



# Oil Extraction and Refining Technician

QP Code: FIC/Q1008

Version: 1.0

NSQF Level: 4

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## FIC/Q1008: Oil Extraction and Refining Technician

### Brief Job Description

An Oil Extraction and Refining Technician is responsible for extraction and refining of all types of edible vegetable oil by a process of receiving and cleaning the raw materials (oilseeds), drying and storing it, flaking, pressing, extracting and refining crude oil.

### Personal Attributes

An Oil Extraction and Refining Technician must have the ability to plan, organize, prioritize, concentrate, and handle the pressure. The individual must possess reading, writing, and communication skills. In addition, the individual must have mechanical aptitude and troubleshooting skills.

### Applicable National Occupational Standards (NOS)

#### Compulsory NOS:

1. [FIC/N9026: Prepare for production](#)
2. [FIC/N1029: Carry out oil extraction](#)
3. [FIC/N1030: Carry out oil refining](#)
4. [FIC/N9901: Implement health and safety practices at the workplace](#)
5. [FIC/N9902: Work effectively in an organisation](#)
6. [SGJ/N1702: Optimize resource utilization at workplace](#)

### Qualification Pack (QP) Parameters

<b>Sector</b>	Food Processing
<b>Sub-Sector</b>	Food Grain Milling
<b>Occupation</b>	Processing-Food Grain Milling (including oilseeds)
<b>Country</b>	India
<b>NSQF Level</b>	4
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/8160.1200

<b>Minimum Educational Qualification &amp; Experience</b>	12th Class OR 10th Class with 2 Years of experience relevant experience OR 8th Class with 3 Years of experience relevant experience
<b>Minimum Level of Education for Training in School</b>	Not Applicable
<b>Pre-Requisite License or Training</b>	NA
<b>Minimum Job Entry Age</b>	18 Years
<b>Last Reviewed On</b>	NA
<b>Next Review Date</b>	NA
<b>NSQC Approval Date</b>	
<b>Version</b>	1.0

## FIC/N9026: Prepare for production

### Description

This NOS unit is about performing various tasks prior to production in the food processing industry.

### Scope

The scope covers the following :

- Plan for production
- Clean and maintain work area, machineries, and tools for production
- Organize for production

### Elements and Performance Criteria

#### *Plan for production*

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

- PC1.** identify work requirements by obtaining instructions from the supervisor. Instructions: process chart, product flow chart, formulation, chart, etc.
- PC2.** plan and prioritize tasks as per work schedule. Tasks: inspect, clean, maintain, verify, etc.
- PC3.** estimate manpower and material requirements as per work requirement. Material: raw materials and packaging materials
- PC4.** ensure required quantity of raw materials, packaging materials, equipment, and manpower for production
- PC5.** plan capacity utilization of machinery with respect to the processing time, production order, and batch size for each product

#### *Clean and maintain work area, machineries, and tools for production*

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

- PC6.** clean and maintain the work area as per organizational procedures
- PC7.** clean and maintain the machines and tools and sanitize them as per the organization's specifications and standards
- PC8.** dispose of the waste material at designated place safely. Waste material: hazardous waste, food waste, packaging waste, etc.
- PC9.** inspect the tools, equipment, and machinery to ascertain suitability for use
- PC10.** report information such as faulty tools and equipment to the concerned authority

#### *Organize for production*

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

- PC11.** organize tools and equipment
- PC12.** receive and organize production materials appropriately. Production materials: raw materials, packaging materials, etc.
- PC13.** allot responsibilities/work to the assistants and helpers

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** production planning process
- KU2.** analysis and interpretation of various process charts, product flow charts, etc.
- KU3.** resource management process
- KU4.** procedure to estimate manpower and raw material
- KU5.** capacity utilization calculation
- KU6.** organizational policies and SOP on cleanliness
- KU7.** operating procedure and general maintenance of food production machineries
- KU8.** waste management procedures
- KU9.** methods to inspect tools, equipment and machinery
- KU10.** procedure to allot work or responsibility to the team

### **Generic Skills (GS)**

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

- GS1.** read and interpret organizational policies, SOP, production charts, etc.
- GS2.** communicate effectively with subordinates as well as supervisors
- GS3.** plan and prioritize various tasks
- GS4.** be always punctual and courteous
- GS5.** organize all process/equipment manuals to access information easily
- GS6.** discuss task lists, schedules, and activities with the senior/supervisor

## Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Plan for production</i>	<b>11</b>	<b>25</b>	-	-
<b>PC1.</b> identify work requirements by obtaining instructions from the supervisor. Instructions: process chart, product flow chart, formulation, chart, etc.	3	6	-	-
<b>PC2.</b> plan and prioritize tasks as per work schedule. Tasks: inspect, clean, maintain, verify, etc.	2	5	-	-
<b>PC3.</b> estimate manpower and material requirements as per work requirement. Material: raw materials and packaging materials	2	4	-	-
<b>PC4.</b> ensure required quantity of raw materials, packaging materials, equipment, and manpower for production	2	5	-	-
<b>PC5.</b> plan capacity utilization of machinery with respect to the processing time, production order, and batch size for each product	2	5	-	-
<i>Clean and maintain work area, machineries, and tools for production</i>	<b>14</b>	<b>32</b>	-	-
<b>PC6.</b> clean and maintain the work area as per organizational procedures	3	7	-	-
<b>PC7.</b> clean and maintain the machines and tools and sanitize them as per the organization's specifications and standards	3	7	-	-
<b>PC8.</b> dispose of the waste material at designated place safely. Waste material: hazardous waste, food waste, packaging waste, etc.	3	7	-	-
<b>PC9.</b> inspect the tools, equipment, and machinery to ascertain suitability for use	3	6	-	-
<b>PC10.</b> report information such as faulty tools and equipment to the concerned authority	2	5	-	-
<i>Organize for production</i>	<b>5</b>	<b>13</b>	-	-
<b>PC11.</b> organize tools and equipment	2	7	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC12.</b> receive and organize production materials appropriately. Production materials: raw materials, packaging materials, etc.	2	4	-	-
<b>PC13.</b> allot responsibilities/work to the assistants and helpers	1	2	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-



## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	FIC/N9026
<b>NOS Name</b>	Prepare for production
<b>Sector</b>	Food Processing
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Production
<b>NSQF Level</b>	3
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	24/02/2022
<b>Next Review Date</b>	24/02/2024
<b>NSQC Clearance Date</b>	24/02/2022

## FIC/N1029: Carry out oil extraction

### Description

This NOS unit is about oil extraction using various methods and machineries as per the specifications and standards of the organization.

