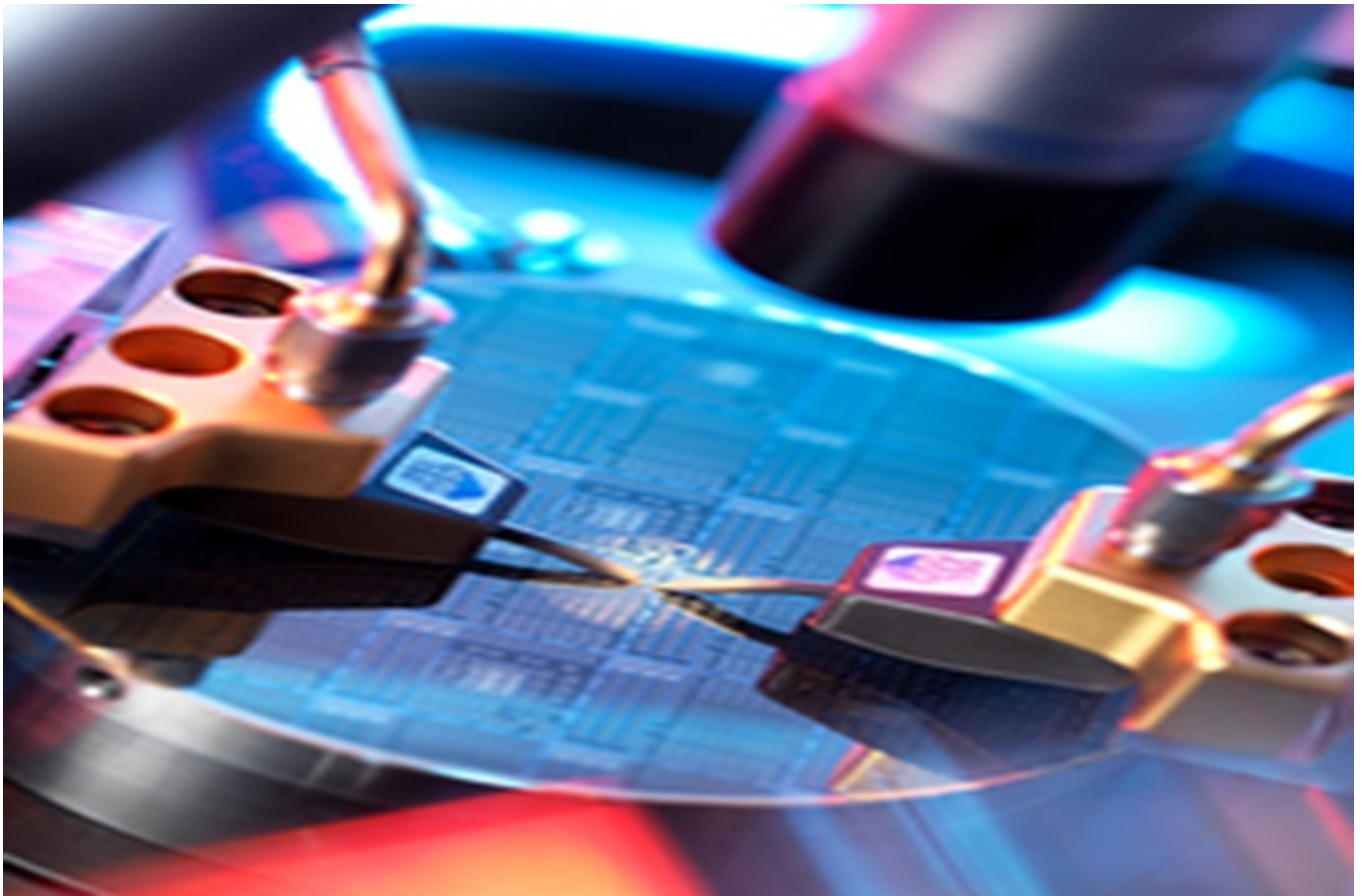


Qualification Pack



Wafer Testing and Sorting Engineer

QP Code: ELE/Q0122

Version: 3.0

NSQF Level: 5

Electronics Sector Skills Council of India || 155, 2nd Floor, ESC House Okhla Industrial Area-Phase 3
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Qualification Pack

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ELE/Q0122: Wafer Testing and Sorting Engineer

Brief Job Description

Wafer Testing & Sorting Engineer is responsible for wafer inspection, testing & prober handling activity to verify all defined parameters for inspection of wafers before proceeding to another step of manufacturing. The individual needs to also assist the manager and/or other authorized personnel in machine buy-off and consumable calculations for each and every step.

