

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR GREEN JOBS

### 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- Solar PV Manufacturing Technician

**SECTOR:** GREEN JOBS

**SUB-SECTOR:** RENEWABLE ENERGY

**OCCUPATION:** MANUFACTURING

**REFERENCE ID:** SGJ/0119

**ALIGNED TO:** NCO-2015/ 7422.1901

**Brief Job Description:** Solar PV Manufacturing Technician cleans and checks the front glass cover for the PV module; monitors the process of soldering solar cells to the strings to make interconnect, lamination of modules, framing of solar PV module, module testing and packaging for transit

**Personal Attributes:** This job requires the individual to concentrate on the job at hand and complete it without any accidents so diligence and hardworking are desired attributes for individuals performing this role. He must also demonstrate strong work ethics, an ability to communicate courteously with co-workers, and must be good with following instructions of the supervisor

Job Details	<b>Qualifications Pack Code</b>	<b>SGJ/Q0119</b>		
	<b>Job Role</b>	<b>Solar PV Manufacturing Technician</b> [This job role is applicable in both national and international scenarios]		
	<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
	<b>Sector</b>	<b>Green Jobs</b>	<b>Drafted on</b>	<b>01/09/2016</b>
	<b>Sub-sector</b>	<b>Renewable Energy</b>	<b>Last reviewed on</b>	<b>17/05/2017</b>
	<b>Occupation</b>	<b>Manufacturing</b>	<b>Next review date</b>	<b>30/09/2019</b>
	<b>NSQC Clearance on</b>	<b>03/08/2018</b>		

<b>Job Role</b>	<b>Solar PV Manufacturing Technician</b>
<b>Role Description</b>	Solar PV Manufacturing Technician - specializes in manufacturing of Solar PV Modules
<b>NSQF level</b>	4
<b>Minimum Educational Qualifications</b>	10 <sup>th</sup> pass preferably
<b>Maximum Educational Qualifications</b>	Not Applicable
<b>Training</b> (Suggested but not mandatory)	N/A
<b>Minimum Job Entry Age</b>	18 years
<b>Experience</b>	Not required
<b>Applicable National Occupational Standards (NOS)</b>	<p><b>Compulsory:</b></p> <ol style="list-style-type: none"> <li><a href="#">SGJ/N0145: Carry out the manufacturing of Solar PV Modules</a></li> <li><a href="#">SGJ/N0147: Maintain personal health &amp; safety in a manufacturing facility</a></li> <li><a href="#">SGJ/N0120: Work effectively with others</a></li> </ol>
<b>Performance Criteria</b>	As described in the relevant OS units

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.
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 (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OSs, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.
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 need 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.

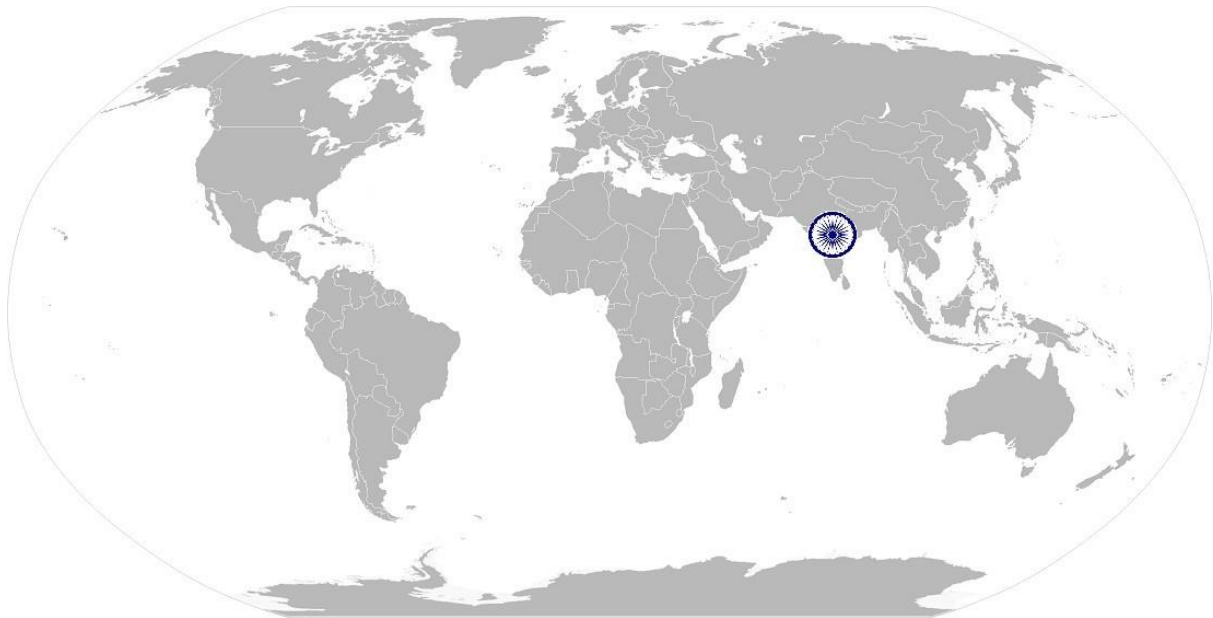
Qualifications Pack For “Solar PV Manufacturing Technician”

