

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR CAPITAL GOODS INDUSTRY

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: Fitter – Electrical and Electronic Assembly

SECTOR: CAPITAL GOODS

SUB-SECTOR:

- | | |
|-------------------------------------|-----------------------------------|
| 1. Machine Tools | 4. Process Plant Machinery |
| 2. Plastics Manufacturing Machinery | 5. Electrical and Power Machinery |
| 3. Textile Manufacturing Machinery | |

OCCUPATION: Fitting and Assembly

REFERENCE ID: CSC/ Q 0305

Aligned to: NCO-2004/7241.10, 7241.20, 7242.90, 7242.10

Fitter – Electrical and electronic assembly: Operations to assemble and wire up electrical panels/components and electronic equipment and systems to mechanical equipment.

Brief Job Description: It involves the assembly of the electrical panels, equipment/systems and electronic products, inclusive of components, sub-assemblies, or completed equipment/systems. Along with soldering techniques and anti-static protection techniques assemble with the mechanical equipment.

Personal Attributes: Basic communication, numerical and computational abilities. Openness to learning, ability to plan and organize own work and identify and solve problems in the course of working. Understanding the need to take initiative and manage self and work to improve efficiency and effectiveness

Job Details	Qualifications Pack Code	CSC/ Q 0305		
	Job Role	Fitter – Electrical and electronic assembly		
	Credits (NSQF)	TBD	Version number	1.0
	Sector	CAPITAL GOODS	Drafted on	10/04/14
	Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Plastics Manufacturing Machinery 3. Textile Manufacturing Machinery 4. Process Plant Machinery 5. Electrical and Power Machinery 	Last reviewed on	
	Occupation	FITTING AND ASSEMBLY	Next review date	30/08/16

Job Role	Fitter – Electrical and electronic assembly
Role Description	Operations to assemble and wire up electrical panels/components and equipments and systems to mechanical equipment..
NSQF level Minimum Educational Qualifications Maximum Educational Qualifications	3 Diploma(10+) - Electrical or Electronics N.A.
Training (Suggested but not mandatory)	No Previous Training Required
Experience	No Previous Experience Required
Applicable National Occupational Standards (NOS)	<p>Compulsory:</p> <ol style="list-style-type: none"> 1. CSC/ N 0305 (Assemble and wire up electrical components to mechanical equipment) 2. CSC/ N 0306 (Assemble and wire up electronic equipment and systems to mechanical equipment) 3. CSC/ N 1335 (Use basic health and safety practices at the workplace) 4. CSC/ N 1336 (Work effectively with others) <p>Optional: N.A.</p>
Performance Criteria	As described in the relevant OS units

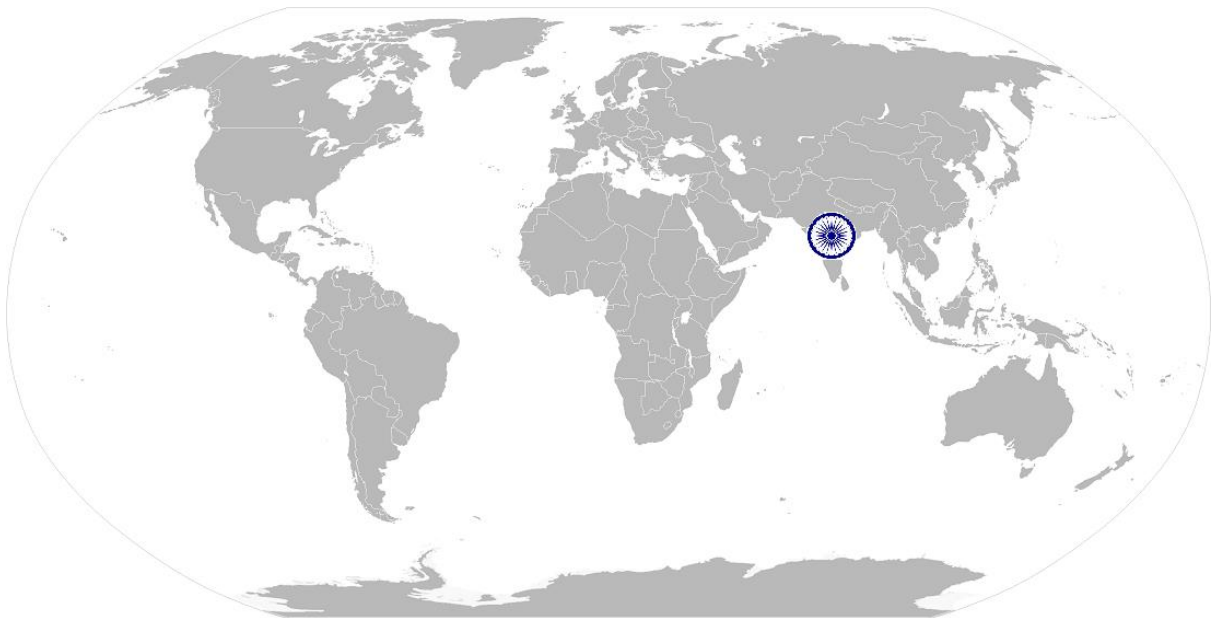
Definitions

Keywords /Terms	Description
Core Skills/Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.
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 NOS.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
National Occupational Standards (NOS)	NOS are Occupational Standards which apply uniquely in the Indian context
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Organisational Context	Organisational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
Qualifications Pack(QP)	Qualifications Pack comprises the set of NOS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Scope	Scope is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.
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.
Sub-functions	Sub-functions are sub-activities essential to fulfil the achieving the objectives of the function.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Unit Code	Unit Code is a unique identifier for a NOS unit, which can be denoted with an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Vertical	Vertical may exist within a sub-sector representing different domain areas or the client industries served by the industry.

Acronyms	Keywords /Terms	Description
	CO2	Carbon dioxide
	CPR	Cardiac Pulmonary Resuscitation
	PPE	Personal Protective Equipment
	ESD	Electrostatic Discharge
	PCB	Printed Circuit Board

CSC/ N 0305: Assemble and wire up electrical components to mechanical equipment

National Occupational Standard



Overview

This unit covers operations to assemble and wire up electrical panels/components to mechanical equipment.

CSC/ N 0305: Assemble and wire up electrical components to mechanical equipment

National Occupational Standard

Unit Code	CSC/ N 0305
Unit Title (Task)	Assemble and wire up electrical components to mechanical equipment
Description	<p>This unit covers the skills and knowledge needed to assemble and wire up electrical products, inclusive of components, sub-assemblies, or completed equipment/systems mounted in enclosures or otherwise to mechanical equipment, in accordance with approved procedures.</p> <p>The candidate's will work under a high level of supervision, while taking responsibility for they own actions and for the quality and accuracy of the work that they carry out.</p>
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> Working safely Assembling and wiring up electrical components to mechanical equipment
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Working safely	<p>The user/individual on the job should be able to:</p> <p>PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work</p> <p>PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing calibration operations</p> <p>PC3. work following laid down procedures and instructions</p> <p>PC4. check that tools and equipment to be used are in a safe, tested, calibrated and usable condition</p> <p>PC5. where appropriate, apply procedures and precautions to eliminate electrostatic discharge (ESD) hazards (eg. the use of grounded wrist straps and mats)</p>
Assembling and wiring up electrical components to mechanical equipment	<p>The user/individual on the job should be able to:</p> <p>PC6. follow the relevant instructions, assembly drawings and any other specifications at all times</p> <p>PC7. assemble electrical components on panels or in enclosures, in compliance with national and international wiring regulations, standards and procedures, and company standards and procedures</p> <p>PC8. obtain the correct tools and equipment for the assembly and test operations, and check that they are in a safe and usable condition</p> <p>PC9. prepare the electrical components and panels/enclosures for the assembly operations</p> <p>PC10. use safe and approved techniques to mount the electrical components on the panels or in the enclosures</p> <p>PC11. use the appropriate methods and techniques to assemble the components in their correct positions</p> <p>Methods and techniques: insulation stripping; securing wires and cables (eg. cable ties, clips, plastic strapping, lacing, harnessing); cable routing; cable forming/bending; adding cable protection (eg. sleeves or grommets); making screwed/clamped connections; installing and terminating pre-formed looms;</p>

CSC/ N 0305: Assemble and wire up electrical components to mechanical equipment

	<p>making crimped connections (eg. spade end, loops, tags and pins); marking or color coding wires/cables; applying sealants/adhesives; making soldered connections</p> <p>PC12. secure the components, using the specified connectors and securing devices</p> <p>PC13. wire and terminate cables to the appropriate connections on the components Cable types: single core, screened, twisted pair/ribbon, multicore, fibre-optic, data/communication, laminated copper, braided copper</p> <p>PC14. check the completed assembly to ensure that all operations have been completed, and that the finished assembly is secure and meets the required specification Checks: visual checks for completeness and freedom from damage to conductors or components; mechanical checks for security of components and connections; checks for electrical continuity and earth continuity</p> <p>PC15. report any difficulties or problems that may arise with the electrical assembly and wiring activities, and carry out any agreed actions</p> <p>PC16. leave the work area in a safe and tidy condition on completion of the electrical panel/equipment assembly activities</p> <p>PC17. return all tools and equipment to the correct location on completion of the assembly activities</p> <p>PC18. carry out electrical calculations for job operations using a range of variables</p>
Knowledge and Understanding (K)	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</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 company 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> <p>KA9. documentation and related procedures applicable in the context of employment and work</p>
<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. the specific safety practices and procedures that you need to observe when assembling and wiring electrical components mounted on panels or in enclosures (including any specific regulations or codes of practice for the activities, equipment or materials) Items on panels or in enclosures: e.g. drives and PLC; enclosure partitions; bases for plug-in devices; limit switches; component mounting plates; switches (push button, toggle); sensors; contactors; capacitors; plugs/sockets; overload and other relays; resistors; grommets/grommet strip; transformers/chokes; rectifiers; batteries; circuit breakers/fuses; power</p>

