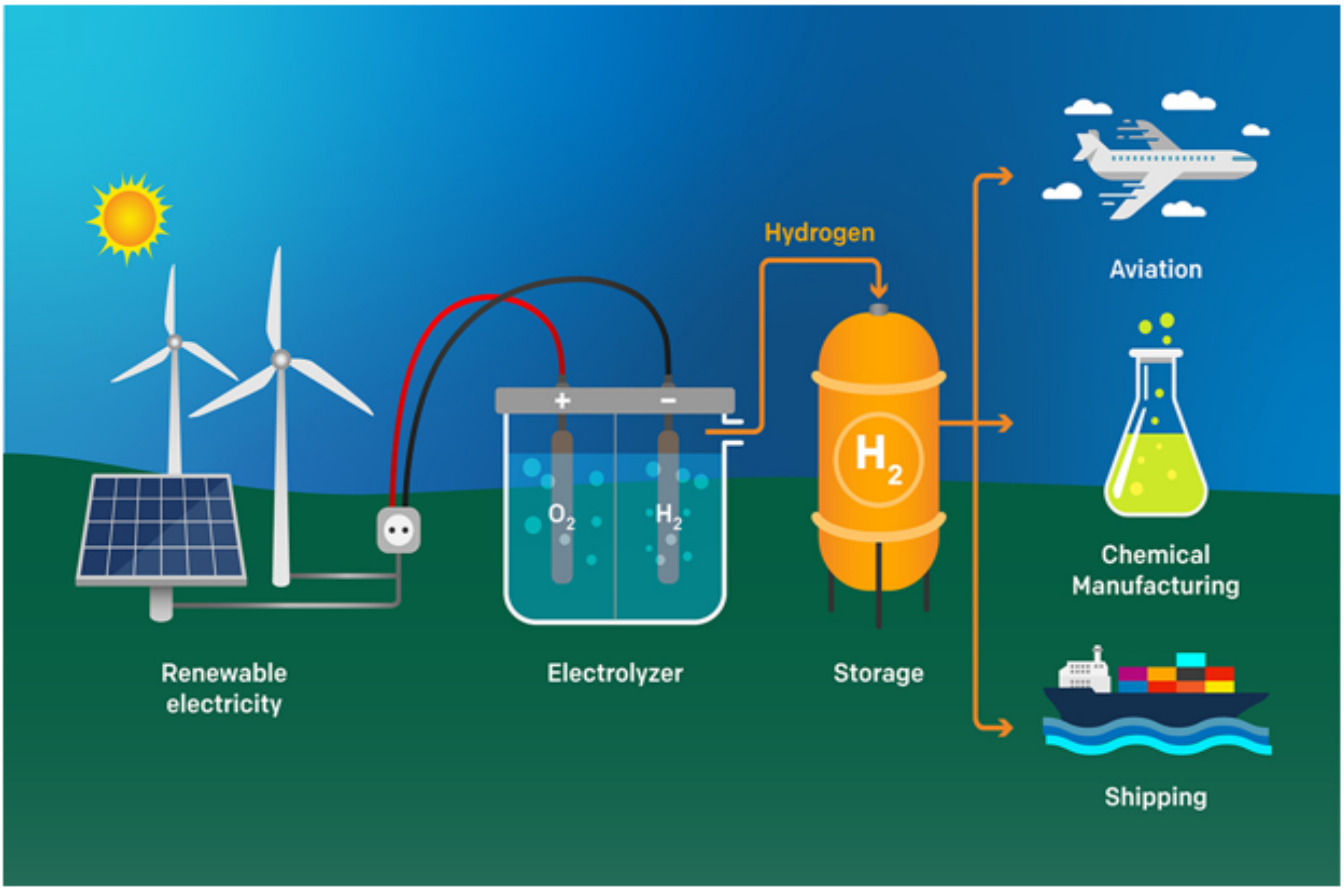
Qualification Pack



Green Hydrogen Plant Junior Technician - Power Sources

QP Code: SGJ/Q4301

Version: 1.0

NSQF Level: 3

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SGJ/Q4301: Green Hydrogen Plant Junior Technician - Power Sources

Brief Job Description

The job holder shall perform testing, installation and facility integration of various parts, repairs, troubleshooting, upkeep and maintenance of electrical control systems, protection systems, and other auxiliary equipment and associated tools in integrating power sources with electrolyser for production of Green Hydrogen. He/She will be responsible for the complete installation, maintenance, electric wiring for integrating power sources with electrolyser. This role works closely with the power supply project, testing, plant engineering, process operation, control & operation all types power sources integrating with electrolyser.

