

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR POWER SECTOR

What are Occupational Standards(OS)?

➤ OS describe what individuals need to do, know and understand in order to carry out a particular job role or function

➤ OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack- Engineer – Power Distribution

SECTOR: Power

SUB-SECTOR: Distribution

OCCUPATION: Engineer – Power Distribution

REFERENCE ID: PSS/Q7001

ALIGNED TO: NCO-2004/NIL

Engineer-Power Distribution is responsible for power distribution system's erection and commissioning, operation & maintenance, testing & inspection of LT and HV systems and metering, billing, collection for distribution. Candidate should be aware of GIS, SCADA, protection, automation system, smart grid etc. He should also have understanding of load dispatch and power trading mechanisms.

Brief Job Description: Oversee installation, operation & maintenance, testing & inspection of grid substation, distribution transformer, distribution network, O/H line, U/G cabling, GIS, SCADA, automation system, smart grid, metering, billing and collection etc. testing and inspection on pre and post commissioning.

Personal Attributes: Work is performed indoor as well as outdoors in all weather conditions. Work requires the ability to perform engineering and co-ordination activities as and when required. Periodic night-time work also required.



Job Details	Qualifications Pack Code	PSS/Q7001		
	Job Role	ENGINEER- POWER DISTRIBUTION		
	Credits (NSQF)	TBD	Version number	1.0
	Sector	Power	Drafted on	15/01/2016
	Sub-sector	Distribution	Last reviewed on	19/07/2016
	Occupation	Engineer- Distribution	Next review date	19/07/2018
	NSQC Clearance Date	Not Applicable		

Job Role	Engineer -Power Distribution is also known as Assistant Engineer
Role Description	Engineer-Power Distribution has the responsibility of a designated area looking after construction, operation and maintenance of the power distribution system, including material management, resource management, consumer handling and coordination with seniors.
NSQF level	6
Minimum Educational Qualifications	BE/B.Tech (Electrical)
Maximum Educational Qualifications	Not Applicable
Training (Suggested but not mandatory)	Not Applicable
Minimum Job Entry Age	21 Years
Experience	Not Applicable
Applicable National Occupational Standards (NOS)	<p>Compulsory:</p> <ol style="list-style-type: none"> PSS/N7001 Oversee installation activities of power distribution system PSS/N7002 Supervise power distribution system operation and maintenance activities PSS/ N2001 Use basic health and safety practices at the workplace PSS/N1336 Work effectively with others <p>Optional: Not Applicable</p>
Performance Criteria	As described in the relevant OS units



Keywords /Terms	Description	
Definitions	Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.	
Vertical	Vertical may exist within a sub-sector representing different domain areas or the client industries served by the industry.	
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.	
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.	
Sub-functions	Sub-functions are sub-activities essential achieving the objectives of the function.	
Job role	Job role defines unique set of functions that together form a unique employment opportunity in an organization.	
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve consistently while carrying out a function at the workplace. Occupational Standards as set of competencies is applicable both in Indian and overreaching global contexts.	
Performance Criteria	Performance Criteria defined for a task are statements that together specify the standard of performance while carrying out the task.	
National Occupational Standards (NOS)	NOS are Occupational Standards which apply uniquely in Indian context.	
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.	
Qualifications Pack(QP)	Qualifications Pack comprises set of OS, together with the educational, training and other criteria that are required to perform a job role satisfactorily at workplace. A Qualifications Pack is assigned a unique qualification pack code for clear identification.	
Knowledge and Understanding	Knowledge and Understanding are statements which together as a set specify the technical, generic, professional and organization specific knowledge that an individual needs to possess in order to perform and meet the required standards consistently.	
Organizational Context	Organizational Context includes the way the organization is structured and how it operates. It includes elements of operational knowledge contents defined in relation to functioning of an organization that a skilled professional need to possess specific to its precise areas of responsibility.	
Technical Knowledge	Technical Knowledge is the specific domain knowledge needed to accomplish the task in combination with other competencies. It is usually coined with specifically	



Acronyms

	designated roles and responsibilities.
Core Skills/Generic Skills	Core Skills or Generic Skills as set are group of skills. It is key to working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include mainly communication related skills that are applicable to most job roles.
Keywords /Terms	Description
PPE	Personal Protective Equipment
KW	Kilowatt
KV	Kilo Volt
KWH	Kilo Watt Hour
PTW	Permit to work
CPR	Cardio Pulmonary Resuscitation
GIS	Geographical Information System
RTU	Remote Terminal Unit
CBIP	Central Board of Irrigation and Power
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CPRI	Central Power Research Institute
CT	Current Transformer
DC	Direct Current
DISCOM	Distribution Company
DT	Distribution Transformer
E/F	Earth Fault
HT	High Tension
HVDS	High Voltage Distribution System
IE Act	Indian Electricity Act 2003
IS	Indian Standard
KV	Kilo Volt
LA	Lightening Arrestor
MD	Maximum Demand
MVA	Mega Volt Ampere
MW	Mega Watt
MWh	Mega Watt hour
O/C	Over Current
O/H	Over Head
O&M	Operation & Maintenance



Qualifications Pack For Engineer -Power Distribution



OPGW	Optical Ground Wire
PT	Potential Transformer
RMU	Ring Main Unit
SCADA	Supervisory Control and Data Acquisition
SEB	State Electricity Board
SERC	State Electricity Regulatory Commission
SMS	Short Message Service
T&D	Transmission and Distribution
T/F	Transformer
VT	Voltage Transformer
XLPE	Cross Linked Poly Ethylene Cable