Personal Attributes

The individual must have an aptitude for details along with analytical and problem-solving skills. The person should be able to work in co-ordination with others. The individual should be able to communicate appropriately, both verbally and in writing.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [ELE/N0152: Inspect the Wafer](#)
2. [ELE/N0153: Test & Sort](#)
3. [ELE/N0154: Prober Handling](#)
4. [ELE/N0155: Purchasing of Machine/Tools & Consumables](#)
5. [DGT/VSQ/N0102: Employability Skills \(60 Hours\)](#)

Qualification Pack (QP) Parameters

Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
Country	India
NSQF Level	5
Credits	19
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7223.2800

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Minimum Educational Qualification & Experience	<p>Completed 2nd year of UG (UG Diploma) (Physics/ Electronics /Electrical/Mechanical) with 1.5 years of experience Relevant Experience in Semiconductor & Components</p> <p>OR</p> <p>Completed 3 year diploma after 10th (Electronics/ Electrical/Mechanical) with 3 Years of experience Relevant Experience in Semiconductor & Components</p> <p>OR</p> <p>Previous relevant Qualification of NSQF Level (4.5) with 1.5 years of experience Relevant Experience in Semiconductor & Components</p>
Minimum Level of Education for Training in School	10th Class
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	31/10/2025
NSQC Approval Date	08/05/2025
Version	3.0
Reference code on NQR	QG-05-EH-03996-2025-V3-ESSCI
NQR Version	3.0

Remarks:

NA

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ELE/N0152: Inspect the Wafer

Description

The NOS unit is about inspecting the process parameters and manage daily activity.

Scope

The scope covers the following :

- Incoming Inspection
- Optical Inspection
- Data Analysis
- Prepare SOP

Elements and Performance Criteria

Incoming Inspection

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

- PC1.** check the wafer physically to find out any defects
- PC2.** ensure to map all defects and reject
- PC3.** ensure to map each wafer based on defects
- PC4.** verify the mapping to the next stage
- PC5.** analyze all defects
- PC6.** evaluate root cause of defects
- PC7.** manage the feedback to the internal team
- PC8.** use portfolio meter or any other wafer geometry measurement tools
- PC9.** identify the mm level defects by is
- PC10.** check manual measurements on the wafer

Optical Inspection

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

- PC11.** use optical microscopes
- PC12.** use the roughness measurement tool
- PC13.** identify the micro-level defects
- PC14.** learn program microscopes
- PC15.** analyze defect data
- PC16.** generate wafer defect map
- PC17.** prepare document wafer map & pass to next process
- PC18.** prepare the Standard operating procedure (SOP)
- PC19.** train the operators

Data Analysis

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

- PC20.** run data analysis tools such as Joint Manpower Program (JMP) etc

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- PC21.** identify wafer related failure modes
- PC22.** use Statistical Process Control (SPC) or a statistical system for yield tracking
- PC23.** analysis yield every day
- PC24.** calculate CPK, PPK, standard deviation, etc
- PC25.** ensure that Define, Measure, Analyse, Improve, and Control (DMAIC) Methodology is followed
- PC26.** evaluate the Supplier Standard and Company Specifications

Prepare SOP

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

- PC27.** identify the requirements as per Commercial Computer-aided design (AUTO-CAD)
- PC28.** prepare process flow with clear specifications like temp., speed, mold flow, vacuum & mold direction, etc
- PC29.** formulate mold compound curing oven setup parameters
- PC30.** prepare SOP in such a way so that it is more understandable to operators with pictures, visuals, data charts, etc.
- PC31.** train Operators on SOP Flow
- PC32.** prepare a traveling card with the defined process or program name/ code