Personal Attributes

This job requires the individual to concentrate on the job at hand and complete the work safely. He/she should be able to communicate in local language. He / She must possess energy and strength for physical work. And also have a basic understanding of social and natural environment. He/she should possess very good interpersonal skills to work in integrating power sources with electrolyser.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. SGJ/N4301: Basics of Green Hydrogen Production
2. SGJ/N4302: Analyse Main Parts of green hydrogen production unit
3. SGJ/N4303: Identify Renewable Energy sources for green hydrogen production
4. SGJ/N4037: Perform integration of Power Sources with Electrolyser
5. SGJ/N4038: Identify tools and tackles used for handling Power Sources
6. SGJ/N4039: Perform Health & Safety measures for integrating Power Sources with Electrolyser at Green hydrogen Plant.
7. DGT/VSQ/N0101: Employability Skills (30 Hours)

Qualification Pack (QP) Parameters

Sector	Green Jobs
Sub-Sector	Other Green Jobs

Qualification Pack

Occupation	Hydrogen Plant Technician
Country	India
NSQF Level	3
Credits	10
Aligned to NCO/ISCO/ISIC Code	NCO-2015/ 8131.2100
Minimum Educational Qualification & Experience	10th grade pass OR 8th grade pass with 2 years of NTC (/NAC) with NA of experience OR Previous relevant Qualification of NSQF Level (2.5 with 1.5 years of relevant experience)
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	31/08/2026
NSQC Approval Date	31/08/2023
Version	1.0
Reference code on NQR	QG-03-ES-00764-2023-V1-SCGJ
NQR Version	1

Remarks:

Total 360 Hours i.e. 12 Credits (Theory: 170 hours+Practical:100 hours+ 30 hours of employability skills + 60 hours of OJT)

SGJ/N4301: Basics of Green Hydrogen Production

Description

This unit specified the fundamentals of green hydrogen production system

Scope

The scope covers the following :

- Basics of Green Hydrogen Production

Elements and Performance Criteria

Basics of Green Hydrogen Production

To be competent, the user/individual on the job must be able to:

PC1. discuss properties and characteristics of Hydrogen

PC2. describe basic concepts of Hydrogen as fuel and energy carrier

PC3. discuss in brief various existing methods of hydrogen production and demonstrate various methods of hydrogen production.

PC4. discuss various colour code nomenclature of Hydrogen and demonstrate with chart colour code nomenclature of Hydrogen

PC5. discuss various technology options for production of Green Hydrogen and draw a flow diagram of green hydrogen production, conversion and end uses across the energy system

PC6. discuss key aspects and challenges related to production and storage of Green Hydrogen and do an activity for matching the process and source of production as applicable for different colour codes of hydrogen

PC7. discuss the end use applications of Green hydrogen in industry, transport and power production

PC8. discuss the role and responsibilities of various Green Hydrogen Plant Junior Technicians and demonstrate roles of various technicians in a green hydrogen plant

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organizations reporting structure

KU2. organizations documentation policy

KU3. organizational culture

KU4. Properties and characteristic of hydrogen

KU5. concept of hydrogen as fuel and energy carrier

KU6. signs, symbols and color codes and nomenclature used in hydrogen production

KU7. challenges related to production and storage of green hydrogen

KU8. basic skills required to perform the task of green hydrogen production

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up relevant documents.
GS2. read vernacular language.
GS3. understand the various colour codes used in hydrogen production
GS4. express statements or information clearly so that others can understand
GS5. understand the main points of simple discussions
GS6. follow organization rule-based decision making process.
GS7. planning and organization of work to meet schedule.
GS8. work constructively and collaboratively with others.
GS9. communicate and create awareness.
GS10. recognize problems & approach relevant authority.
GS11. critically evaluate information obtained from supervisor and co-workers to perform day to day activities.
GS12. ask questions for better understanding.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Basics of Green Hydrogen Production	**30**	**20**	**-**	**-**
PC1. discuss properties and characteristics of Hydrogen	3	-	-	-
PC2. describe basic concepts of Hydrogen as fuel and energy carrier	3	-	-	-
PC3. discuss in brief various existing methods of hydrogen production and demonstrate various methods of hydrogen production.	4	2	-	-
PC4. discuss various colour code nomenclature of Hydrogen and demonstrate with chart colour code nomenclature of Hydrogen	4	3	-	-
PC5. discuss various technology options for production of Green Hydrogen and draw a flow diagram of green hydrogen production, conversion and end uses across the energy system	4	5	-	-
PC6. discuss key aspects and challenges related to production and storage of Green Hydrogen and do an activity for matching the process and source of production as applicable for different colour codes of hydrogen	4	5	-	-
PC7. discuss the end use applications of Green hydrogen in industry, transport and power production	4	-	-	-
PC8. discuss the role and responsibilities of various Green Hydrogen Plant Junior Technicians and demonstrate roles of various technicians in a green hydrogen plant	4	5	-	-
NOS Total	**30**	**20**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4301
NOS Name	Basics of Green Hydrogen Production
Sector	Green Jobs
Sub-Sector	Other Green Jobs
Occupation	Hydrogen Plant Technician
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	31/08/2023
Next Review Date	31/08/2026
NSQC Clearance Date	31/08/2023