### Scope

The scope covers the following :

- Pre-processing of raw materials
- Extract oil by pressing method
- Extract oil by solvent extraction method

### Elements and Performance Criteria

#### *Pre-processing of raw materials*

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

- PC1.** check safety norms of defined area and information the safety in charge if not suitable.
- PC2.** interpret the process chart/product flow chart/formulation chart for products to be produced
- PC3.**
  - check and verify the weight and quality of the received raw materials through physical parameters from the supplier/warehouse
  - Raw materials: oil seeds such as peanut, sunflower seed, sesame seeds, soya bean, corn, etc.
  - Physical parameters: such as appearance, colour, odour, texture etc.
- PC4.**
  - set up the machines for oil extraction and refining process
  - Machines: connect pipes between containers and processing equipment, assemble fittings, valves, plates, disks, and other parts, etc.
- PC5.**
  - set the controls of the dryer and perform the drying process of the weighed raw materials and achieve the required moisture content.
  - Controls: temperature/air temperature, air-flow, drying time, etc.
- PC6.**
  - set controls of the fan to perform cooling process of the dried raw materials
  - Controls: speed of the fan, air-flow, etc.
- PC7.** transfer raw materials from the storage silo to cleaning machines
- PC8.** remove lighter impurities like straw, sticks, etc. from the materials
- PC9.** carry out the de-stoner process and collect the de-stoned materials
- PC10.** discard the waste materials as per standard operating procedures
- PC11.** transfer raw materials from the storage silo to cleaning machines
- PC12.**
  - set controls of the cracking mill to carry out the cracking process of the raw materials
  - Controls: speed of rollers, distance between rollers of grain cracking mill
- PC13.** separate kernels and remove hull ,if required by de-hulling the cracked raw materials
- PC14.** adjust clearance between rollers of the flaking machine and dump/open chute to feed raw materials through feed hopper for flaking
- PC15.** collect the flakes from the discharged chute
- PC16.**
  - set the parameters of the cooking vessel to cook/condition the raw materials
  - Parameters: temperature, pressure, time, etc.

- PC17.** maintain process parameters by observing gauge and adjusting its controls
- PC18.** check temperature and moisture content of the raw materials
- PC19.** inject water/steam into the cooked/conditioned raw materials to adjust the moisture content and meet the standard requirement

*Extract oil by pressing method*

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

- PC20.** • extract the oil using the machine and setting its controls  
 • Set controls of screw press machine: speed, temperature, pressure, etc.
- PC21.** allow measured quantity of raw material (oilseeds) into the extractor by opening the chute
- PC22.** take the sample of expelled oil cake/meal to assess the temperature and to determine that sufficient amount of oil has been removed
- PC23.** adjust the pressure for better extraction, if required
- PC24.** collect extracted oil in the collection tank
- PC25.** check the quality of extracted oil as per SOP
- PC26.** take sample of the extracted oil and transfer it to the quality lab for analysis
- PC27.** pack and store extracted oil as per SOP until further processing or transfer the oil to the refining tank for further processing
- PC28.** collect the by-product i.e., oil cake or oil meal for further processing such as extraction of oil through solvent extraction method or to dry and pack as animal feed, etc.

*Extract oil by solvent extraction method*

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

- PC29.** weigh flaked raw materials (oilseeds or oil cake/ meal) and transfer into the feeding hopper
- PC30.** maintain quantity of raw materials entering the extractor by adjusting the speed of the conveyor from the feeding hopper
- PC31.** adjust dampers of the extractor conveyor to adjust the height of raw materials bed in the extractor
- PC32.** spray solvent and oil-solvent mixture (miscella) on the bed of raw materials flakes for oil extraction and on the materials conveyor screen to prevent clogging
- PC33.** collect the oil rich solvent (full miscella) in collection tank and oil extracted flakes
- PC34.** transfer the collected oil to remove solvent
- PC35.** • transfer full miscella into distillation system and maintain process parameters for distillation system to remove solvent and separate oil  
 • Distillation system: flash evaporator/ vacuum distillation unit/steam stripping unit  
 • Controls of the distillation system: such as temperature, pressure, etc.
- PC36.** collect crude oil in container/storage tank
- PC37.** take sample of the crude oil and transfer it to quality lab for analysis
- PC38.** store the crude oil as per organizational standards
- PC39.** transfer spent meal into the feed hopper
- PC40.** • remove solvent and moisture by controlling the parameters of de-solventizer and dry the spent meal  
 • Parameters of the de-solventizer-toaster: temperature, steam pressure, speed of rotation valve speed of rotation stirrer, etc.
- PC41.** pack and store extracted oil as per SOP for further processing

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** types of raw materials used in oil extraction process
- KU2.** standard parameters to check and verify the quality of the raw materials
- KU3.** procedure to perform the cooling process of the dried raw materials
- KU4.** standards to identify the moisture equilibration in the raw materials
- KU5.** procedure to carry out de-stoner process
- KU6.** SOP to discard the waste materials
- KU7.** techniques to cook/condition the raw materials
- KU8.** operating procedures of all machineries and equipment used in oil extraction such as drier, cleaning machine, de-stoner, cracking mill, cooking /conditioning equipment, screw press machine, solvent sprayers, distillation system, etc.
- KU9.** methods of the oil extraction
- KU10.** sample collection procedures of R.M and P.M, SFG, FG
- KU11.** types of packaging materials and machineries
- KU12.** standard procedure to store the extracted crude oil
- KU13.** organizational and FSSAI laws and regulations on product, R.M,P.M etc
- KU14.** know about PRPs OPRPs and CCP, HACCP as per Process flow chart of organization
- KU15.** about all types of Hazard
- KU16.** food safety and hygiene standards as per FSSAI-Schedule IV
- KU17.** ensure calibration of weighing balance pressure gauge, temperature probe before start of operation

### **Generic Skills (GS)**

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

- GS1.** knowledge of documentation and record keeping
- GS2.** note down the information communicated by the senior/supervisor, observations (if any) related to the process, and data for online erp or as per applicability in the organization
- GS3.** read and interpret the work order from the supervisor, certificate of analysis, analysis report from internal lab, process required for producing various types of products, equipment manuals and process documents to understand the equipments operation and process requirement
- GS4.** communicate effectively with subordinates as well as supervisors
- GS5.** plan and prioritize various tasks as per standards
- GS6.** discuss task lists, schedules, and activities for carry out production with the senior/supervisor

