

# QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR ELECTRONICS INDUSTRY



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## 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

## Introduction

### Qualifications Pack- Injection Moulding Operator

**SECTOR:** ELECTRONICS

**SUB-SECTOR:** CONSUMER ELECTRONICS

**OCCUPATION:** MANUFACTURING

**REFERENCE ID:** ELE/Q3501

**ALIGNED TO:** NCO-2004/ NIL

**Injection Moulding Operator:** Also called, 'Injection Moulding Technician', the Injection Moulding Operator produces plastic parts used in electronic housings of electronic products

**Brief Job Description:** The individual at work sets up and operates the injection moulding machine to cast products from thermoplastic materials

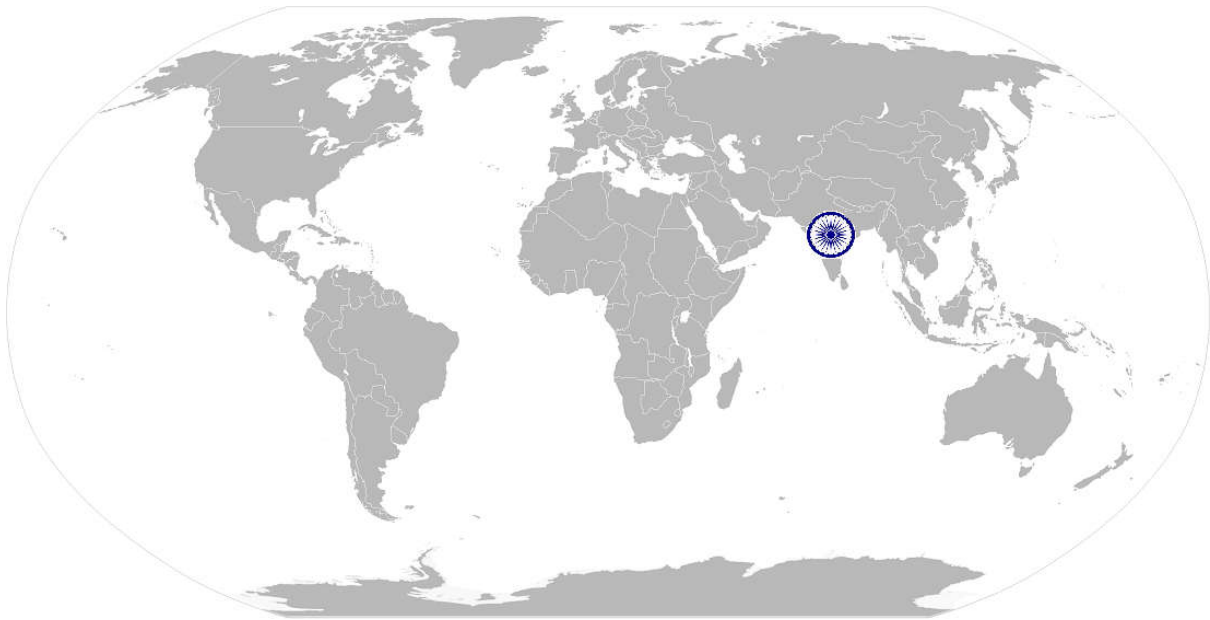
**Personal Attributes:** The individual must have the ability to work in standing position for long hours in a high decibel noise environment.

## Qualifications Pack For Injection Moulding Operator

|             |  |                                    |                         |                 |
|-------------|--|------------------------------------|-------------------------|-----------------|
| Job Details | <b>Qualifications Pack Code</b>            | <b>ELE/Q3501</b>                   |                         |                 |
|             | <b>Job Role</b>                            | <b>Injection Moulding Operator</b> |                         |                 |
|             | <b>Credits(NVEQF/NVQF/NSQF) [OPTIONAL]</b> | <b>TBD</b>                         | <b>Version number</b>   | <b>1.0</b>      |
|             | <b>Sector</b>                              | <b>Electronics</b>                 | <b>Drafted on</b>       | <b>06/01/14</b> |
|             | <b>Sub-sector</b>                          | <b>Consumer Electronics</b>        | <b>Last reviewed on</b> | <b>24/03/14</b> |
|             | <b>Occupation</b>                          | <b>Manufacturing</b>               | <b>Next review date</b> | <b>24/03/14</b> |

