construction site	PC1. ensure that preventive maintenance of electrical wiring, equipment and fixtures deployed at construction works is being carried out regularly as per requirement	**100**	3	1	2
	PC2. check and ensure materials, fixtures and devices being used in repairing or maintenance works are ISI certified		5	2	3
	PC3. inspect completed LV electrical arrangements for conformance with specifications, requirements and compliance with applicable statutory and HSE requirements		5	2	3
	PC4. check & ensure that lighting arrangements and its components are in safe condition working properly		3	1	2
	PC5. conduct periodical checks/ tests to insulation, joints, physical condition and termination of wires and cables to ensure safe working of wiring systems		3	1	2
	PC6. check condition and safety of isolation and ensure safe condition for undertaking maintenance/ repairing in wires, cables, lights and fixtures		5	2	3
	PC7. diagnose malfunctioning of wiring systems, circuits, temporary panels and its components, using appropriate measuring equipment and hand tools		5	2	3
	PC8. carry out troubleshooting and take immediate actions in case of emergency repairing requirements related to short circuit or malfunction in wiring systems, temporary electrical panels or lighting arrangements		5	2	3
	PC9. ensure proper functioning of power tools and diagnostic tools by conducting maintenance as per manufacturer's guidelines at scheduled intervals		5	2	3
	PC10. develop hand sketches relevant to electrical circuit diagrams using standard wiring symbols as per work requirements		5	2	3
	PC11. supervise electrical works by providing instructions, directions ensuring completion of the same within specified time as per applicable schematics, specification, guidelines and safety norms		5	2	3

	PC12. adhere to schedule of calibration (if any) and conduct calibration periodically to ensure correct working of testing equipment and ensure removal of faulty ones from worksite		3	1	2
	PC13. check condition and safety of isolation and ensure safe condition for undertaking maintenance/ repairing in construction equipments		5	2	3
	PC14. conduct installation, electrical maintenance and repair of equipment like electrical distribution panels and its accessories, common construction equipment like bar cutting/bending machine, different types of common pumps used in construction sites, transformers and tower cranes		3	1	2
	PC15. ensure proper termination of cables as per applicability at power source and equipment		5	2	3
	PC16. prepare schedule of maintenance for common equipment and machineries such as motor, bar cutting/ bending machines, vibratos, tower cranes etc.		5	2	3
	PC17. determine potential hazards prior to conduct any maintenance/ repairing work to the equipment or circuits		5	2	3
	PC18. take necessary steps or report to concerned authorities on observing any hazardous conditions at work place		3	1	2
	PC19. ensure erection of safety signage and barricading, surrounding the faulty or electrically hazardous equipment/ locations to avoid unsafe conditions		3	1	2
	PC20. carry out checks for adverse situation like vicinity of water, fire prior, during and after establishing any electrical system at regular intervals		3	1	2
	PC21. ensure proper earthing of electrical circuits as per relevant specifications or manufacturer's guidelines		5	2	3
	PC22. ensure occurrence of trial run and obtain clearance from respective authority relevant to electrical works prior to leave any equipment for working		5	2	3
	PC23. ensure upkeep of valuable electrical fixtures and perform checks at electrical stores to ensure safe condition		3	1	2

	PC24. prepare data sheet, report and note readings as per applicability according to organizational procedures		5	2	3
	PC25. ensure electrical safety to workers, equipment, materials and fixtures by adopting standard safe working procedures as per organizational norms, at workplace		3	1	2
		Total	**100**	**40**	**60**
CON/N0612 : Establish electrical connections during erection of plant and heavy construction machineries	PC1. read manufacturer's guidelines to ascertain electrical requirement of the machinery to be installed	**100**	5	2	3
	PC2. prepare material requirement from electrical drawing/ diagram if available with machinery as per standard practice		5	2	3
	PC3. derive specification of electrical materials to be used in circuits/ electrical systems		5	2	3
	PC4. pass material requirement to senior authority after checking with material availability at store		5	2	3
	PC5. perform visual inspection of available material in terms of their specification and physical condition		5	2	3
	PC6. coordinate with superiors for allocation of desired manpower		5	2	3
	PC7. provide inputs in planning and preparing work schedules required to complete the erection		5	2	3
	PC8. check for completion of required preparatory works and availability of safety devices at workplace, prior to starting installation works		5	2	3
	PC9. carry out or inspect electrical isolation at the main and secondary power source as per standard procedure and ensure work safety prior to conducting maintenance to electrical units		5	2	3
	PC10. inspect electrical panel, transformers to ensure conformance to manufacturer's specification, compatibility of devices, power ratings of devices to be connected adhering electrical safety norms		8	3	5
	PC11. erect electrical panel as power source if required and get it activated		5	2	3
	PC12. conduct and carry out electrical connection works between machinery and power source		3	1	2
	PC13. install earthing arrangement and protective devices at appropriate locations as per manufacturer's guidelines		5	2	3

