Contents

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- Wireman – Control panel

SECTOR: ELECTRONICS

SUB-SECTOR: INDUSTRIAL ELECTRONICS

OCCUPATION: MANUFACTURING

REFERENCE ID: ELE/Q7302

ALIGNED TO: NCO-2004/7137.20

Wireman – Control Panel: The Control Panel Wireman reads the wiring diagram and routes and wires various components within the panel in accordance to the diagram

Brief Job Description: The individual at work is responsible for wiring all components present within the panel as per specifications provided by the design engineering team.

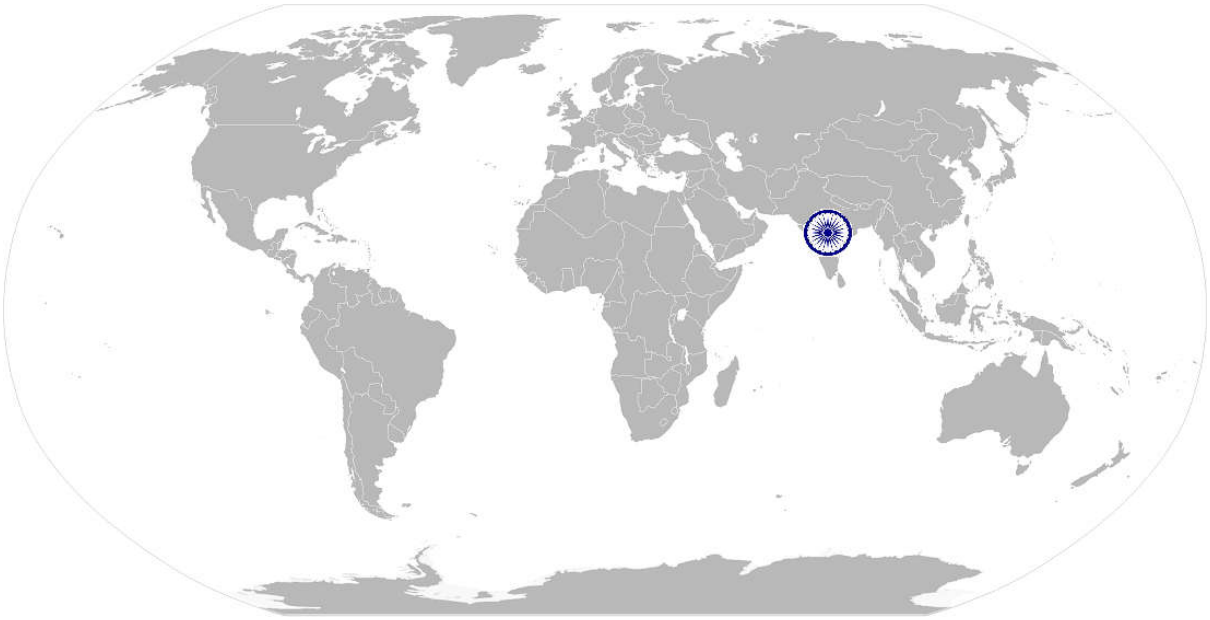
Personal Attributes: The individual must have the ability to work in high-decibel noise environment and in a standing position for long hours.

Job Details

Qualifications Pack Code	**ELE/Q7302**		
Job Role	**Wireman – Control Panel**		
Credits(NVEQF/NVQF/NSQF) [*OPTIONAL*]	**TBD**	**Version number**	**1.0**
Sector	**Electronics**	**Drafted on**	**17/02/14**
Sub-sector	**Industrial Electronics**	**Last reviewed on**	**24/03/14**
Occupation	**Manufacturing**	**Next review date**	**24/03/15**

Job Role	**Wireman – Control Panel**
Role Description	Route cables and connect to various components in the panel in accordance with the wiring diagram developed by the design team
NVEQF/NVQF level	3
Minimum Educational Qualifications	10th standard passed
Maximum Educational Qualifications	ITI/Diploma (Electronics/Electrical)
Training	Not applicable
Experience	Not applicable
Applicable National Occupational Standards (NOS)	**Compulsory:** 1. ELE/N7302 Wire control panel 2. ELE/N9962 Interact with co-workers 3. ELE/N9963 Maintain safe work surroundings **Optional:** Not applicable
Performance Criteria	As described in the relevant OS units

National Occupational Standard



Overview

This unit is about routing and wiring electrical and electronic components in a control panel as per the wiring diagram.