|   |  |
|---|--|
| <b>Job Role</b>   | <b>Injection Moulding Operator</b><br>Also called “Injection Moulding Technician”  |
| <b>Role Description</b>                                 | Set up machine controls and operate injection moulding machine in order to produce plastic casing for electronic products as per design specifications   |
| <b>NVEQF/NVQF level</b>                                 | 3  |
| <b>Minimum Educational Qualifications</b>               | 10 <sup>th</sup> Standard passed (with Science)  |
| <b>Maximum Educational Qualifications</b>               | ITI/Diploma (Electrical or Electronics)  |
| <b>Training</b>   | Not Applicable   |
| <b>Experience</b>                                       | Not Applicable   |
| <b>Applicable National Occupational Standards (NOS)</b> | <b>Compulsory:</b> <ol style="list-style-type: none"> <li><a href="#">ELE/N3505 Operate injection moulding machine</a></li> <li><a href="#">ELE/N9902 Coordinate with colleagues</a></li> <li><a href="#">ELE/N9903 Maintain safe work environment</a></li> </ol> <b>Optional:</b><br>Not applicable |
| <b>Performance Criteria</b>                             | As described in the relevant OS units  |

# National Occupational Standard



## Overview

This unit is about operating the injection moulding machine in order to produce plastic parts to be used in electronic housings.

ELE / N3505

Operate injection moulding machine

National Occupational Standard

|   |  |
|---|--|
| <b>Unit Code</b>                                      | <b>ELE/N3505</b>   |
| <b>Unit Title (Task)</b>                              | <b>Operate injection moulding machine</b>  |
| <b>Description</b>                                    | This OS is about operating the injection moulding machine in order to produce plastic parts to be used in electronic housings  |
| <b>Scope</b>  | <p>This unit/ task covers the following:</p> <ul style="list-style-type: none"> <li>• Understand work requirement from the supervisor</li> <li>• Set up and operate the moulding machine</li> <li>• Report problems to supervisor</li> <li>• Achieve productivity, quality and safety standards as per company's norms</li> </ul>  |
| <b>Performance Criteria(PC) w.r.t. the Scope</b>      |  |
| <b>Element</b>  | <b>Performance Criteria</b>  |
| <b>Understanding work requirement from supervisor</b> | <p>To be competent, the user/ individual must be able to:</p> <p>PC1. interact with the supervisor in order to understand the production schedule</p> <p>PC2. plan the day's production activities based on the supervisor's instructions</p> <p>PC3. collect data sheet, machine instructions and work manuals</p> <p>PC4. ensure availability of consumables and materials for production</p>  |
| <b>Operating injection moulding machine</b>           | <p>To be competent, the user/ individual must be able to:</p> <p>PC5. collect the mould from tool room</p> <p>PC6. install and bolt the mould in place and slide the safety door shut</p> <p>PC7. enter moulding temperature, volume of plastic and weight settings in the machine as per data sheet</p> <p>PC8. enter machine and process parameters such as moulding pressure and time as per the data sheet</p> <p>PC9. collect the pre-heated pellets and raw material in granular form</p> <p>PC10. add the raw material in the machine using material loader or by manual feeding</p> <p>PC11. add master batch and regrind raw material as per standard composition and mix it well</p> <p>PC12. run the machine and visually inspect sample casing manufactured comparing to master sample or first part approved sample kept on operating table</p> <p>PC13. define accepted products and defective products as per sample</p> <p>PC14. count rejections and accepted products during every operating hour</p> <p>PC15. do all necessary post moulding operation during the cycle time run such as. trimming, apply protective tapes, putting labels on each product for identification</p> <p>PC16. remove the mould and recheck dimensions of final casing</p> <p>PC17. collect final cases in assigned bins and place them in storage area</p> <p>PC18. work in compliance with specified health and safety standards</p> <p>PC19. label and organize moulds as per the day's production plan</p> <p>PC20. clean and maintain the machine at regular intervals as per company's policy</p> |