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. In the context of the OS, these include communication related skills that are applicable to most job roles.
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Acronyms

Keywords /Terms	Description
SCGJ	Skill Council for green jobs
NOS	National Occupational Standards
NSQF	National Skills Qualification Framework
NVEQF	National Vocational Educational Qualification Framework
NVQF	National Vocational Qualification Framework
OS	Occupational Standards
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skills Council
DC	Direct Current
AC	Alternating Current
PV	Photovoltaic
O&M	Operation and Maintenance
ERP	Enterprise Resource Planning
OHS	Occupational Health and Safety

# National Occupational Standard



## Overview

This unit is about manufacturing of solar PV modules

**SGJ/N0145**

**Carry out manufacturing of solar PV modules**

<b>Unit Code</b>	<b>SGJ/N0145</b>
<b>Unit Title (Task)</b>	<b>Carry out manufacturing of Solar PV Modules</b>
<b>Description</b>	This unit is about manufacturing of Solar PV Modules
<b>Scope</b>	<p>This unit/ task covers the following:</p> <ul style="list-style-type: none"> <li>• sorting of solar cells</li> <li>• monitoring the assembly and lamination of solar module</li> <li>• complete the final assembly</li> <li>• testing of PV module</li> <li>• packing of solar module</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Sorting of solar cells</b>	To be competent, the user/ individual must be able to: PC1. sort the solar cells using a cell sorter and put use the cells with same specifications for making a cell string
<b>Monitoring the assembly and lamination of solar module</b>	To be competent, the user/ individual must be able to: PC2. monitor the assembly and interconnection of cells with metal ribbons to make a module PC3. ensure the testing of solar cells as per standard operating procedures PC4. cut EVA using a cutter and place it on the glass substrate PC5. monitoring the process of aligning and placing cell strings on EVA sheet at assembler module layup station PC6. monitor the process of completing the module laminate circuit at the busing station and provide output leads PC7. visually inspect and electrically test the module laminate circuit by measuring its I-V characteristics at an inspection station PC8. cut EVA back sheets to length using the cut and place station, and then assemble them with the glass and module circuit PC9. monitor the process to laminate the assembly and cure the EVA with the laminator
<b>Complete the final assembly</b>	To be competent, the user/ individual must be able to: PC10. trim the edges of the laminated module panel using cutter PC11. attach the junction box and by-pass diodes PC12. install an edge gasket PC13. monitor the framing of solar module at a frame press station
<b>Testing of PV module</b>	To be competent, the user/ individual must be able to: PC14. measure the module's performance under simulated sunlight PC15. perform the testing of solar modules as per relevant industry standards PC16. visually inspect the completed module for quality of materials and workmanship
<b>Packing of solar module</b>	To be competent, the user/ individual must be able to: PC17. check proper packaging material for module PC18. pack modules in properly designed cartons for transportation

**SGJ/N0145**

**Carry out manufacturing of solar PV modules**

Knowledge and Understanding (K)	
<p><b>A. Organizational Context</b> (Knowledge of the organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KA1. government/corporate policies and guidelines on: workplace safety, identification and mitigation of safety hazards, work procedures and guidelines for working at height</li> <li>KA2. document information using appropriate corporate forms</li> <li>KA3. obtain authorization from specified field safety officer and supervisor</li> <li>KA4. legislative, organization, site requirements and procedures</li> <li>KA5. the environmental requirements</li> <li>KA6. work in varying weather conditions</li> <li>KA7. complete knowhow on manufacturer's warranty policy</li> </ul>
<p><b>B. Technical Knowledge</b></p>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>KB1. basics of electrical concepts like voltage, current, power, energy, etc.</li> <li>KB2. basics of electrical measurement equipments</li> <li>KB3. basics on solar energy system and power generation</li> <li>KB4. basics of electricity and associated terminologies like volts, amps and watts</li> <li>KB5. basics of the electrical systems, components like strings, junction boxes, fuses, inverters, auxiliary power supplies, etc, their functioning and maintenance</li> <li>KB6. use and maintenance of various measuring equipments such as multi-meter, solar array tester and meggers etc.</li> <li>KB7. raw materials, shelf life, storage specifications of various equipment</li> <li>KB8. cutting of EVA and back sheet</li> <li>KB9. performance characteristic parameters of solar cells and modules</li> <li>KB10. soldering techniques</li> <li>KB11. usage and handling procedures of solar panels</li> <li>KB12. operation of laminator, framing machine, etc.</li> <li>KB13. various types of faults that can occur in the electrical systems/ components, their detection equipment and methods</li> <li>KB14. various types of tools and procedures involved in maintenance and troubleshooting the system</li> <li>KB15. various types of tools, measuring equipments and procedures involved in maintenance and troubleshooting of electrical components of the solar module manufacturing plants</li> <li>KB16. importance of wearing protective clothing and other safety gear while carrying out maintenance activities (PPEs)</li> <li>KB17. proper documentation as per standards</li> <li>KB18. relevant occupational health and safety standards importance of wearing protective clothing and other safety gear while carrying out manufacturing activities (PPES)</li> </ul>
Skills (S)	
<p><b>A. Core Skills/ Generic Skills</b></p>	<p><b>Writing skills</b></p>
	<p>The user/ individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>SA1. proper documentation as per relevant industry standards</li> </ul>
	<p><b>Reading skills</b></p>
	<p>The user/ individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> <li>SA2. vernacular/English language</li> <li>SA3. how to read manuals, health and safety instructions, memos, other company documents</li> </ul>