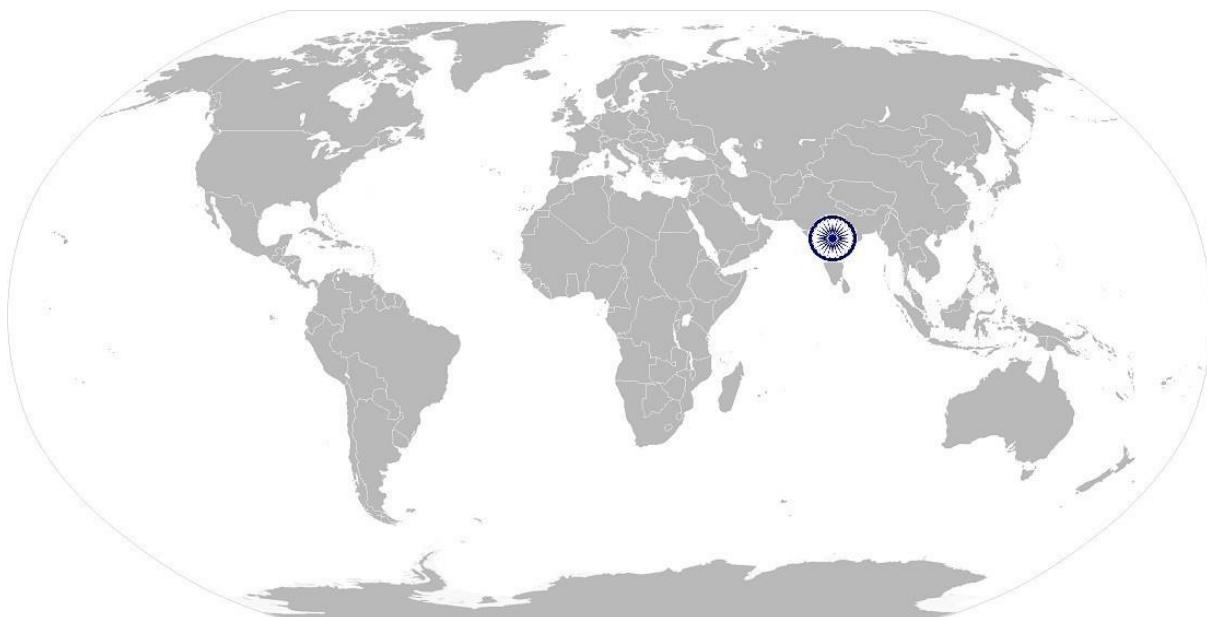
NOS
National Occupational Standards



PSS/N7001

Oversee installation activities of power distribution system

National Occupational Standard



Overview

This unit is about the power distribution system installation activities performed under the supervision of Engineer- Power Distribution.



PSS/N7001 **Oversee installation activities of power distribution system**

National Occupational Standard

Unit Code	PSS/N7001
Unit Title (Task)	Oversee installation activities of power distribution system
Description	Engineer- power distribution will be overlooking all installation related activities including erection and commissioning of power distribution systems.
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • power distribution system installation • substation erection and commissioning • protection system
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Power distribution system installation	<p>The user/individual on the job needs to:</p> <p>PC1. supervise and ensure entire power distribution system from substation to last mile consumers</p> <p>PC2. demonstrate knowledge of types of distribution system network – ring main system, radial system, interconnected system etc.</p> <p>PC3. manage load flow</p> <p>PC4. supervise the installation of key equipment in power distribution system and ensure all technical specifications are inline</p> <p>PC5. ensure voltage level using technology of different types of distribution system</p> <p>PC6. read and analyse schematic drawings, engineering drawings, single line diagrams, lay out plans etc.</p> <p>PC7. be aware of different types of transformers, poles, conductors and cables</p> <p>PC8. survey elements for creation of new service line connections</p> <p>PC9. review engineering drawings, layout plans, technical specification of equipment</p> <p>PC10. manage revenue across all processes in distribution chain from release of new connection to collection including meter installation, meter reading, bill generation, bill distribution etc.</p> <p>PC11. demonstrate knowledge of equipments installed in power system viz. transformers, circuit breakers, isolators, current transformers, voltage transformers, wave traps, types of conductors, protection equipment, lightning arrestors, grounding and earthing, capacitors, relays etc. and their technical specifications</p> <p>PC12. preparation of estimates and bill of quantities (BoQ)</p> <p>PC13. overviewing of procurement function (modes and types- turnkey, supply & services etc.); material planning and handling; store handling methods</p> <p>PC14. supervise route survey for O/H line, U/G lines and ROW, using best practises</p> <p>PC15. review all types of protection system and earthing in distribution network</p> <p>PC16. installation of transformer and associated equipment</p> <p>PC17. take decision of use and insallation of 1-phase and 3-phase metering system</p>



PSS/N7001 **Oversee installation activities of power distribution system**

	<p>PC18. understand and appreciate Smart grid, AMR, AMI and SCADA implementation and GIS mapping</p> <p>PC19. supervise erection and commissioning of substation and line elements like different types of towers, O/H line, U/G cable, switchgear etc.</p> <p>PC20. supervise installation of protection system- surge protection device, over voltage protection etc.</p> <p>PC21. coordinate and manage logistic related issues</p>
<p>Substation erection and commissioning</p>	<p>The user/individual on the job needs to:</p> <p>PC22. understand and demonstrate knowledge of air insulated and gas insulated substation</p> <p>PC23. supervise erection and commissioning of substation equipment</p> <p>PC24. undertake installation of switchgear and control panel</p> <p>PC25. supervise installation of Substation Automation System (SAS)</p> <p>PC26. ensure protection system of all the plant equipment</p> <p>PC27. supervise G.O. switch installation</p>
<p>Protection system</p>	<p>The user/individual on the job needs to:</p> <p>PC28. ensure protection of distribution system equipment –transformer, switchgear etc.</p> <p>PC29. ensure grounding and earthing system of all the plant and equipment</p> <p>PC30. apply knowledge of circuit breaker, relay ,CT,PT and LA installation</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. relevant legislation, standards, policies, and procedures followed in the organization relevant to own employment and performance conditions</p> <p>KA2. relevant health and safety requirements applicable in the work place</p> <p>KA3. own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities</p> <p>KA4. reporting structure, inter-dependent functions, lines and procedures in the work area</p> <p>KA5. how to engage with specialists for support in order to resolve incidents and service requests</p> <p>KA6. importance of working in clean and safe environment practices and procedures</p> <p>KA7. responsibility of relevant people within the work area</p> <p>KA8. escalation matrix and procedures for reporting work and employment related issues</p>



PSS/N7001 **Oversee installation activities of power distribution system**

<p>B. Technical Knowledge</p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. network layout, schematic and design drawing of substation</p> <p>KB2. technical specification of distribution system equipment</p> <p>KB3. policy and regulatory regime in the sector</p> <p>KB4. design of distribution network based on prevailing planning and policy guidelines</p> <p>KB5. load flow studies, sag and tension calculation, transient studies, vibration analysis, wind pressure analysis, short circuit studies etc.</p> <p>KB6. various type of equipment protection system</p> <p>KB7. ratings and specifications of line, transformer, cables, fuses, switches and wires</p> <p>KB8. smart grid, AMR,AMI and automation system</p> <p>KB9. handling of all machineries, equipment's & vehicles</p> <p>KB10. use of appropriate judgment and initiative pertaining to work methods and tools</p> <p>KB11. technical manuals, blueprints, schematics, diagrams, plans, specifications</p> <p>KB12. estimation of time, material and equipment needed to complete assignments procedures for raw materials and finished goods</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information related to work</p> <p>SA2. note down observations (if any) related to the process</p> <p>SA3. use IT</p> <p>SA4. prepare estimates</p> <p>SA5. document and keep records</p> <p>Reading Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA6. read and interpret the process required for various types of operations</p> <p>SA7. read and interpret and process flowchart for all operations</p> <p>SA8. read manuals and operation documents to understand the Equipment used into operation</p> <p>Oral Communication (Listening and Speaking skills)</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA9. discuss task lists, schedules and activities with the seniors</p> <p>SA10. effectively communicate with the team members</p> <p>SA11. communicate clearly with the customer</p>
<p>B. Professional Skills</p>	<p>Decision Making</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. follow organization rule-based decision making process</p> <p>SB2. take decisions with systematic course of actions and/or response</p> <p>SB3. demonstrate leadership skill</p> <p>SB4. understand importance of proper documentation</p>