**ELE/N3505**

**Operate injection moulding machine**

|   |  |
|---|--|
| <b>Reporting to superior</b>  | To be competent, the user/ individual must be able to:<br>PC21. highlight repetitive or unresolved errors production process or mould dimensions<br>PC22. report defective or inadequate amount of raw material s<br>PC23. report completion of work as per instructions   |
| <b>Achieving productivity, quality and safety standards</b>                                     | To be competent, the user/ individual must be able to:<br>PC24. achieve 100% work as planned for the day<br>PC25. meet 100% daily or monthly target<br>PC26. minimise errors to zero in products manufactured<br>PC27. check any repetitive defects during the production process<br>PC28. keep work area clean and organised<br>PC29. achieve 100% compliance with health and safety guidelines and rules   |
| <b>Knowledge and Understanding (K)</b>  |  |
| <b>A. Organizational Context</b><br>(Knowledge of the company / organization and its processes) | The individual on the job needs to understand:<br>KA1. company’s policies on: incentives, personnel management<br>KA2. company’s code of conduct<br>KA3. importance of individual’s role in the work flow<br>KA4. organisation culture<br>KA5. company’s reporting structure<br>KA6. company’s documentation policy  |
| <b>B. Technical Knowledge</b>   | The individual on the job needs to know and understand:<br>KB1. general principles of moulding procedure and process knowledge<br>KB2. mould loading and unloading procedure<br>KB3. analysis of defects that occur in the final products and correlate them to problems with the injection moulding machine<br>KB4. check-list procedure to ensure quality of final product<br>KB5. how to avoid defects in machine operation and final product manufacture<br>KB6. tonnage and capacity of the machine being operated<br>KB7. how to combine machine dependent and machine independent settings<br>KB8. how to perform moulding machine safety check<br>KB9. safety procedures to be adopted to complete mould removal process |
| <b>Skills (S)</b>   |  |
| <b>A. Core Skills/ Generic Skills</b>   | <b>Reading and writing skills</b>  |
|   | The individual on the job needs to know and understand:<br>SA1. how to be able to read warnings, instructions and other text material on product labels, components etc.<br>SA2. how to enter into the history card details of the fault identified in the plastic product manufactured  |
| <b>B. Professional Skills</b>   | <b>Using tools and machines</b>  |
|   | The individual on the job needs to know and understand:<br>SB1. how to operate or use injection moulding machine, gauges, knife, mixing  |

**ELE/N3505**

**Operate injection moulding machine**

|  |   |
|--|---|
|  | <p>machine, etc.<br/>SB2. safety gear to use as per company's policy</p>  |
|  | <p><b>Interpersonal skills</b><br/>The individual on the job needs to know and understand:<br/>SB3. how to interact with supervisor to understand the daily target<br/>SB4. how to interact with co-workers in order to coordinate work processes</p> |
|  | <p><b>Reflective thinking</b><br/>The user/individual on the job needs to know and understand how:<br/>SB1. to improve work processes<br/>SB2. to reduce repetition of errors</p>   |
|  |   |

**ELE/N3505**

**Operate injection moulding machine**

|  |                             |                         |                 |
|--|-----------------------------|-------------------------|-----------------|
| <b>NOS Code</b>                                | <b>ELE/N3505</b>            |                         |                 |
| <b>Credits(NVEQF/NVQF/NSQF)<br/>[OPTIONAL]</b> | <b>TBD</b>                  | <b>Version number</b>   | <b>1.0</b>      |
| <b>Industry</b>                                | <b>Electronics</b>          | <b>Drafted on</b>       | <b>06/01/14</b> |
| <b>Industry Sub-sector</b>                     | <b>Consumer Electronics</b> | <b>Last reviewed on</b> | <b>24/03/14</b> |
|  |                             | <b>Next review date</b> | <b>24/03/14</b> |