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** how to identify the die dimensions and back grinding processes
- KU2.** the importance of analyzing the die attach film/material properties and thickness requirements
- KU3.** how to evaluate the curing and attaching conditions of die-attach film/material
- KU4.** how to recognize the structure of stacking (die thickness and substrate thickness with die attach film/material thickness)
- KU5.** how to specify the bonding force, pick & place location, curing parameters inside the oven, etc.
- KU6.** the procedure of setting up all process parameters, such as bonding force, placements, attaching speed, adhesive thickness, wafer and substrate location moving speed, etc.
- KU7.** how to set to run dummy samples
- KU8.** the importance of taking measurements to ensure all dimensions are within specification
- KU9.** the importance of repeating the criteria until the specified criteria are met
- KU10.** how to turn major input parameters into Standard Operating Procedure (SOP)
- KU11.** the importance of preparing full SOP and releasing it to production, and considering the special requirements, if required
- KU12.** the importance of identifying the parameters for the new product verification process
- KU13.** how to prepare a copy of the old recipe to perform a similar program
- KU14.** the importance of identifying and making changes as per the product specification requirements
- KU15.** how to run dummy measurements, Calculate Process Capability (CPK), Process Performance (PPK), and other quality parameters

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- KU16.** the importance and process of verifying the real product using various quality and reliability checks
- KU17.** the importance of preparing for mass production after all QCs are passed
- KU18.** how to use Automatic Computer-Aided Design (AUTO-CAD) software
- KU19.** the procedure of preparing process flow with clear specifications, such as temperature, speed, water flow, vacuumed, etc.
- KU20.** the importance of preparing the SOP with pictures, visuals, data charts to ensure it is more understandable to operators
- KU21.** the importance of identifying the training needs of operators on SOP flow
- KU22.** the process of preparing the travelling card with the defined process or program name/ code
- KU23.** the importance of ensuring the quality of all the travelling cards released to production
- KU24.** the importance of performing regular inspection of programs
- KU25.** the importance of performing regular inspection of data, such as yield, failure, etc.
- KU26.** the importance of preparing for emergencies

Generic Skills (GS)

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

- GS1.** maintain work-related notes and records
- GS2.** read the relevant literature to get the latest updates about the field of work
- GS3.** listen attentively to understand the information/ instructions being shared
- GS4.** communicate politely and professionally
- GS5.** plan and prioritize tasks to ensure timely completion
- GS6.** co-ordinate with the co-workers to achieve the work objectives
- GS7.** evaluate all possible solutions to a problem to select the best one
- GS8.** take quick decisions to deal with workplace emergencies/ accidents

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Incoming Inspection</i>	16	18	-	4
PC1. check the wafer physically to find out any defects	-	-	-	-
PC2. ensure to map all defects and reject	-	-	-	-
PC3. ensure to map each wafer based on defects	-	-	-	-
PC4. verify the mapping to the next stage	-	-	-	-
PC5. analyze all defects	-	-	-	-
PC6. evaluate root cause of defects	-	-	-	-
PC7. manage the feedback to the internal team	-	-	-	-
PC8. use portfolio meter or any other wafer geometry measurement tools	-	-	-	-
PC9. identify the mm level defects by is	-	-	-	-
PC10. check manual measurements on the wafer	-	-	-	-
<i>Optical Inspection</i>	10	14	-	2
PC11. use optical microscopes	-	-	-	-
PC12. use the roughness measurement tool	-	-	-	-
PC13. identify the micro-level defects	-	-	-	-
PC14. learn program microscopes	-	-	-	-
PC15. analyze defect data	-	-	-	-
PC16. generate wafer defect map	-	-	-	-
PC17. prepare document wafer map & pass to next process	-	-	-	-
PC18. prepare the Standard operating procedure (SOP)	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC19. train the operators	-	-	-	-
<i>Data Analysis</i>	8	10	-	2
PC20. run data analysis tools such as Joint Manpower Program (JMP) etc	-	-	-	-
PC21. identify wafer related failure modes	-	-	-	-
PC22. use Statistical Process Control (SPC) or a statistical system for yield tracking	-	-	-	-
PC23. analysis yield every day	-	-	-	-
PC24. calculate CPK, PPK, standard deviation, etc	-	-	-	-
PC25. ensure that Define, Measure, Analyse, Improve, and Control (DMAIC) Methodology is followed	-	-	-	-
PC26. evaluate the Supplier Standard and Company Specifications	-	-	-	-
<i>Prepare SOP</i>	6	8	-	2
PC27. identify the requirements as per Commercial Computer-aided design (AUTO-CAD)	-	-	-	-
PC28. prepare process flow with clear specifications like temp., speed, mold flow, vacuum & mold direction, etc	-	-	-	-
PC29. formulate mold compound curing oven setup parameters	-	-	-	-
PC30. prepare SOP in such a way so that it is more understandable to operators with pictures, visuals, data charts, etc.	-	-	-	-
PC31. train Operators on SOP Flow	-	-	-	-
PC32. prepare a traveling card with the defined process or program name/ code	-	-	-	-
NOS Total	40	50	-	10

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0152
NOS Name	Inspect the Wafer
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	5
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

Qualification Pack

ELE/N0153: Test & Sort

Description

The NOS unit is about testing and sorting of product.