**Assessment Criteria**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Pre-processing of raw materials</i>	<b>22</b>	<b>51</b>	-	-
<b>PC1.</b> check safety norms of defined area and information the safety in charge if not suitable.	-	-	-	-
<b>PC2.</b> interpret the process chart/product flow chart/formulation chart for products to be produced	-	-	-	-
<b>PC3.</b> <ul style="list-style-type: none"> <li>• check and verify the weight and quality of the received raw materials through physical parameters from the supplier/warehouse</li> <li>• Raw materials: oil seeds such as peanut, sunflower seed, sesame seeds, soya bean, corn, etc.</li> <li>• Physical parameters: such as appearance, colour, odour, texture etc.</li> </ul>	-	-	-	-
<b>PC4.</b> <ul style="list-style-type: none"> <li>• set up the machines for oil extraction and refining process</li> <li>• Machines: connect pipes between containers and processing equipment, assemble fittings, valves, plates, disks, and other parts, etc.</li> </ul>	-	-	-	-
<b>PC5.</b> <ul style="list-style-type: none"> <li>• set the controls of the dryer and perform the drying process of the weighed raw materials and achieve the required moisture content.</li> <li>• Controls: temperature/air temperature, air-flow, drying time, etc.</li> </ul>	-	-	-	-
<b>PC6.</b> <ul style="list-style-type: none"> <li>• set controls of the fan to perform cooling process of the dried raw materials</li> <li>• Controls: speed of the fan, air-flow, etc.</li> </ul>	-	-	-	-
<b>PC7.</b> transfer raw materials from the storage silo to cleaning machines	-	-	-	-
<b>PC8.</b> remove lighter impurities like straw, sticks, etc. from the materials	-	-	-	-
<b>PC9.</b> carry out the de-stoner process and collect the de-stoned materials	-	-	-	-
<b>PC10.</b> discard the waste materials as per standard operating procedures	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC11.</b> transfer raw materials from the storage silo to cleaning machines	-	-	-	-
<b>PC12.</b> <ul style="list-style-type: none"> <li>• set controls of the cracking mill to carry out the cracking process of the raw materials</li> <li>• Controls: speed of rollers, distance between rollers of grain cracking mill</li> </ul>	-	-	-	-
<b>PC13.</b> separate kernels and remove hull ,if required by de-hulling the cracked raw materials	-	-	-	-
<b>PC14.</b> adjust clearance between rollers of the flaking machine and dump/open chute to feed raw materials through feed hopper for flaking	-	-	-	-
<b>PC15.</b> collect the flakes from the discharged chute	-	-	-	-
<b>PC16.</b> <ul style="list-style-type: none"> <li>• set the parameters of the cooking vessel to cook/condition the raw materials</li> <li>• Parameters: temperature, pressure, time, etc.</li> </ul>	-	-	-	-
<b>PC17.</b> maintain process parameters by observing gauge and adjusting its controls	-	-	-	-
<b>PC18.</b> check temperature and moisture content of the raw materials	-	-	-	-
<b>PC19.</b> inject water/steam into the cooked/conditioned raw materials to adjust the moisture content and meet the standard requirement	-	-	-	-
<i>Extract oil by pressing method</i>	<b>10</b>	<b>21</b>	-	-
<b>PC20.</b> <ul style="list-style-type: none"> <li>• extract the oil using the machine and setting its controls</li> <li>• Set controls of screw press machine: speed, temperature, pressure, etc.</li> </ul>	-	-	-	-
<b>PC21.</b> allow measured quantity of raw material (oilseeds) into the extractor by opening the chute	-	-	-	-
<b>PC22.</b> take the sample of expelled oil cake/meal to assess the temperature and to determine that sufficient amount of oil has been removed	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC23.</b> adjust the pressure for better extraction, if required	-	-	-	-
<b>PC24.</b> collect extracted oil in the collection tank	-	-	-	-
<b>PC25.</b> check the quality of extracted oil as per SOP	-	-	-	-
<b>PC26.</b> take sample of the extracted oil and transfer it to the quality lab for analysis	-	-	-	-
<b>PC27.</b> pack and store extracted oil as per SOP until further processing or transfer the oil to the refining tank for further processing	-	-	-	-
<b>PC28.</b> collect the by-product i.e., oil cake or oil meal for further processing such as extraction of oil through solvent extraction method or to dry and pack as animal feed, etc.	-	-	-	-
<i>Extract oil by solvent extraction method</i>	<b>13</b>	<b>33</b>	-	-
<b>PC29.</b> weigh flaked raw materials (oilseeds or oil cake/ meal) and transfer into the feeding hopper	-	-	-	-
<b>PC30.</b> maintain quantity of raw materials entering the extractor by adjusting the speed of the conveyor from the feeding hopper	-	-	-	-
<b>PC31.</b> adjust dampers of the extractor conveyor to adjust the height of raw materials bed in the extractor	-	-	-	-
<b>PC32.</b> spray solvent and oil-solvent mixture (miscella) on the bed of raw materials flakes for oil extraction and on the materials conveyor screen to prevent clogging	-	-	-	-
<b>PC33.</b> collect the oil rich solvent (full miscella) in collection tank and oil extracted flakes	-	-	-	-
<b>PC34.</b> transfer the collected oil to remove solvent	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC35.</b> <ul style="list-style-type: none"> <li>transfer full miscella into distillation system and maintain process parameters for distillation system to remove solvent and separate oil</li> <li>Distillation system: flash evaporator/ vacuum distillation unit/steam stripping unit</li> <li>Controls of the distillation system: such as temperature, pressure, etc.</li> </ul>	-	-	-	-
<b>PC36.</b> collect crude oil in container/storage tank	-	-	-	-
<b>PC37.</b> take sample of the crude oil and transfer it to quality lab for analysis	-	-	-	-
<b>PC38.</b> store the crude oil as per organizational standards	-	-	-	-
<b>PC39.</b> transfer spent meal into the feed hopper	-	-	-	-
<b>PC40.</b> <ul style="list-style-type: none"> <li>remove solvent and moisture by controlling the parameters of de-solventizer and dry the spent meal</li> <li>Parameters of the de-solventizer-toaster: temperature, steam pressure, speed of rotation valve speed of rotation stirrer, etc.</li> </ul>	-	-	-	-
<b>PC41.</b> pack and store extracted oil as per SOP for further processing	-	-	-	-
<b>NOS Total</b>	<b>45</b>	<b>105</b>	-	-



**National Occupational Standards (NOS) Parameters**

<b>NOS Code</b>	FIC/N1029
<b>NOS Name</b>	Carry out oil extraction
<b>Sector</b>	Food Processing
<b>Sub-Sector</b>	Food Grain Milling
<b>Occupation</b>	Processing-Food Grain Milling (including oilseeds)
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Next Review Date</b>	NA

## FIC/N1030: Carry out oil refining

### Description

This NOS unit is about refining the oil using various methods as per organization standards.