PSS/N7001 Oversee installation activities of power distribution system

	Plan and Organize
	The user/individual on the job needs to know and understand: SB5. planning and organization of tasks to meet deadlines
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB6. build customer relationships and use customer centric approach
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB7. seek and comprehend operation related inputs for clarification SB8. find ways of modifying difficult operating stages to make it operation friendly
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB9. apply domain information to set and define operation parameters that ensures economy and quality of the product
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB10. critically evaluate operation parameters in relation to product features intended SB11. develop a holistic and comprehensive profile of products based on segregated discrete process stages

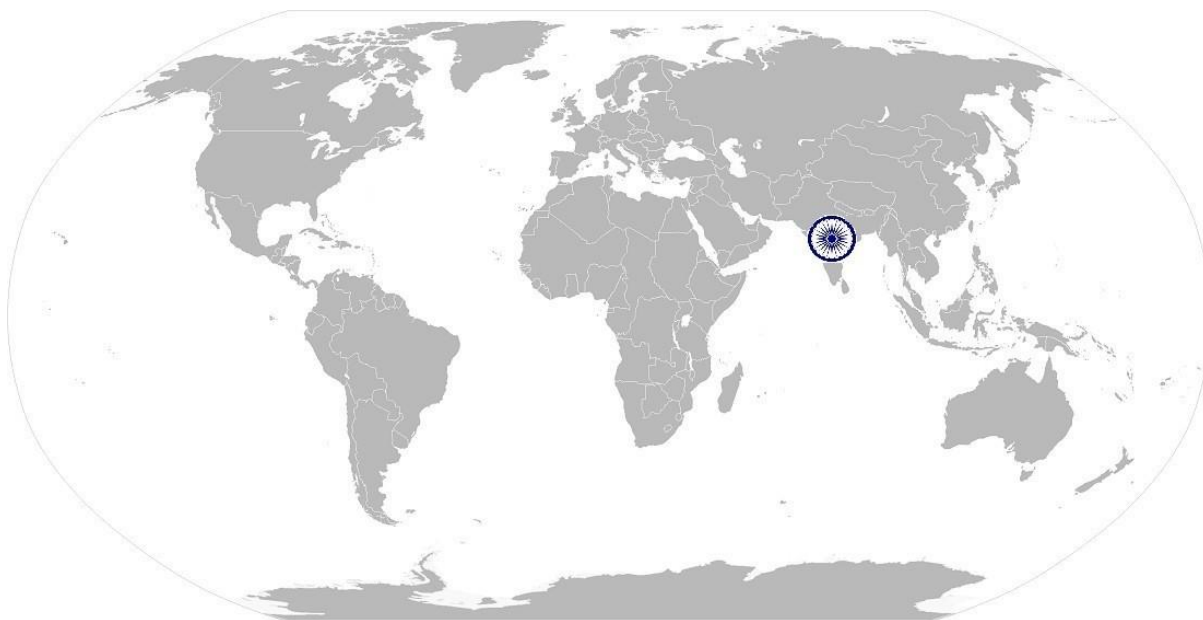
NOS Version Control

NOS Code	PSS/N7001		
Credits (NSQF)	TBD	Version number	1.0
Industry	Power	Drafted on	15/01/2016
Industry Sub-sector	Distribution	Last reviewed on	19/07/2016
Occupation	Engineer Power Distribution	Next review date	19/07/2018

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National Occupational Standard



Overview

This unit is about the operation and maintenance work done by Engineer- Power Distribution.



PSS/N7002 Supervise power distribution system operation and maintenance activities

National Occupational Standard	Unit Code	PSS/N7002
	Unit Title (Task)	Supervise power distribution system operation and maintenance activities
	Description	This section covers the operation and maintenance of distribution system like substation, distribution transformer, O/H line, U/G cable, switchgear and associated components etc. ensuring uninterrupted operation of distribution system equipment.
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • operation & maintenance – distribution system • testing of the system • repairing & replacement
	Performance Criteria(PC) w.r.t. the Scope	
	Element	Performance Criteria
Operation & maintenance – Distribution system	<p>The user/individual on the job needs to:</p> <p>PC1. ensure proper O&M of the distribution systems</p> <p>PC2. ensure proper protection and earthing of equipment for healthy operation</p> <p>PC3. understand consumer categories and applicable tariffs</p> <p>PC4. understand operation aspects of distribution substations and lines</p> <p>PC5. prepare preventive and breakdown maintenance plan for distribution system</p> <p>PC6. handle consumer management aspects and customer relationship issues</p> <p>PC7. review load management, grid stability, frequency, load dispatch, feeder loading etc.</p> <p>PC8. locate the conduit, cables & other underground system to perform maintenance work</p> <p>PC9. ensure performance monitoring of critical system such as RTU, Remote Metering Unit (RMU) and other automation system</p> <p>PC10. use tools and technologies available for conducting maintenance activities</p> <p>PC11. have an understanding of commercial operation of the entire revenue management process viz meter reading, bill generation, bill distribution, revenue collection, arrear management, consumer management etc.</p> <p>PC12. coordinate resources, mobilize teams, build teams, resolve interpersonal issues, manage logistics</p> <p>PC13. create SOPs, schedules, maintenance schedules</p> <p>PC14. prepare estimates, bill of quantity for carrying out maintenance activity</p> <p>PC15. plan and supervise predictive, preventive, breakdown and routine maintenance for lines and substation equipment</p> <p>PC16. monitor problem and keep the manager informed about progress or any delays in resolving the problem</p>	



PSS/N7002 Supervise power distribution system operation and maintenance activities