SGJ/N4302: Analyse Main Parts of green hydrogen production unit

Description

This unit specifies identifying the main parts of green hydrogen production unit

Scope

The scope covers the following :

- Analyse Main Parts of green hydrogen production unit

Elements and Performance Criteria

Analyse Main Parts of green hydrogen production unit

To be competent, the user/individual on the job must be able to:

PC1. identify key parts and components of the Green Hydrogen plant including electrical, mechanical and civil components and illustrate the schematic of Green hydrogen production plant

PC2. discuss functions of each part and components and illustrate key components of the plant and outline their functions through plant schematic

PC3. discuss fundamental principles of main components on which they operate

PC4. explain basics of plant layout and illustrate how to interpret the Plant Layout including various equipments

PC5. discuss the plant components most relevant to the course and demonstrate how to interpret signs, notices and/or cautions at project site.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organizations reporting structure

KU2. organizations documentation policy

KU3. organizational culture

KU4. Properties and characteristic of hydrogen

KU5. concept of hydrogen as fuel and energy carrier

KU6. signs, symbols and color codes and nomenclature used in hydrogen production

KU7. challenges related to production and storage of green hydrogen

KU8. basic skills required to perform the task of green hydrogen production

KU9. understanding relevant regulations and safety standards

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up relevant documents
GS2. read vernacular language
GS3. understand the various colour codes used in hydrogen production
GS4. express statements or information clearly so that others can understand
GS5. understand the main points of simple discussions
GS6. follow organization rule-based decision making process
GS7. planning and organization of work to meet schedule
GS8. work constructively and collaboratively with others
GS9. communicate and create awareness
GS10. ask questions for better understanding.
GS11. critically evaluate information obtained from supervisor and co-workers to perform day to day activities.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Analyse Main Parts of green hydrogen production unit	**30**	**20**	**-**	**-**
PC1. identify key parts and components of the Green Hydrogen plant including electrical, mechanical and civil components and illustrate the schematic of Green hydrogen production plant	6	5	-	-
PC2. discuss functions of each part and components and illustrate key components of the plant and outline their functions through plant schematic	6	5	-	-
PC3. discuss fundamental principles of main components on which they operate	6	5	-	-
PC4. explain basics of plant layout and illustrate how to interpret the Plant Layout including various equipments	6	-	-	-
PC5. discuss the plant components most relevant to the course and demonstrate how to interpret signs, notices and/or cautions at project site.	6	5	-	-
NOS Total	**30**	**20**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4302
NOS Name	Analyse Main Parts of green hydrogen production unit
Sector	Green Jobs
Sub-Sector	Other Green Jobs
Occupation	Hydrogen Plant Technician
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	31/08/2023
Next Review Date	31/08/2026
NSQC Clearance Date	31/08/2023

SGJ/N4303: Identify Renewable Energy sources for green hydrogen production

Description

This unit outlines how to identify renewable input sources for green hydrogen generation

Scope

The scope covers the following :

- Description of various Renewable Energy sources

Elements and Performance Criteria

Description of various Renewable Energy sources

To be competent, the user/individual on the job must be able to:

PC1. Provide an overview of various renewable sources along with their key features and comparison and illustrate different types of Renewable Power Sources and their key specification through Pictures, videos, product data sheet etc

PC2. explain the major components of each type of Renewable Energy Source

PC3. discuss the Operating principles and procedure of solar, wind, hydro Power Sources and outline differences in various power sources like solar, wind, hydro etc. and illustrate their schematics

PC4. explain the inputs required for generating Renewable Power

PC5. discuss basic technical specifications of each Power Source and demonstrate basic technical specifications of each Power Source

PC6. discuss the type of output power we get from each renewable energy source

PC7. identify successful case studies for various successful renewable energy projects for green hydrogen production in India and overseas and showcase successful case studies for various successful renewable energy projects for green hydrogen production in India and overseas through pictures and videos.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organizations reporting structure

KU2. organizations documentation policy

KU3. organizational culture

KU4. Properties and characteristic of power sources

KU5. concept of hydrogen as fuel and energy carrier

KU6. signs, symbols and color codes and nomenclature used in power sources and hydrogen production

KU7. understanding relevant regulations and safety standards

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up relevant documents

GS2. read vernacular/English language

GS3. participate in and understand the main points of discussions with teams and external stakeholders

GS4. express statements or information clearly so that others can understand

GS5. plan and organize work schedule to meet work deadlines

GS6. take decision with systematic course of actions and/or response

GS7. read and write different types of documents/instructions/correspondence

GS8. communicate effectively using appropriate language in formal and informal settings