### Scope

The scope covers the following :

- Carry out degumming or neutralizing of oil
- Bleach the oil
- Carry out dewaxing/winterization of oil
- Carry out de-odourizing of oil
- Carry out post-production cleaning and regular maintenance of equipment

### Elements and Performance Criteria

#### *Carry out degumming or neutralizing of oil*

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

- PC1.** arrange crude oil from the storage
- PC2.** prepare required chemicals as per work order
- PC3.**
  - set controls of the heat exchanger
  - Controls of heat exchanger: temperature, pressure, etc.
- PC4.** heat the oil to specified processing temperature
- PC5.** allow heated oil from heat exchanger to flow into centrifugal mixer by opening the valve
- PC6.** add measured quantity of acids such as phosphoric acid or citric acid to carry out acid mixing process
- PC7.** add measured quantity of sodium hydroxide solution (caustic lye solution) from caustic lye solution
- PC8.**
  - set controls of the centrifuge to carry out separation of the non-hydratable gums and soap stock from oil
  - Controls: speed, time, etc.
- PC9.**
  - set controls of the heat exchanger and heat the oil after separation process
  - Controls: temperature, pressure, etc.
- PC10.** mix the hot water with oil for water washing process to remove residual gums
- PC11.** separate the neutralized oil and washed water
- PC12.** transfer neutralized oil to the collection tank
- PC13.**
  - set controls of the vacuum dryer and remove moisture from the neutralized oil under the vacuum
  - Controls: pressure, temperature, etc.

#### *Bleach the oil*

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

- PC14.**
  - set controls of the heat exchanger and heat and bleach the degummed and dried oil as per SOP
  - Controls: temperature, pressure, time, etc.

- PC15.** • set controls of the bleacher and spray heated oil through nozzles into bleacher evenly
  - Controls: pressure, temperature, retention time, etc.
- PC16.** remove any residual gums and soaps, colours, impurities, trace metals, etc., by bleaching earth
- PC17.** transfer dried oil and earth mixture into series of two pressure leaf filters to remove spent earth and collect filtered oil in filtrate receiver
- PC18.** polish the filtered oil and collect polished oil in bleached oil collection tank
- PC19.** remove residual oil and collect in recovered oil tank
- PC20.** perform quality check of spent earth residual oil to minimize losses

*Carry out dewaxing/winterization of oil*

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

- PC21.** • heat the oil to a specified temperature to liquify the oil
  - Controls: temperature, pressure, flow rate, etc.
- PC22.** transfer heated oil to the storage tank
- PC23.** circulate cooling tower water to cool down the oil to certain temperature
- PC24.** circulate propylene glycol to gradually cool oil to required temperature as per SOP
- PC25.** • set controls of the agitator and agitate cooled oil at the specified speed for the specified time and temperature
  - Controls: temperature, speed, etc.
- PC26.** remove precipitated solids and collect filtered oil (clear oil with sparkling appearance) in the storage tank
- PC27.** take sample of dewaxed oil and transfer it to the quality analysis lab

*Carry out de-odourizing of oil*

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

- PC28.** transfer bleached oil to economizer to pre-heat oil to the specified temperature by using outgoing hot de-odourized oil
- PC29.** • set controls of the economizer
  - Controls of the economizer: temperature, time, etc.
- PC30.** create vacuum in the deaerator tank by pre-heating the oil to the specified temperature
- PC31.** • set controls of the de-odorizing economizer to remove free fatty acid and other volatile impurities from the oil along with steam
  - Controls: temperature, pressure, retention time, etc.
- PC32.** cool down the de-odourized oil in the de-odourizing economizer in bleaching plant
- PC33.** cool down the oil to storage temperature by spraying water from cooling water tower
- PC34.** collect oil in refined oil storage tank
- PC35.** • check the quality of finished product (de-odourized oil) through physical parameters
  - Physical parameters: colour, odour, viscosity, etc.
- PC36.** take sample and transfer it to the quality lab for the analysis
- PC37.** transfer refined oil into the filling tank of packaging machine
- PC38.** load packaging materials and labels in packaging machine
- PC39.** • set controls of the packaging, labeling, and date coding machines as per SOP
  - Controls: filling volume, date coding, batch number, date of manufacture, date of expiry, etc.
- PC40.** place the packed products in cartons and seal, and transfer them to the storage area and store as per SOP

- PC41.** set controls in PLC for process parameters of each machinery i.e., neutralizer, bleacher, crystallizer, de-odourizer
- PC42.**
- perform final processing of refined oil and package the refined oil in case of fully automated process by passing the crude oil continuously through respective equipment
  - Final process: neutralize/degum, bleach, dewax, de-odorize
  - Equipment: neutralizer, bleacher, crystallizer, de-odourizer
- PC43.**
- document and maintain record on production, process details and the types of finished products produced
  - Production records: raw material used, products produced, production sequence, defects observed, equipment and machinery details, efficiency and capacity utilization of equipment
  - Process details: Process flow chart
  - Finished products: sweet products, savoury products
  - Records: batch number, time of packing, date of manufacture, date of expiry, other label details, primary and secondary and ter
- PC44.** verify documents and track from finished product to ingredients, in case of quality concerns and for quality management system audits
- PC45.** report discrepancies/concerns to the supervisor for immediate action and implement suggested corrective action, if any

*Carry out post-production cleaning and regular maintenance of equipment*

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

- PC46.** clean the work area, machineries, equipment and tools using recommended cleaning agents and sanitizers
- PC47.** ensure periodic (daily/weekly/monthly/ quarterly/half yearly/annual) maintenance of all machines and equipment following the SOP or following suppliers' instructions/manuals

## Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** degumming or neutralizing process of the oil
- KU2.** usage of chemicals in degumming or neutralizing process
- KU3.** operating procedure of all machineries such as heat exchanger, centrifuge, bleaching heat exchanger, bleacher, thermal oil heater, economizer/ economizer, de-odourizer/pre-stripper, packaging, labelling, and date coding, etc.
- KU4.** procedure to carry out separation process of the crude oil
- KU5.** significance of removing moisture from the neutralized oil under the vacuum
- KU6.** sop to heat and bleach the degummed and dried oil
- KU7.** procedure to polish filtered oil
- KU8.** methods to liquify the oil
- KU9.** procedure to cool down the oil
- KU10.** techniques to circulate propylene glycol on oil to cool down it to the required temperature
- KU11.** how to agitate cooled oil
- KU12.** sop to take samples for quality analysis
- KU13.** de-odourizing process of oil
- KU14.** pre-heating process of the oil along with the steam
- KU15.** procedure to remove impurities from the oil along with steam

- KU16.** physical parameters to check quality of the finished product
- KU17.** sop to report discrepancies/concerns to departments supervisor
- KU18.** procedure to perform post production cleaning and regular maintenance of equipments

### **Generic Skills (GS)**

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

- GS1.** note down the information communicated by the senior/supervisor, observations (if any) related to the process, and data for online ERP or as per applicability in the organization
- GS2.** read and interpret the work order from the supervisor, certificate of analysis, analysis report from internal lab, process required for producing various types of products, equipment manuals and process documents to understand the equipments operation and process requirement
- GS3.** communicate effectively with team members and supervisors
- GS4.** plan and prioritize various tasks as per standards
- GS5.** discuss task lists, schedules, and activities for carry out production with the senior/supervisor
- GS6.** plan to utilise time and equipment effectively

## Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Carry out degumming or neutralizing of oil</i>	<b>9</b>	<b>25</b>	-	-
<b>PC1.</b> arrange crude oil from the storage	-	-	-	-
<b>PC2.</b> prepare required chemicals as per work order	-	-	-	-
<b>PC3.</b> • set controls of the heat exchanger • Controls of heat exchanger: temperature, pressure, etc.	-	-	-	-
<b>PC4.</b> heat the oil to specified processing temperature	-	-	-	-
<b>PC5.</b> allow heated oil from heat exchanger to flow into centrifugal mixer by opening the valve	-	-	-	-
<b>PC6.</b> add measured quantity of acids such as phosphoric acid or citric acid to carry out acid mixing process	-	-	-	-
<b>PC7.</b> add measured quantity of sodium hydroxide solution (caustic lye solution) from caustic lye solution	-	-	-	-
<b>PC8.</b> • set controls of the centrifuge to carry out separation of the non-hydratable gums and soap stock from oil • Controls: speed, time, etc.	-	-	-	-
<b>PC9.</b> • set controls of the heat exchanger and heat the oil after separation process • Controls: temperature, pressure, etc.	-	-	-	-
<b>PC10.</b> mix the hot water with oil for water washing process to remove residual gums	-	-	-	-
<b>PC11.</b> separate the neutralized oil and washed water	-	-	-	-
<b>PC12.</b> transfer neutralized oil to the collection tank	-	-	-	-
<b>PC13.</b> • set controls of the vacuum dryer and remove moisture from the neutralized oil under the vacuum • Controls: pressure, temperature, etc.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Bleach the oil</i>	<b>9</b>	<b>17</b>	-	-
<b>PC14.</b> • set controls of the heat exchanger and heat and bleach the degummed and dried oil as per SOP • Controls: temperature, pressure, time, etc.	-	-	-	-
<b>PC15.</b> • set controls of the bleacher and spray heated oil through nozzles into bleacher evenly • Controls: pressure, temperature, retention time, etc.	-	-	-	-
<b>PC16.</b> remove any residual gums and soaps, colours, impurities, trace metals, etc., by bleaching earth	-	-	-	-
<b>PC17.</b> transfer dried oil and earth mixture into series of two pressure leaf filters to remove spent earth and collect filtered oil in filtrate receiver	-	-	-	-
<b>PC18.</b> polish the filtered oil and collect polished oil in bleached oil collection tank	-	-	-	-
<b>PC19.</b> remove residual oil and collect in recovered oil tank	-	-	-	-
<b>PC20.</b> perform quality check of spent earth residual oil to minimize losses	-	-	-	-
<i>Carry out dewaxing/winterization of oil</i>	<b>7</b>	<b>14</b>	-	-
<b>PC21.</b> • heat the oil to a specified temperature to liquify the oil • Controls: temperature, pressure, flow rate, etc.	-	-	-	-
<b>PC22.</b> transfer heated oil to the storage tank	-	-	-	-
<b>PC23.</b> circulate cooling tower water to cool down the oil to certain temperature	-	-	-	-
<b>PC24.</b> circulate propylene glycol to gradually cool oil to required temperature as per SOP	-	-	-	-
<b>PC25.</b> • set controls of the agitator and agitate cooled oil at the specified speed for the specified time and temperature • Controls: temperature, speed, etc.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC26.</b> remove precipitated solids and collect filtered oil (clear oil with sparkling appearance) in the storage tank	-	-	-	-
<b>PC27.</b> take sample of dewaxed oil and transfer it to the quality analysis lab	-	-	-	-
<i>Carry out de-odourizing of oil</i>	<b>16</b>	<b>43</b>	-	-
<b>PC28.</b> transfer bleached oil to economizer to pre-heat oil to the specified temperature by using outgoing hot de-odourized oil	-	-	-	-
<b>PC29.</b> <ul style="list-style-type: none"> <li>• set controls of the economizer</li> <li>• Controls of the economizer: temperature, time, etc.</li> </ul>	-	-	-	-
<b>PC30.</b> create vacuum in the deaerator tank by pre-heating the oil to the specified temperature	-	-	-	-
<b>PC31.</b> <ul style="list-style-type: none"> <li>• set controls of the de-odorizing economizer to remove free fatty acid and other volatile impurities from the oil along with steam</li> <li>• Controls: temperature, pressure, retention time, etc.</li> </ul>	-	-	-	-
<b>PC32.</b> cool down the de-odourized oil in the de-odourizing economizer in bleaching plant	-	-	-	-
<b>PC33.</b> cool down the oil to storage temperature by spraying water from cooling water tower	-	-	-	-
<b>PC34.</b> collect oil in refined oil storage tank	-	-	-	-
<b>PC35.</b> <ul style="list-style-type: none"> <li>• check the quality of finished product (de-odourized oil) through physical parameters</li> <li>• Physical parameters: colour, odour, viscosity, etc.</li> </ul>	-	-	-	-
<b>PC36.</b> take sample and transfer it to the quality lab for the analysis	-	-	-	-
<b>PC37.</b> transfer refined oil into the filling tank of packaging machine	-	-	-	-
<b>PC38.</b> load packaging materials and labels in packaging machine	-	-	-	-



Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC39.</b> <ul style="list-style-type: none"> <li>• set controls of the packaging, labeling, and date coding machines as per SOP</li> <li>• Controls: filling volume, date coding, batch number, date of manufacture, date of expiry, etc.</li> </ul>	-	-	-	-
<b>PC40.</b> place the packed products in cartons and seal, and transfer them to the storage area and store as per SOP	-	-	-	-
<b>PC41.</b> set controls in PLC for process parameters of each machinery i.e., neutralizer, bleacher, crystallizer, de-odourizer	-	-	-	-
<b>PC42.</b> <ul style="list-style-type: none"> <li>• perform final processing of refined oil and package the refined oil in case of fully automated process by passing the crude oil continuously through respective equipment</li> <li>• Final process: neutralize/degum, bleach, dewax, deodorize</li> <li>• Equipment: neutralizer, bleacher, crystallizer, de-odourizer</li> </ul>	-	-	-	-
<b>PC43.</b> <ul style="list-style-type: none"> <li>• document and maintain record on production, process details and the types of finished products produced</li> <li>• Production records: raw material used, products produced, production sequence, defects observed, equipment and machinery details, efficiency and capacity utilization of equipment</li> <li>• Process details: Process flow chart</li> <li>• Finished products: sweet products, savoury products</li> <li>• Records: batch number, time of packing, date of manufacture, date of expiry, other label details, primary and secondary and ter</li> </ul>	-	-	-	-
<b>PC44.</b> verify documents and track from finished product to ingredients, in case of quality concerns and for quality management system audits	-	-	-	-
<b>PC45.</b> report discrepancies/concerns to the supervisor for immediate action and implement suggested corrective action, if any	-	-	-	-
<i>Carry out post-production cleaning and regular maintenance of equipment</i>	<b>4</b>	<b>6</b>	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC46.</b> clean the work area, machineries, equipment and tools using recommended cleaning agents and sanitizers	-	-	-	-
<b>PC47.</b> ensure periodic (daily/weekly/monthly/quarterly/half yearly/annual) maintenance of all machines and equipment following the SOP or following suppliers' instructions/manuals	-	-	-	-
<b>NOS Total</b>	<b>45</b>	<b>105</b>	-	-

