

# Model Curriculum

## Dairy Processing Equipment Operator

**SECTOR: FOOD PROCESSING**  
**SUB-SECTOR: DAIRY PRODUCTS**  
**OCCUPATION: PROCESSING**  
**REF ID: FIC/Q2002, V1.0**  
**NSQF LEVEL: 4**



## Certificate

### CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

FOOD INDUSTRY CAPACITY AND SKILL INITIATIVE (FICSI)

for the

### MODEL CURRICULUM

Complying to National Occupational Standards of  
Job Role/ Qualification Pack: **'Dairy Processing Equipment Operator'** QP No. **'FIC/Q2002, NSQF Level 4'**

Date of Issuance: 04 September, 2018

Valid up to: 30 June, 2019

\* Valid up to the next review date of the Qualification Pack



Authorized Signatory  
(Food Industry Capacity and Skill Initiative)

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# Dairy Processing Equipment Operator

## CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Dairy Processing Equipment Operator”, in the “Food Processing” Sector/Industry and aims at building the following key competencies amongst the learner

<b>Program Name</b>	<b>Dairy Processing Equipment Operator</b>		
<b>Qualification Pack Name &amp; Reference ID. ID</b>	FIC/Q2002, v1.0		
<b>Version No.</b>	1.0	<b>Version Update Date</b>	04/09/2018
<b>Pre-requisites to Training</b>	Preferably Class 10 and 2-3 years' experience in a dairy processing unit		
<b>Training Outcomes</b>	<b>After completing this programme, participants will be able to:</b> <ul style="list-style-type: none"> <li>• use dairy equipment and machineries while maintaining process parameters,</li> <li>• execute production sequence as per production order,</li> <li>• demonstrate preparation of work area for producing dairy products,</li> <li>• perform documentation and record keeping related to production of dairy products,</li> <li>• apply food safety and hygiene practices at work.</li> </ul>		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of “Dairy Processing Equipment Operator” Qualification Pack issued by “Food Industry Capacity and Skill Initiative”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<b>Introduction to Training Program and Overview of Food Processing Industry</b>  <b>Theory Duration</b> (hh:mm) 03:00 <b>Practical Duration</b> (hh:mm) 00:00  <b>Corresponding NOS Code</b> Bridge Module	<ul style="list-style-type: none"> <li>Introduce yourself to fellow participants and trainer</li> <li>Define food processing</li> <li>List the various sub sectors of food processing industry</li> <li>Define dairy processing</li> <li>List the various units within a dairy processing plant</li> <li>List the equipment used in a dairy processing plant</li> <li>State the methods of testing dairy products produced for accepted quality standards</li> </ul>	
2	<b>Organizational Standards and Norms</b>  <b>Theory Duration</b> (hh:mm) 10:00 <b>Practical Duration</b> (hh:mm) 08:00  <b>Corresponding NOS Code</b> FIC/N2007	<ul style="list-style-type: none"> <li>State the roles and responsibilities of a dairy processing equipment operator</li> <li>State how to conduct yourself at the workplace</li> <li>State the personal hygiene and sanitation guidelines</li> <li>State the food safety hygiene standards to follow in a work environment</li> </ul>	Protective Gloves, Head Caps, Aprons, Safety Goggles, Safety Boots, Mouth Masks, Sanitizer, Food Safety Manual
3	<b>Prepare and Maintain Work Area and Process Machineries for Operating Dairy Processing Equipment</b>  <b>Theory Duration</b> (hh:mm) 15:00  <b>Practical Duration</b> (hh:mm) 15:00	<ul style="list-style-type: none"> <li>State the materials and equipment used in the cleaning and maintenance of the work area</li> <li>State the common detergents and sanitizers used in cleaning work area and machineries</li> <li>State the methods of cleaning and sanitization</li> <li>Perform the process of preparing the work area for scheduled production</li> <li>Describe the functions to be carried out before starting production</li> <li>State the different types of maintenance procedures</li> <li>Conduct minor repairs and faults in process machineries</li> </ul>	pH Meter, Weighing Balance, Beaker, Bunsen Burner, Filter, Homogenizer, Pasteurizer, Separator, Clarifier, Packaging Machines, Protective Gloves, Head Caps, Aprons, Safety Goggles, Safety Boots, Mouth Masks, Sanitizer, Food Safety Manual