<p>Testing of the system</p>	<p>The user/individual on the job needs to lead teams of technicians and supervisors for:</p> <p>PC17. testing of distribution transformers and other associated equipments</p> <p>PC18. testing of earthing systems for distribution systems</p> <p>PC19. fault location methods for distribution system lines, cables</p>
<p>Repairing & replacement</p>	<p>The user/individual on the job needs to lead teams of technicians and supervisors for:</p> <p>PC20. carrying out repair and replacement of faulty/ unhealthy equipment</p> <p>PC21. troubleshooting of faulty system</p> <p>PC22. upgrading or modifying the existing unhealthy equipment/system</p> <p>PC23. carrying out general routine repair work</p> <p>PC24. technical change implementation in equipment/systems</p> <p>PC25. coordinating resources, mobilize teams, build teams, resolve interpersonal issues, manage logistics</p> <p>PC26. creating SOPs, schedules, maintenance schedules</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. relevant legislation, standards, policies, and procedures followed in the organization relevant to own employment and performance conditions</p> <p>KA2. relevant health and safety requirements applicable in the work place</p> <p>KA3. own job role and responsibilities and sources for information pertaining to employment terms, entitlements, job role and responsibilities</p> <p>KA4. reporting structure, inter-dependent functions, lines and procedures in the work area</p> <p>KA5. how to engage with specialists for support in order to resolve incidents and service requests</p> <p>KA6. importance of working in clean and safe environment practices and procedures</p> <p>KA7. relevant people and their responsibilities within the work area</p> <p>KA8. escalation matrix and procedures for reporting work and employment related issues</p>



PSS/N7002 Supervise power distribution system operation and maintenance activities

<p>B. Technical Knowledge</p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. tools and technologies available for conducting maintenance activities</p> <p>KB2. load management, system stability, frequency, load dispatch, etc.</p> <p>KB3. transformer, substation equipment including relay and breaker maintenance</p> <p>KB4. live and dead line maintenance of distribution system</p> <p>KB5. emergency restoration procedures of distribution network</p> <p>KB6. technical manuals, blueprints, schematics, diagrams, plans, specifications estimate time, material and equipment needed to complete assignments</p> <p>KB7. common electricity terminology and correct interpretation of the same terminology: e.g. current, voltage, resistance, kilowatt (kw), kilowatt hour(kwh)</p> <p>KB8. ratings and specifications of cables, fuses, switches and wires</p> <p>KB9. all machineries, equipment & vehicles used for distribution system O&M</p> <p>KB10. use of appropriate judgment and initiative pertaining to work methods and tools</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the supervisor or engineer</p> <p>SA2. note down observations (if any) related to the process of installation, operation and maintenance of power distribution system</p> <p>Reading Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA3. read and interpret the process required for various types of operations related to power distribution system</p> <p>SA4. read and interpret and process flowchart for all operations related to power distribution system</p> <p>SA5. read manuals and operation documents to understand the Equipment used into operation</p> <p>Oral Communication (Listening and Speaking skills)</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA6. discuss task lists, schedules and activities with the supervisor</p> <p>SA7. effectively communicate with the team members</p> <p>SA8. communicate clearly with the customer on the issues faced during query/fault</p>
<p>B. Professional Skills</p>	<p>Decision Making</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. follow organization rule-based decision making process</p> <p>SB2. take decisions with systematic course of actions and/or response</p> <p>Plan and Organize</p>



PSS/N7002 Supervise power distribution system operation and maintenance activities

	The user/individual on the job needs to know and understand: SB3. planning and organization of tasks to meet deadlines
Customer Centricity	
	The user/individual on the job needs to know and understand how to: SB4. build customer relationships and use customer centric approach
Problem Solving	
	The user/individual on the job needs to know and understand how to: SB5. seek and comprehend operation related inputs for clarification SB6. find ways of modifying difficult operating stages to make it operation friendly
Analytical Thinking	
	The user/individual on the job needs to know and understand how to: SB7. apply domain information to set and define operation parameters that ensures economy and quality of the product SB8. lead and manage
Critical Thinking	
	The user/individual on the job needs to know and understand how to: SB9. critically evaluate operation parameters in relation to equipment features SB10. develop a holistic and comprehensive profile of products based on segregated discrete process stages

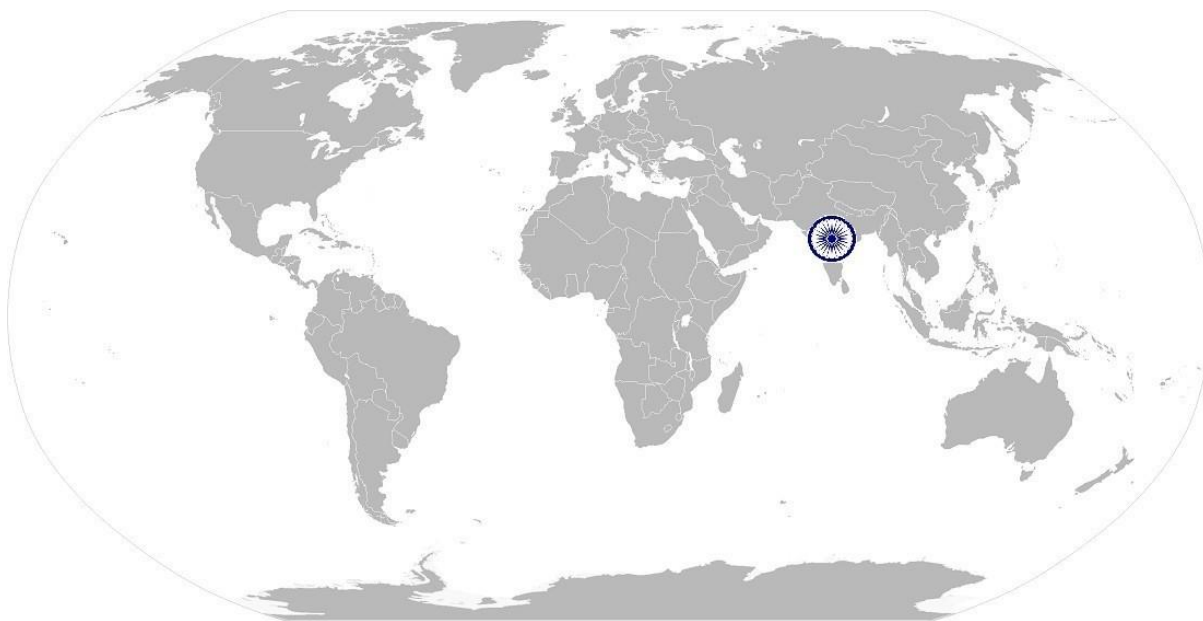
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NOS Code	PSS/N7002		
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Occupation	Engineer- Power Distribution	Next review date	19/07/2018

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National Occupational Standard



Overview

This unit covers health, safety and security for power related work. This includes procedures and practices that candidates need to follow to help maintain a healthy, safe and secure work environment.