National Occupational Standard

Unit Code	ELE/N7302
Unit Title (Task)	Wire Control Panel
Description	This OS unit is about routing and wiring electrical and electronic components in a control panel as per the wiring diagram
Scope	This unit/ task covers the following: • Understand work requirement from the supervisor • Wire the control panel • Report problems to supervisor • Achieve productivity, quality and safety standards as per company's norms
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Understanding work requirement	To be competent, the user/ individual must be able to: PC1. interact with the supervisor in order to understand the production schedule PC2. plan the day's production activities based on the supervisor's instructions PC3. use wiring drawings, job instructions or work manuals PC4. check availability of materials required for wiring
Wiring the control panel	To be competent, the user/ individual must be able to: PC5. collect wire or cables to carry out the wiring process PC6. ensure that the panel is positioned as prescribed, following safety norms PC7. ensure that tools and equipment used in the wiring process are in safe and usable condition PC8. install the feeder pipe in the panel PC9. pull the feeder wires into the panel through the feeder pipe installed PC10. ensure that there is enough wire to get to the opposite end of the control panel PC11. connect the neutral wire to the neutral bus of the panel PC12. strip the wire just enough before making any connections PC13. follow the wiring diagram in order to install the branch circuit wires PC14. ensure that the outer sheathing is stripped in order to expose the conductor PC15. connect all the bare copper wires to the ground bus PC16. make sure that wires used for installation are of appropriate size PC17. use the wiring diagram accurately to meet the specifications PC18. ensure that approved components or modules are available in good condition PC19. bend the wires so that the wiring has a neat appearance after completion PC20. follow applicable local electrical codes and standards PC21. return all tools and equipment to stores at the end of each day's activities
Reporting to superior	To be competent, the user/ individual must be able to: PC22. highlight any errors in previous step of the assembly process identified PC23. report defective or inadequate number of components in time

ELE / N7302 **Wire control panel**

	PC24. report about inadequate quantity of consumables such as connectors, screws, nuts, etc.
Achieving productivity, quality and safety standards	To be competent, the user/ individual must be able to: PC25. achieve 100% work schedule as planned for the day PC26. meet 100% daily or monthly target PC27. achieve zero errors in assembling as per company policy PC28. achieve zero component damage PC29. check any repetitive defects during the assembly process PC30. keep work area clean and organised PC31. identify problems on the assembly line and alert in time PC32. achieve 100% compliance with health and safety guidelines and rules
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The individual on the job needs to understand: KA1. company's policies on: incentives, delivery standards and personnel management KA2. reporting and documentation processes KA3. importance of the individual's role in the workflow KA4. reporting structure
B. Technical Knowledge	The individual on the job needs to know and understand: KB1. electro-mechanical assembly and wiring instructions KB2. hazards associated with panel assembly and wiring and how to avoid them KB3. general principles of wiring and assembly KB4. insulation stripping, securing of cables and wires, cable routing, cable forming or bending, colour coding wires and cables KB5. types of cables such as single and multi-core fibre optic cables, etc. KB6. types of components and sub-assemblies used in the panel assembly process KB7. preparations and precautions to be taken on the components and the panel before assembly process KB8. basics of automation and electro mechanical control systems KB9. regulations applicable during selection of wiring/cabling KB10. methods of attaching labels, warning signs on the panel KB11. operation of PLCs, relays, contactors, circuit breakers, solenoids, actuators, controllers, etc. KB12. motors, generators, starters and their controls KB13. safety norms in handling electrical/electronic components and electrostatic discharge KB14. customer safety requirements for all projects being implemented and other applicable safety standards KB15. ISO standards and procedures applicable for assembly activities KB16. fundamentals of electricity such as Ohms law, difference between AC and DC, series and parallel connections KB17. components such as diode, transformer, LED, transistor, capacitor, resistor, inductor, thermistor, ICs