SGJ/N0145

**Carry out manufacturing of solar PV modules**

	SA4. how to read from different sources- books, screens in machines and signage
	SA5. the various colour codes, as per standard electrical, mechanical and civil nomenclature
	<b>Oral communication (listening and speaking skills)</b>
	The user/ individual on the job needs to know and understand:
	SA6. express statements or information clearly so that others can hear and understand
	SA7. participate in and understand the main points of simple discussions
	SA8. respond appropriately to any queries
	SA9. communicate with peers, superiors and sub-ordinates
<b>B. Professional Skills</b>	<b>Decision making</b>
	The user/individual on the job needs to know and understand how to:
	SB1. follow organisation rule- based decision making process
	SB2. take decision with systematic course of actions and/or response
	<b>Plan and organize</b>
	The user/individual on the job needs to know and understand how to:
	SB3. plan and organize work schedule to meet deadlines
	SB4. work constructively and collaboratively with others
	<b>Customer centricity</b>
	The user/individual on the job needs to know and understand how to:
	SB5. follow organisation code of conduct
	SB6. manage relationships with customers with intent on satisfying its requirements for service delivery
	<b>Problem Solving</b>
The user/individual on the job needs to know and understand how to:	
SB7. recognize problems and search for solutions	
SB8. choose best methods to complete assigned tasks	
SB9. approach relevant authority when required	
<b>Analytical thinking</b>	
The user/individual on the job needs to know and understand how to:	
SB10. apply domain knowledge, observations and data to select course of action to perform tasks related to solar photovoltaic module manufacturing facility	
<b>Critical thinking</b>	
The user/individual on the job needs to know and understand how to:	
SB11. use reasoning skills to identify and resolve basic problems	
SB12. use intuition to detect any potential problems which could arise during operations	
SB13. use acquired knowledge of the process for identifying and handling issues	



SGJ/N0145

Carry out manufacturing of solar PV modules

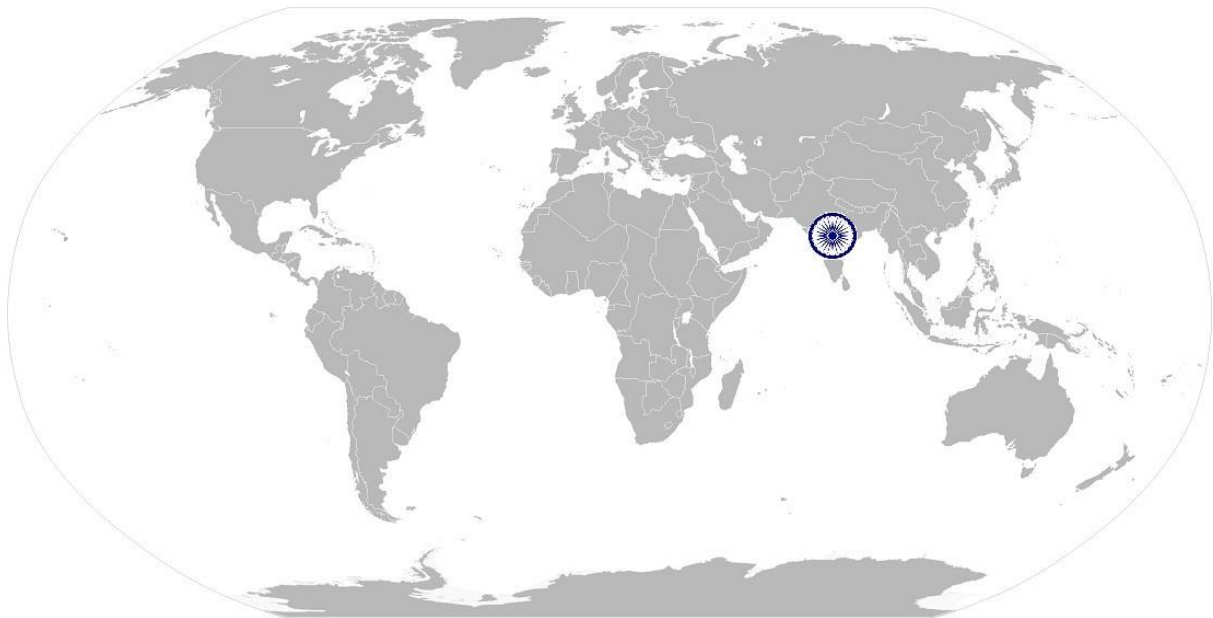
## NOS Version Control

<b>NOS Code</b>	<b>SGJ/N0145</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Green Jobs</b>	<b>Drafted on</b>	<b>01/09/2016</b>
<b>Industry Sub-sector</b>	<b>Renewable Energy</b>	<b>Last reviewed on</b>	<b>17/05/2017</b>
<b>Occupation</b>	<b>Manufacturing</b>	<b>Next review date</b>	<b>30/09/2016</b>