PSS/N2001

Use basic health and safety practices for power related work

National Occupational Standard	Unit Code	PSS/N2001
	Unit Title (Task)	Use basic health and safety practices for power related work
	Description	This unit covers health, safety and security for power related work. This includes procedures and practices that candidates need to follow to help maintain a healthy, safe and secure work environment. It covers responsibilities towards self, others, assets and the environment. .
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • health and safety • fire safety • emergencies, rescue and first-aid procedures
	Performance Criteria(PC) w.r.t. the Scope	
	Element	Performance Criteria
Health and safety	<p>The user/individual on the job needs to:</p> <p>PC1. use protective clothing/equipment for specific tasks and work conditions.</p> <p>PC2. state the name and location of people responsible for health and safety in the workplace</p> <p>PC3. state the names and location of documents that refer to health and safety in the workplace</p> <p>PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace</p> <p>PC5. follow electrical safe working procedures such as Tag out/Lock out and display PTW (Permit To Work),</p> <p>PC6. follow warning signs (danger, out of service, etc.) while working with electrical systems</p> <p>PC7. use standard safe working practices when working at heights, confined areas and trenches</p> <p>PC8. test any electrical equipment and system using insulated testing devices before touching them</p> <p>PC9. ensure positive isolation of electrical equipment & system as per given standards</p> <p>PC10. recognize any abnormalities in electrical equipment or system installed alarm annunciation and/or noticing parameters from gauge/ indicator installed</p> <p>PC11. carry out safe working practices while dealing with hazards to ensure the safety of self and others</p> <p>PC12. state methods of accident prevention in the work environment of the job role</p> <p>PC13. state location of general health and safety equipment in the workplace</p> <p>PC14. inspect for faults, set up and safely use of scaffolds and elevated platforms and ladder</p> <p>PC15. lift, carry and transport heavy objects & tools safely using correct procedures from storage to workplace and vice versa</p> <p>PC16. inspect Grid station and its equipment routinely for any signs of oil and water leakage</p>	



PSS/N2001

Use basic health and safety practices for power related work

	<p>PC17. store flammable materials and machine lubricating oil safely and correctly</p> <p>PC18. check that the emission and pollution control devices are working properly in line with environmental policy standards</p> <p>PC19. apply good housekeeping practices at all times</p> <p>PC20. identify common hazard signs displayed in various areas</p> <p>PC21. retrieve and/or point out documents that refer to health and safety in the workplace</p> <p>PC22. inform relevant authorities about any abnormal situation/behavior of any equipment/system promptly</p>
<p>Fire safety</p>	<p>The user/individual on the job needs to:</p> <p>PC23. use the various appropriate fire extinguishers on different types of fires correctly</p> <p>PC24. distinguish types of fire</p> <p>PC25. demonstrate rescue techniques applied during fire hazard</p> <p>PC26. demonstrate good housekeeping in order to prevent fire hazards</p> <p>PC27. demonstrate the correct use of a fire extinguisher</p>
<p>Emergencies, rescue and first-aid procedures</p>	<p>The user/individual on the job needs to:</p> <p>PC28. demonstrate how to free a person from electrocution</p> <p>PC29. administer appropriate first aid to victims where required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.</p> <p>PC30. demonstrate basic techniques of bandaging</p> <p>PC31. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments</p> <p>PC32. perform and organize loss minimization or rescue activity during an accident in real or simulated environments</p> <p>PC33. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases</p> <p>PC34. demonstrate the artificial respiration and the CPR Process</p> <p>PC35. participate in emergency procedures Emergency procedures: raising alarm, safe/efficient, evacuation, correct means of escape, correct assembly point, roll call, correct return to work</p> <p>PC36. complete a written accident/incident report or dictate a report to another person, and send report to person responsible</p> <p>PC37. demonstrate correct method to move injured people and others during an emergency</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. names (and job titles if applicable), and where to find, all the people responsible for health and safety in a workplace.</p> <p>KA2. names and location of documents that refer to health and safety in the workplace.</p>



PSS/N2001

Use basic health and safety practices for power related work

<p>B. Technical Knowledge</p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. meaning of “hazards” and “risks”</p> <p>KB2. health and safety hazards commonly present in the work environment and related precautions</p> <p>KB3. possible causes of risk, hazard or accident in the workplace and why risk and/or accidents are possible</p> <p>KB4. possible causes of risk and accident</p> <p>KB5. methods of accident prevention</p> <p>KB6. safe working practices when working with tools and machines</p> <p>KB7. safe working practices while working at various hazardous sites</p> <p>KB8. where to find all the general health and safety equipment in the workplace</p> <p>KB9. various dangers associated with the use of electrical equipment</p> <p>KB10. positive isolation of electrical equipment and system</p> <p>KB11. safe handling and disposal of hazardous power plant wastes</p> <p>KB12. use of emission and pollution control devices and measures taken to control pollution</p> <p>KB13. various safety procedures and equipment used to work at heights, trenches and confined places</p> <p>KB14. safe working practices specific to working with electrical equipment & system e.g. lock out/ tag out, PTW, etc.</p> <p>KB15. preventative and remedial actions to be taken in the case of exposure to toxic materials</p> <p>KB16. importance of using protective clothing/equipment and other insulated work gear while handling electrical system and equipment</p> <p>KB17. precautionary activities taken to prevent fire accident</p> <p>KB18. various causes of fire</p> <p>KB19. techniques of using the different fire extinguishers</p> <p>KB20. different methods of extinguishing fire</p> <p>KB21. different materials used for extinguishing fire</p> <p>KB22. emergency rescue techniques applied during a fire hazard</p> <p>KB23. various types of safety signs and what they mean</p> <p>KB24. appropriate basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, poisoning, eye injuries</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the officer incharge</p> <p>SA2. note down observations (if any) related to the operation/maintenance.</p> <p>Reading Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA3. read and interpret the process required for different types of manuals for maintenance.</p>



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	<p>SA4. read and interpret the flowchart of all parts of an assembly. SA5. read manuals and documents to understand the product-details & how they can be used.</p>
	<p>Oral Communication (Listening and Speaking skills)</p>
	<p>The user/individual on the job needs to know and understand how to: SA6. discuss task lists, schedules and activities with the colleague/supervisor. SA7. effectively communicate with the team members. SA8. attentively listen and comprehend the information given by the colleague/supervisor/contractor. SA9. communicate clearly with the colleague on the issues faced during query/fault.</p>
<p>B. Professional Skills</p>	<p>Decision Making</p>
	<p>The user/individual on the job needs to know and understand how to: SB1. follow colleague/contractor rule-based decision making process. SB2. take decisions with systematic course of actions and/or response.</p>
	<p>Plan and Organize</p>
	<p>The user/individual on the job needs to know and understand: SB3. planning and organization of tasks to meet deadlines.</p>
	<p>Customer Centricity</p>
	<p>The user/individual on the job needs to know and understand how to: SB4. build customer relationships and use customer centric approach.</p>
	<p>Problem Solving</p>
	<p>The user/individual on the job needs to know and understand how to: SB5. seek and comprehend operation related inputs for clarification SB6. find ways of modifying difficult operating stages to make it operation friendly</p>
	<p>Analytical Thinking</p>
	<p>The user/individual on the job needs to know and understand how to: SB7. work systematically and logically to resolve the issues and identify causation and anticipate unexpected results. SB8. quick approach and solution towards faults repairing.</p>
	<p>Critical Thinking</p>
	<p>The user/individual on the job needs to know and understand how to: SB9. critically evaluate operation parameters in relation to system normality SB10. develop a holistic and comprehensive profile of grid station on segregated discrete process stages of blank forming processes</p>