ELE / N7302 **Wire control panel**

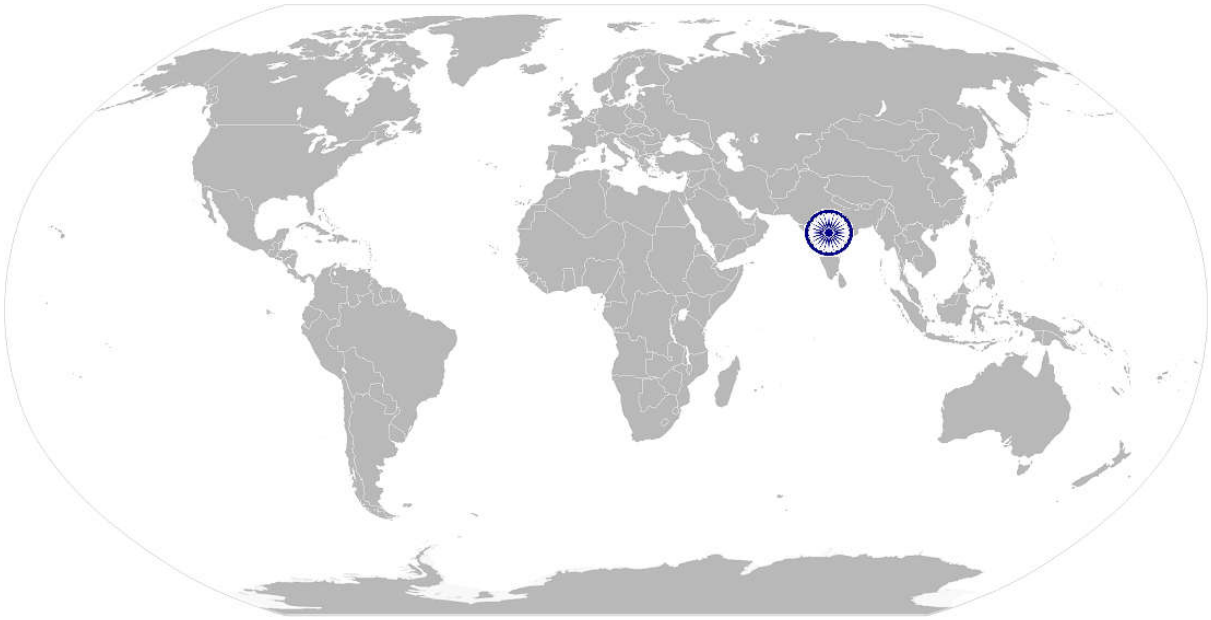
	KB18. how to read values, colour coding, polarity, orientation, tolerance KB19. specific safety precautions while working in an electronic assembly unit KB20. protective gear such as goggles, gloves, rubber shoes, etc. KB21. selection and maintenance of various tools used during the assembly process KB22. frequently occurring errors, causes and preventive measures KB23. work place norms such as 5S and Kaizen
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Basic reading skills**
	The individual on the job needs to know and understand how to: SA1. read warnings, instructions and other text material on product labels, components, etc. SA2. read drawings and job sheets or work orders
	Documentation skills
	The individual on the job needs to know and understand how to: SA3. use computers for documentation or record keeping SA4. complete forms such as work orders, invoices, maintenance records
	Team work skills
	The individual on the job needs to know and understand how to: SA5. deliver work on time to the next process SA6. share work load with other operators
B. Professional Skills	**Electro-mechanical assembling skills**
	The individual on the job needs to know and understand: SB1. cabinet assembly, bucket assembly, shelf/ door assembly, cable assembly SB2. electrical parts, mechanical parts, electronic parts and their wiring SB3. colour codes, labels and specifications SB4. packaging standards and product delivery modes SB5. quality standards and pricing of product
	Using tools and machines
	The individual on the job needs to know and understand how to: SB6. use screw driver, ratchets, spring driver, speciality wrenches, inspection fixtures, wire cutter, pliers, tester, spanner, hammer, hand bender, ladder, knife, voltmeter, ammeter, wattmeter, MEGGER etc. SB7. create a hazard-free work environment
	Interpersonal skills
	The individual on the job needs to know and understand how to interact with: SB8. supervisor to achieve the daily production target SB9. co-workers in order to share and learn
	Analytical and reflective skills
	The individual on the job needs to know and understand how to: SB10. analyse errors to avoid repetition in future SB11. improve work process