Scope

The scope covers the following :

- Test Program Development
- Test Program Readiness
- Electrical Failure Analysis
- Document/SOP

Elements and Performance Criteria

Test Program Development

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

- PC1.** identify the memory structure
- PC2.** understand the packaging structure
- PC3.** check feasibility study
- PC4.** develop a test program
- PC5.** prepare characterization of the developed program
- PC6.** check and verify at a small scale
- PC7.** run basic commands
- PC8.** understand electrical commands
- PC9.** execute necessary commands required as per design
- PC10.** perform basic manual testing

Test Program Readiness

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

- PC11.** develop test program should be verified on low volume
- PC12.** verify and save the document as a golden sample
- PC13.** transfer the verified document to mass production
- PC14.** check the work production line to sort out defects
- PC15.** monitor the yield tracking
- PC16.** check the failures and link them to processes
- PC17.** create wafer mapping good versus bad
- PC18.** map the wafer with exact locations

Electrical Failure Analysis

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

- PC19.** debug the production failures
- PC20.** debug the customer return failures

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- PC21.** check the root cause and find out the failure location
- PC22.** link the defects to processes
- PC23.** analyze yield improvement
- PC24.** check the failure mode
- PC25.** determine the category of each failure mode that can link to physical failures
- PC26.** check and understand electrical failure analysis tools
- PC27.** check and understand functional test

Document/SOP

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

- PC28.** work on AUTO CAD
- PC29.** prepare Process flow with clear specifications like Temp., Speed, Mold Flow, Vacuum & Mold Direction, etc
- PC30.** prepare mold compound curing oven setup parameters
- PC31.** plan SOP in such a way so that it is more understandable to operators with pictures, visuals, data Charts, etc.
- PC32.** train Operators on SOP Flow
- PC33.** prepare a traveling card with the defined process or program name/ code

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the importance of defining all die dimensions, stacking combination, and wire bonding parameters
- KU2.** how to define sample size for each lot to measure all dimensions
- KU3.** the importance of preparing the measurement techniques in the SOP for operators
- KU4.** the importance of analyzing the collected data and performing statistical analysis to determine if it is within the specification before releasing the lot to the next step
- KU5.** how to identify the consumables pack specifications
- KU6.** the importance of regularly inspecting for each consumable
- KU7.** how to identify any failure at die attach
- KU8.** the importance of ensuring wire bond passes through failure analysis
- KU9.** the importance of checking the root cause of each failure
- KU10.** the importance of defining the short term and long-term actions or failures to reduce the failure rate
- KU11.** how to prepare an 8D report
- KU12.** the importance of preparing the yield data collection for each product
- KU13.** how to analyze the yield
- KU14.** the importance of analyzing data using statistical methods
- KU15.** the importance of recording all failures along with actions to avoid future failure
- KU16.** the importance of performing Research and Development (R&D) and preparing strategies for further improvements



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- KU17.** the working principle of machines to improve UPH
- KU18.** how to develop the design of experiments (DOE) expertise
- KU19.** the process of running statistical tools, such as the Joint Manpower Program (JMP)
- KU20.** the importance of regularly interacting with customers, suppliers, and internal teams
- KU21.** the process generating designs using Auto-CAD

Generic Skills (GS)

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

- GS1.** write work-related notes and maintain relevant records
- GS2.** read the relevant literature to get the latest updates about the field of work
- GS3.** listen attentively to understand the information/ instructions being shared by the speaker
- GS4.** communicate politely and professionally
- GS5.** plan and prioritize tasks to ensure timely completion
- GS6.** evaluate all possible solutions to a problem to select the best one
- GS7.** co-ordinate with the co-workers to achieve work objectives
- GS8.** identify possible disruptions to work and take appropriate preventive measures
- GS9.** take quick decisions to deal with workplace emergencies/ accidents