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NOS Version Control

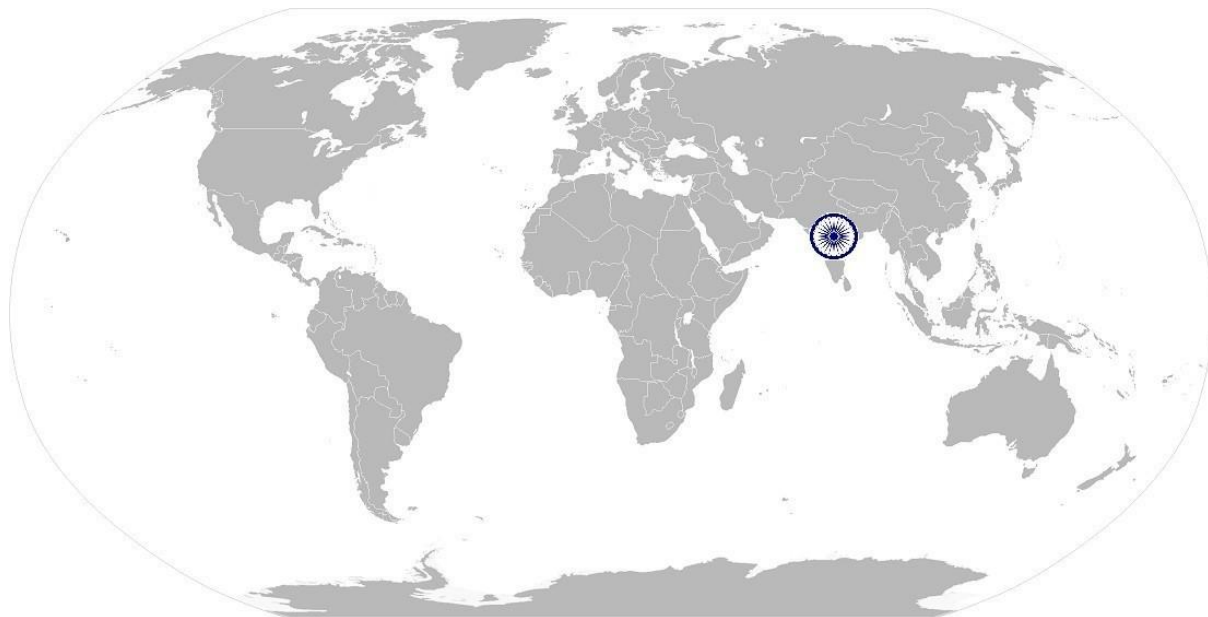
NOS Code	PSS/N2001		
Credits (NSQF)	TBD	Version number	1.0
Industry	Power	Drafted on	04/06/2016
Industry Sub-sector	Generation, Transmission & Distribution	Last reviewed on	19/07/2016
Occupation	Technician	Next review date	19/07/2018

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National Occupational Standard



Overview

This unit covers basic practices that improve effectiveness of working with others in an organizational set-up



PSS/N1336

Work effectively with others

National Occupational Standard	Unit Code	PSS/N1336
	Unit Title (Task)	Work effectively with others
	Description	<p>This unit covers basic etiquette and competencies that a candidate is required to possess and demonstrate in their behavior and interactions with others at the workplace.</p> <p>These cover areas such as communication etiquette, discipline, listening, handling conflict and grievances.</p>
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> working with others
	Performance Criteria(PC) w.r.t. the Scope	
	Element	Performance Criteria
	Working with others	<p>The user/individual on the job should be able to:</p> <p>PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required</p> <p>PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt</p> <p>PC3. give information to others clearly, at a pace and in a manner that helps them to understand</p> <p>PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible</p> <p>PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks</p> <p>PC6. display appropriate communication etiquette while working .</p> <p>PC7. display active listening skills while interacting with others at work</p> <p>PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism</p> <p>PC9. demonstrate responsible and disciplined behavior at the workplace</p> <p>PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict</p>
	Knowledge and Understanding (K)	
	A. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. legislation, standards, policies, and procedures followed in the organisation relevant to own employment and performance conditions</p> <p>KA2. reporting structure, inter-dependent functions, lines and procedures in the work area</p> <p>KA3. relevant people and their responsibilities within the work area</p> <p>KA4. escalation matrix and procedures for reporting work and employment related issues</p>



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Work effectively with others

<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. various categories of people that one is required to communicate and co-ordinate with in the organization</p> <p>KB2. importance of effective communication in the workplace</p> <p>KB3. importance of teamwork in organizational and individual success</p> <p>KB4. various components of effective communication</p> <p>KB5. key elements of active listening</p> <p>KB6. value and importance of active listening and assertive communication</p> <p>KB7. barriers to effective communication</p> <p>KB8. importance of tone and pitch in effective communication</p> <p>KB9. importance of avoiding casual expletives and unpleasant terms while communicating professional circles</p> <p>KB10. how poor communication practices can disturb people, environment and cause problems for the employee, the employer and the customer</p> <p>KB11. importance of ethics for professional success</p> <p>KB12. importance of discipline for professional success</p> <p>KB13. what constitutes disciplined behavior for a working professional</p> <p>KB14. common reasons for interpersonal conflict</p> <p>KB15. importance of developing effective working relationships for professional success</p> <p>KB16. how to express and address grievances appropriately and effectively</p> <p>KB17. importance and ways of managing interpersonal conflict effectively</p>
<p>Skills (S) (Optional)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. note the information communicated by the officer incharge.</p> <p>SA2. note down observations (if any) related to the operation/maintenance.</p> <p>Reading Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA3. read and interpret the process required for different types of manuals</p> <p>SA4. read and interpret the flowchart of all parts of an assembly.</p> <p>SA5. read manuals and documents to understand the product-details & how they can be used.</p> <p>Oral Communication (Listening and Speaking skills)</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA6. discuss task lists, schedules and activities with the colleague/supervisor.</p> <p>SA7. effectively communicate with the team members.</p> <p>SA8. attentively listen and comprehend the information given by the colleague/supervisor/contractor.</p> <p>SA9. communicate clearly with the colleague on the issues faced during query/fault.</p>
<p>B. Professional</p>	<p>Decision Making</p>



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Work effectively with others

Skills	The user/individual on the job needs to know and understand how to: SB11. follow colleague/contractor rule-based decision making process. SB12. take decisions with systematic course of actions and/or response.
	Plan and Organize
	The user/individual on the job needs to know and understand: SB13. planning and organization of tasks to meet deadlines.
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB14. build customer relationships and use customer centric approach.
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB15. seek and comprehend operation related inputs for clarification find ways of modifying difficult operating stages to make it operation friendly
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB16. work systematically and logically to resolve the issues and identify causation and anticipate unexpected results. Quick approach and solution towards faults repairing.
	Critical Thinking
The user/individual on the job needs to know and understand how to: SB17. critically evaluate operation parameters in relation to system normality develop a holistic and comprehensive profile of grid station.	