ELE / N7302 **Wire control panel**

NOS Version Control

NOS Code	ELE/N7302		
Credits(NVEQF/NVQF/NSQF) [*OPTIONAL*]	TBD	Version number	1.0
Industry	Electronics	Drafted on	17/02/14
Industry Sub-sector	Industrial Electronics	Last reviewed on	24/03/14
		Next review date	24/03/15

National Occupational Standard



Overview

This unit is about the individual's level of communication with co-workers and other departments within the organisation. It determines the ability to work as a team member to achieve the required deliverables on schedule.

ELE/N9962 **Interact with co-workers**

National Occupational Standard

Unit Code	**ELE/N9962**
Unit Title (Task)	**Interact with co workers**
Description	This OS unit is about communicating with colleagues and seniors in order to achieve smooth work flow
Scope	This unit/ task covers the following: • Interact with supervisor or superior • Coordinate with colleagues

Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Interacting with supervisor	To be competent, the user/ individual must be able to: PC1. understand work requirements, targets and incentives PC2. learn about new product models, their features and functions PC3. report problems identified in the field PC4. escalate customer concerns that cannot be handled on field PC5. resolve personnel issues PC6. receive feedback on work standards and customer satisfaction PC7. communicate any potential hazards at a particular location PC8. meet given targets PC9. deliver work of expected quality despite constraints PC10. have feedback from a happy and satisfied customer
Interacting with colleagues	To be competent, the user/ individual must be able to: PC11. resolve inter-personnel conflicts and achieve smooth workflow PC12. receive spares from tool room or stores PC13. deposit faulty modules and tools to stores PC14. pass on customer complaints to colleagues in a respective geographical area PC15. assist colleagues with resolving field problems PC16. share knowledge and experience gained through every day work PC17. clearly demarcate roles of each team member

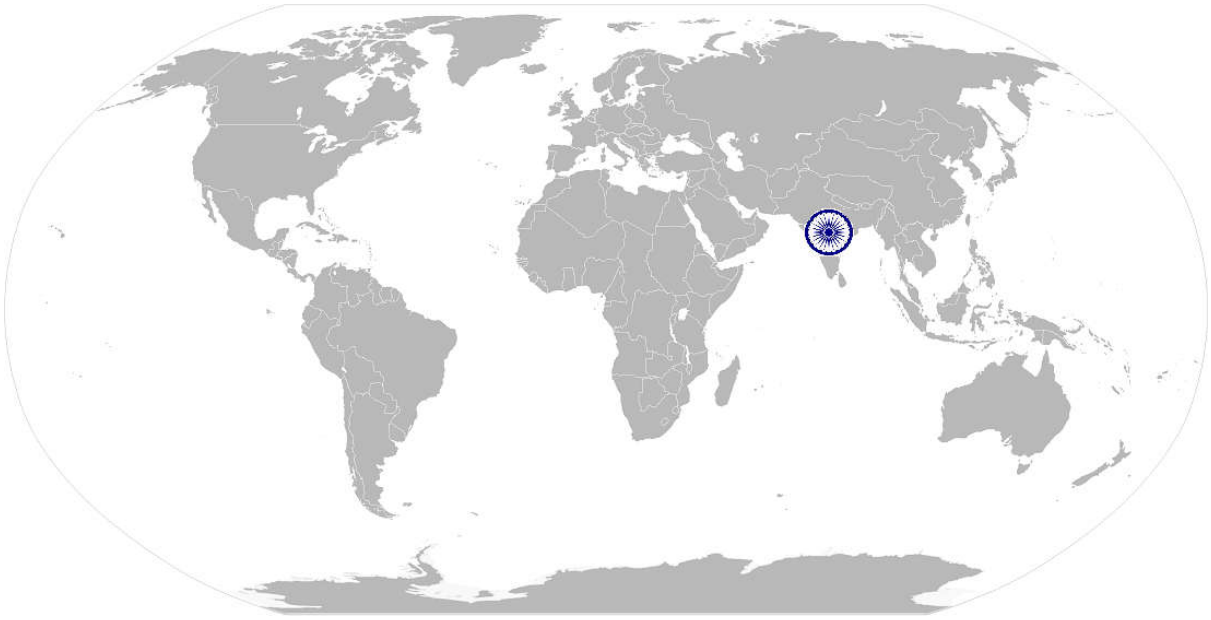
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The individual on the job needs to know and understand: KA1. company's policies on: incentives, delivery standards, and personnel management KA2. importance of the individual's role in the workflow KA3. reporting structure
B. Technical Knowledge	The individual on the job needs to know and understand: KB1. how to communicate effectively KB2. how to build team coordination