**National Occupational Standards (NOS) Parameters**

<b>NOS Code</b>	FIC/N1030
<b>NOS Name</b>	Carry out oil refining
<b>Sector</b>	Food Processing
<b>Sub-Sector</b>	Food Grain Milling
<b>Occupation</b>	Processing-Food Grain Milling (including oilseeds)
<b>NSQF Level</b>	4
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Next Review Date</b>	NA

## FIC/N9901: Implement health and safety practices at the workplace

### Description

This unit is about following health and safety procedures at the workplace.

### Scope

The scope covers the following :

- Ensure food safety and personal hygiene
- Follow safety measures to avoid accidents
- Follow emergency procedures
- Manage infection control

### Elements and Performance Criteria

#### *Ensure food safety and personal hygiene*

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

- PC1.** follow relevant practices to avoid cross contamination at all stages of food processing operations
- PC2.** follow organisational procedures for handling items that may cause allergic reactions
- PC3.** follow Good Manufacturing Practices (GMP) at the workplace. Good Manufacturing Practices: location and layout (ergonomics), cleaning and sanitation, equipment and containers, pest control, facilities (lighting, water supply, drainage and waste disposal, air quality and ventilation), food storage, transportation, and distribution (Source: Schedule IV, FSSAI Licensing and Registration, 2011)
- PC4.** follow Good Hygiene Practices (GHP) at the workplace appropriately. Good Hygiene Practices: use of gloves, hairnets, masks, ear plugs, goggles, shoes etc; washing hands regularly; treating injuries such as cuts, boils, skin infections and grazes; preventive health check-ups ; getting vaccinated whenever required. (Source: Schedule IV, FSSAI Licensing and Registration, 2011)

#### *Follow safety measures to avoid accidents*

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

- PC5.** use protective clothing/equipment for specific tasks and work conditions
- PC6.** identify job-site hazardous work and possible causes of risk or accident at the workplace
- PC7.** deal with hazards safely and appropriately to ensure safety of self and others as per organisational protocol
- PC8.** use various types of fire extinguishers effectively
- PC9.** respond promptly and appropriately to an accident situation or medical emergency
- PC10.** provide cardio-pulmonary resuscitation (CPR) as per the requirement (e.g. cardiac arrest)

#### *Follow emergency procedures*

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

- PC11.** follow workplace emergency and evacuation procedures
- PC12.** use safe methods to free a person from electrocution

**PC13.** administer appropriate first aid to victims in case of cuts, bleeding, burns, choking, electric shock, poisoning etc.

*Manage infection control*

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

**PC14.** use appropriate disinfectants to disinfect the work area and equipment as per organisational protocol

**PC15.** ensure personal hygiene by washing hands regularly using alcohol based sanitisers and wearing personal protective equipment (PPE)

**PC16.** report illness of self and others to the supervisor or concerned authority

## **Knowledge and Understanding (KU)**

The individual on the job needs to know and understand:

**KU1.** meaning of hazards and risks

**KU2.** possible causes of risk, hazard or accident in the workplace

**KU3.** where to find all the general health and safety equipment in the workplace

**KU4.** health and safety policy and procedures of the organization

**KU5.** health and safety hazards commonly present in the work environment

**KU6.** work practices and precautions used to control and prevent risks, hazards and accidents

**KU7.** applicable standards and regulations as listed in The Food Safety and Standards Act, 2006

**KU8.** importance of each personal protective equipment used such as eye protection, hard hats, gloves apron, rubber boots, etc.

**KU9.** importance of ensuring personal hygiene at the workplace

**KU10.** ways to prevent cross contamination at the workplace

**KU11.** importance of storing food at specified temperatures

**KU12.** various dangers associated with the use of electrical and other equipment

**KU13.** preventive and remedial actions to be taken in the case of exposure to toxic materials

**KU14.** various causes of fire and the ways to prevent them

**KU15.** techniques of using the different fire extinguishers

**KU16.** procedure followed for providing cardio-pulmonary resuscitation (CPR) to the affected

**KU17.** rescue techniques applied during a fire hazard

**KU18.** various types of safety signs and what they mean

**KU19.** workplace emergency and evacuation procedures

**KU20.** appropriate basic first aid treatment relevant to the condition e.g. shock, electrical shock, bleeding, breaks to bones, minor burns, resuscitation, poisoning, eye injuries

**KU21.** potential injuries and ill health conditions associated with incorrect manual handling

**KU22.** safe lifting and carrying practices

**KU23.** safe practices to be followed for ensuring sanitisation of self and work area

**KU24.** procedure for storing the sanitising materials appropriately

## **Generic Skills (GS)**

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

- GS1.** write an accident/incident report in local language or English
- GS2.** read and comprehend basic content to read labels, charts, signages, symbols and product manuals
- GS3.** communicate with coworkers appropriately in order to clarify instructions and other issues
- GS4.** make appropriate decisions pertaining to the concerned area of work regarding the work objective, span of authority, responsibility, laid down procedure and guidelines
- GS5.** plan and organize the work schedule, work area, tools, equipment and materials for improved productivity
- GS6.** identify probable solutions to the problems in hand and evaluate them
- GS7.** seek official and authorised sources of help and guidance to resolve problems that cannot be solved at one's level of authority

## Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Ensure food safety and personal hygiene</i>	<b>7</b>	<b>19</b>	-	-
<b>PC1.</b> follow relevant practices to avoid cross contamination at all stages of food processing operations	1	4	-	-
<b>PC2.</b> follow organisational procedures for handling items that may cause allergic reactions	1	4	-	-
<b>PC3.</b> follow Good Manufacturing Practices (GMP) at the workplace. Good Manufacturing Practices: location and layout (ergonomics), cleaning and sanitation, equipment and containers, pest control, facilities (lighting, water supply, drainage and waste disposal, air quality and ventilation), food storage, transportation, and distribution (Source: Schedule IV, FSSAI Licensing and Registration, 2011)	3	7	-	-
<b>PC4.</b> follow Good Hygiene Practices (GHP) at the workplace appropriately. Good Hygiene Practices: use of gloves, hairnets, masks, ear plugs, goggles, shoes etc; washing hands regularly; treating injuries such as cuts, boils, skin infections and grazes; preventive health check-ups ; getting vaccinated whenever required. (Source: Schedule IV, FSSAI Licensing and Registration, 2011)	2	4	-	-
<i>Follow safety measures to avoid accidents</i>	<b>11</b>	<b>24</b>	-	-
<b>PC5.</b> use protective clothing/equipment for specific tasks and work conditions	2	4	-	-
<b>PC6.</b> identify job-site hazardous work and possible causes of risk or accident at the workplace	2	4	-	-
<b>PC7.</b> deal with hazards safely and appropriately to ensure safety of self and others as per organisational protocol	2	4	-	-
<b>PC8.</b> use various types of fire extinguishers effectively	2	4	-	-
<b>PC9.</b> respond promptly and appropriately to an accident situation or medical emergency	1	4	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<b>PC10.</b> provide cardio-pulmonary resuscitation (CPR) as per the requirement (e.g. cardiac arrest)	2	4	-	-
<i>Follow emergency procedures</i>	<b>6</b>	<b>12</b>	-	-
<b>PC11.</b> follow workplace emergency and evacuation procedures	2	4	-	-
<b>PC12.</b> use safe methods to free a person from electrocution	2	4	-	-
<b>PC13.</b> administer appropriate first aid to victims in case of cuts, bleeding, burns, choking, electric shock, poisoning etc.	2	4	-	-
<i>Manage infection control</i>	<b>6</b>	<b>15</b>	-	-
<b>PC14.</b> use appropriate disinfectants to disinfect the work area and equipment as per organisational protocol	3	7	-	-
<b>PC15.</b> ensure personal hygiene by washing hands regularly using alcohol based sanitisers and wearing personal protective equipment (PPE)	1	4	-	-
<b>PC16.</b> report illness of self and others to the supervisor or concerned authority	2	4	-	-
<b>NOS Total</b>	<b>30</b>	<b>70</b>	-	-



**National Occupational Standards (NOS) Parameters**

<b>NOS Code</b>	FIC/N9901
<b>NOS Name</b>	Implement health and safety practices at the workplace
<b>Sector</b>	Food Processing
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	3
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	24/02/2022
<b>Next Review Date</b>	24/02/2024
<b>NSQC Clearance Date</b>	24/02/2022

## FIC/N9902: Work effectively in an organisation

### Description

This unit is about working effectively with others.

### Scope

The scope covers the following :

- Communicate effectively
- Work in a team effectively
- Respect diversity

### Elements and Performance Criteria

#### *Communicate effectively*

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

- PC1.** obtain complete information and instructions from designated personnel
- PC2.** reciprocate understanding and seek clarifications whenever required
- PC3.** provide information accurately and clearly
- PC4.** use inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive

#### *Work in a team effectively*

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

- PC5.** plan tasks to be performed as per priority and need
- PC6.** consult with and assist others to maximize effectiveness and efficiency at work
- PC7.** escalate problems and grievances beyond own scope to the concerned authority
- PC8.** take appropriate action to resolve conflicts at the workplace

#### *Respect diversity*

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

- PC9.** maintain a gender-neutral behaviour with everyone at the workplace
- PC10.** empathise with People with Disabilities (PwD) and offer help, if required
- PC11.** recognise and report incidents of harassment and discrimination to appropriate authority

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** organizational quality procedures and processes associated with work
- KU2.** standards, policies, and procedures followed in the organization relevant to employment, harassment, discrimination and performance conditions
- KU3.** reporting structure, inter-dependent functions, lines, and procedures applicable at the workplace

- KU4.** different types of harassment and discrimination based on gender, disability, caste, religion, and culture
- KU5.** components of effective communication and its importance
- KU6.** importance of teamwork in organizational and individual success
- KU7.** importance of ethics and discipline for professional success
- KU8.** how to express and address grievances appropriately and effectively
- KU9.** importance and ways of managing interpersonal conflict effectively
- KU10.** different types of disabilities and the challenges faced by persons with disability (PwD)
- KU11.** laws, acts and provisions defined for PwD
- KU12.** importance of gender sensitivity and equality
- KU13.** legislations, grievance redressal mechanisms, and penalties against harassment in the workplace

### **Generic Skills (GS)**

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

- GS1.** communicate information, doubts and concerns about work related matters in local language or Hindi/English
- GS2.** read and interpret information given in local language or Hindi/English
- GS3.** establish priorities and deadlines in consultation with other and record them
- GS4.** be punctual
- GS5.** listen to others concerns and doubts carefully and address them
- GS6.** be courteous

## Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Communicate effectively</i>	<b>8</b>	<b>13</b>	-	-
<b>PC1.</b> obtain complete information and instructions from designated personnel	2	3	-	-
<b>PC2.</b> reciprocate understanding and seek clarifications whenever required	2	3	-	-
<b>PC3.</b> provide information accurately and clearly	2	3	-	-
<b>PC4.</b> use inclusive language (verbal, non-verbal and written) that is gender, disability and culturally sensitive	2	4	-	-
<i>Work in a team effectively</i>	<b>8</b>	<b>14</b>	-	-
<b>PC5.</b> plan tasks to be performed as per priority and need	2	4	-	-
<b>PC6.</b> consult with and assist others to maximize effectiveness and efficiency at work	2	3	-	-
<b>PC7.</b> escalate problems and grievances beyond own scope to the concerned authority	2	3	-	-
<b>PC8.</b> take appropriate action to resolve conflicts at the workplace	2	4	-	-
<i>Respect diversity</i>	<b>6</b>	<b>12</b>	-	-
<b>PC9.</b> maintain a gender-neutral behaviour with everyone at the workplace	2	4	-	-
<b>PC10.</b> empathise with People with Disabilities (PwD) and offer help, if required	2	4	-	-
<b>PC11.</b> recognise and report incidents of harassment and discrimination to appropriate authority	2	4	-	-
<b>NOS Total</b>	<b>22</b>	<b>39</b>	-	-

## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	FIC/N9902
<b>NOS Name</b>	Work effectively in an organisation
<b>Sector</b>	Food Processing
<b>Sub-Sector</b>	Generic
<b>Occupation</b>	Generic
<b>NSQF Level</b>	3
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	24/02/2022
<b>Next Review Date</b>	18/06/2026
<b>NSQ Clearance Date</b>	24/02/2022

## SGJ/N1702: Optimize resource utilization at workplace

### Description

This unit is about adopting sustainable practices and optimizing use of resources, especially material, energy and waste, in day-to-day operations at work