NOS Version Control

NOS Code	PSS/N1336		
Credits (NSQF)	TBD	Version number	1.0
Industry	Power	Drafted on	04/06/2016
Industry Sub-sector	Generation, Transmission & Distribution	Last reviewed on	19/07/2016
Occupation	Technician	Next review date	19/07/2018

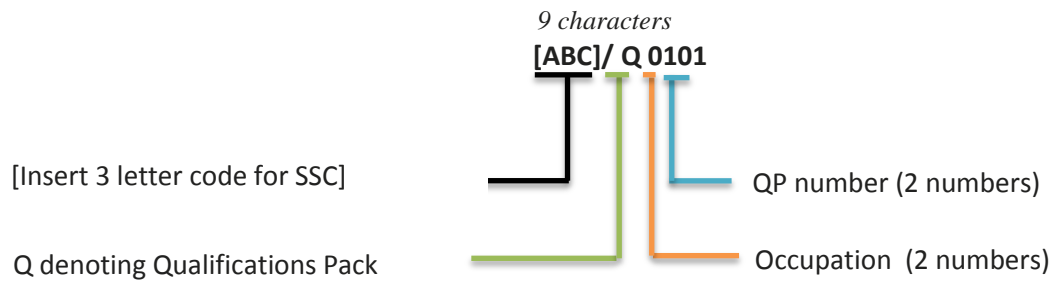
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Annexure

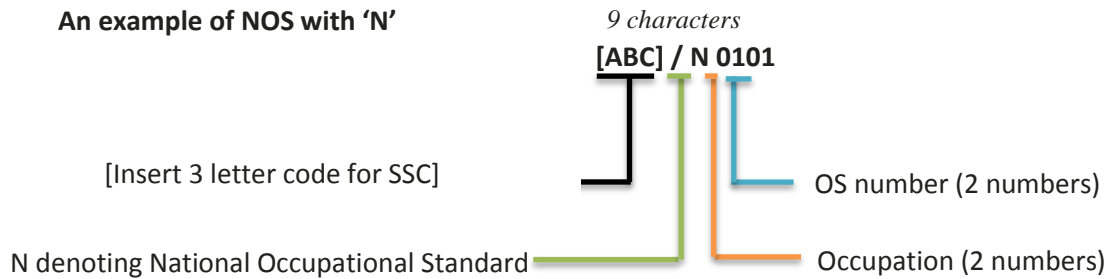
Nomenclature for QP and NOS

Qualifications Pack



Occupational Standard

An example of NOS with 'N'





The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
[Insert Name of Sub-sector1, Font: Calibri (Body), size 11, Bold]	[Insert range]
[Insert Name of Sub-sector2, Font: Calibri (Body), size 11, Bold]	[Insert range]
[Insert Name of Sub-sector3, Font: Calibri (Body), size 11, Bold]	[Insert range]
[Insert Name of Sub-sector4, Font: Calibri (Body), size 11, Bold]	[Insert range]
...	...

Sequence	Description	Example
Three letters	Industry name	[ABC, Font: Calibri (Body), size 11]
Slash	/	/
Next letter	Whether QP or NOS	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01



CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Engineer-Power Distribution

Qualification Pack PSS/Q7001

Sector Skill Council Power

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 theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6. 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

Assessable Outcomes	Assessment Criteria for Outcomes	Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
1. PSS/N7001 Oversee Installation activities of power distribution system	PC1. apply knowledge of entire power distribution system from substation to last mile consumers	100	4	1	3
	PC2. apply knowledge of types of distribution system network – ring main system, radial system, interconnected system etc.		4	1	3
	PC3. apply knowledge of load flow study		4	1	3
	PC4. apply knowledge of key equipment installed in power distribution system and their technical specifications		4	1	3
	PC5. apply knowledge of type of distribution system –voltage level wise/technology		4	1	3
	PC6. apply knowledge of schematic drawings, engineering drawings, single line diagrams, lay out plans etc.		4	1	3
	PC7. apply knowledge of types of transformer, pole, conductors and		4	1	3



Qualifications Pack for Engineer-Power Distribution



	cables			
	PC8. survey elements for creation of new service line connections	4	1	3
	PC9. apply knowledge of engineering drawings, layout plans , technical specification of equipment	3	1	2
	PC10. apply knowledge of revenue management process in distribution from release of new connection to collection of revenue including meter installation, meter reading, bill generation, bill distribution etc.	3	1	2
	PC11. apply knowledge of key equipment installed in power system viz. transformers, circuit breakers, isolators, current transformers, voltage transformers, wave traps, types of conductors, protection equipment, lightning arrestors, grounding and earthing, capacitors, relays etc. and their technical specifications	3	1	2
	PC12. preparation of estimates and bill of quantities	3	1	2
	PC13. overviewing of procurement function (modes and types- turnkey, supply & services etc.); material planning and handling; store handling methods	3	1	2
	PC14. apply methods for route survey for O/H line or U/G lines and ROW	3	1	2
	PC15. apply knowledge of types of protection system and earthing in distribution network	3	1	2
	PC16. installation of transformer and associated equipment	3	1	2
	PC17. apply knowledge of 1-phase and 3-phase metering system	3	1	2
	PC18. apply knowledge of Smart grid, AMR, AMI and SCADA implementation and GIS Mapping	3	1	2
	PC19. erection and commissioning of substation and line elements like different types of towers, O/H line or U/G cable, switchgear etc.	3	1	2