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Test Program Development</i>	16	18	-	4
PC1. identify the memory structure	-	-	-	-
PC2. understand the packaging structure	-	-	-	-
PC3. check feasibility study	-	-	-	-
PC4. develop a test program	-	-	-	-
PC5. prepare characterization of the developed program	-	-	-	-
PC6. check and verify at a small scale	-	-	-	-
PC7. run basic commands	-	-	-	-
PC8. understand electrical commands	-	-	-	-
PC9. execute necessary commands required as per design	-	-	-	-
PC10. perform basic manual testing	-	-	-	-
<i>Test Program Readiness</i>	8	10	-	2
PC11. develop test program should be verified on low volume	-	-	-	-
PC12. verify and save the document as a golden sample	-	-	-	-
PC13. transfer the verified document to mass production	-	-	-	-
PC14. check the work production line to sort out defects	-	-	-	-
PC15. monitor the yield tracking	-	-	-	-
PC16. check the failures and link them to processes	-	-	-	-
PC17. create wafer mapping good versus bad	-	-	-	-
PC18. map the wafer with exact locations	-	-	-	-

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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Electrical Failure Analysis</i>	10	14	-	2
PC19. debug the production failures	-	-	-	-
PC20. debug the customer return failures	-	-	-	-
PC21. check the root cause and find out the failure location	-	-	-	-
PC22. link the defects to processes	-	-	-	-
PC23. analyze yield improvement	-	-	-	-
PC24. check the failure mode	-	-	-	-
PC25. determine the category of each failure mode that can link to physical failures	-	-	-	-
PC26. check and understand electrical failure analysis tools	-	-	-	-
PC27. check and understand functional test	-	-	-	-
<i>Document/SOP</i>	6	8	-	2
PC28. work on AUTO CAD	-	-	-	-
PC29. prepare Process flow with clear specifications like Temp., Speed, Mold Flow, Vacuum & Mold Direction, etc	-	-	-	-
PC30. prepare mold compound curing oven setup parameters	-	-	-	-
PC31. plan SOP in such a way so that it is more understandable to operators with pictures, visuals, data Charts, etc.	-	-	-	-
PC32. train Operators on SOP Flow	-	-	-	-
PC33. prepare a traveling card with the defined process or program name/ code	-	-	-	-
NOS Total	40	50	-	10

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National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0153
NOS Name	Test & Sort
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	4
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

Qualification Pack

ELE/N0154: Prober Handling

Description

The NOS unit is about understanding of structure and prober handling.

Scope

The scope covers the following :

- Prober Handling

Elements and Performance Criteria

Prober Handling

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

- PC1.** check prober selection
- PC2.** check prober buys off
- PC3.** check prober setup
- PC4.** test prober sockets/pin selection
- PC5.** check wafer loading and unloading
- PC6.** test the wafer pin setup
- PC7.** check the vacuum level adjustment
- PC8.** identify integration of test and prober
- PC9.** check prober table temperature
- PC10.** check all other parameter setups
- PC11.** test pad locations to the system
- PC12.** test the prober commands
- PC13.** collect the testing data
- PC14.** generate diagrams of each test
- PC15.** analysis of spec. data and diagram
- PC16.** verify and solve if any issues found
- PC17.** verify and document all instructions in the SOP for operators to follow

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** the use of Auto CAD and other equivalent design tools
- KU2.** the wafer structure and processing, and wire material properties
- KU3.** the importance of determining the customer requirements and collecting data from competitors' specs
- KU4.** how to perform reverse analysis to get the die to attach and wire bonding specifications

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- KU5.** the importance of identifying the critical and normal dimension requirements as per the customer requirements
- KU6.** the importance and process of defining the dimension specifications to meet the customer requirements
- KU7.** the Joint Electron Device Engineering Council (JEDEC) standard
- KU8.** the customer bonding diagram
- KU9.** the importance of specifying the wire bonding material that fulfils the bonding drawing and electrical, mechanical, and thermal specifications
- KU10.** how to perform drawing activities bonding drawing
- KU11.** how to verify the die-attach staking structure
- KU12.** how to verify rubber tip for die attach and capillary for wire bonding drawing
- KU13.** how to identify magazine drawing and cassette drawing

Generic Skills (GS)