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# National Occupational Standard



## Overview

This unit is about maintaining health & safety in a manufacturing facility

**SGJ/N0147 Maintain personal health & safety in a manufacturing facility**

National Occupational Standard

<b>Unit Code</b>	<b>SGJ/N0147</b>
<b>Unit Title (Task)</b>	<b>Maintain personal health &amp; safety in a manufacturing facility</b>
<b>Description</b>	This unit is about maintaining health & safety in a manufacturing facility
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>• establish and follow safe work procedure</li> <li>• use and maintain personal protective equipment</li> <li>• identify and mitigate safety hazards</li> <li>• demonstrate safe and proper use of required tools and equipment</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Establish and Follow safe work procedure</b>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. identify corporate policies required for workplace safety</p> <p>PC2. identify requirements for safe work area and create a safe work environment</p> <p>PC3. identify contact person when workplace safety policies are violated</p> <p>PC4. provide information about incident/violation</p> <p>PC5. identify the location of first aid materials and administer first aid</p>
<b>Use and maintain personal protective equipment</b>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC6. identify the personal protection equipment required for specific locations on-site</p> <p>PC7. identify expiry dates and wear &amp; tear issues of specified equipment</p> <p>PC8. demonstrate safe and accepted practices for personal protection</p>
<b>Identify and mitigate safety hazards</b>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC9. identify environmental hazards associated with the manufacturing facility</p> <p>PC10. identify electrical hazards</p> <p>PC11. identify personal safety hazards or work site hazards and mitigate hazards</p>
<b>Demonstrate safe and proper use of required tools and equipment</b>	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC12. select tools, equipment and testing devices needed to carry out the work</p> <p>PC13. demonstrate safe and proper use of required tools and equipment</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the organization and its processes)	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. company's installation policy</p> <p>KA2. company's customer support policy</p> <p>KA3. company's documentation policy</p> <p>KA4. document information using appropriate corporate forms</p> <p>KA5. obtain authorization from specified field safety officer and supervisor</p> <p>KA6. company's reporting structure &amp; organization culture</p> <p>KA7. company's different department and concerned authority</p>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. relevant personal protective equipment's required within the manufacturing facility</p> <p>KB2. relevant standards and regulations to be followed in the manufacturing facility</p> <p>KB3. occupational health and safety (OHS) standards to be followed in the manufacturing facility</p> <p>KB4. risk identification and mitigation procedure for safe work in a manufacturing facility</p> <p>KB5. knowhow of tools &amp; tackles required to carry out the work</p>

**SGJ/N0147 Maintain personal health & safety in a manufacturing facility**

Skills (S)	
<b>A. Core Skills/ Generic Skills</b>	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. fill up documentation applicable to one's role
	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA2. read vernacular/english language SA3. read and understand manuals, health and safety instructions, memos, other company documents SA4. ability to read from different sources- books, screens in machines and signage SA5. understand the various colour codes, as per standard electrical, mechanical and civil nomenclature
<b>B. Professional Skills</b>	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA6. express statements or information clearly so that others can hear and understand SA7. participate in and understand the main points of simple discussions SA8. respond appropriately to any queries SA9. communicate with peers, supervisor and sub-ordinates
	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. follow organization rule-based decision making process SB2. take decision with systematic course of actions and/or response
<b>B. Professional Skills</b>	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand: SB3. plan and organize service work to meet deadlines SB4. plan to utilise time and equipment's effectively SB5. work constructively and collaboratively with others
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB6. follow organisation code of conduct SB7. manage relationships with customers with intent on satisfying its requirements for service delivery
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB8. recognize problems and search for solutions SB9. choose best methods to complete assigned tasks SB10. approach relevant authority when required
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB11. apply domain knowledge, observations and data to select course of action to perform tasks related to the job role
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities SB13. ask questions for better understanding