GS9. communicate and create awareness

GS10. critically evaluate information obtained from supervisor and co-workers to perform day to day activities.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Description of various Renewable Energy sources	**30**	**20**	**-**	**-**
PC1. Provide an overview of various renewable sources along with their key features and comparison and illustrate different types of Renewable Power Sources and their key specification through Pictures, videos, product data sheet etc	3	5	-	-
PC2. explain the major components of each type of Renewable Energy Source	5	-	-	-
PC3. discuss the Operating principles and procedure of solar, wind, hydro Power Sources and outline differences in various power sources like solar, wind, hydro etc. and illustrate their schematics	4	5	-	-
PC4. explain the inputs required for generating Renewable Power	4	-	-	-
PC5. discuss basic technical specifications of each Power Source and demonstrate basic technical specifications of each Power Source	4	5	-	-
PC6. discuss the type of output power we get from each renewable energy source	5	-	-	-
PC7. identify successful case studies for various successful renewable energy projects for green hydrogen production in India and overseas and showcase successful case studies for various successful renewable energy projects for green hydrogen production in India and overseas through pictures and videos.	5	5	-	-
NOS Total	**30**	**20**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4303
NOS Name	Identify Renewable Energy sources for green hydrogen production
Sector	Green Jobs
Sub-Sector	Other Green Jobs
Occupation	Hydrogen Plant Technician
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	31/08/2023
Next Review Date	31/08/2026
NSQC Clearance Date	31/08/2023

SGJ/N4037: Perform integration of Power Sources with Electrolyser

Description

This unit explain about integration of power sources with electrolyser

Scope

The scope covers the following :

- Integrating of Power Sources with Electrolyser

Elements and Performance Criteria

Integration of Power Sources with Electrolyser

To be competent, the user/individual on the job must be able to:

PC1. discuss different type of voltage levels (HV, MV, LV) required to integrate power source with electrolyser and demonstrate how to integrate solar power through model and schematic

PC2. discuss the role of converters like Inverters, rectifiers required while integrating power sources with electrolyser and demonstrate the use of Rectifier

PC3. discuss step by step process for connection/isolation of power sources with electrolyser and show how to implement the procedure for integrating power source assembly and operations

PC4. discuss how to perform installation, and its testing of various equipment's of power sources connected to electrolyser

PC5. discuss about the type of power available and the type of converter required to integrate power source with electrolyser

PC6. identify best practices for integration of power sources with green hydrogen unit for production of green hydrogen in India and overseas and analyse best practices for integration of power sources with green hydrogen unit for production of green hydrogen in India and overseas

PC7. show how to use different type of converters like inverter, rectifier etc. equipment as per suitable standard and industry practices

PC8. demonstrate the technical specification of Rectifier

PC9. show how to perform requisite data and document management

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. organizations reporting structure

KU2. organizations documentation policy

KU3. organizational culture

KU4. Properties and characteristic of power sources connected to electrolyser

KU5. concept of hydrogen as fuel and energy carrier

KU6. understanding relevant regulations and safety standards

KU7. challenges related to production and storage of green hydrogen

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. complete documentation work applicable to the role
GS2. read various color codes, as per standard electrical, mechanical and civil nomenclature
GS3. follow organisational code of conduct
GS4. approach relevant authority when required
GS5. make timely decisions for efficient utilization of resources
GS6. read health and safety instructions and signage
GS7. complete documentation work applicable to the role
GS8. express statements with required clarity
GS9. ask questions for better understanding
GS10. communicate with team members and colleagues on the significance of greening of jobs

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Integration of Power Sources with Electrolyser	**28**	**22**	**-**	**-**
PC1. discuss different type of voltage levels (HV, MV, LV) required to integrate power source with electrolyser and demonstrate how to integrate solar power through model and schematic	4	3	-	-
PC2. discuss the role of converters like Inverters, rectifiers required while integrating power sources with electrolyser and demonstrate the use of Rectifier	4	3	-	-
PC3. discuss step by step process for connection/isolation of power sources with electrolyser and show how to implement the procedure for integrating power source assembly and operations	5	3	-	-
PC4. discuss how to perform installation, and its testing of various equipment's of power sources connected to electrolyser	5	-	-	-
PC5. discuss about the type of power available and the type of converter required to integrate power source with electrolyser	5	-	-	-
PC6. identify best practices for integration of power sources with green hydrogen unit for production of green hydrogen in India and overseas and analyse best practices for integration of power sources with green hydrogen unit for production of green hydrogen in India and overseas	5	3	-	-
PC7. show how to use different type of converters like inverter, rectifier etc. equipment as per suitable standard and industry practices	-	4	-	-
PC8. demonstrate the technical specification of Rectifier	-	3	-	-
PC9. show how to perform requisite data and document management	-	3	-	-
NOS Total	**28**	**22**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4037
NOS Name	Perform integration of Power Sources with Electrolyser
Sector	Green Jobs
Sub-Sector	Other Green Jobs
Occupation	Technician
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	31/08/2023
Next Review Date	31/08/2026
NSQC Clearance Date	31/08/2023

SGJ/N4038: Identify tools and tackles used for handling Power Sources

Description

This unit Identifies tools and tackles used for handling Power Sources

Scope

The scope covers the following :