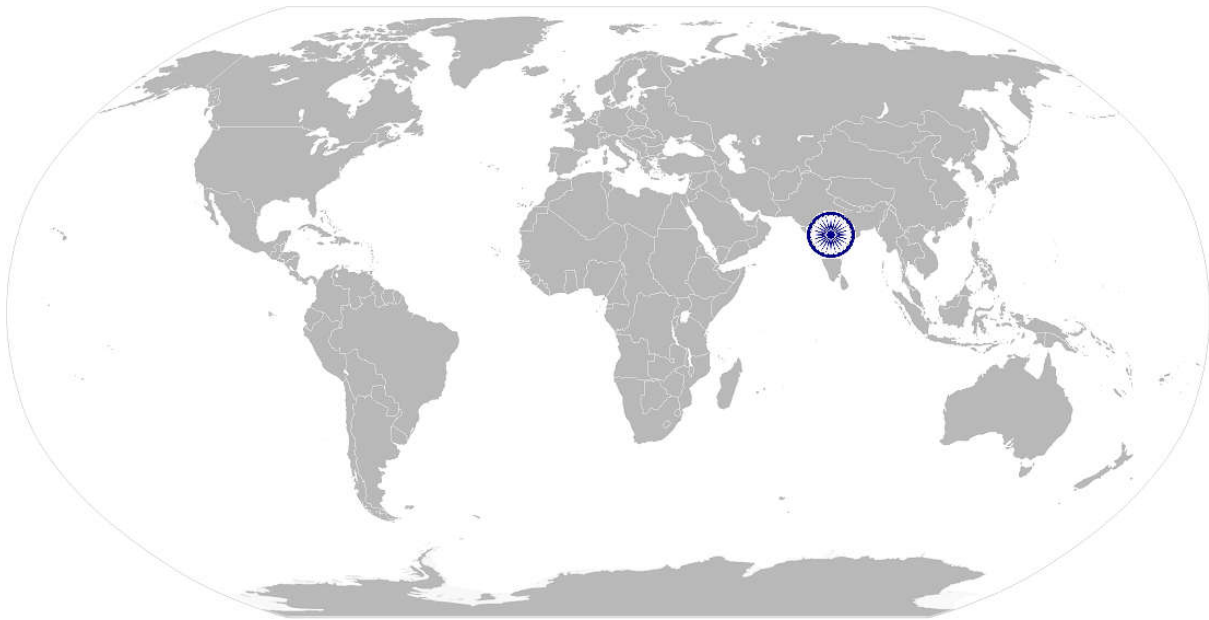
**NOS Version Control**

**ELE/N3505**

**Operate injection moulding machine**



# National Occupational Standard



## Overview

This unit is about the individual's level of communication with colleagues and other departments within the organisation so as to work as a team member and meet deliverables on schedule through a smooth workflow.

## ELE/N9902

## Coordinate with colleagues

|   |  |
|---|--|
| <b>Unit Code</b>  | ELE/N9902  |
| <b>Unit Title (Task)</b>  | Coordinate with colleagues   |
| <b>Description</b>  | This OS unit is about communicating with colleagues and seniors in order to achieve smooth work flow   |
| <b>Scope</b>  | <p>This unit/ task covers the following:</p> <ul style="list-style-type: none"> <li>Interact with superior</li> <li>Coordinate with colleagues</li> </ul>  |
| <b>Performance Criteria(PC) w.r.t. the Scope</b>  |  |
| <b>Element</b>  | <b>Performance Criteria</b>  |
| <b>Interacting with superior</b>  | <p>To be competent, the user/ individual must be able to:</p> <p>PC1. understand work requirements, targets and incentives</p> <p>PC2. receive work order/job instruction from the supervisor on time</p> <p>PC3. understand new operating procedures</p> <p>PC4. report problems encountered in the assembly process</p> <p>PC5. resolve personnel issues</p> <p>PC6. receive feedback on work standards and operating procedure</p> <p>PC7. communicate any potential hazards at work location</p> <p>PC8. meet given targets and deliver work of expected quality despite constraints</p> <p>PC9. highlight any errors in previous step of the assembly process</p> <p>PC10. report in time about shortage of consumables</p> |
| <b>Interacting with colleagues</b>  | <p>To be competent, the user/ individual must be able to:</p> <p>PC11. receive consumables/tools from tool room or stores</p> <p>PC12. report defective or inadequate number of components</p> <p>PC13. deposit faulty modules and tools to stores</p> <p>PC14. communicate to colleagues errors identified in any step of the assembly process</p> <p>PC15. assist colleagues in any problems identified in their work process</p> <p>PC16. resolve conflicts and achieve smooth workflow</p>   |
| <b>Knowledge and Understanding (K)</b>  |  |
| <b>A. Organizational Context</b><br>(Knowledge of the company / organization and its processes) | <p>The individual on the job needs to know and understand:</p> <p>KA1. company's policies on: incentives, delivery standards, and personnel management</p> <p>KA2. importance of the individual's role in the workflow</p> <p>KA3. reporting structure</p>   |
| <b>B. Technical Knowledge</b>   | <p>The individual on the job needs to know and understand:</p> <p>KB1. how to communicate effectively</p>  |