SGJ/N0147

Maintain personal health & safety in a manufacturing facility

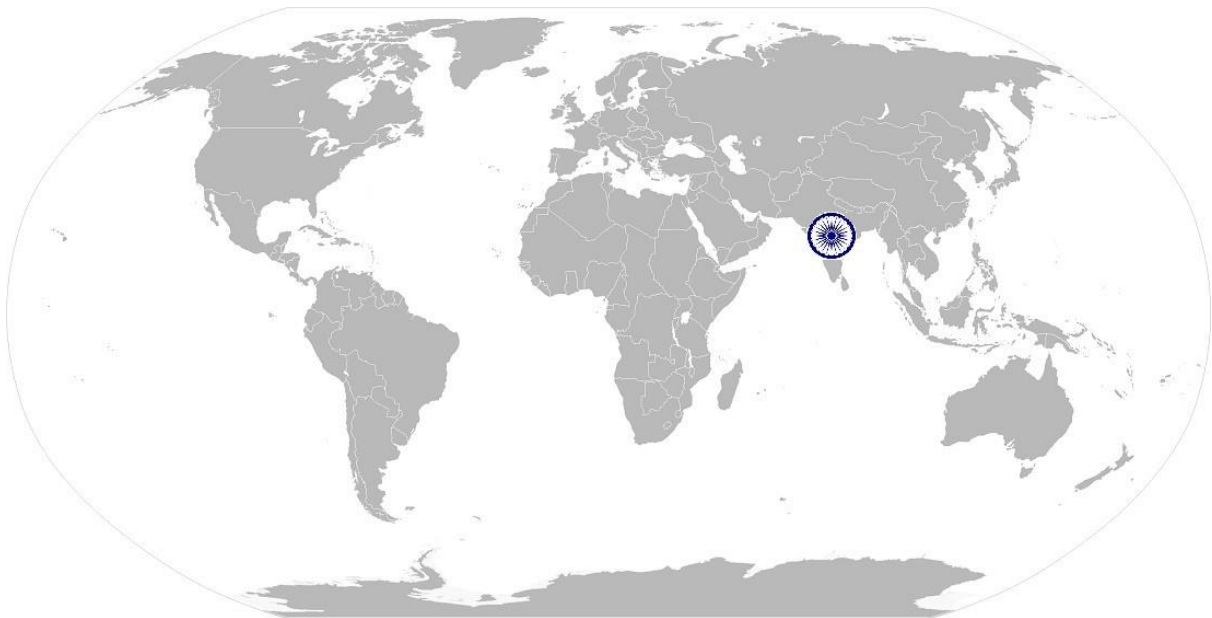
## NOS Version Control

NOS Code	SGJ/N0121		
Credits (NSQF)	TBD	Version number	1.0
Industry	Green Jobs	Drafted on	01/09/2016
Industry Sub-sector	Renewable Energy	Last reviewed on	17/05/2017
Occupation	Health & Safety	Next review date	30/09/2019



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# National Occupational Standard



## Overview

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

SGJ/N0120

Work effectively with others

National Occupational Standard

<b>Unit Code</b>	<b>SGJ/N0120</b>
<b>Unit Title (Task)</b>	<b>Work effectively with others</b>
<b>Description</b>	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
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>working with others</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Working with others</b>	<p>The user/individual on the job should be able to:</p> <p>PC1. accurately pass on information to the authorized persons who require it and within agreed timescale and confirm its receipt</p> <p>PC2. assist others in performing tasks in a positive manner where required and possible</p> <p>PC3. consult and assist others to maximize effectiveness and efficiency in carrying out tasks</p> <p>PC4. display appropriate communication etiquette while working</p> <p>PC5. display active listening skills while interacting with others at work</p> <p>PC6. demonstrate responsible and disciplined behaviors at the project site</p> <p>PC7. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict</p> <p>PC8. identify the need for common grounds with clients, team members, etc. and negotiate in an effective manner to achieve the same</p> <p>PC9. consider and respect the opinions, creativity, values, beliefs and perspectives of others</p> <p>PC10. ensure collaboration and group participation to achieve common goals</p> <p>PC11. promote a friendly, co-operative environment that is conducive to employee's sense of belonging</p> <p>PC12. facilitate an understanding and appreciation of the differences among team members</p>
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (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 organization 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>
<b>B. Technical Knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. various categories of people that one is required to communicate and co-ordinate with in the organization</p> <p>KB2. importance of effective communication in the workplace</p> <p>KB3. importance of teamwork in organizational and individual success</p> <p>KB4. various components of effective communication</p>