- Introduction of tools and tackles used for handling Power Sources
- Describe the Safety and Protection Devices used for Power Sources
- Perform Operation and Maintenance of power supply and Electrical equipment's

Elements and Performance Criteria

Identify tools and tackles used for handling Power Sources

To be competent, the user/individual on the job must be able to:

PC1. discuss suitable tools and equipment required for Integration of power sources with electrolyser and show how to identify the tools and equipment to perform the integration of power sources of as per concerned technical sheets

PC2. discuss the tools required for assembly/Installation of Parts and Components of power sources to be integrated with electrolyser and show how to handle different tools, equipment as per concerned standard and industry practices

PC3. discuss about checking and detection of damaged tools and demonstrate how to identify damaged tools

PC4. discuss the tools required for performing electrical and mechanical work for integration of power source with electrolyser and demonstrate working of each type of tool

PC5. discuss the routine inspection carried out to check the tools are corrosion free

PC6. discuss about all measuring instruments, multimeter, megger, clampmeter, etc. working properly

PC7. discuss the function and attribute of each tool and demonstrate working of each type of tool

PC8. identify best practices for care and use of tools and tackles used in handling power sources for green hydrogen production in India and overseas and showcase best practices for care and use of tools and tackles used in handling power sources for green hydrogen production in India and overseas.

PC9. demonstrate how to implement 5S (SORT, Set in Order, SHINE, STANDARDISED, SUSTAIN) at site

Describe the Safety and Protection Devices used for Power Sources

To be competent, the user/individual on the job must be able to:

PC10. explain the requirements for Safety and Protection Devices used for Power Sources in hydrogen generation project site and demonstrate the requirements for Safety and Protection Devices used for Power Sources in hydrogen generation project site

PC11. explain the importance of placing the safety and protection devices and demonstrate importance of location while placing the safety and protection devices

PC12. describe how to avoid potential causes of emergency such as electrocution, fire, explosion, etc. while placing protection devices at the required location and show how to avoid potential causes of emergency such as gas leaks, fire, explosion, etc while placing protection devices at the required location

PC13. discuss the zone of protection of each type of protective device used

PC14. discuss the monitoring of various parameters of each type of protective device

PC15. discuss about the temperature requirement for various motor control centres and protective devices connected to power supply

PC16. identify the successful case studies for use of safety and protection devices used in integrating power sources with electrolyser for green hydrogen production in India and overseas and analyse the successful case studies for use of safety and protection devices used in integrating power sources with electrolyser for green hydrogen production in India and overseas.

Perform Operation and Maintenance of power supply and Electrical equipments

To be competent, the user/individual on the job must be able to:

PC17. discuss key terms like voltage level, line current, type of power AC OR DC etc. and demonstrate about different type of voltage level ,type of power AC or DC, Power factor, frequency etc

PC18. discuss the Operation of various equipment's connected to power supply and show the step by step process of operating various equipment's connected to power supply through pictures and videos

PC19. discuss the key parameters due to which power supply at source can be affected

PC20. discuss the maintenance of various equipment's connected to power supply and show how to do routine and preventive maintenance of various equipment's connected to power supply

PC21. discuss about the test before touch methodology before start working on electrical equipments and power sources

PC22. discuss about LOTOTO Strategy before start maintenance of electrical equipments and demonstrate LOTOTO (Lockout, Tagout, Try-out).

PC23. discuss about the full load current capacity of various connected power sources

PC24. identify best practices for successful operation and maintenance of electrical equipment and power sources required for green hydrogen production in India and Overseas and analyse best practices for successful operation and maintenance of electrical equipment and power sources required for green hydrogen production in India and Overseas.

PC25. show how to perform requisite data and document management

PC26. show how to monitor various parameters of power connected equipment's

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. identification of tools and tackles

KU2. use of the tools and tackles

KU3. how to obtain required authorization

KU4. Importance of safety and protective devices

KU5. precautions to be taken while handling different electrical components

KU6. • importance of wearing protective clothing and other safety gear while carrying out installation • and O&M activities (PPEs)

KU7. usage and handling procedure of electrical components

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. complete documentation work applicable to the role