**ELE/N9902**

**Coordinate with colleagues**

|   |  |
|---|--|
|   | KB2. how to build team coordination  |
| <b>Skills (S) [Optional]</b>              |  |
| <b>A. Core Skills/<br/>Generic Skills</b> | <b>Teamwork and multitasking</b>   |
|   | The individual on the job needs to know and understand how:<br>SA1. to achieve smooth workflow<br>SA2. to deliver product to next work process on time   |
| <b>B. Professional Skills</b>             | <b>Decision making</b>   |
|   | The individual on the job needs to know and understand:<br>SB1. how to report potential areas of disruptions to work process<br>SB2. when to report to supervisor and when to deal with a colleague depending on the type of concern |
|   | <b>Reflective thinking</b>   |
|   | The individual on the job needs to know and understand:<br>SB3. how to improve work process<br>SB4. how to resolve recurring inter-personal conflicts  |
|   | <b>Critical thinking</b>   |
|   | The individual on the job needs to know and understand:<br>SB5. how to spot process disruptions and delays   |

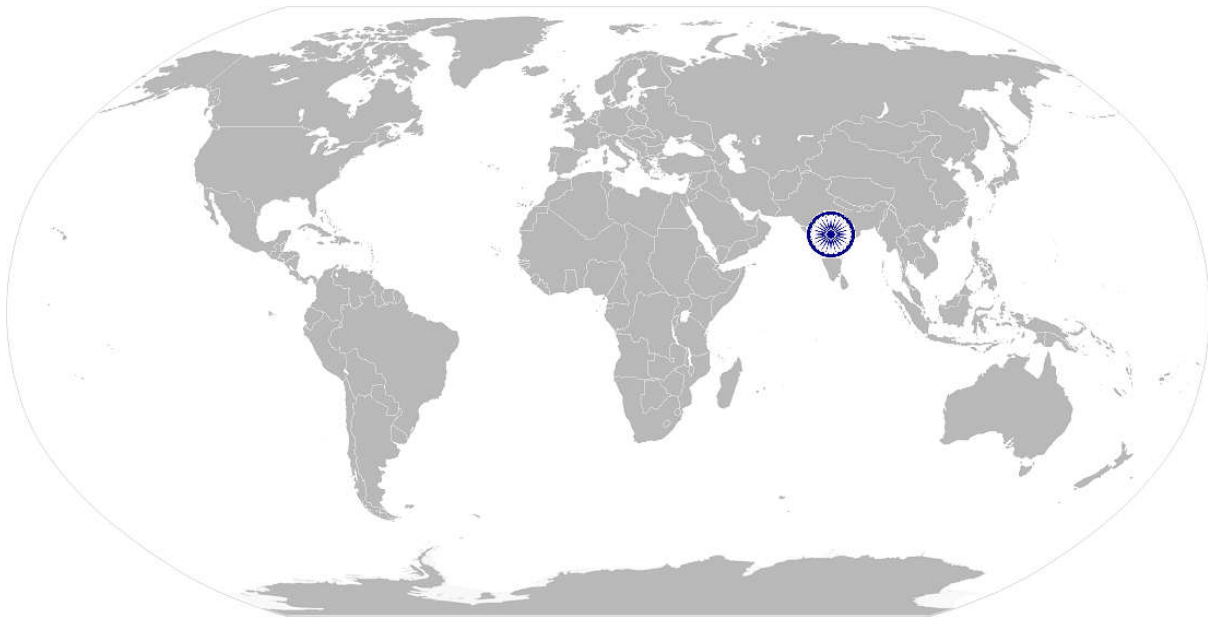
**ELE/N9902**

**Coordinate with colleagues**

**NOS Version Control**

|  |                             |                         |                 |
|--|-----------------------------|-------------------------|-----------------|
| <b>NOS Code</b>                                | <b>ELE/N9902</b>            |                         |                 |
| <b>Credits(NVEQF/NVQF/NSQF)<br/>[OPTIONAL]</b> | <b>TBD</b>                  | <b>Version number</b>   | <b>1.0</b>      |
| <b>Industry</b>                                | <b>Electronics</b>          | <b>Drafted on</b>       | <b>06/01/14</b> |
| <b>Industry Sub-sector</b>                     | <b>Consumer Electronics</b> | <b>Last reviewed on</b> | <b>24/03/14</b> |
|  |                             | <b>Next review date</b> | <b>24/03/14</b> |

# National Occupational Standard



## Overview

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

ELE/N9903

Maintain safe work environment

National Occupational Standard

|   |  |
|---|--|
| <b>Unit Code</b>  | <b>ELE/N9903</b>   |