SGJ/N0120

**Work effectively with others**

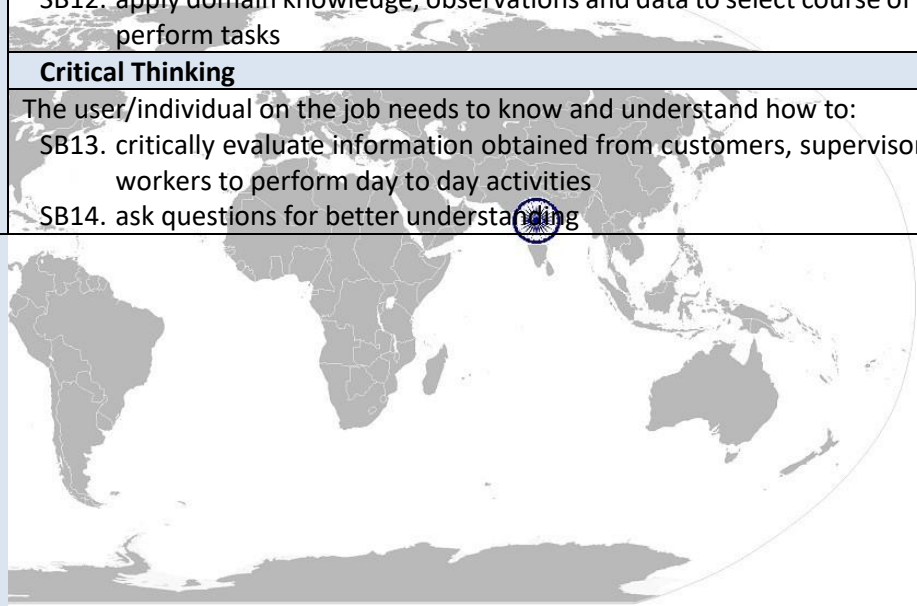
	<p>KB5. key elements of active listening          KB6. value and importance of active listening and assertive communication          KB7. barriers to effective communication          KB8. importance of tone and pitch in effective communication          KB9. importance of avoiding casual expletives and 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. key elements and importance of non-verbal communication          KB12. importance of ethics for professional success          KB13. importance of discipline for professional success          KB14. what constitutes disciplined behavior for a working professional          KB15. common reasons for interpersonal conflict          KB16. importance of developing effective working relationships for professional success          KB17. expressing and addressing grievances appropriately and effectively          KB18. importance and ways of managing interpersonal conflict effectively          KB19. importance of teamwork and collaboration</p>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<p><b>Writing Skills</b>          The user/ individual on the job needs to know and understand how to:          SA1. note the information communicated          SA2. record the readings of various parameters in the prescribed format          SA3. note down observations related to the activity          SA4. write information documents to internal departments/ internal teams</p> <p><b>Reading Skills</b>          The user/individual on the job needs to know and understand how to:          SA5. read vernacular/English language          SA6. read and understand equipment manuals, health and safety instructions, memos, other company documents          SA7. read from different sources- books, screens in machines and signage          SA8. read internal information documents sent by internal teams</p> <p><b>Oral Communication (Listening and Speaking skills)</b>          The user/individual on the job needs to know and understand how to:          SA9. express statements or information clearly so that others can hear and understand          SA10. participate in and understand the main points of simple discussions          SA11. respond appropriately to any queries          SA12. communicate effectively with supervisor, peers and subordinates</p>
<b>B. Professional Skills</b>	<p><b>Decision Making</b>          The user/individual on the job needs to know and understand how to:          SB1. follow organization rule-based decision making process          SB2. analyze critical points in day to day tasks and identify control measures to solve the issue          SB3. handle issues in case the superior is not available (as per the authority matrix defined by the organisation)</p> <p><b>Plan and Organize</b>          The user/individual on the job needs to know and understand how to :</p>



SGJ/N0120

**Work effectively with others**

	SB4. planning and organization of work to meet deadlines SB5. work constructively and collaboratively with others SB6. support the superiors in scheduling tasks
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB7. follow organisation code of conduct SB8. manage relationships with customers with intent on satisfying its requirements for service delivery
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB9. recognize problems and search for solutions SB10. choose best methods to complete assigned tasks SB11. approach relevant authority when required
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB12. apply domain knowledge, observations and data to select course of action to perform tasks
	<b>Critical Thinking</b>
The user/individual on the job needs to know and understand how to: SB13. critically evaluate information obtained from customers, supervisor and co-workers to perform day to day activities SB14. ask questions for better understanding	