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	<p>supplies; connector rails; panel meters (voltage, current); circuit boards; solenoids; terminal blocks/junction boxes; thermistors/thermocouples; isolators; safety interlocks; indicators (lamps, LEDs); other specific components; etc.</p> <p>KB2. the hazards associated with assembling and wiring electrical panels and how they can be minimized Hazards: e.g. using sharp instruments for stripping cable insulation, use of soldering equipment, etc.</p> <p>KB3. the importance of wearing appropriate protective clothing and equipment (PPE), and keeping the work area safe and tidy</p> <p>KB4. what constitutes hazardous voltage and how to recognize victims of electric shock</p> <p>KB5. how to reduce the risks of a phase to earth shock (eg. insulated tools, rubber matting and isolating transformers)</p> <p>KB6. precautions to be taken to prevent electrostatic discharge (ESD) damage to circuits and sensitive components (eg. use of earthed wrist straps, anti-static mats, special packaging and handling areas)</p> <p>KB7. how to interpret drawings, circuit and physical layouts, charts, specifications, graphical electrical symbols, national and international wiring regulations, and other documents needed for the electrical activities</p> <p>KB8. functionality of different types of components and sub-assemblies that are used in the assembly activities Functionality: contactors; relays/ SMPS (Switch Mode Power Supply); circuit breakers/fuses; solenoids; switches; transformers; ballast chokes; terminal blocks; sub-assemblies; measuring/ indicating electrical instruments (meters indication lamps); variable frequency drives (VFDs) and soft starters</p> <p>KB9. preparations to be undertaken on the components and enclosure, prior to the mounting activities</p> <p>KB10. how the components are to be aligned and positioned prior to securing, and the tools and equipment that are used</p> <p>KB11. how to identify any orientation requirements, values or polarity for the components used in the electrical assembly and wiring activities</p> <p>KB12. types of cabling to be used in the assembly and wiring of the panels or enclosures Cable types: single core, screened, twisted pair/ribbon, multicore, fibre-optic, data/communication, laminated copper, braided copper</p> <p>KB13. why electrical bonding/earthing is critical, and why it must be both mechanically and electrically secure</p> <p>KB14. use of national and international wiring, and other regulations when selecting wires and cables</p> <p>KB15. assembly methods and techniques to be used when wiring electrical panels or components mounted in enclosures (eg. cable stripping, soldering, crimping, securing cables using cable ties, lacing/strapping of wires) Methods and techniques: insulation stripping; securing wires and cables (eg. cable ties, clips, plastic strapping, lacing, harnessing); cable routing; cable forming/bending; adding cable protection (eg. sleeves or grommets); making screwed/clamped connections; installing and terminating pre-formed looms; making crimped connections (eg. spade end, loops, tags and pins); marking or color coding wires/cables; applying sealants/adhesives; making soldered</p>
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CSC/ N 0305: Assemble and wire up electrical components to mechanical equipment

	<p>connections</p> <p>KB16. different types, applications, and methods of attaching identification markers/labels during the electrical wiring activities</p> <p>KB17. how to conduct any necessary checks to ensure the accuracy and quality of the assembly produced Checks: positional accuracy of all components; correct termination of all wires to components; correct orientation; security of all terminations; correct alignment; completeness; component security; ensuring freedom from damage; ensuring that the enclosure is free of debris (eg. cable offcuts/insulation, enclosure/trunking breakouts); continuity of cable/wiring connections (eg. battery and lamp checks)</p> <p>KB18. how to check that tools and equipment are free from damage or defects, are in a safe, tested, calibrated and usable condition</p> <p>KB19. importance of leaving the work area in a safe and clean condition on completion of the electrical assembly and wiring activities (eg. returning tools and equipment to the designated location, cleaning the work area, removing and disposing of waste)</p> <p>KB20. function of various electrical components</p> <p>KB21. application of various electrical components</p> <p>KB22. current and voltage distribution in series and parallel circuits</p>
Skills (S) [Optional]	
<p>A. Core Skills/ Generic Skills</p>	<p>Communication Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. read and interpret information correctly from various job specification documents, manuals, health and safety instructions, memos, etc. applicable to the job in English and/or local language</p> <p>SA2. check and clarify task-related information</p> <p>SA3. liaise with appropriate authorities using correct protocol</p> <p>SA4. convey and share technical information clearly using appropriate language</p> <p>SA5. fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language</p> <p>SA6. communicate with people in respectful form and manner in line with organizational protocol</p> <p>Numerical and computational skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. undertake numerical operations, and calculations/ formulae Numerical computations: addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages Electrical calculations: basic electron theory; Ohms' Law (Basics of electrical circuits theory); resistivity; resistors in series and parallel/ current; voltage and resistance in parallel circuits; power; calculation of power ratings for common components and equipment; energy as power x time</p> <p>SA8. identify and draw various basic, compound and solid shapes as per dimensions given Basic shapes: square, rectangle, triangle, circle Compound shapes: involving squares, rectangles, triangles, circles, semi-</p>

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	<p>circles, quadrants of a circle Solid shapes: cube, rectangular prism, cylinder</p> <p>SA9. use appropriate measuring techniques and units of measurement Basic S.I. Units and derived units for: length, area and volume; force, energy, power, pressure & stress; electrical potential; capacitance, inductance; charge & flux, magnetic flux, flux density; electrical resistance; frequency; temperature; current</p> <p>SA10. use appropriate units and number systems to express degree of accuracy Units and number systems representing degree of accuracy: decimals places, significant figures, fractions as a decimal quantity</p> <p>SA11. use basic algebra to solve linear equations</p> <p>SA12. use basic calculations with positive, negative and fractional indices</p>
	Learning
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA13. participate in on-the-job and other learning, training and development interventions and assessments</p> <p>SA14. clarify task related information with appropriate personnel or technical adviser</p> <p>SA15. seek to improve and modify own work practices</p> <p>SA16. maintain current knowledge of application standards, legislation, codes of practice and product/process developments</p>
B. Professional Skills	Problem Solving
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. identify problems with work planning, procedures, output and behavior and their implications</p> <p>SB2. prioritize and plan for problem solving</p> <p>SB3. communicate problems appropriately to others</p> <p>SB4. identify sources of information and support for problem solving</p> <p>SB5. seek assistance and support from other sources to solve problems</p> <p>SB6. identify effective resolution techniques</p> <p>SB7. select and apply resolution techniques</p> <p>SB8. seek evidence for problem resolution</p>
	Plan and Organize
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. plan, prioritize and sequence work operations as per job requirements</p> <p>SB10. organize and analyze information relevant to work</p> <p>SB11. basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time</p>
	Initiative and Enterprise

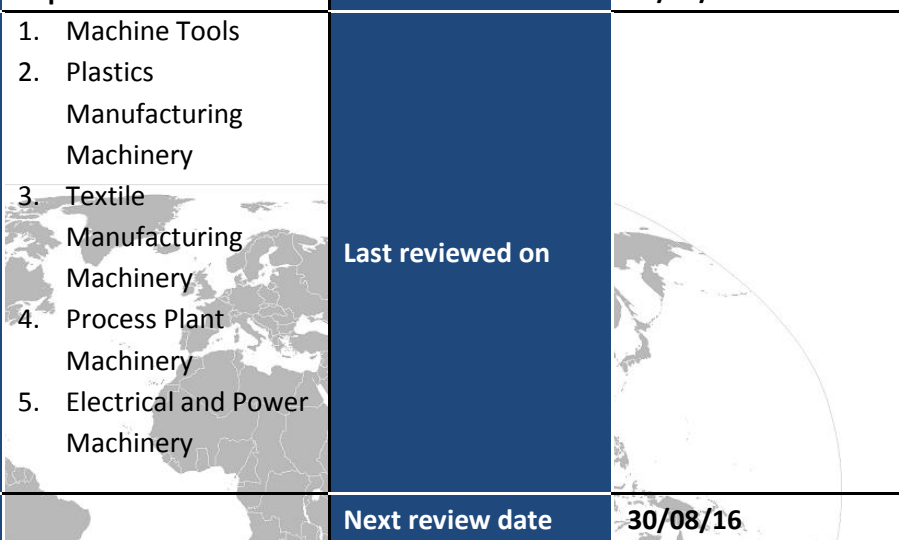
CSC/ N 0305: Assemble and wire up electrical components to mechanical equipment