	PC14. ensure safe joining (straight through joint as per applicability), and termination of cables as per standard practice		5	2	3
	PC15. conduct required electrical tests using appropriate measuring and diagnostic devices to ensure safe and desired working of machineries		5	2	3
	PC16. conduct trial run and required tests to ensure safe working of plant and machineries		5	2	3
	PC17. check panels, transformers, machineries for factors responsible for electrical distribution system failure like loose connections/ parts, moisture, line disturbance, defective/ inadequate insulations, short circuiting, collision, overloading, dust/dirt or oil accumulation and other possible unsafe acts		5	2	3
	PC18. conduct preventive maintenance to electrical panels and electrical machineries parts as and when necessary		5	2	3
	PC19. ensure electrical safety to workers, equipment, materials and fixtures by adopting standard safe working procedures as per organizational norms, at workplace		5	2	3
	PC20. prepare field reports, hand sketches etc. as and when necessary for documentation of related works		5	2	3
		Total	**100**	**40**	**60**
CON/N0613 : Conduct permanent wiring, maintenance work in buildings	PC1. go through electrical drawing, guidelines to ascertain electrical requirement of the work to be undertaken	100	5	2	3
	PC2. calculate electrical material requirement considering customer requirement and preferences or standard requirements of home electrical systems as per standard practice if drawing / diagram is not available		5	2	3
	PC3. derive list of electrical equipment and fixtures to be used in circuits/ electrical systems from drawing for considering power rating of the equipment		5	2	3
	PC4. calculate requirement of wiring materials as per drawing customer requirement and standard practice		5	2	3
	PC5. prepare and document as- built drawing of temporary and permanent – embedded electrical lines/ connection in order to be available in the final as built drawing		8	3	5
	PC6. monitor and ensure wall chasing work as per standard procedure prior to laying conduit		5	2	3

	PC7. conduct conduit laying for RCC structures and ensure specification of conduits are as per requirement		8	3	5
	PC8. conduct cable laying through conduit and ensure right specification of cables are being used considering electrical voltage/ load requirement		8	3	5
	PC9. conduct/ carry out concealed, exposed, electrical wiring work as per standard method and customer's requirement		8	3	5
	PC10. carry out or inspect electrical isolation at the main and secondary power source as per standard procedure and ensure work safety prior to conducting maintenance to electrical wiring or pre installed units		8	3	5
	PC11. fix complex electrical fixtures, installs fire alarm systems as per requirement		8	3	5
	PC12. conduct/ carry out earthing of installed electrical circuit as per standard method and using standard earthing components		8	3	5
	PC13. conduct required tests/ inspections as and when necessary to ensure safe working of electrical circuits or to determine any fault in the circuit		8	3	5
	PC14. suggest suitable methods of maintenance of a part of electrical circuit and conduct/ carry out maintenance work as per requirement adhering specification of parts and general electrical guidelines		5	2	3
	PC15. change parts, fixture, wirings as per requirement		5	2	3
	PC16. carry out basic maintenance of household equipment like water pump, motor etc.		5	2	3
	Total		**100**	**40**	**60**
CON/N8001: Work effectively in a team to deliver desired results at the workplace	PC1. pass on work related information/ requirement clearly to the team members	100	10	4	6
	PC2. inform co-workers and superiors about any kind of deviations from work		10	4	6
	PC3. address the problems effectively and report if required to immediate supervisor appropriately		20	8	12
	PC4. receive instructions clearly from superiors and respond effectively on the same		10	4	6
	PC5. communicate to team members/subordinates for appropriate work technique and method		10	4	6
	PC6. seek clarification and advice as per the requirement and applicability		10	4	6