GS2. read various color codes, as per standard electrical nomenclature

GS3. follow organisational code of conduct

GS4. approach relevant authority when required

GS5. make timely decisions for efficient utilization of resources

GS6. read health and safety instructions and signage

GS7. communicate and create awareness

GS8. critically evaluate information obtained from supervisor and co-workers to perform day to day activities.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Identify tools and tackles used for handling Power Sources	**18**	**18**	**-**	**-**
PC1. discuss suitable tools and equipment required for Integration of power sources with electrolyser and show how to identify the tools and equipment to perform the integration of power sources of as per concerned technical sheets	2	2	-	-
PC2. discuss the tools required for assembly/Installation of Parts and Components of power sources to be integrated with electrolyser and show how to handle different tools, equipment as per concerned standard and industry practices	2	2	-	-
PC3. discuss about checking and detection of damaged tools and demonstrate how to identify damaged tools	2	2	-	-
PC4. discuss the tools required for performing electrical and mechanical work for integration of power source with electrolyser and demonstrate working of each type of tool	2	3	-	-
PC5. discuss the routine inspection carried out to check the tools are corrosion free	2	-	-	-
PC6. discuss about all measuring instruments, multimeter, megger, clampmeter, etc. working properly	2	-	-	-
PC7. discuss the function and attribute of each tool and demonstrate working of each type of tool	3	3	-	-
PC8. identify best practices for care and use of tools and tackles used in handling power sources for green hydrogen production in India and overseas and showcase best practices for care and use of tools and tackles used in handling power sources for green hydrogen production in India and overseas.	3	3	-	-
PC9. demonstrate how to implement 5S (SORT, Set in Order, SHINE, STANDARDISED, SUSTAIN) at site	-	3	-	-
Describe the Safety and Protection Devices used for Power Sources	**17**	**12**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. explain the requirements for Safety and Protection Devices used for Power Sources in hydrogen generation project site and demonstrate the requirements for Safety and Protection Devices used for Power Sources in hydrogen generation project site	2	3	-	-
PC11. explain the importance of placing the safety and protection devices and demonstrate importance of location while placing the safety and protection devices	2	3	-	-
PC12. describe how to avoid potential causes of emergency such as electrocution, fire, explosion, etc. while placing protection devices at the required location and show how to avoid potential causes of emergency such as gas leaks, fire, explosion, etc while placing protection devices at the required location	2	3	-	-
PC13. discuss the zone of protection of each type of protective device used	2	-	-	-
PC14. discuss the monitoring of various parameters of each type of protective device	3	-	-	-
PC15. discuss about the temperature requirement for various motor control centres and protective devices connected to power supply	3	-	-	-
PC16. identify the successful case studies for use of safety and protection devices used in integrating power sources with electrolyser for green hydrogen production in India and overseas and analyse the successful case studies for use of safety and protection devices used in integrating power sources with electrolyser for green hydrogen production in India and overseas.	3	3	-	-
Perform Operation and Maintenance of power supply and Electrical equipments	**17**	**18**	**-**	**-**
PC17. discuss key terms like voltage level, line current, type of power AC OR DC etc. and demonstrate about different type of voltage level ,type of power AC or DC, Power factor, frequency etc	2	2	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC18. discuss the Operation of various equipment's connected to power supply and show the step by step process of operating various equipment's connected to power supply through pictures and videos	2	2	-	-
PC19. discuss the key parameters due to which power supply at source can be affected	2	-	-	-
PC20. discuss the maintenance of various equipment's connected to power supply and show how to do routine and preventive maintenance of various equipment's connected to power supply	2	2	-	-
PC21. discuss about the test before touch methodology before start working on electrical equipments and power sources	2	-	-	-
PC22. discuss about LOTOTO Strategy before start maintenance of electrical equipments and demonstrate LOTOTO (Lockout, Tagout, Try-out).	2	3	-	-
PC23. discuss about the full load current capacity of various connected power sources	2	-	-	-
PC24. identify best practices for successful operation and maintenance of electrical equipment and power sources required for green hydrogen production in India and Overseas and analyse best practices for successful operation and maintenance of electrical equipment and power sources required for green hydrogen production in India and Overseas.	3	3	-	-
PC25. show how to perform requisite data and document management	-	3	-	-
PC26. show how to monitor various parameters of power connected equipment's	-	3	-	-
NOS Total	**52**	**48**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4038
NOS Name	Identify tools and tackles used for handling Power Sources
Sector	Green Jobs
Sub-Sector	Other Green Jobs
Occupation	Technician
NSQF Level	3
Credits	4
Version	1.0
Last Reviewed Date	31/08/2023
Next Review Date	31/08/2026
NSQC Clearance Date	31/08/2023

SGJ/N4039: Perform Health & Safety measures for integrating Power Sources with Electrolyser at Green hydrogen Plant.

Description

This unit explain about how to perform Health & Safety measures for integrating Power Sources with Electrolyser at Green hydrogen Plant.

Scope

The scope covers the following :

- Health & Safety measures for integrating Power Sources with Electrolyser at Green hydrogen Plant.

Elements and Performance Criteria

Perform Health & Safety measures for integrating Power Sources with Electrolyser at Green hydrogen Plant.