| <b>Unit Title (Task)</b>  | <b>Maintain safe work environment</b>  |
| <b>Description</b>  | This OS unit is about following adequate safety procedures to make work environment safe   |
| <b>Scope</b>  | <p>This unit/ task covers the following:</p> <ul style="list-style-type: none"> <li>• Follow standard safety procedures of the company</li> <li>• Participate in company's safety and fire drills</li> <li>• Maintain good posture at work for long term health</li> </ul>   |
| <b>Performance Criteria(PC) w.r.t. the Scope</b>  |  |
| <b>Element</b>  | <b>Performance Criteria</b>  |
| <b>Following safety measures and standards</b>  | <p>To be competent, the user/ individual must be able to:</p> <p>PC1. comply with general safety procedures followed in the company</p> <p>PC2. follow standard safety procedures while handling an equipment, hazardous material or tool</p> <p>PC3. use of safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.</p> <p>PC4. escalate about any hazardous materials or things found in the premises</p> <p>PC5. report about any breach of safety procedure in the company</p> <p>PC6. ensure zero accidents at work</p> <p>PC7. avoid damage of components due to negligence in ESD procedures</p> <p>PC8. regularly participate in fire drills or other safety related workshops organised by the company</p> <p>PC9. ensure no loss for company due to safety negligence</p> |
| <b>Maintaining good health and posture</b>  | <p>To be competent, the user/ individual must be able to:</p> <p>PC10. maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials</p> <p>PC11. Participate in company organised health sessions such as yoga, physiotherapy or games</p> <p>PC12. handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders</p>  |
| <b>Knowledge and Understanding (K)</b>  |  |
| <b>B. Organizational Context</b><br>(Knowledge of the company / organization and its processes) | <p>The individual on the job needs to know and understand:</p> <p>KA1. company's policies on: incentives, delivery standards, and personnel management</p> <p>KA2. company occupational safety and health policy followed</p> <p>KA3. company emergency evacuation procedure</p> <p>KA4. company's medical policy</p>  |