	PC20. installation of protection system- surge protection device, over voltage protection etc.		3	1	2
	PC21. coordination and management of logistic related issues		2		2
	PC22. apply knowledge of air insulated and Gas insulated substation		3	1	2
	PC23. erection and commissioning of substation equipment		3	1	2
	PC24. installation of switchgear and control panel		3	1	2
	PC25. installation of Substation Automation System (SAS)		3	1	2
	PC26. ensure protection system of all the plant equipment		3	1	2
	PC27. G.O switch installation		3	1	2
	PC28. Ensure protection of distribution system equipment –transformer, switchgear etc.		3	1	2
	PC29. Ensure grounding and earthing system of all the plant and equipment		3	1	2
	PC30. apply knowledge of circuit breaker, relay ,CT,PT and LA installation		3	1	2
	PC31. use of PPE: e.g. safety helmet, safety glove, safety shoe, climbing harness, lanyard and tool belt (when climbing), earth rod (discharge rod), safety rope ,ladder etc.		3	1	2
			100	30	70
2. PSS/N7002 Supervise power distribution system operation and maintenance activities	PC1. ensuring proper O&M of the distribution systems	100	4	1	3
	PC2. ensuring proper protection and earthing of equipment for healthy operation		4	1	3
	PC3. understanding of consumer categories, applicable tariffs		5	2	3
	PC4. understanding of operation aspects of distribution substations and lines		5	2	3
	PC5. prepare preventive and breakdown maintenance plan for distribution system		4	1	3



Qualifications Pack for Engineer-Power Distribution



PC6.	understanding of consumer management aspects and customer relationship management	5	2	3
PC7.	understanding of load management, grid stability, frequency, load dispatch, feeder loading etc.	4	1	3
PC8.	locate the conduit, cables & other underground system to perform maintenance work	4	1	3
PC9.	performance monitoring of critical system such as RTU, Remote Metering Unit (RMU) and other automation system	4	1	3
PC10.	Understand tools and technologies available for conducting maintenance activities	4	1	3
PC11.	commercial operation- understanding of entire revenue management process viz meter reading, bill generation, bill distribution, revenue collection, arrear management, consumer management etc.	4	1	3
PC12.	Co-ordinate resources, mobilise teams, build teams, resolve interpersonal issues, manage logistics	4	1	3
PC13.	Create SOPs, schedules, maintenance schedules	4	1	3
PC14.	prepare estimates, bill of quantity for carrying out maintenance activity	4	1	3
PC15.	plan and supervise predictive, preventive, breakdown and routine maintenance for lines and substation equipment	4	1	3
PC16.	monitor problem and keep the manager informed about progress or any delays in resolving the problem	4	1	3
PC17.	testing of distribution transformer and other associated equipment	3	1	2
PC18.	Testing of earthing systems for distribution systems	3	1	2
PC19.	Fault location methods for distribution system lines, cables	3	1	2
PC20.	carry out repair and replacement of faulty/ unhealthy equipment	3	1	2



	PC21. Troubleshooting of faulty system		3	1	2
	PC22. upgrade or modify the existing unhealthy equipment/system		3	1	2
	PC23. carry out general routine repair work		3	1	2
	PC24. technical change implementation in equipment/systems		3	1	2
	PC25. Co-ordinate resources, mobilise teams, build teams, resolve interpersonal issues, manage logistics		3	1	2
	PC26. Create SOPs, schedules, maintenance schedules		3	1	2
	PC27. PPE: e.g. safety helmet, safety glove, safety shoe, climbing harness, lanyard and tool belt (when climbing), earth rod (discharge rod), safety rope ,ladder etc.		3	1	2
			100	30	70
3. PSS/N2001 Use basic health and safety practices for power related work	PC1. use protective clothing/equipment for specific tasks and work conditions	100	2		2
	PC2. state the name and location of people responsible for health and safety in the workplace		3	1	2
	PC3. state the names and location of documents that refer to health and safety in the workplace		3	1	2
	PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace		2	1	1
	PC5. follow electrical safe working procedures such as Tag out/Lock out and display PTW (Permit To Work),		3	1	2
	PC6. follow warning signs (danger, out of service, etc.) while working with electrical systems		3	1	2
	PC7. use standard safe working practices when working at heights, confined areas and trenches		3	1	2
	PC8. test any electrical equipment and system using insulated testing devices before touching them		3	1	2
	PC9. ensure positive isolation of electrical equipment & system as per given standards		3	1	2



Qualifications Pack for Engineer-Power Distribution



PC10. recognize any abnormalities in electrical equipment or system installed alarm annunciation and/or noticing parameters from gauge/ indicator installed	3	1	2
PC11. carry out safe working practices while dealing with hazards to ensure the safety of self and others	3	1	2
PC12. state methods of accident prevention in the work environment of the job role	3	1	2
PC13. state location of general health and safety equipment in the workplace	3	1	2
PC14. inspect for faults, set up and safely use of scaffolds and elevated platforms and ladder	3	1	2
PC15. lift, carry and transport heavy objects & tools safely using correct procedures from storage to workplace and vice versa	3	1	2
PC16. inspect Grid station and its equipment routinely for any signs of oil and water leakage	3	1	2
PC17. store flammable materials and machine lubricating oil safely and correctly	3	1	2
PC18. check that the emission and pollution control devices are working properly in line with environmental policy standards	3	1	2
PC19. apply good housekeeping practices at all times	2		2
PC20. identify common hazard signs displayed in various areas	3	1	2
PC21. retrieve and/or point out documents that refer to health and safety in the workplace	3	1	2
PC22. inform relevant authorities about any abnormal situation/behavior of any equipment/system promptly	3	1	2
PC23. use the various appropriate fire extinguishers on different types of fires correctly	3	1	2
PC24. distinguish types of fire	3	1	2
PC25. demonstrate rescue techniques applied during fire hazard	3	1	2
PC26. demonstrate good housekeeping in order to prevent fire hazards	2		2



	PC27. demonstrate the correct use of a fire extinguisher		3	1	2
	PC28. demonstrate how to free a person from electrocution		3	1	2
	PC29. administer appropriate first aid to victims were required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.		3	1	2
	PC30. demonstrate basic techniques of bandaging		3	1	2
	PC31. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		3	1	2
	PC32. perform and organize loss minimization or rescue activity during an accident in real or simulated environments		2		2
	PC33. administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases		3	1	2
	PC34. demonstrate the artificial respiration and the CPR Process		3	1	2
	PC35. participate in emergency procedures Emergency procedures: raising alarm, safe/efficient, evacuation, correct means of escape, correct assembly point, roll call, correct return to work		1		1
	PC36. complete a written accident/incident report or dictate a report to another person, and send report to person responsible		1		1
	PC37. demonstrate correct method to move injured people and others during an emergency		1		1
			100	30	70
4. PSS/N1336 Work effectively with others	PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	100	10	3	7
	PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		10	3	7
	PC3. give information to others clearly, at a pace and in a manner that helps		10	3	7



Qualifications Pack for Engineer-Power Distribution



	them to understand			
	PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible	10	3	7
	PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks	10	3	7
	PC6. display appropriate communication etiquette while working	10	3	7
	PC7. display active listening skills while interacting with others at work	10	3	7
	PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism	10	3	7
	PC9. demonstrate responsible and disciplined behaviors at the workplace	10	3	7
	PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict	10	3	7
		100	30	70