To be competent, the user/individual on the job must be able to:

PC1. explain the requirements for safe work area at Power sources integrate with Electrolyser in hydrogen generation project site and demonstrate how to follow necessary and adequate safety measures including personal protective equipment and precautions to avoid any accident at power sources connected to electrolyser at hydrogen generation site

PC2. explain the importance of Occupational health & Safety standards and regulations for Basic considerations for the safety of Electrolyser systems

PC3. describe potential causes of emergency such as gas leaks, fire, explosion, bomb threatening, natural calamities etc

PC4. discuss importance of different detectors and safety tools

PC5. discuss and review the Material Safety Data Sheet and labels of chemicals contained in cylinders in order to be aware of their hazards and precautionary measures

PC6. explain the importance of administering first aid and demonstrate how to administer first aid

PC7. identify the personal protective equipment used for the specific purpose and demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work of power sources connected to Electrolyser

PC8. identify the hazards associated with Electrolyser and hydrogen generation system

PC9. discuss the best practices for health and safety in integrating power sources to electrolyser for green hydrogen production projects in India and overseas and showcase the best practices for health and safety in integrating power sources to electrolyser for green hydrogen production projects in India and overseas through pictures and videos.

PC10. discuss Mock testing of firefighting system and demonstrate the use of fire extinguishers, fire detection and alarm system.

PC11. discuss all applicable statutory requirements along with safety regulations in terms of fire protection

PC12. discuss and incorporate good housekeeping practices and infection control guidelines and demonstrate good housekeeping and infection control & prevention practices

PC13. show how to comply with all applicable statutory requirements along with safety regulations in terms of fire protection

PC14. demonstrate implementation of 5S (Sort, set in order, shine, standardised, sustain) at workplace

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. company's installation policy

KU2. document information using appropriate corporate forms

KU3. obtain authorization from specified field safety officer and supervisor

KU4. relevant personal protective equipments required within the facility

KU5. relevant standards and regulations to be followed in the facility

KU6. occupational health and safety (OHS) standards to be followed in the facility

KU7. risk identification and mitigation procedure for safe work in in a facility

KU8. know how of tools & tackles required to carry out the work

KU9. understand the various colour codes used in hydrogen production

KU10. challenges related to production and storage of green hydrogen

KU11. Properties and characteristic of hydrogen

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. organizations reporting structure

GS2. organizations documentation policy

GS3. organizational culture

GS4. signs, symbols and color codes and nomenclature used in hydrogen production

GS5. understanding relevant regulations and safety standards

GS6. basic skills required to perform the task of green hydrogen production

GS7. specific requirements relating to hydrogen infrastructure

GS8. express statements or information clearly so that others can understand

GS9. follow organization rule-based decision making process

GS10. planning and organization of work to meet schedule

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform Health & Safety measures for integrating Power Sources with Electrolyser at Green hydrogen Plant.	**27**	**23**	**-**	**-**
PC1. explain the requirements for safe work area at Power sources integrate with Electrolyser in hydrogen generation project site and demonstrate how to follow necessary and adequate safety measures including personal protective equipment and precautions to avoid any accident at power sources connected to electrolyser at hydrogen generation site	2	2	-	-
PC2. explain the importance of Occupational health & Safety standards and regulations for Basic considerations for the safety of Electrolyser systems	2	-	-	-
PC3. describe potential causes of emergency such as gas leaks, fire, explosion, bomb threatening, natural calamities etc	2	-	-	-
PC4. discuss importance of different detectors and safety tools	2	-	-	-
PC5. discuss and review the Material Safety Data Sheet and labels of chemicals contained in cylinders in order to be aware of their hazards and precautionary measures	2	-	-	-
PC6. explain the importance of administering first aid and demonstrate how to administer first aid	2	3	-	-
PC7. identify the personal protective equipment used for the specific purpose and demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work of power sources connected to Electrolyser	2	3	-	-
PC8. identify the hazards associated with Electrolyser and hydrogen generation system	3	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. discuss the best practices for health and safety in integrating power sources to electrolyser for green hydrogen production projects in India and overseas and showcase the best practices for health and safety in integrating power sources to electrolyser for green hydrogen production projects in India and overseas through pictures and videos.	3	3	-	-
PC10. discuss Mock testing of firefighting system and demonstrate the use of fire extinguishers, fire detection and alarm system.	2	3	-	-
PC11. discuss all applicable statutory requirements along with safety regulations in terms of fire protection	3	-	-	-
PC12. discuss and incorporate good housekeeping practices and infection control guidelines and demonstrate good housekeeping and infection control & prevention practices	2	3	-	-
PC13. show how to comply with all applicable statutory requirements along with safety regulations in terms of fire protection	-	3	-	-
PC14. demonstrate implementation of 5S (Sort, set in order, shine, standardised, sustain) at workplace	-	3	-	-
NOS Total	**27**	**23**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	SGJ/N4039
NOS Name	Perform Health & Safety measures for integrating Power Sources with Electrolyser at Green hydrogen Plant.
Sector	Green Jobs
Sub-Sector	Other Green Jobs
Occupation	Technician
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	31/08/2023
Next Review Date	31/08/2026
NSQC Clearance Date	31/08/2023

DGT/VSQ/N0101: Employability Skills (30 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

To be competent, the user/individual on the job must be able to:

PC1. understand the significance of employability skills in meeting the job requirements

Constitutional values – Citizenship

To be competent, the user/individual on the job must be able to:

PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices

Becoming a Professional in the 21st Century

To be competent, the user/individual on the job must be able to:

PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.