**ELE/N9903**

**Maintain safe work environment**

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

**ELE/N9903**

**Maintain safe work environment**

**NOS Version Control**

|  |                             |                         |                 |
|--|-----------------------------|-------------------------|-----------------|
| <b>NOS Code</b>                                | <b>ELE/N9903</b>            |                         |                 |
| <b>Credits(NVEQF/NVQF/NSQF)<br/>[OPTIONAL]</b> | <b>TBD</b>                  | <b>Version number</b>   | <b>1.0</b>      |
| <b>Industry</b>                                | <b>Electronics</b>          | <b>Drafted on</b>       | <b>06/01/14</b> |
| <b>Industry Sub-sector</b>                     | <b>Consumer Electronics</b> | <b>Last reviewed on</b> | <b>24/03/14</b> |
|  |                             | <b>Next review date</b> | <b>24/03/14</b> |



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.  |

*Qualifications Pack For Injection Moulding Operator*

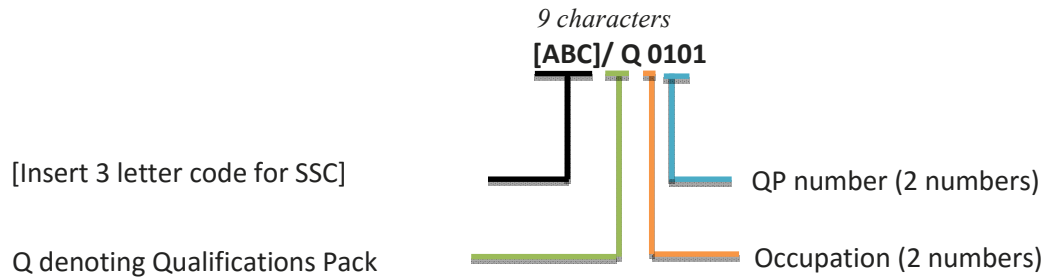
|                             |   |
|-----------------------------|---|
| Core Skills/ Generic Skills | Core skills or generic skills are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills 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. |
|-----------------------------|---|

| 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

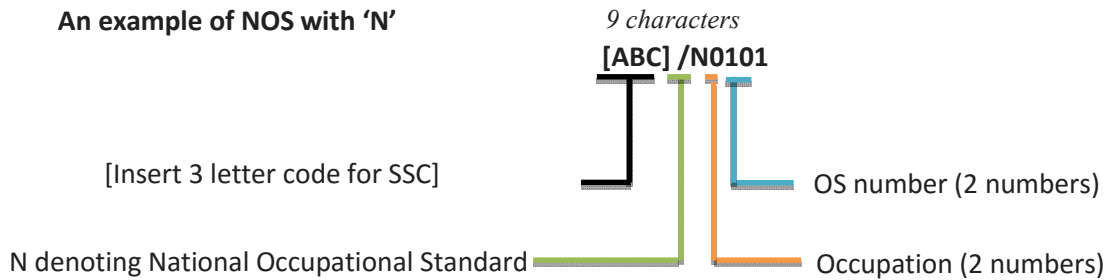
### Nomenclature for QP and NOS

#### Qualifications Pack



#### Occupational Standard

##### An example of NOS with 'N'



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 <b>QP</b> or <b>NOS</b> | Q       |
| Next two numbers | Occupation code                 | 01      |
| Next two numbers | OS number                       | 01      |

| SSC    | QPCode    | Name of the QP              | NSQF Level | Equipment Name  | Min. no. of Equipment required (per batch of 30 trainees) | Unit Type | Is this a mandatory Equipment to be Training Center (Yes/No) | Dimension/Specification/Description of the Equipment/ ANY OTHER REMARK                       |
|--------|-----------|-----------------------------|------------|---|---|-----------|--|--|
| Rubber | RSC/Q0207 | Injection Moulding Operator | 4          | Rubber Injection Moulding Machine   | 1   | Unit      | No   | It is difficult to specify dimensions as it depends on the equipment to be used for training |
| Rubber | RSC/Q0207 | Injection Moulding Operator | 4          | Safety Equipments   | 2   | Unit      | Yes  | Safety Equipment include-Gloves, Safety shoes, Mask & other safety equipments                |
| Rubber | RSC/Q0207 | Injection Moulding Operator | 4          | Moulds For Standard Test Specimens And Tools Used Such As Bushes, O-Rings Etc | 2   | Unit      | Yes  | NA   |