	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB12. undertake and express new ideas and initiatives to others SB13. modify work plan to overcome unforeseen difficulties or developments that occur as work progresses SB14. participate in improvement procedures including process, quality and internal/external customer/supplier relationships SB15. one's competencies in new and different situations and contexts to achieve more
	<p>Self-Management</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB16. exercise restraint while expressing dissent and during conflict situations SB17. avoid and manage distractions to be disciplined at work SB18. Manage own time for achieving better results
	<p>Teamwork</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB19. work in a team in order to achieve better results SB20. identify and clarify work roles within a team SB21. communicate and cooperate with others in the team for better results SB22. seek assistance from fellow team members



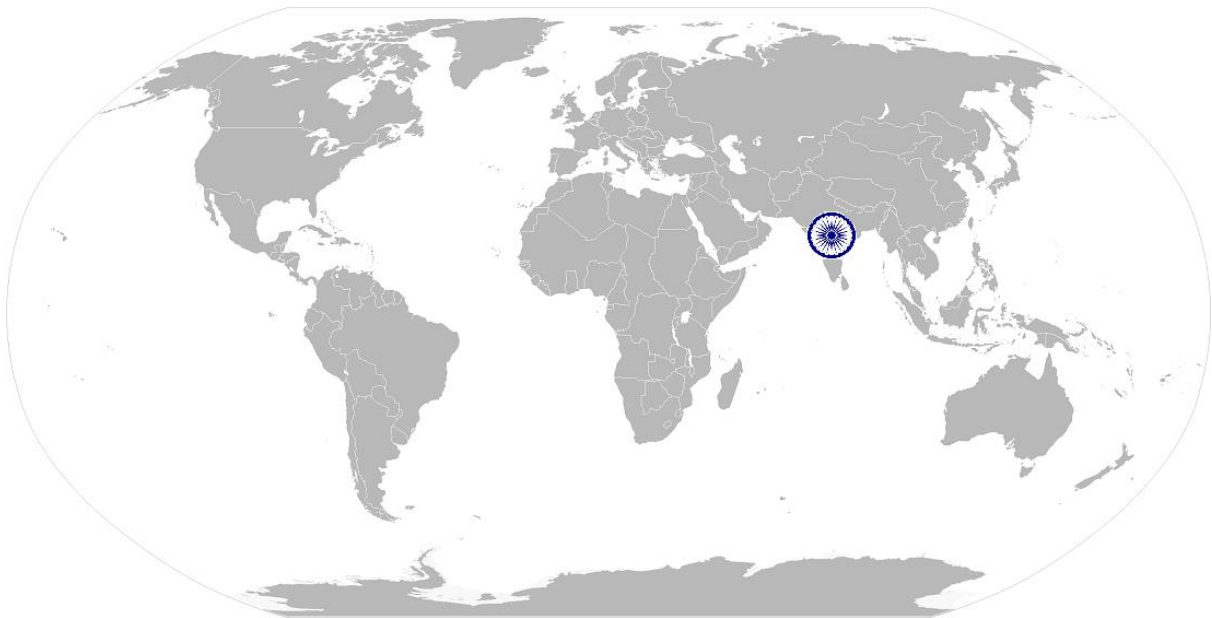
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NOS Version Control

NOS Code	CSC/ N 0305		
Credits (NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	1. Machine Tools 2. Plastics Manufacturing Machinery	Last reviewed on	
	3. Textile Manufacturing Machinery 4. Process Plant Machinery 5. Electrical and Power Machinery		
		Next review date	30/08/16

CSC/ N 0306: Assemble and wire up electronic equipment and systems to mechanical equipment

National Occupational Standard



Overview

This unit covers operations to assemble and wire up electronic equipment and systems to mechanical equipment

CSC/ N 0306: Assemble and wire up electronic equipment and systems to mechanical equipment

National Occupational Standard	Unit Code	CSC/ N 0306
	Unit Title (Task)	Assemble and wire up electronic equipment and systems to mechanical equipment
	Description	<p>This unit covers the skills and knowledge needed to assemble and wire up electronic products, inclusive of components, sub-assemblies, or completed equipment/systems to mechanical equipment, in accordance with approved procedures.</p> <p>The candidate will be expected to work with a minimum of supervision, taking full responsibility for their own actions and for the quality and accuracy of the work that they carry out.</p>
	Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Working safely • Assembling and wiring up electronic equipment and systems to mechanical equipment
	Performance Criteria(PC) w.r.t. the Scope	
	Element	Performance Criteria
	Working safely	<p>The user/individual on the job should be able to:</p> <p>PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work</p> <p>PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing calibration operations</p> <p>PC3. work following laid down procedures and instructions</p> <p>PC4. check that tools and equipment to be used are in a safe, tested, calibrated and usable condition</p> <p>PC5. where appropriate, apply procedures and precautions to eliminate electrostatic discharge (ESD) hazards (eg. the use of grounded wrist straps and mats)</p>
	Assembling and wiring up electronic equipment and systems to mechanical equipment	<p>The user/individual on the job should be able to:</p> <p>PC6. follow the relevant instructions, assembly drawings and any other specification documents</p> <p>Documents: assembly drawings and charts; interconnection net diagrams; schedules of specified components; wiring specifications; wire running lists</p> <p>PC7. ensure that the specified components are available and that they are in a usable condition</p> <p>PC8. obtain, check and prepare consumables and specialized tools to be used for the wiring and interconnections</p> <p>Check and prepare: solder and any associated fluxes (eg. sufficient quantity, right type, good condition and shelf life assessment); wire strippers and cutters (eg. right size, good condition); authorized crimp tooling and attachments (eg. checked for sizes, calibration and condition); cables and individual wiring/fibre optic links (eg. correct sizes and types, good condition); cable strapping obtained and cut to nominal length (eg. right sizes and sufficient quantities)</p> <p>PC9. use the appropriate methods and techniques to assemble the components in</p>

CSC/ N 0306: Assemble and wire up electronic equipment and systems to mechanical equipment

	<p>their correct positions</p> <p>Range of methods: set up, programme and use automated wiring termination equipment (where appropriate); attach wire terminations by appropriate method/s (eg. soldering, crimping); set out/position interconnection wiring; bundle/strap/tie wiring looms and cables; cut wires to required length; set out and terminate any fibre optic links; strip insulation from ends of wires; termination identification (e.g. ferruling, transfer printing); tin/lead soldering; lead-free soldering systems; no-wash fluxing; crimping</p> <p>PC10. secure the components using the specified connectors and securing devices</p> <p>PC11. obtain, check and prepare components, and complete the preparatory assembly</p> <p>Preparatory assembly: use hand tools/automated tools for securing all fastenings; assemble sub-units to support housings/brackets; assemble connectors and allied devices</p> <p>PC12. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification</p> <p>Checks: security of all assembled and interconnected items; insulation resistance between housing assembly and interconnection wiring; continuity of all interconnections; unwanted short circuits between wires</p> <p>PC13. select the appropriate software as specified for use</p> <p>PC14. load appropriate software on electronic components in accordance with laid down procedures</p> <p>PC15. check the output of software as per procedure</p> <p>PC16. check the functionality of the completed electronic assembly</p> <p>PC17. leave the work area in a safe and tidy condition on completion of the electrical equipment assembly activities use the correct issue of drawings, job instructions and specifications</p> <p>PC18. follow risk assessment procedures and regulations</p> <p>PC19. keep the work area clean and follow hygienic and safe work practices</p> <p>PC20. carry out the assembling and wiring activities in line with organizational procedures</p> <p>Compliance: national and international wiring regulations; national and international standards and procedures; company standards and procedures</p> <p>PC21. create and store records of the activities, in accordance with appropriate procedures</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. relevant standards, policies, and procedures followed in the company</p> <p>KA2. relevant health and safety requirements of the work</p> <p>KA3. the organizational process or procedure for assembly and wiring</p> <p>KA4. responsibilities with regard to the reporting lines and procedures in the working area</p> <p>KA5. appropriate people and their responsibilities within the candidate's working area</p> <p>KA6. to whom they should report if they have problems that they cannot resolve</p> <p>KA7. the importance of leaving the work area in a safe and clean condition on</p>

CSC/ N 0306: Assemble and wire up electronic equipment and systems to mechanical equipment