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

- GS1.** write work-related notes and maintain relevant records
- GS2.** read the relevant literature to get the latest updates about the field of work
- GS3.** listen attentively to understand the information/ instructions being shared by the speaker
- GS4.** communicate politely and professionally
- GS5.** plan and prioritize tasks to ensure timely completion
- GS6.** evaluate all possible solutions to a problem to select the best one
- GS7.** co-ordinate with the co-workers to achieve work objectives
- GS8.** identify possible disruptions to work and take appropriate preventive measures
- GS9.** take quick decisions to deal with workplace emergencies/ accidents

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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Prober Handling</i>	40	50	-	10
PC1. check prober selection	-	-	-	-
PC2. check prober buys off	-	-	-	-
PC3. check prober setup	-	-	-	-
PC4. test prober sockets/pin selection	-	-	-	-
PC5. check wafer loading and unloading	-	-	-	-
PC6. test the wafer pin setup	-	-	-	-
PC7. check the vacuum level adjustment	-	-	-	-
PC8. identify integration of test and prober	-	-	-	-
PC9. check prober table temperature	-	-	-	-
PC10. check all other parameter setups	-	-	-	-
PC11. test pad locations to the system	-	-	-	-
PC12. test the prober commands	-	-	-	-
PC13. collect the testing data	-	-	-	-
PC14. generate diagrams of each test	-	-	-	-
PC15. analysis of spec. data and diagram	-	-	-	-
PC16. verify and solve if any issues found	-	-	-	-
PC17. verify and document all instructions in the SOP for operators to follow	-	-	-	-
NOS Total	40	50	-	10

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National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0154
NOS Name	Prober Handling
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	4
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

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ELE/N0155: Purchasing of Machine/Tools & Consumables

Description

The NOS unit is about buy machines and acceptance of tests at manufacturer's site.

Scope

The scope covers the following :

- Factory Acceptance test at equipment manufacturer site
- Site Acceptance test at product manufacturer site
- Consumable and Raw Material Qualification

Elements and Performance Criteria

Factory Acceptance test at equipment manufacturer site

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

- PC1.** prepare Factory Acceptance Testing (FAT) report
- PC2.** verify the report and meet specifications (operation, main controller, main panel)
- PC3.** prepare general machine specification (operation, main controller, the main panel should function as per requirements given to manufacturer)
- PC4.** check all equipment consumables specifications, dimensions, and other parameters clearly defined by the process and equipment engineer
- PC5.** check all equipment as well as process parameters during testing at the site
- PC6.** test the sample size required to buy off machines should be defined clearly with specification and CPK Requirements
- PC7.** test and run all the material through equipment along with the manufacturer's team
- PC8.** prepare a solid report to avoid any future issues
- PC9.** review and approve the report and keep it for record

Site Acceptance test at product manufacturer site

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

- PC10.** prepare Factory Acceptance Testing (FAT) report
- PC11.** verify the report and meet specifications (operation, main controller, main panel)
- PC12.** prepare general machine specification (operation, main controller, the main panel should function as per requirements given to manufacturer)
- PC13.** check all equipment consumables specifications, dimensions, and other parameters clearly defined by the process and equipment engineer
- PC14.** check all equipment as well as process parameters during testing at the site
- PC15.** test the sample size required to buy off machines should be defined clearly with specification and CPK Requirements
- PC16.** test and run all the material through equipment along with the manufacturer's team
- PC17.** prepare a solid report to avoid any future issues
- PC18.** review and approve the report and keep it for record

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Consumable and Raw Material Qualification

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

- PC19.** verify low cost and high reliable raw material
- PC20.** verify new material to design DOE
- PC21.** collect all the quality and reality data for each characterization, feasibility, and qualification build
- PC22.** generate Process Change Notification (PCN)
- PC23.** prepare qualification report and present to management
- PC24.** release Low volume Mass Production (LVM) & co-work with the production team to make a smooth transition to high volume mass production
- PC25.** work as per characterization phase, feasibility phase, customer samples phase, and qualification phase