### Scope

The scope covers the following :

- Material conservation practices
- Energy/electricity conservation practices
- Effective waste management/recycling practices

### Elements and Performance Criteria

#### *Material conservation practices*

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

- PC1.** identify ways to optimize usage of material including water in various tasks/activities/processes
- PC2.** check for spills/leakages in various tasks/activities/processes
- PC3.** plug spills/leakages and escalate to appropriate authority if unable to rectify
- PC4.** carry out routine cleaning of tools, machines and equipment

#### *Energy/electricity conservation practices*

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

- PC5.** identify ways to optimize usage of electricity/energy in various tasks/activities/processes
- PC6.** check if the equipment/machine is functioning normally before commencing work and rectify wherever required
- PC7.** report malfunctioning (fumes/sparks/emission/vibration/noise) and lapse in maintenance of equipment
- PC8.** ensure electrical equipment and appliances are properly connected and turned off when not in use

#### *Effective waste management/recycling practices*

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

- PC9.** identify recyclable and non-recyclable, and hazardous waste generated
- PC10.** segregate waste into different categories
- PC11.** dispose non-recyclable waste appropriately
- PC12.** deposit recyclable and reusable material at identified location
- PC13.** follow processes specified for disposal of hazardous waste

### Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

- KU1.** potential hazards, risks and threats based on the nature of work
- KU2.** layout of the workstation and electrical and thermal equipment used
- KU3.** organizations procedures for minimizing waste
- KU4.** efficient and inefficient utilization of material and water
- KU5.** ways of efficiently managing material and water in the process
- KU6.** basics of electricity and prevalent energy efficient devices
- KU7.** ways to recognize common electrical problems
- KU8.** common practices of conserving electricity
- KU9.** usage of different colours of dustbins
- KU10.** categorization of waste into dry, wet, recyclable, non-recyclable and items of single-use plastics
- KU11.** waste management and methods of waste disposal
- KU12.** common sources of pollution and ways to minimize it

### **Generic Skills (GS)**

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

- GS1.** record data on waste disposal at workplace
- GS2.** complete statutory documents relevant to safety and hygiene
- GS3.** read Standard Operating Practices (SOP) documents
- GS4.** communicate with colleagues on the significance of greening of jobs
- GS5.** make timely decisions for efficient utilization of resources
- GS6.** complete tasks efficiently and accurately within stipulated time
- GS7.** work with supervisors/team members to carry out work related tasks
- GS8.** identify cause and effect of greening of jobs

## Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>Material conservation practices</i>	<b>4</b>	<b>8</b>	-	-
<b>PC1.</b> identify ways to optimize usage of material including water in various tasks/activities/processes	1	2	-	-
<b>PC2.</b> check for spills/leakages in various tasks/activities/processes	1	2	-	-
<b>PC3.</b> plug spills/leakages and escalate to appropriate authority if unable to rectify	1	2	-	-
<b>PC4.</b> carry out routine cleaning of tools, machines and equipment	1	2	-	-
<i>Energy/electricity conservation practices</i>	<b>4</b>	<b>8</b>	-	-
<b>PC5.</b> identify ways to optimize usage of electricity/energy in various tasks/activities/processes	1	2	-	-
<b>PC6.</b> check if the equipment/machine is functioning normally before commencing work and rectify wherever required	1	2	-	-
<b>PC7.</b> report malfunctioning (fumes/sparks/emission/vibration/noise) and lapse in maintenance of equipment	1	2	-	-
<b>PC8.</b> ensure electrical equipment and appliances are properly connected and turned off when not in use	1	2	-	-
<i>Effective waste management/recycling practices</i>	<b>5</b>	<b>10</b>	-	-
<b>PC9.</b> identify recyclable and non-recyclable, and hazardous waste generated	1	2	-	-
<b>PC10.</b> segregate waste into different categories	1	2	-	-
<b>PC11.</b> dispose non-recyclable waste appropriately	1	2	-	-
<b>PC12.</b> deposit recyclable and reusable material at identified location	1	2	-	-
<b>PC13.</b> follow processes specified for disposal of hazardous waste	1	2	-	-
<b>NOS Total</b>	<b>13</b>	<b>26</b>	-	-



## National Occupational Standards (NOS) Parameters

<b>NOS Code</b>	SGJ/N1702
<b>NOS Name</b>	Optimize resource utilization at workplace
<b>Sector</b>	Green Jobs
<b>Sub-Sector</b>	Other Green Jobs
<b>Occupation</b>	Resource Optimization
<b>NSQF Level</b>	3
<b>Credits</b>	TBD
<b>Version</b>	1.0
<b>Last Reviewed Date</b>	24/02/2022
<b>Next Review Date</b>	24/02/2026
<b>NSQC Clearance Date</b>	24/02/2022

## 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. 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 centre (as per assessment criteria below).
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criterion.
6. To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7. In case of unsuccessful completion, the trainee may seek reassessment on the

Qualification Pack.

**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

<b>National Occupational Standards</b>	<b>Theory Marks</b>	<b>Practical Marks</b>	<b>Project Marks</b>	<b>Viva Marks</b>	<b>Total Marks</b>	<b>Weightage</b>
FIC/N9026.Prepare for production	30	70	-	-	100	15
FIC/N1029.Carry out oil extraction	45	105	-	-	150	25
FIC/N1030.Carry out oil refining	45	105	-	-	150	25
FIC/N9901.Implement health and safety practices at the workplace	30	70	-	-	100	15
FIC/N9902.Work effectively in an organisation	22	39	-	-	61	10
SGJ/N1702.Optimize resource utilization at workplace	13	26	-	-	39	10
<b>Total</b>	<b>185</b>	<b>415</b>	<b>-</b>	<b>-</b>	<b>600</b>	<b>100</b>

## Acronyms

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

## Glossary

<b>Sector</b>	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.
<b>Sub-sector</b>	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
<b>Occupation</b>	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
<b>Job role</b>	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
<b>Occupational Standards (OS)</b>	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.
<b>Performance Criteria (PC)</b>	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
<b>National Occupational Standards (NOS)</b>	NOS are occupational standards which apply uniquely in the Indian context.
<b>Qualifications Pack (QP)</b>	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.
<b>Unit Code</b>	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
<b>Unit Title</b>	Unit title gives a clear overall statement about what the incumbent should be able to do.
<b>Description</b>	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.
<b>Scope</b>	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.
<b>Knowledge and Understanding (KU)</b>	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.

<b>Organisational Context</b>	<p>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.</p>
<b>Technical Knowledge</b>	<p>Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.</p>
<b>Core Skills/ Generic Skills (GS)</b>	<p>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.</p>
<b>Electives</b>	<p>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.</p>
<b>Options</b>	<p>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.</p>