	<p>completion of the electronic assembly and wiring activities (eg. returning tools and equipment to the designated location, cleaning the work area, removing and disposing of waste)</p>
<p>B. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. the specific safety precautions to be taken when working with soldering and crimping equipment/tools and wiring aids within an electronics assembly and wiring environment (eg. avoiding hot solder splashes and flying ends from cut wires)</p> <p>KB2. the personal protective equipment (PPE) to be worn whilst carrying out the electronic wiring activities concerned, for both personal protection and protection of the components and circuits Personal protective equipment: e.g. protective outer clothing, eye and hearing protection, anti-static devices, etc.</p> <p>KB3. regulations and standards that are relevant to electronic wiring and assembly being undertaken (SLD- single line diagram)</p> <p>KB4. how mechanical assembly instructions are represented and how to interpret them</p> <p>KB5. the range of methods used, and their key features Range of methods: set up, programme and use automated wiring termination equipment (where appropriate); attach wire terminations by appropriate method/s (eg. soldering, crimping); set out/position interconnection wiring; bundle/strap/tie wiring looms and cables; cut wires to required length; set out and terminate any fibre optic links; strip insulation from ends of wires; termination identification (e.g. ferruling, transfer printing); tin/lead soldering; lead-free soldering systems; no-wash fluxing; crimping</p> <p>KB6. how the different types of electronic wiring and insulation are coded and specified</p> <p>KB7. how information on wiring interconnections is specified, with particular reference to the role of wiring schedules, wire-running lists, backplane net interconnect lists</p> <p>KB8. the various methods used for securing electronic wiring (eg. heat shrink sleeves, strapping, cable ties, p-clips)</p> <p>KB9. the care and selection of tools and aids used in wiring and assembly work (eg. soldering tools and equipment, crimp tools, testing and checking equipment for continuity, short circuit testing, joint/crimp 'pull-off' security, insulation resistance)</p> <p>KB10. how to recognize wiring types and sizes, their identification, coding and range of termination methods</p> <p>KB11. how to identify the types and read the values of electronic components (eg. resistors, capacitors, diodes, integrated circuits) with particular reference to their polarity, orientation, color coding, value, tolerance, working voltage/current</p> <p>KB12. how to take anti-static precautions in relation to component handling during the wiring and assembly of electronic products, and when such precautions are needed</p> <p>KB13. the handling requirements and termination methods used for SMPS, high-level protective devices and fibre-optic links</p>

CSC/ N 0306: Assemble and wire up electronic equipment and systems to mechanical equipment

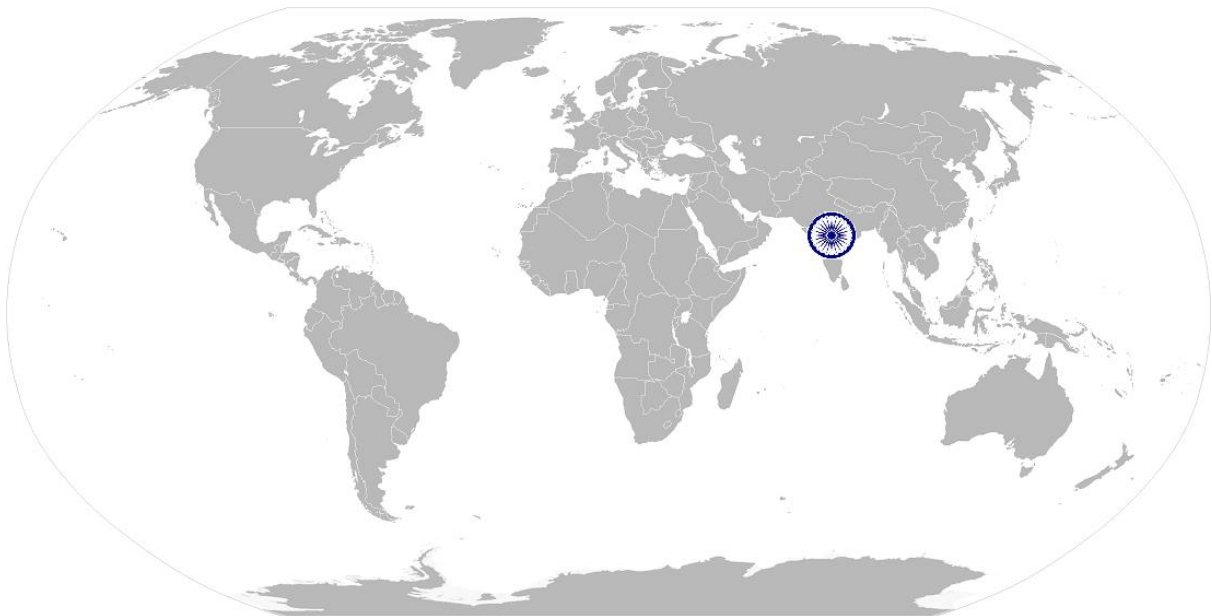
	<p>KB14. the range of checks and tests used within wiring and assembly work (eg. insulation resistance, flashover testing, continuity, short circuit testing)</p> <p>KB15. calibration requirements for tools and equipment used in wiring (eg. crimp tool test and selection for wire sizes, 'pull-off' limits, meters for continuity and insulation resistance checks)</p> <p>KB16. importance of and maintain dust free environment for electronic assembly</p> <p>KB17. handling multilayered populated PCB's</p> <p>KB18. the documentation completion requirements for the work undertaken</p> <p>KB19. the problems that can occur with wiring and assembly work, and how they can be avoided</p> <p>KB20. basic units used in electrotechnology</p> <p>KB21. function of various electrical components</p> <p>KB22. application of various electrical components</p> <p>KB23. current and voltage distribution in series and parallel circuits</p> <p>KB24. magnetic fields for bar magnets in various configurations</p> <p>KB25. polarity of a solenoid</p> <p>KB26. construction of a typical capacitor</p> <p>KB27. sine wave as displayed on an oscilloscope</p> <p>KB28. determining input and output voltage of double wound transformers</p> <p>KB29. how to construct a simple bridge rectifier circuit and its function</p>
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	<p>Communication</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. read and interpret information correctly from various job specification documents, manuals, health and safety instructions, memos, etc. applicable to the job in English and/or local language</p> <p>SA2. fill up appropriate technical forms, process charts, activity logs as per organizational format in English and/or local language</p> <p>SA3. convey and share technical information clearly using appropriate language</p> <p>SA4. check and clarify task-related information</p> <p>SA5. liaise with appropriate authorities using correct protocol</p> <p>SA6. communicate with people in respectful form and manner in line with organizational protocol</p> <hr/> <p>Numerical and computational skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA7. undertake numerical operations, and calculations/ formulae</p> <p style="padding-left: 20px;">Numerical computations: addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages</p> <p style="padding-left: 20px;">Electrical calculations: basic electron theory; Ohms' Law (Basics of electrical circuits theory); resistivity; resistors in series and parallel/ current; voltage and resistance in parallel circuits; power; calculation of power ratings for common components and equipment; energy as power x time</p> <p>SA8. identify and draw various basic, compound and solid shapes as per dimensions given</p> <p style="padding-left: 20px;">Basic shapes: square, rectangle, triangle, circle</p> <p style="padding-left: 20px;">Compound shapes: involving squares, rectangles, triangles, circles, semi-</p>

CSC/ N 0306: Assemble and wire up electronic equipment and systems to mechanical equipment

	<p>circles, quadrants of a circle Solid shapes: cube, rectangular prism, cylinder</p> <p>SA9. use appropriate measuring techniques and units of measurement Basic S.I. Units and derived units for: length, area and volume; force, energy, power, pressure & stress; electrical potential; capacitance, inductance; charge & flux, magnetic flux, flux density; electrical resistance; frequency; temperature; current</p> <p>SA10. use appropriate units and number systems to express degree of accuracy Units and number systems representing degree of accuracy: decimals places, significant figures, fractions as a decimal quantity</p> <p>SA11. use basic algebra to solve linear equations</p> <p>SA12. use basic calculations with positive, negative and fractional indices</p>
	Learning
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA13. participate in on-the-job and other learning, training and development interventions and assessments</p> <p>SA14. clarify task related information with appropriate personnel or technical adviser</p> <p>SA15. seek to improve and modify own work practices</p> <p>SA16. maintain current knowledge of application standards, legislation, codes of practice and product/process developments</p>
B. Professional Skills	Problem Solving
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. identify problems with work planning, procedures, output and behavior and their implications</p> <p>SB2. prioritize and plan for problem solving</p> <p>SB3. communicate problems appropriately to others</p> <p>SB4. identify sources of information and support for problem solving</p> <p>SB5. seek assistance and support from other sources to solve problems</p> <p>SB6. identify effective resolution techniques</p> <p>SB7. select and apply resolution techniques</p> <p>SB8. seek evidence for problem resolution</p>
	Plan and Organize
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB9. plan, prioritize and sequence work operations as per job requirements</p> <p>SB10. organize and analyze information relevant to work</p> <p>SB11. basic concepts of shop-floor work productivity including waste reduction, efficient material usage and optimization of time</p>
	Initiative and Enterprise
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. undertake and express new ideas and initiatives to others</p> <p>SB13. modify work plan to overcome unforeseen difficulties or developments that occur as work progresses</p> <p>SB14. participate in improvement procedures including process, quality and internal/external customer/supplier relationships</p> <p>SB15. one's competencies in new and different situations and contexts to achieve more</p>

CSC/ N 0306: Assemble and wire up electronic equipment and systems to mechanical equipment

	Self-Management
	The user/individual on the job needs to know and understand how to: SB16. exercise restraint while expressing dissent and during conflict situations SB17. avoid and manage distractions to be disciplined at work SB18. Manage own time for achieving better results
	Teamwork
	The user/individual on the job needs to know and understand how to: SB19. work in a team in order to achieve better results SB20. identify and clarify work roles within a team SB21. communicate and cooperate with others in the team for better results SB22. seek assistance from fellow team members