	PC7. hand over the required material, tools tackles, equipment and work fronts timely to interfacing teams		15	6	9
	PC8. work together with co-workers in a synchronized manner		15	6	9
		Total	**100**	**40**	**60**
CON/N8002: Plan and organize work to meet expected outcomes	PC1. understand clearly the targets and timelines set by superiors	**100**	13	5	8
	PC2. plan activities as per schedule and sequence		10	4	6
	PC3. provide guidance to the subordinates to obtain desired outcome		13	5	8
	PC4. plan housekeeping activities prior to and post completion of work		8	3	5
	PC5. list and arrange required resources prior to commencement of work		10	4	6
	PC6. select and employ correct tools, tackles and equipment for completion of desired work		8	3	5
	PC7. complete the work with allocated resources		8	3	5
	PC8. engage allocated manpower in an appropriate manner		5	2	3
	PC9. use resources in an optimum manner to avoid any unnecessary wastage		5	2	3
	PC10. employ tools, tackles and equipment with care to avoid damage to the same		5	2	3
	PC11. organize work output, materials used, tools and tackles deployed,		10	4	6
	PC12. processes adopted to be in line with the specified standards and instructions		8	3	5
		Total	**100**	**40**	**60**
CON/N8003: Supervise, monitor and evaluate performance of subordinates at workplace	PC1. fix expected targets for the respective gang as per site requirements and allocate work to subordinates	100	15	6	9
	PC2. establish expected performance standards and expectations for the respective gang of workers to meet the desired outcomes		15	6	9
	PC3. inspect assigned work to the respected gang of workers through progressive checking		20	8	12
	PC4. observe and verify the work activities performed by the subordinates at the construction site		20	8	12
	PC5. monitor overall performance of subordinates on the designed measures to ensure quality requirements set by the concerned authority		15	6	9

	PC6. ensure adherence to the organizational policies and procedures for all relevant construction activities by the workmen subordinations		15	6	9
		Total	**100**	**40**	**60**
CON/N9002: Manage workplace for safe and healthy work environment	PC1. Ensure proper housekeeping at workplace		5	2	3
	PC2. Implement safe handling , stacking methods at workplace / store		5	2	3
	PC3. Ensure that health and safety plan is followed by all subordinates		8	3	5
	PC4. Identify any hazard in workplace and notify them to appropriate authority		5	2	3
	PC5. ensure that all safety and protection installation are correctly placed & adequate		5	2	3
	PC6. Ensure safe access is available at work place for movement of workers & materials.		5	2	3
	PC7. Ensure safe use of tools and tackles by the workmen as per applicability		5	2	3
	PC8. ensure appropriate use of following Personal Protective Equipment (PPE) as per applicability: • Head Protection (Helmets) • Ear Protection • Fall Protection • Foot Protection • Face and Eye Protection, • Hand &Body Protection • Respiratory Protection		5	2	3
	PC9. Maintain entrances & exit from confined spaces , excavated pits and other location in concurrence with safety parameters or instruction form safety personals.		5	2	3
	PC10. Ensure organizational policies and procedures are followed for health , safety and welfare, in relation to: • methods of receiving or sourcing information • dealing with accidents and emergencies associated with the work and environment • reporting • stooping work • evacuation • fire risks and safe exit procedures		8	3	5
	PC11. follow procedures for accident recording and reporting as per organizational and statuary requirements		8	3	5

	PC12. ensure effective adherence to response to emergency procedures / protocols		8	3	5
	PC13. report any case of emergency / risks to the concern people at the construction site		8	3	5
	PC14. report any perceived risk hazards to the superiors / concerned EHS		8	3	5
	PC15. demonstrate the use of fire protection equipments for different type of fire hazard		8	3	5
	PC16. implement control measures to reduce risk & meet legal requirement as per organizational policies		8	3	5
		Total	**100**	**40**	**60**