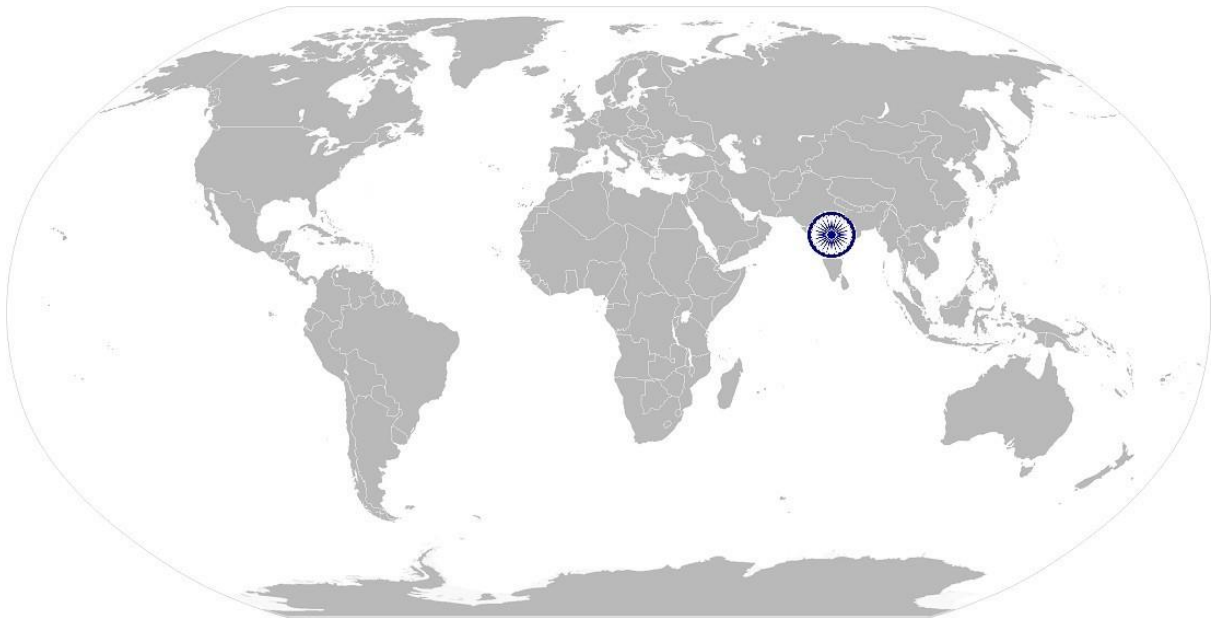


SGJ/N0120

Work effectively with others

## NOS Version Control

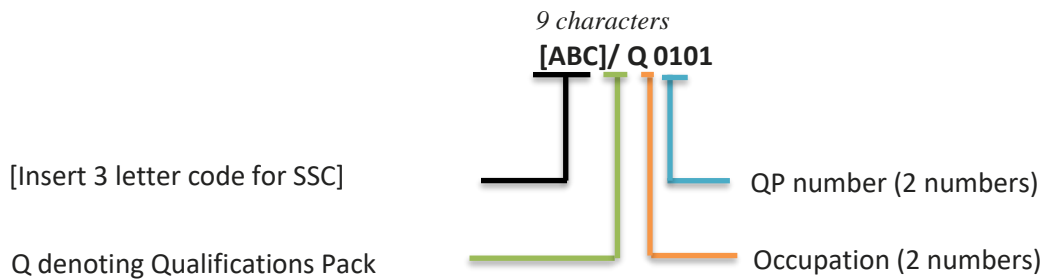
<b>NOS Code</b>	<b>SGJ/ N0120</b>		
<b>Credits (NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Green Jobs</b>	<b>Drafted on</b>	<b>01/09/2016</b>
<b>Industry Sub-sector</b>	<b>Renewable Energy</b>	<b>Last reviewed on</b>	<b>15/02/2017</b>
<b>Occupation</b>	<b>Team Manufacturing</b>	<b>Next review date</b>	<b>30/09/2019</b>



## Annexure

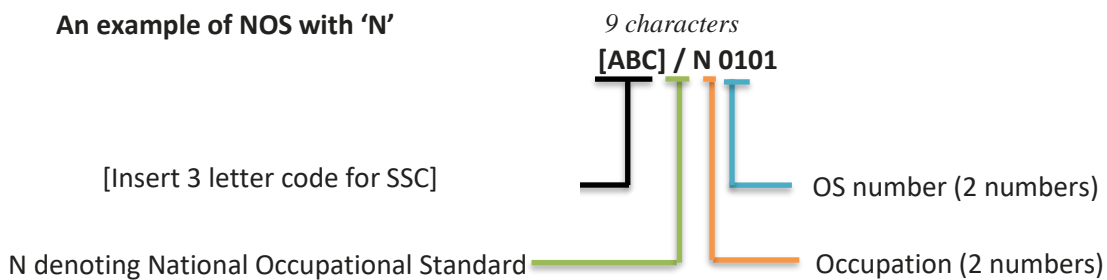
### Nomenclature for QP and NOS

#### Qualifications Pack



#### Occupational Standard

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



SGJ/Q0119

*Qualifications Pack For “Solar PV Manufacturing Technician”*

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

Sub-sector		Range of Occupation numbers
<b>Renewable Energy (01-35)</b>	<b>Solar Photovoltaic</b>	01-05
	<b>Solar Thermal</b>	06-10
	<b>Wind</b>	11-15
	<b>Hydro</b>	16-20
	<b>Biomass</b>	21-25
	<b>Geothermal</b>	26-30
	<b>All Renewables (Cross-cutting/ Enabling Activities)</b>	31-35
<b>Green Transportation (36 - 40)</b>	<b>Alternative Fuel Transportation</b>	36-40
	<b>Bio-fuels and Farming</b>	40-45
	<b>Other Green Transportation</b>	46-50
<b>Green Construction (51- 60)</b>	<b>Green Buildings</b>	51-55
	<b>Energy Efficiency</b>	56-60
<b>Waste Management (61- 65)</b>	<b>Waste Management</b>	61-65
<b>Water Management ( 66-70)</b>	<b>Water and Wastewater Management</b>	66-70
<b>Co-Generation (71 - 75)</b>	<b>Co-generation</b>	71-75
<b>Other Green Jobs (76- 99)</b>	<b>Carbon Sinks</b>	76-80
	<b>Environmental Compliance and Sustainability Planning</b>	81-85
	<b>Other Green Jobs</b>	85-99