CSC/ N 0306: Assemble and wire up electronic equipment and systems to mechanical equipment

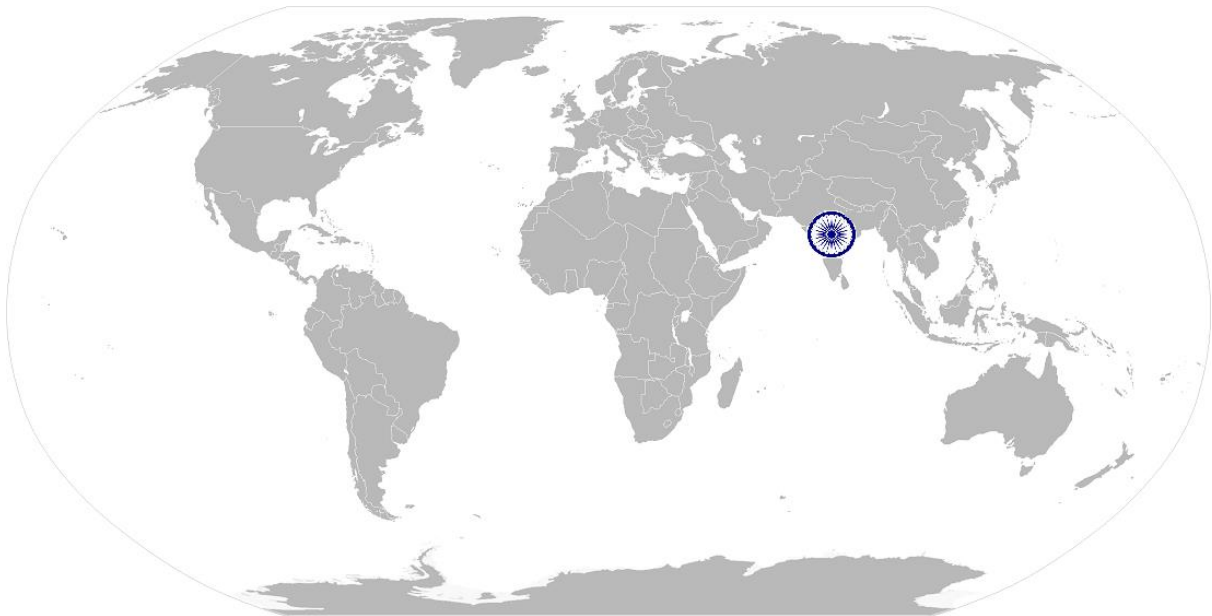
NOS Version Control

NOS Code	CSC/ N 0306		
Credits (NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Plastics Manufacturing Machinery 3. Textile Manufacturing Machinery 4. Process Plant Machinery 5. Electrical and Power Machinery 	Last reviewed on	
		Next review date	30/08/16



CSC/ N 1335: Use basic health and safety practices at the workplace

National Occupational Standard



Overview

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

CSC/ N 1335: Use basic health and safety practices at the workplace

National Occupational Standard

Unit Code	CSC / N 1335
Unit Title (Task)	Use basic health and safety practices at the workplace
Description	<p>This OS unit is about knowledge and practices relating to health, safety and security that candidates need to use in the workplace. It covers responsibilities towards self, others, assets and the environment.</p> <p>It includes understanding of risks and hazards in the workplace, along with common techniques to minimize risk, deal with accidents, emergencies, etc.</p> <p>It covers knowledge of fire safety, common first aid applications, safe practices and emergency procedures.</p>
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 should be able to:</p> <p>PC1. use protective clothing/equipment for specific tasks and work conditions</p> <p>Protective clothing: leather or asbestos gloves, flame proof aprons, flame proof overalls buttoned to neck, cuffless (without folds), trousers, reinforced footwear, helmets/hard hats, cap and shoulder covers, ear defenders/plugs, safety boots, knee pads, particle masks, glasses/goggles/visors</p> <p>Equipment: hand shields, machine guards, residual current devices, shields, dust sheets, respirator</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>Hazards: sharp edged and heavy tools; heated metals; oxyfuel and gas cylinders; welding radiation; hazardous surfaces(sharp, slippery, uneven, chipped, broken, etc.); hazardous substances(chemicals, gas, oxy-fuel, fumes, dust, etc.); physical hazards(working at heights, large and heavy objects and machines, sharp and piercing objects, tolls and machines, intense light, load noise, obstructions in corridors, by doors, blind turns, noise, over stacked shelves and packages, etc.) electrical hazards (power supply and points, loose and naked cables and wires, electrical machines and appliances, etc.)</p>

CSC/ N 1335: Use basic health and safety practices at the workplace

	<p>Possible causes of risk and accident: physical actions; reading; listening to and giving instructions; inattention; sickness and incapacity (such as drunkenness); health hazards (such as untreated injuries and contagious illness)</p> <p>PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others</p> <p>Safe working practices: using protective clothing and equipment; putting up and reading safety signs; handle tools in the correct manner and store and maintain them properly; keep work area clear of clutter, spillage and unsafe object lying casually; while working with electricity take all electrical precautions like insulated clothing, adequate equipment insulation, use of control equipment, dry work area, switch off the power supply when not required, etc.; safe lifting and carrying practices; use equipment that is working properly and is well maintained; take due measures for safety while working in confined places, trenches or at heights, etc. including safety harness, fall arrestors, etc.</p> <p>PC6. state methods of accident prevention in the work environment of the job role</p> <p>Methods of accident prevention: training in health and safety procedures; using health and safety procedures; use of equipment and working practices (such as safe carrying procedures); safety notices, advice; instruction from colleagues and supervisors</p> <p>PC7. state location of general health and safety equipment in the workplace</p> <p>General health and safety equipment: fire extinguishers; first aid equipment; safety instruments and clothing; safety installations(eg fire exits, exhaust fans)</p> <p>PC8. inspect for faults, set up and safely use steps and ladders in general use</p> <p>Ladder faults: corrosion of metal components, deterioration, splits and cracks timber components, imbalance, loose rungs, missing/unfixed nuts or bolts, etc.</p> <p>Ladders set up: firm/level base, clip/lash down, leaning at the correct angle, etc.</p> <p>PC9. work safely in and around trenches, elevated places and confined areas</p> <p>PC10. lift heavy objects safely using correct procedures</p> <p>PC11. apply good housekeeping practices at all times</p> <p>Good housekeeping practices: clean/tidy work areas, removal/disposal of waste products, protect surfaces</p> <p>PC12. identify common hazard signs displayed in various areas</p> <p>Various areas: on chemical containers; equipment; packages; inside buildings; in open areas and public spaces, etc.</p> <p>PC13. retrieve and/or point out documents that refer to health and safety in the workplace</p>
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CSC/ N 1335: Use basic health and safety practices at the workplace

	<p>Documents: fire notices, accident reports, safety instructions for equipment and procedures, company notices and documents, legal documents (eg government notices)</p>
Fire safety	<p>The user/individual on the job should be able to:</p> <p>PC14. use the various appropriate fire extinguishers on different types of fires correctly</p> <p>Types of fires: Class A: eg. ordinary solid combustibles, such as wood, paper, cloth, plastic, charcoal, etc.; Class B: flammable liquids and gases, such as gasoline, propane, diesel fuel, tar, cooking oil, and similar substances; Class C: eg. electrical equipment such as appliances, wiring, breaker panels, etc. (These categories of fires become Class A, B, and D fires when the electrical equipment that initiated the fire is no longer receiving electricity); Class D: combustible metals such as magnesium, titanium, and sodium (These fires burn at extremely high temperatures and require special suppression agents)</p> <p>PC15. demonstrate rescue techniques applied during fire hazard</p> <p>PC16. demonstrate good housekeeping in order to prevent fire hazards</p> <p>PC17. demonstrate the correct use of a fire extinguisher</p>
Emergencies, rescue and first-aid procedures	<p>The user/individual on the job should be able to:</p> <p>PC18. demonstrate how to free a person from electrocution</p> <p>PC19. administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.</p> <p>PC20. demonstrate basic techniques of bandaging</p> <p>PC21. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments</p> <p>PC22. perform and organize loss minimization or rescue activity during an accident in real or simulated environments</p> <p>PC23. 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>PC24. demonstrate the artificial respiration and the CPR Process</p> <p>PC25. participate in emergency procedures</p> <p>Emergency procedures: raising alarm, safe/efficient, evacuation, correct means of escape, correct assembly point, roll call, correct return to work</p> <p>PC26. complete a written accident/incident report or dictate a report to another person, and send report to person responsible</p> <p>Incident Report includes details of: name, date/time of incident, date/time of report, location, environment conditions, persons involved, sequence of events, injuries sustained, damage sustained, actions taken, witnesses, supervisor/manager notified</p> <p>PC27. demonstrate correct method to move injured people and others during an emergency</p>

Knowledge and Understanding (K)