Basic English Skills

To be competent, the user/individual on the job must be able to:

PC4. speak with others using some basic English phrases or sentences

Communication Skills

To be competent, the user/individual on the job must be able to:

PC5. follow good manners while communicating with others

PC6. work with others in a team

Diversity & Inclusion

To be competent, the user/individual on the job must be able to:

PC7. communicate and behave appropriately with all genders and PwD

PC8. report any issues related to sexual harassment

Financial and Legal Literacy

To be competent, the user/individual on the job must be able to:

PC9. use various financial products and services safely and securely

PC10. calculate income, expenses, savings etc.

PC11. approach the concerned authorities for any exploitation as per legal rights and laws

Essential Digital Skills

To be competent, the user/individual on the job must be able to:

PC12. operate digital devices and use its features and applications securely and safely

PC13. use internet and social media platforms securely and safely

Entrepreneurship

To be competent, the user/individual on the job must be able to:

PC14. identify and assess opportunities for potential business

PC15. identify sources for arranging money and associated financial and legal challenges

Customer Service

To be competent, the user/individual on the job must be able to:

PC16. identify different types of customers

PC17. identify customer needs and address them appropriately

PC18. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

To be competent, the user/individual on the job must be able to:

PC19. create a basic biodata

PC20. search for suitable jobs and apply

PC21. identify and register apprenticeship opportunities as per requirement

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use basic spoken English language

KU6. Do and dont of effective communication

KU7. inclusivity and its importance

KU8. different types of disabilities and appropriate communication and behaviour towards PwD

KU9. different types of financial products and services

KU10. how to compute income and expenses
KU11. importance of maintaining safety and security in financial transactions
KU12. different legal rights and laws
KU13. how to operate digital devices and applications safely and securely
KU14. ways to identify business opportunities
KU15. types of customers and their needs
KU16. how to apply for a job and prepare for an interview
KU17. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. communicate effectively using appropriate language
GS2. behave politely and appropriately with all
GS3. perform basic calculations
GS4. solve problems effectively
GS5. be careful and attentive at work
GS6. use time effectively
GS7. maintain hygiene and sanitisation to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC2. identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**1**	**3**	**-**	**-**
PC3. explain 21st Century Skills such as Self-Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC4. speak with others using some basic English phrases or sentences	-	-	-	-
Communication Skills	**1**	**1**	**-**	**-**
PC5. follow good manners while communicating with others	-	-	-	-
PC6. work with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**1**	**-**	**-**
PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC8. report any issues related to sexual harassment	-	-	-	-
Financial and Legal Literacy	**3**	**4**	**-**	**-**
PC9. use various financial products and services safely and securely	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. calculate income, expenses, savings etc.	-	-	-	-
PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
Essential Digital Skills	**4**	**6**	**-**	**-**
PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
PC13. use internet and social media platforms securely and safely	-	-	-	-
Entrepreneurship	**3**	**5**	**-**	**-**
PC14. identify and assess opportunities for potential business	-	-	-	-
PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
Customer Service	**2**	**2**	**-**	**-**
PC16. identify different types of customers	-	-	-	-
PC17. identify customer needs and address them appropriately	-	-	-	-
PC18. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**1**	**3**	**-**	**-**
PC19. create a basic biodata	-	-	-	-
PC20. search for suitable jobs and apply	-	-	-	-
PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0101
NOS Name	Employability Skills (30 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	2
Credits	1
Version	1.0
Last Reviewed Date	16/12/2025
Next Review Date	18/11/2028
NSQC Clearance Date	16/12/2025

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification will be created by the Sector Skill Council. Each Element/ 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 Element/ 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 these criteria.

6. To pass the Qualification assessment, every trainee should score the Recommended Pass % aggregate for the QP.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
SGJ/N4301.Basics of Green Hydrogen Production	30	20	0	0	50	14
SGJ/N4302.Analyse Main Parts of green hydrogen production unit	30	20	0	0	50	14
SGJ/N4303.Identify Renewable Energy sources for green hydrogen production	30	20	0	0	50	14
SGJ/N4037.Perform integration of Power Sources with Electrolyser	28	22	0	0	50	14
SGJ/N4038.Identify tools and tackles used for handling Power Sources	52	48	0	0	100	16
SGJ/N4039.Perform Health & Safety measures for integrating Power Sources with Electrolyser at Green hydrogen Plant.	27	23	0	0	50	14
DGT/VSQ/N0101.Employability Skills (30 Hours)	20	30	-	-	50	14
Total	**217**	**183**	**-**	**-**	**400**	**100**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

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 (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) 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 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 (KU)	Knowledge and Understanding (KU) 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 (GS)	Core skills or Generic Skills (GS) 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.
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.