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** how to prepare the File Allocation Table (FAT) report
- KU2.** how to identify all specifications as per the organizational standards
- KU3.** the importance of ensuring the functioning of the main controller and the main panel as per the requirements given to the manufacturer
- KU4.** the importance of ensuring all equipment consumable specifications, dimensions and other parameters are clearly defined by the process and equipment engineer
- KU5.** the importance and process of preparing the equipment and process parameters
- KU6.** the importance of defining and preparing sample size required to buy off machines as per the specifications and CPK Requirements
- KU7.** the importance of preparing a comprehensive report to avoid any future issues
- KU8.** the importance of recording all approvals in the appropriate formats as per the organizational standards
- KU9.** the importance of ensuring the functioning of the main controller and the main panel as per requirements given to the manufacturer
- KU10.** the importance of preparing the equipment consumables according to the specifications, dimensions and other parameters defined by the process and equipment engineer
- KU11.** how to prepare the sample size required to buy off machines and the importance of ensuring it is defined clearly according to the specifications and CPK requirements
- KU12.** the importance of using low cost and highly reliable raw material and consumables
- KU13.** how to verify new material to design DOE
- KU14.** the process of collecting the quality and reliability data for each characterization, feasibility, and building the qualification
- KU15.** how to generate the Process Change Notification (PCN)
- KU16.** the process of transitioning from low volume mass production to high volume mass production
- KU17.** the characterization phase, feasibility phase, customer sampling phase, and qualification phase is required



Qualification Pack

Generic Skills (GS)

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

- GS1.** write work-related notes and maintain relevant records
- GS2.** read the relevant literature to get the latest updates about the field of work
- GS3.** listen attentively to understand the information/ instructions being shared by the speaker
- GS4.** communicate politely and professionally
- GS5.** plan and prioritize tasks to ensure timely completion
- GS6.** evaluate all possible solutions to a problem to select the best one
- GS7.** co-ordinate with the co-workers to achieve work objectives
- GS8.** identify possible disruptions to work and take appropriate preventive measures
- GS9.** take quick decisions to deal with workplace emergencies/ accidents

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Factory Acceptance test at equipment manufacturer site</i>	15	18	-	4
PC1. prepare Factory Acceptance Testing (FAT) report	-	-	-	-
PC2. verify the report and meet specifications (operation, main controller, main panel)	-	-	-	-
PC3. prepare general machine specification (operation, main controller, the main panel should function as per requirements given to manufacturer)	-	-	-	-
PC4. check all equipment consumables specifications, dimensions, and other parameters clearly defined by the process and equipment engineer	-	-	-	-
PC5. check all equipment as well as process parameters during testing at the site	-	-	-	-
PC6. test the sample size required to buy off machines should be defined clearly with specification and CPK Requirements	-	-	-	-
PC7. test and run all the material through equipment along with the manufacturer's team	-	-	-	-
PC8. prepare a solid report to avoid any future issues	-	-	-	-
PC9. review and approve the report and keep it for record	-	-	-	-
<i>Site Acceptance test at product manufacturer site</i>	15	18	-	3
PC10. prepare Factory Acceptance Testing (FAT) report	-	-	-	-
PC11. verify the report and meet specifications (operation, main controller, main panel)	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. prepare general machine specification (operation, main controller, the main panel should function as per requirements given to manufacturer)	-	-	-	-
PC13. check all equipment consumables specifications, dimensions, and other parameters clearly defined by the process and equipment engineer	-	-	-	-
PC14. check all equipment as well as process parameters during testing at the site	-	-	-	-
PC15. test the sample size required to buy off machines should be defined clearly with specification and CPK Requirements	-	-	-	-
PC16. test and run all the material through equipment along with the manufacturer's team	-	-	-	-
PC17. prepare a solid report to avoid any future issues	-	-	-	-
PC18. review and approve the report and keep it for record	-	-	-	-
<i>Consumable and Raw Material Qualification</i>	10	14	-	3
PC19. verify low cost and high reliable raw material	-	-	-	-
PC20. verify new material to design DOE	-	-	-	-
PC21. collect all the quality and reality data for each characterization, feasibility, and qualification build	-	-	-	-
PC22. generate Process Change Notification (PCN)	-	-	-	-
PC23. prepare qualification report and present to management	-	-	-	-
PC24. release Low volume Mass Production (LVM) & co-work with the production team to make a smooth transition to high volume mass production	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC25. work as per characterization phase, feasibility phase, customer samples phase, and qualification phase	-	-	-	-
NOS Total	40	50	-	10

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	ELE/N0155
NOS Name	Purchasing of Machine/Tools & Consumables
Sector	Electronics
Sub-Sector	Semiconductor & Components
Occupation	Production-S&C
NSQF Level	5
Credits	4
Version	2.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