CSC/ N 1335: Use basic health and safety practices at the workplace

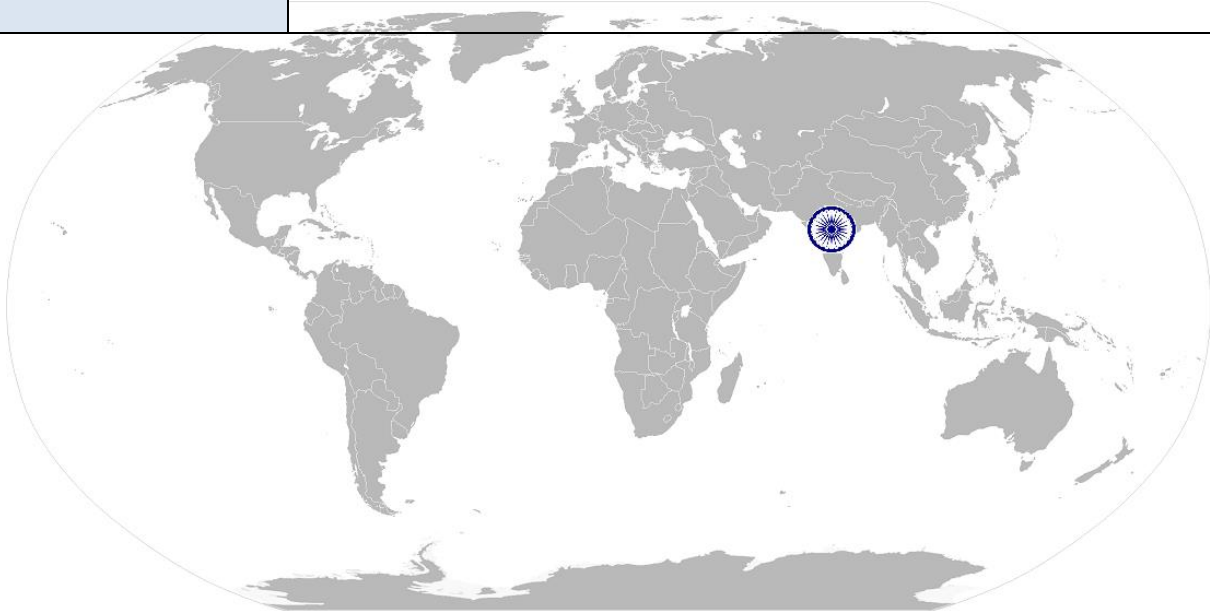
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. names (and job titles if applicable), and where to find, all the people responsible for health and safety in a workplace.</p> <p>KA2. names and location of documents that refer to health and safety in the workplace.</p>
<p>B. Technical Knowledge</p>	<p>The user/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 Possible causes of risk and accident: physical actions; reading; listening to and giving instructions; inattention; sickness and incapacity (such as drunkenness); health hazards (such as untreated injuries and contagious illness)</p> <p>KB5. methods of accident prevention Methods of accident prevention: training in health and safety procedures; using health and safety procedures; use of equipment and working practices (such as safe carrying procedures); safety notices, advice; instruction from colleagues and supervisors</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. preventative and remedial actions to be taken in the case of exposure to toxic materials Exposure: ingested, contact with skin, inhaled Preventative action: ventilation, masks, protective clothing/ equipment); Remedial action: immediate first aid, report to supervisor Toxic materials: solvents, flux, lead</p> <p>KB11. importance of using protective clothing/equipment while working</p> <p>KB12. precautionary activities to prevent the fire accident</p> <p>KB13. various causes of fire Causes of fires: heating of metal; spontaneous ignition; sparking; electrical heating; loose fires (smoking, welding, etc.); chemical fires; etc.</p> <p>KB14. techniques of using the different fire extinguishers</p> <p>KB15. different methods of extinguishing fire</p> <p>KB16. different materials used for extinguishing fire Materials: sand, water, foam, CO₂, dry powder</p> <p>KB17. rescue techniques applied during a fire hazard</p> <p>KB18. various types of safety signs and what they mean</p>

CSC/ N 1335: Use basic health and safety practices at the workplace

	<p>KB19. appropriate basic first aid treatment relevant to the condition eg. shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, poisoning, eye injuries</p> <p>KB20. content of written accident report</p> <p>KB21. potential injuries and ill health associated with incorrect manual handling</p> <p>KB22. safe lifting and carrying practices</p> <p>KB23. personal safety, health and dignity issues relating to the movement of a person by others</p> <p>KB24. potential impact to a person who is moved incorrectly</p>
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Reading and Writing Skills
	The user/individual on the job needs to know and understand how to: <ul style="list-style-type: none"> SA1. read and comprehend basic content to read labels, charts, signages SA2. read and comprehend basic English to read manuals of operations SA3. read and write an accident/incident report in local language or English
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: <ul style="list-style-type: none"> SA4. question coworkers appropriately in order to clarify instructions and other issues SA5. give clear instructions to coworkers, subordinates others
	Decision Making
	The user/individual on the job needs to know and understand how to: <ul style="list-style-type: none"> SA6. make appropriate decisions pertaining to the concerned area of work with respect to intended work objective, span of authority, responsibility, laid down procedure and guidelines
B. Professional Skills	Plan and Organize
	The user/individual on the job needs to know and understand how to: <ul style="list-style-type: none"> SB1. plan and organize their own work schedule, work area, tools, equipment and materials to maintain decorum and for improved productivity
	Working with others
	The user/individual on the job needs to know and understand how to: <ul style="list-style-type: none"> SB2. remain congenial while discussing and debating issues with co-workers SB3. follow appropriate protocols for communication based on situation, hierarchy, organizational culture and practice SB4. ask for, provide and receive required assistance where possible to ensure achievement of work related objectives SB5. thank coworkers for any assistance received SB6. offer appropriate respect based on mutuality and respect for fellow workmanship and authority

CSC/ N 1335: Use basic health and safety practices at the workplace

	Problem Solving
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB7. think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s)</p> <p>SB8. identify immediate or temporary solutions to resolve delays</p> <p>SB9. identify sources of support that can be availed of for problem solving for various kind of problems</p> <p>SB10. seek appropriate assistance from other sources to resolve problems</p> <p>SB11. report problems that you cannot resolve to appropriate authority</p>
	Analytical Thinking
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB12. identify cause and effect relations in their area of work</p> <p>SB13. use cause and effect relations to anticipate potential problems and their solution</p>

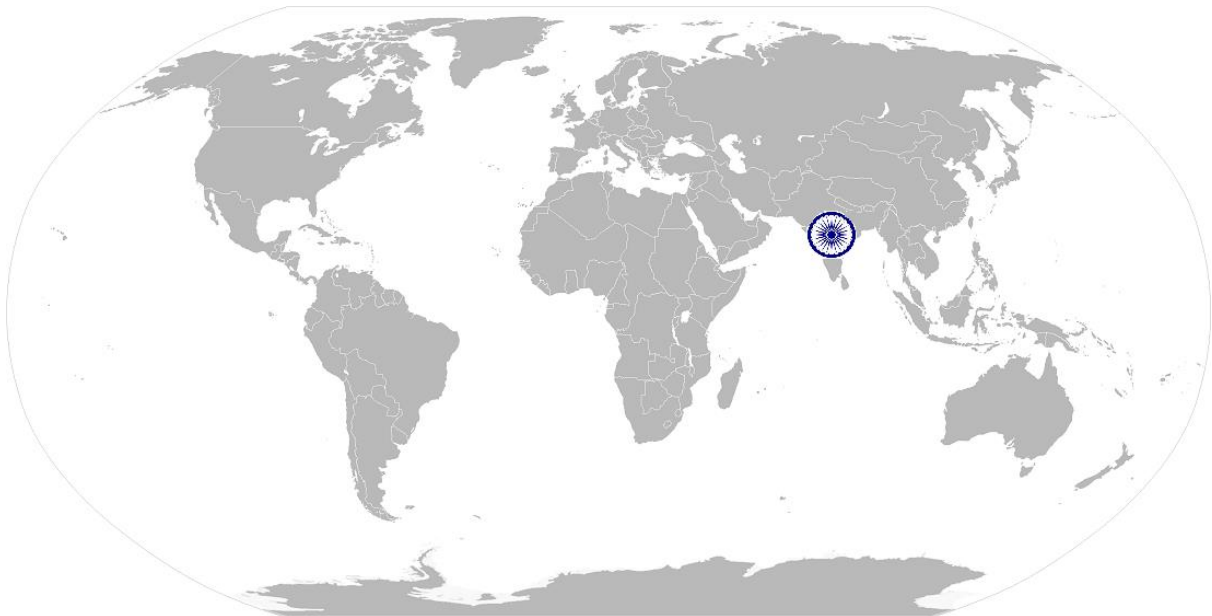


CSC/ N 1335: Use basic health and safety practices at the workplace

NOS Version Control

NOS Code	CSC / N 1335		
Credits (NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds And Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Generation Machinery 7. Light Engineering Goods 	Last reviewed on	
		Next review date	30/08/16

National Occupational Standard



Overview

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

CSC/ N 1336: Work effectively with others

Unit Code	CSC / N 1336
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>Communication etiquette: do not use abusive language; use appropriate titles and terms of respect; do not eat or chew while talking (vice versa)etc.</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 behaviors at the workplace</p> <p>Disciplined behaviors: e.g. punctuality; completing tasks as per given time and standards; not gossiping and idling time; eliminating waste, honesty, etc.</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 company 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>