Sequence	Description	Example
<b>Three letters</b>	Industry name	SGJ
<b>Slash</b>	/	/
<b>Next letter</b>	Whether QP or NOS	Q or N
<b>Next two numbers</b>	Occupation code	01
<b>Next two numbers</b>	OS number	01

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### **CRITERIA FOR ASSESSMENT OF TRAINEES**

**Job Role** Solar PV Manufacturing Technician/ Operator

**Qualification Pack** SGJ/Q0119

**Sector Skill Council** Green Jobs

#### **Guidelines for Assessment**

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criterion.
6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7. In case of *unsuccessful completion*, the trainee may seek reassessment on the Qualification Pack.

Compulsory NOS			Marks allocation		
Total Marks: 200			Out of	Theory	Skills Practical
Assessment Outcomes	Assessment Criteria for outcomes	Total Marks			
SGJ/N0145 Carry out the manufacturing of solar PV modules	PC1. sort the solar cells using a cell sorter and put use the cells with same specifications for making a cell string	100	6	2	4
	PC2. monitor the assembly and interconnection of cells with metal ribbons to make a module		6	2	4
	PC3. ensure the testing of solar cells as per standard operating procedures		6	3	3
	PC4. cut EVA using a cutter and place it on the glass substrate		6	2	4
	PC5. monitoring the process of aligning and placing cell strings on EVA sheet at assembler module layup station		6	2	4
	PC6. monitor the process of completing the module laminate circuit at the busing station and provide output leads		7	2	5
	PC7. visually inspect and electrically test the module laminate circuit by measuring its I-V characteristics at an inspection station		7	2	5
	PC8. cut EVA back sheets to length using the cut and place station, and then		6	2	4

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	assemble them with the glass and module circuit				
	PC9. monitor the process to laminate the assembly and cure the EVA with the laminator		6	2	4
	PC10. trim the edges of the laminated module penal using cutter		4	1	3
	PC11. attach the junction box and by-pass diodes		4	1	3
	PC12. install an edge gasket		4	1	3
	PC13. monitor the framing of solar module at a frame press station		4	1	3
	PC14. measure the module’s performance under simulated sunlight		7	2	5
	PC15. perform the testing of solar modules as per relevant industry standards		7	2	5
	PC16. visually inspect the completed module for quality of materials and workmanship		6	2	4
	PC17. check proper packaging material for module		4	1	3
	PC18. pack modules in properly designed cartons for transportation		4	1	3
	<b>TOTAL</b>		<b>100</b>	<b>31</b>	<b>69</b>
<b>SGJ/N0147 Maintain personal health &amp; safety in a manufacturing facility</b>	PC1. identify corporate policies required for workplace safety	<b>50</b>	2	1	1
	PC2. identify requirements for safe work area and create a safe work environment		3	2	1
	PC3. identify contact person when workplace safety policies are violated		1	1	0
	PC4. provide information about incident/violation		1	1	0
	PC5. identify the location of first aid materials and administer first aid		2	1	1
	PC6. identify the personal protection equipment required for specific locations on-site		8	3	5
	PC7. identify expiry dates and wear & tear issues of specified equipment		2	1	1
	PC8. demonstrate safe and accepted practices for personal protection		8	3	5
	PC9. identify environmental hazards associated with the manufacturing facility		4	2	2
	PC10. identify electrical hazards		4	2	2
	PC11. identify personal safety hazards or work site hazards and mitigate hazards		6	3	3
	PC12. select tools, equipment and testing devices needed to carry out the work		4	2	2
	PC13. demonstrate safe and proper use of required tools and equipment		5	2	3
	<b>TOTAL</b>		<b>50</b>	<b>24</b>	<b>26</b>

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SGJ/N0120 Work effectively with others	PC1. accurately pass on information to the authorized persons who require it and within agreed timescale and confirm its receipt	50	4	2	2
	PC2. assist others in performing tasks in a positive manner where required and possible		4	2	2
	PC3. consult and assist others to maximize effectiveness and efficiency in carrying out tasks		4	2	2
	PC4. display appropriate communication etiquette while working		6	3	3
	PC5. display active listening skills while interacting with others at work		4	2	2
	PC6. demonstrate responsible and disciplined behaviors at the project site		4	2	2
	PC7. escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict		3	1	2
	PC8. identify the need for common grounds with clients, team members, etc. and negotiate in an effective manner to achieve the same		3	1	2
	PC9. consider and respect the opinions, creativity, values, beliefs and perspectives of others		4	2	2
	PC10. ensure collaboration and group participation to achieve common goals		6	3	3
	PC11. promote a friendly, co-operative environment that is conducive to employee’s sense of belonging		4	2	2
	PC12. facilitate an understanding and appreciation of the differences among team members		4	2	2
<b>TOTAL</b>		<b>50</b>	<b>24</b>	<b>26</b>	