Skills (S) [Optional]	
A. Core Skills/ Generic Skills	**Teamwork and multitasking**
	The individual on the job needs to know and understand how: SA1. to deliver product to next work process on time
B. Professional Skills	**Decision making**
	The individual on the job needs to know and understand: SB1. how to report potential areas of disruptions to work process SB2. when to report to supervisor and when to deal with a colleague depending on the type of concern
	Reflective thinking
	The individual on the job needs to know and understand: SB3. how to improve work process
	Critical thinking
	The individual on the job needs to know and understand: SB4. how to spot process disruptions and delays

NOS Version Control

NOS Code	ELE/N9962		
Credits(NVEQF/NVQF/NSQF) [*OPTIONAL*]	TBD	Version number	1.0
Industry	Electronics	Drafted on	17/02/14
Industry Sub-sector	Industrial Electronics	Last reviewed on	24/03/14
		Next review date	24/03/15

National Occupational Standard



Overview

This unit is about the individual's effort to maintain a safe, healthy and secure working environment.

National Occupational Standard

Unit Code	ELE/N9963
Unit Title (Task)	Uphold safe work surroundings
Description	This OS unit is about following adequate safety procedures to make work environment safe
Scope	This unit/ task covers the following: • Follow standard safety procedures of the company • Participate in company's safety and fire drills • Maintain good posture at work for long term health
Performance Criteria(PC) w.r.t. the Scope	
Element	**Performance Criteria**
Following safety measures and standards	To be competent, the user/ individual must be able to: PC1. comply with general safety procedures followed in the company PC2. follow standard safety procedures while handling an equipment, hazardous material or tool PC3. remove rings or any other metal objects before working on the unit PC4. use of safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc. PC5. escalate about any hazardous materials or things found in the premises PC6. report about any breach of safety procedure in the company PC7. ensure zero accidents at work PC8. avoid damage of components due to negligence in ESD procedures PC9. regularly participate in fire drills or other safety related workshops organised by the company PC10. ensure no loss for company due to safety negligence
Maintaining good health and posture	To be competent, the user/ individual must be able to: PC11. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials PC12. participate in company organised health sessions such as yoga, physiotherapy or games PC13. handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders
Knowledge and Understanding (K)	
B. Organizational Context (Knowledge of the company / organization and	The individual on the job needs to know and understand: KA1. company's policies on: incentives, delivery standards, and personnel management KA2. company occupational safety and health policy followed KA3. company emergency evacuation procedure KA4. company's medical policy

its processes)	
B. Technical Knowledge	The individual on the job needs to know and understand: KB1. how to maintain the work area safe and secure KB2. how to handle hazardous materials, tools and equipment KB3. emergency procedures to be followed such as fire accidents, etc. KB4. long term value of good posture and use of appropriate handling equipment
Skills (S) [Optional]	
C. Professional Skills	**Handling safety equipment**
	The individual on the job needs to know and understand: SB1. significance of using safety materials such as gloves, etc. SB2. how to use safety equipment such as fire extinguisher during fire accidents