CSC/ N 1336: Work effectively with others

**B. Technical
Knowledge**

The user/individual on the job needs to know and understand:

- KB1. various categories of people that one is required to communicate and co-ordinate with in the organization
- KB2. importance of effective communication in the workplace
- KB3. importance of teamwork in organizational and individual success
- KB4. various components of effective communication
- KB5. key elements of active listening
- KB6. value and importance of active listening and assertive communication
- KB7. barriers to effective communication
- KB8. importance of tone and pitch in effective communication
- KB9. importance of avoiding casual expletives and unpleasant terms while communicating professional circles
- KB10. how poor communication practices can disturb people, environment and cause problems for the employee, the employer and the customer
- KB11. importance of ethics for professional success
- KB12. importance of discipline for professional success
- KB13. what constitutes disciplined behavior for a working professional
- KB14. common reasons for interpersonal conflict
- KB15. importance of developing effective working relationships for professional success
- KB16. expressing and addressing grievances appropriately and effectively
- KB17. importance and ways of managing interpersonal conflict effectively

Skills (S) [Optional]



CSC/ N 1336: Work effectively with others

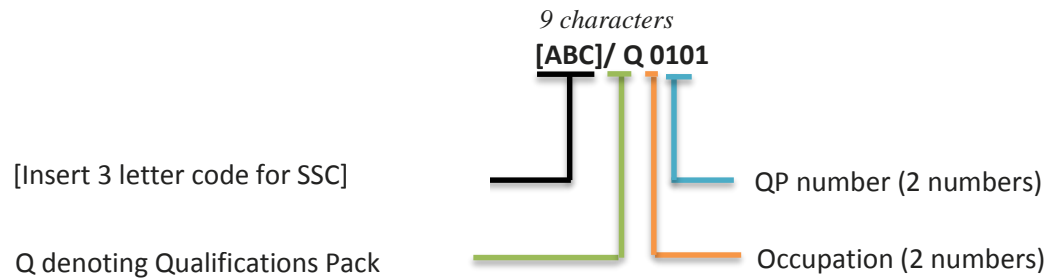
NOS Version Control

NOS Code	CSC / N 1336		
Credits(NSQF)	TBD	Version number	1.0
Industry	Capital Goods	Drafted on	10/04/14
Industry Sub-sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds And Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods 	Last reviewed on	30/08/16
		Next review date	

Annexure

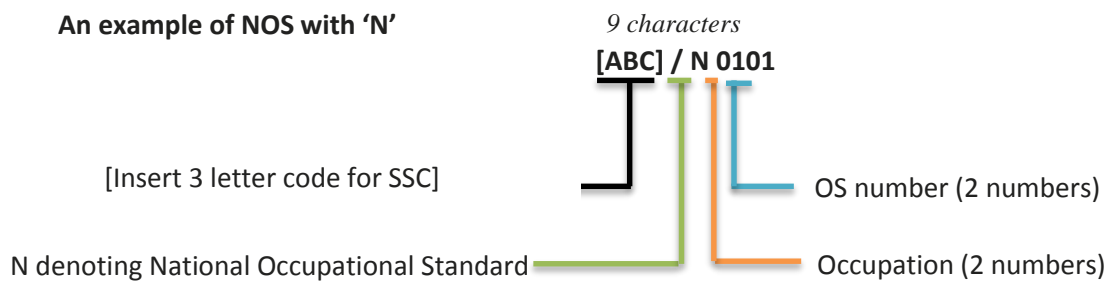
Nomenclature for QP and NOS

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
Machine Tools	01-13
Dies, Moulds and Press Tools	01-13
Plastic Manufacturing Machinery	01-13
Textile Manufacturing Machinery	01-13
Process Plant Machinery	01-13
Electrical and Power Machinery	01-13
Light Engineering Goods	01-13

Sequence	Description	Example
Three letters	Capital Goods	CSC
Slash	/	/
Next letter	Whether QP or NOS	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

PERFORMANCE CRITERIA

Job Role: Fitter – Electrical and electronic assembly

Qualification Pack: CSC/ Q 0305

Sector Skill Council: Capital Goods Sector Skills Council

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 and skill practical part for each candidate at each examination/training center.
4. 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.

Assessment Strategy Marks Allocation		
NOS CODE	NOS TITLE	Weightage
CSC/ N 0306	Assemble and wire up electrical components to mechanical equipment	35
CSC/ N 0305	Assemble and wire up electronic equipment and systems to mechanical equipment	35
CSC/ N 1335	Use basic health and safety practices at the workplace	20
CSC/ N 1336	Work effectively with others	10
		100

CSC/ N 0306	Assemble and wire up electrical components to mechanical equipment		
Elements	Performance criteria	Theory	Practical
Working safely	PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work	2	3
	PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing calibration operations	2	3
	PC3. work following laid down procedures and instructions	0	3
	PC4. check that tools and equipment to be used are in a safe, tested, calibrated and usable condition	0	4
	PC5. where appropriate, apply procedures and precautions to eliminate electrostatic discharge (ESD) hazards (eg. the use of grounded wrist straps and mats)	2	4
		6	17

Assembling and wiring up electronic equipment and systems to mechanical equipment	PC5. follow the relevant instructions, assembly drawings and any other specifications at all times	3	4
	PC6. assemble electrical components on panels or in enclosures, in compliance with national and international wiring regulations, standards and procedures, and company standards and procedures	3	5
	PC7. obtain the correct tools and equipment for the assembly and test operations, and check that they are in a safe and usable condition	0	4
	PC8. prepare the electrical components and panels/enclosures for the assembly operations	0	5
	PC9. use safe and approved techniques to mount the electrical components on the panels or in the enclosures	2	5
	PC10. use the appropriate methods and techniques to assemble the components in their correct positions	2	5
	PC11. secure the components, using the specified connectors and securing devices	2	5
	PC12. wire and terminate cables to the appropriate connections on the components	0	5
	PC13. check the completed assembly to ensure that all operations have been completed, and that the finished assembly is secure and meets the required specification	3	5
	PC14. report any difficulties or problems that may arise with the electrical assembly and wiring activities, and carry out any agreed actions	2	5
	PC15. leave the work area in a safe and tidy condition on completion of the electrical panel/equipment assembly activities	0	4
	PC16. return all tools and equipment to the correct location on completion of the assembly activities	0	3
	PC17. carry out electrical calculations	0	5
		17	60
	23	77	
	100		

CSC/ N 0305		Assemble and wire up electronic equipment and systems to mechanical equipment	
Elements	Performance Criteria	Theory	Practical
Working safely	PC1. comply with health and safety, environmental and other relevant regulations and guidelines at work	2	3
	PC2. adhere to procedures and guidelines for personal protective equipment (PPE) and other relevant safety regulations while performing calibration operations	2	3
	PC3. work following laid down procedures and instructions	0	3
	PC4. check that tools and equipment to be used are in a safe, tested, calibrated and usable condition	0	4
	PC5. where appropriate, apply procedures and precautions to eliminate electrostatic discharge (ESD) hazards (eg. the use of grounded wrist straps and mats)	2	4
		2	15

Assembling and wiring up electronic equipment and systems to mechanical equipment	PC5. follow the relevant instructions, assembly drawings and any other specifications	2	4
	PC6. ensure that the specified components are available and that they are in a usable condition	0	3
	PC7. obtain, check and prepare consumables and specialized tools to be used for the wiring and interconnections	0	3
	PC8. use the appropriate methods and techniques to assemble the components in their correct positions	2	5
	PC9. secure the components using the specified connectors and securing devices	2	5
	PC10. obtain, check and prepare components, and complete the preparatory assembly	0	5
	PC11. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification	2	5
	PC12. select the appropriate software	0	3
	PC13. load appropriate software on electronic components in accordance with laid down procedures	2	4
	PC14. check the output of software as per procedure	2	3
	PC15. check the functionality of the completed electronic assembly	0	5

	PC16. leave the work area in a safe and tidy condition on completion of the electrical equipment assembly activities use the correct issue of drawings, job instructions and specifications	0	3
	PC17. follow risk assessment procedures and regulations	2	3
	PC18. follow clean work area protocols	2	3
	PC19. carry out the assembling and wiring activities in line with organizational procedures	2	5
	PC20. create and store records of the activities, in accordance with appropriate procedures	2	4
	20	63	
	22	78	
	100		