Qualification Pack

DGT/VSQ/N0102: Employability Skills (60 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
- Career Development & Goal Setting
- 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.** identify employability skills required for jobs in various industries
- PC2.** identify and explore learning and employability portals

Constitutional values – Citizenship

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

- PC3.** recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.
- PC4.** follow environmentally sustainable practices

Becoming a Professional in the 21st Century

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

- PC5.** recognize the significance of 21st Century Skills for employment
- PC6.** practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

Basic English Skills

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

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- PC7.** use basic English for everyday conversation in different contexts, in person and over the telephone
- PC8.** read and understand routine information, notes, instructions, mails, letters etc. written in English
- PC9.** write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

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

- PC10.** understand the difference between job and career
- PC11.** prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

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

- PC12.** follow verbal and non-verbal communication etiquette and active listening techniques in various settings
- PC13.** work collaboratively with others in a team

Diversity & Inclusion

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

- PC14.** communicate and behave appropriately with all genders and PwD
- PC15.** escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

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

- PC16.** select financial institutions, products and services as per requirement
- PC17.** carry out offline and online financial transactions, safely and securely
- PC18.** identify common components of salary and compute income, expenses, taxes, investments etc
- PC19.** identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

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

- PC20.** operate digital devices and carry out basic internet operations securely and safely
- PC21.** use e- mail and social media platforms and virtual collaboration tools to work effectively
- PC22.** use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

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

- PC23.** identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research
- PC24.** develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion
- PC25.** identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

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

- PC26.** identify different types of customers
- PC27.** identify and respond to customer requests and needs in a professional manner.

Qualification Pack

PC28. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

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

PC29. create a professional Curriculum vitae (Résumé)

PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

PC31. apply to identified job openings using offline /online methods as per requirement

PC32. answer questions politely, with clarity and confidence, during recruitment and selection

PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills and different learning and employability related portals

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 English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

KU6. importance of career development and setting long- and short-term goals

KU7. about effective communication

KU8. POSH Act

KU9. Gender sensitivity and inclusivity

KU10. different types of financial institutes, products, and services

KU11. how to compute income and expenditure

KU12. importance of maintaining safety and security in offline and online financial transactions

KU13. different legal rights and laws

KU14. different types of digital devices and the procedure to operate them safely and securely

KU15. how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

KU16. how to identify business opportunities

KU17. types and needs of customers

KU18. how to apply for a job and prepare for an interview

KU19. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

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

GS1. read and write different types of documents/instructions/correspondence

GS2. communicate effectively using appropriate language in formal and informal settings



Qualification Pack

- GS3.** behave politely and appropriately with all
- GS4.** how to work in a virtual mode
- GS5.** perform calculations efficiently
- GS6.** solve problems effectively
- GS7.** pay attention to details
- GS8.** manage time efficiently
- GS9.** maintain hygiene and sanitization to avoid infection

Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Introduction to Employability Skills</i>	1	1	-	-
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
<i>Constitutional values – Citizenship</i>	1	1	-	-
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
<i>Becoming a Professional in the 21st Century</i>	2	4	-	-
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
<i>Basic English Skills</i>	2	3	-	-
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
<i>Career Development & Goal Setting</i>	1	2	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
<i>Communication Skills</i>	2	2	-	-
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
<i>Diversity & Inclusion</i>	1	2	-	-
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
<i>Financial and Legal Literacy</i>	2	3	-	-
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
<i>Essential Digital Skills</i>	3	4	-	-
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Entrepreneurship</i>	2	3	-	-
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
<i>Customer Service</i>	1	2	-	-
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
<i>Getting ready for apprenticeship & Jobs</i>	2	3	-	-
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	20	30	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0102
NOS Name	Employability Skills (60 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	31/10/2025
NSQC Clearance Date	08/05/2025

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below.)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria.
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS.
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

Qualification Pack

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
ELE/N0152.Inspect the Wafer	40	50	-	10	100	20
ELE/N0153.Test & Sort	40	50	-	10	100	20
ELE/N0154.Prober Handling	40	50	-	10	100	20
ELE/N0155.Purchasing of Machine/Tools & Consumables	40	50	-	10	100	20
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	20
Total	180	230	-	40	450	100

Qualification Pack

Acronyms

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

Qualification Pack

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.

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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.