NOS Version Control

NOS Code	ELE/N9963		
Credits(NVEQF/NVQF/NSQF) [*OPTIONAL*]	TBD	Version number	1.0
Industry	Electronics	Drafted on	17/02/14
Industry Sub-sector	Industrial Electronics	Last reviewed on	24/03/14
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Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar business 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.
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 an 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-function	Sub-functions are sub-activities essential to fulfil the achieving the objectives of the function.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance criteria are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (OS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a 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 quality of performance required.
Knowledge and Understanding	Knowledge and understanding are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish

	specific designated responsibilities.
Core Skills/ Generic Skills	Core skills or generic skills are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

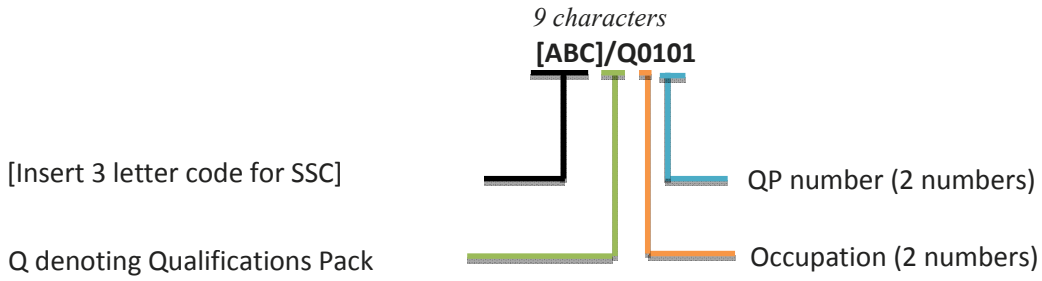
Acronyms

Keywords /Terms	Description
NOS	National Occupational Standard(s)
NVQF	National Vocational Qualifications Framework
NSQF	National Qualifications Framework
NVEQF	National Vocational Education Qualifications Framework
QP	Qualifications Pack

Annexure

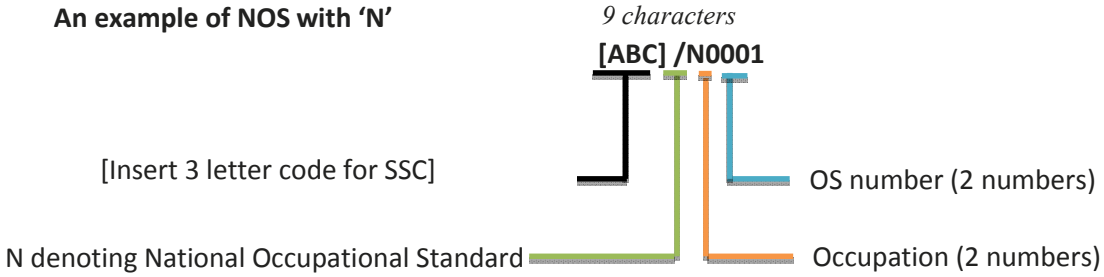
Nomenclature for QP and NOS

Qualifications Pack



Occupational Standard

An example of NOS with 'N'



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

Sub-sector	Range of Occupation numbers
Passive Components	01 - 10
Semiconductors	11 - 20
PCB Manufacturing	21 - 30
Consumer Electronics	31 - 40
IT Hardware	41 - 50
PCB Assembly	51 - 55
Solar Electronics	56 - 60
Strategic Electronics	61 - 65
Automotive Electronics	66 - 70
Industrial Electronics	71 - 75
Medical Electronics	76 - 80
Communication Electronics	81 - 85
PCB Design	86 - 90
LED	91 - 95

Sequence	Description	Example
Three letters	Industry name	ELE
Slash	/	/
Next letter	Whether **Q**P or **N**OS	Q
Next two numbers	Occupation code	01
Next two numbers	OS number	01