CSC/ N 1335		Use basic health and safety practices at the workplace	
Elements	Performance criteria	Theory	Practical
Health and safety	PC1. use protective clothing/equipment for specific tasks and work conditions	2	3
	PC2. state the name and location of people responsible for health and safety in the workplace	1	2
	PC3. state the names and location of documents that refer to health and safety in the workplace	1	2
	PC4. identify job-site hazardous work and state possible causes of risk or accident in the workplace	2	3
	PC5. carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role	2	2
	PC6. state location of general health and safety equipment in the workplace	2	1
	PC7. inspect for faults, set up and safely use steps and ladders in general use	2	3
	PC8. work safely in and around trenches, elevated places and confined areas	2	3
	PC9. lift heavy objects safely using correct procedures	2	3
	PC10. apply good housekeeping practices at all times	2	2
	PC11. identify common hazard signs displayed in various areas	2	3
	PC12. retrieve and/or point out documents that refer to health and safety in the workplace	1	2
		21	29
Fire safety	PC13. use the various appropriate fire extinguishers on different types of fires correctly	1	3
	PC14. demonstrate rescue techniques applied during fire hazard	1	3
	PC15. demonstrate good housekeeping in order to prevent fire hazards	1	2
	PC16. demonstrate the correct use of a fire extinguisher	1	3
		4	11
Emergencies, rescue and first-aid procedures	PC17. demonstrate how to free a person from electrocution	1	3
	PC18. administer appropriate first aid to victims where required eg. in case of bleeding, burns, choking, electric shock, poisoning etc.	1	3

	PC19. demonstrate basic techniques of bandaging	1	2
	PC20. respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments	1	3
	PC21. perform and organize loss minimization or rescue activity during an accident in real or simulated environments	1	2
	PC22. 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	1	2
	PC23. demonstrate the artificial respiration and the CPR Process	1	2
	PC24. participate in emergency procedures	2	1
	PC25. complete a written accident/incident report or dictate a report to another person, and send report to person responsible	1	3
	PC26. demonstrate correct method to move injured people and others during an emergency	1	3
	11	24	
100			

CSC/ N 1336	Work effectively with others		
Elements	Performance criteria	Theory	Practical
Work effectively with others	PC1. accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	3	7
	PC2. accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt	3	7
	PC3. give information to others clearly, at a pace and in a manner that helps them to understand	3	7
	PC4. display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible	3	7
	PC5. consult with and assist others to maximize effectiveness and efficiency in carrying out tasks	3	7
	PC6. display appropriate communication etiquette while working	3	7
	PC7. display active listening skills while interacting with others at work	3	7
	PC8. use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism	3	7
	PC9. demonstrate responsible and disciplined behaviors at the workplace	3	7
	PC10. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict	3	7
		30	70
		100	

SSC	QP Code	Name of the QP	NSQF Level	Equipment Name	Minimum number of Equipment required (per batch of 30 trainees)	Unit Type	Is this a mandatory Equipment to be available at the Training Center (Yes/No)	Dimension/Specification/Description of the Equipment/ ANY OTHER REMARK
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Steel Tape, 15 m length	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Plier Insulated, 150 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Plier Side Cutting, 150 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Screw Driver, 100 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Electrician Connector, screw driver insulated handle thin stem, 100 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Electrician Screw Driver thin stem insulated handle, 250 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Punch Centre , 150 mm X 9 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Knife Double Bladed Electrician	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Neon Tester	17	nos	Yes	

Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Steel Rule 300 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Hammer, cross peen with handle	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Hammer, ball peen With handle	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Scriber (Knurled centre position)	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Pincer 150 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	C- Clamp 200 mm, 150 mm and 100 mm	2	nos each	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Spanner Adjustable 150 mm,300mm	2	nos each	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Chisel Cold firmer 25 mm X 200 mm	2	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Chisel 25 mm and 6 mm	2	nos each	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Hand Drill Machine	1	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Portable Electric Drill Machine 6 mm capacity	1	nos	NO	

Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Pillar Electric Drill Machine 12 mm capacity	1	nos	No	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Allen Key	1	set	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Grease Gun	1	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Out Side Micrometer	2	nos	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Motorised Bench Grinder	1	nos	NO	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Rawl plug tool and bit	2	set	Yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Thermometer 0 to 100 deg Centigrade	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Crimping Tool	2	set	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Wire stripper 20 cm	2	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Chisel Cold flat 12 mm	2	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Hammer Extractor type 0.40 kg	4	nos	yes	

Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Hacksaw frame 200 mm 300 mm adjustable	2	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Try Square 150 mm blade	4	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Outside and Inside Divider Calliper	2	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Pliers flat nose 150 mm	4	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Pliers round nose 100 mm	4	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Tweezers 100 mm	4	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Snip Straight and Bent 150 mm	2	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	D.E. metric Spanner	2	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Drill hand brace	4	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Plane, smoothing cutters 50 mm	2	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Gauge, wire imperial	2	nos	yes	

Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	file set	5	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Soldering Iron 25 watt, 65 watt, 125 watt	2	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Ohm Meter; Series Type & Shunt Type	2	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Multi Meter (analog) 0 to 1000 M Ohms,2.5 to 500 V	2	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Digital Multi Meter	6	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	A.C. Voltmeter M.I. 0 –500V A.C	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Ammeter MC 0-5 A, 0- 25 A	1	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	A.C. Ammeter M.I. 0-5A, 0-25 A	1	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Kilo Wattmeter 0-1-3 kw	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	DC Power Supply 0-30V, 2 amp	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Current Transformer 415 Volt,50 Hz, CT Ratio 150 / 5 Amp, 5VA	1	nos	yes	

Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Potential Transformer 415 Volt,50Hz, PT Ratio 11KV/ 110V, 10VA	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Contactors & auxiliary contacts 3 phase, 440volt, 16amp (Raw Material)	1	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Rotary Switch 16 A (Raw Material)	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Used Motor-Generator in working condition (AC to DC) consisting of : Squirrel Cage Induction Motor with star delta starter and directly coupled to DC shunt generator	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Used DC Generators-series in working condition, shunt and compound type for overhauling practice	1	nos each	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Used Diesel Generator Set with change over switch, over current breaker and water-cooled with armature, star-delta connections AC 3 phase, 5 KVA and above, 240 volt	1	nos	NO	

Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Used DC Series Motor coupled with mechanical load 0.5 to 2 KW, 220 Volts	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	DC Shunt Motor 2 to 2.5 KW, 220 volts	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	DC compound Motor with starter and switch 2 to 2.5 KW ,220 volts	1	nos	yes	
Iron & Steel	ISC/Q 1001	Fitter Electrical Assembly	3	Three phase transformer, shell type oil cooled with all mounting 3 KVA , 415/240 V, 50 Hz , (Delta/Star)	1	nos	yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Steel Tape, 15 m length	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Plier Insulated, 150 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Plier Side Cutting, 150 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Screw Set, 100 mm. 150 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Heavy Duty Screw Driver , 200 mm	17	nos	Yes	

Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Punch Centre , 150 mm X 9 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Knife Double Bladed Electrician	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Neon Tester	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Steel Rule 300 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Hammer, cross peen with handle	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Hammer, ball peen With handle	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Scriber (Knurled centre position)	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Pincer 150 mm	17	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	C- Clamp 200 mm, 150 mm and 100 mm	2	nos each	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Spanner Adjustable 150 mm,300mm	2	nos each	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Chisel 25 mm and 6 mm	2	nos each	Yes	

Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Hand Drill Machine	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Portable Electric Drill Machine 6 mm capacity	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Allen Key	1	set	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Crimping Tool	2	set	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Wire stripper 20 cm	2	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Chisel Cold flat 12 mm	2	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Mallet hard wood 0.50 kg	4	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Hammer Extractor type 0.40 kg	4	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Hacksaw frame 200 mm 300 mm adjustable	2	nos each	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Try Square 150 mm blade	4	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Outside and Inside Divider Calliper	2	nos each	Yes	

Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Pliers flat nose 150 mm	4	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Pliers round nose 100 mm	4	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Tweezers 100 mm	4	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	D.E. metric Spanner	2	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	File set	10	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Soldering Iron 25 watt, 65 watt, 125 watt	2	nos each	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Copper bit soldering iron 0.25 kg.	2	nos each	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Ohm Meter; Series Type & Shunt Type	2	nos each	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Multi Meter (analog) 0 to 1000 M Ohms, 2.5 to 500 V	2	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Digital Multi Meter	6	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	A.C. Voltmeter M.I. 0 –500V A.C	1	nos	Yes	

Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Milli Voltmeter centre zero 100 – 0 – 100 m volt	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	D.C. Milli ammeter 0 -500m A	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Ammeter MC 0-5 A, 0- 25 A	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Kilo Wattmeter 0-1-3 kw	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	A.C. Energy Meter, Single phase 5 amp. Three Phase 15 amp	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Frequency Meter	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Laboratory Type Induction Coil	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	DC Power Supply 0-30V, 2 amp	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Growler	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Tong Tester / Clamp Meter 0 – 100 amp. AC	1	nos	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Megger 500 volts	1	nos	Yes	

Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Contactors & auxiliary contacts 3 phase, 440volt, 16amp (Raw Material)	1	nos each	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Contactors & auxiliary contacts 3 phase, 440 volt, 32 amp. (Raw Material)	1	nos each	Yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Rotary Switch 16 A (Raw Material)	1	nos	yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	Voltage Stabiliser Input: 150 – 230 volt AC Output: 220 volt AC	1	nos	yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	3- point D.C. Starter	1	nos	yes	
Iron & Steel	ISC/Q 1101	Fitter Electronic Assembly	3	4- point D.C. Starter	1	nos	yes	