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<b>Corresponding NOS Code</b> FIC/N2005	<ul style="list-style-type: none"> <li>Prepare the machines and tools required for production</li> </ul>	
4.	<b>Prepare For Operating Dairy Process Machineries and Production of Various Dairy Products</b>  <b>Theory Duration</b> (hh:mm) 10:00  <b>Practical Duration</b> (hh:mm) 20:00  <b>Corresponding NOS Code</b> FIC/N2006	<ul style="list-style-type: none"> <li>Perform a check if all the machineries are clean and in good working conditions</li> <li>Demonstrate assembling of all components of machines</li> <li>Perform a pre check on working of all machineries</li> <li>Calculate the process time for effective utilization of machineries and manpower</li> <li>Analyze the quality of raw material by assessing its physical parameters</li> </ul>	pH Meter, Weighing Balance, Beaker, Bunsen Burner, Filter, Homogenizer, Pasteurizer, Separator, Clarifier, Packaging Machines, Protective Gloves, Head Caps, Aprons, Safety Goggles, Safety Boots, Mouth Masks, Sanitizer, Food Safety Manual
5.	<b>Operate Dairy Processing Machines</b>  <b>Theory Duration</b> (hh:mm) 19:00  <b>Practical Duration</b> (hh:mm) 40:00  <b>Corresponding NOS Code</b> FIC/N2007	<ul style="list-style-type: none"> <li>Set the control parameters of all the machineries used in a dairy processing plant</li> <li>Demonstrate use of holding tank</li> <li>Demonstrate the use of metering device that measures the volume of milk required</li> <li>Use the filter to remove sediments from milk</li> <li>Demonstrate use of separator for separation of cream from milk</li> <li>Demonstrate use of homogenizer for getting desire fat content</li> <li>Demonstrate use of pasteurizer</li> <li>Demonstrate chilling of milk in the chilling tank</li> <li>Perform a check on the quality of product produced</li> <li>Demonstrate packaging of dairy products produced</li> <li>Perform CIP after the production is complete</li> <li>Perform the cleaning of work area using approved sanitizers and detergents.</li> </ul>	pH Meter, Weighing Balance, Beaker, Bunsen Burner, Filter, Homogenizer, Pasteurizer, Separator, Clarifier, Packaging Machines, Protective Gloves, Head Caps, Aprons, Safety Goggles, Safety Boots, Mouth Masks, Sanitizer, Food Safety Manual

Sr. No.	Module	Key Learning Outcomes	Equipment Required
6.	<p><b>Complete Documentation and Record Keeping Related to Operation of Dairy Processing Equipment</b></p> <p><b>Theory Duration</b> (hh:mm) 06:00</p> <p><b>Practical Duration</b> (hh:mm) 04:00</p> <p><b>Corresponding NOS Code</b> FIC/N2008</p>	<ul style="list-style-type: none"> <li>State the need for documenting and maintaining records of raw materials, processes and finished products</li> <li>State the method of documenting and recording the details of raw material to final finished product</li> <li>Demonstrate the process of documenting records of production plan, process parameters, and finished products</li> </ul>	Food Safety Manual, Log Books.
7.	<p><b>Food Safety, Hygiene and Sanitation for Processing Food Products</b></p> <p><b>Theory Duration</b> (hh:mm) 15:00</p> <p><b>Practical Duration</b> (hh:mm) 35:00</p> <p><b>Corresponding NOS Code</b> FIC/N9001</p>	<ul style="list-style-type: none"> <li>State the importance of safety, hygiene and sanitation in the baking industry</li> <li>Apply the industry standards to maintain a safe and hygiene workplace</li> <li>Apply HACCP principles to eliminate food safety hazards in the process and products</li> <li>Apply safety practices in the work area</li> </ul>	Protective Gloves, Head Caps, Aprons, Safety Goggles, Safety Boots, Mouth Covers, Sanitizer, Food Safety Manual ,Log Books etc.
8.	<p><b>Professional and Core Skills</b></p> <p><b>Theory Duration</b> (hh:mm) 04:00</p> <p><b>Practical Duration</b> (hh:mm) 10:00</p> <p><b>Corresponding NOS Code</b> Bridge Module</p>	<ul style="list-style-type: none"> <li>Undertake a self-assessment test to identify personal strengths and weaknesses</li> <li>Plan and schedule the work order and manage time effectively to complete the tasks assigned</li> <li>State the importance of decision making</li> <li>Identify potential problems and make sound and timely decision</li> <li>State the importance of listening</li> </ul>	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
9.	<b>IT Orientation</b>  <b>Theory Duration</b> (hh:mm) 06:00  <b>Practical Duration</b> (hh:mm) 20:00  <b>Corresponding NOS Code</b> FIC/N2008	<ul style="list-style-type: none"> <li>• Use the computer keyboard effectively to type</li> <li>• Use ERP effectively to record day-to-day activities</li> <li>• Use the word processor effectively</li> <li>• Use the spreadsheet application effectively</li> <li>• Use the computer to document day-to-day activities</li> </ul>	Computer/Laptop
	<b>Total Duration</b> <b>240:00</b>  <b>Theory Duration</b> <b>88:00</b>  <b>Practical Duration</b> <b>152:00</b>	<b>Unique Equipment Required:</b> pH Meter, Weighing Balance, Beaker, Bunsen Burner, Filter, Homogenizer, Pasteurizer, Separator, Clarifier, Packaging Machines, Protective Gloves, Head Caps, Aprons, Safety Goggles, Safety Boots, Mouth Masks, Sanitizer, Food Safety Manual, Log Books, Computer/Laptop	

Grand Total Course Duration: **240Hours, 0 Minutes**

Recommend OJT Hours: **90Hours, 0 Minutes**

*(This syllabus/ curriculum has been approved by SSC: Food Industry Capacity and Skill Initiative)*



## Trainer Prerequisites for Job role: “Dairy Processing Equipment Operator” mapped to Qualification Pack: “FIC/Q2002, v1.0”

Sr. No.	Area	Details
1	<b>Description</b>	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “FIC/Q2002”, Version 1.0
2	<b>Personal Attributes</b>	An aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training, and pre/post work to ensure competent, employable candidates at the end of the training. Strong communication skills, ability to work as part of a team; a passion for quality and for developing others; well-organized and focused, eager to learn and keep oneself updated with the latest in the mentioned fields.
3	<b>Minimum Educational Qualifications</b>	<ul style="list-style-type: none"> <li>• M.Sc./M. Tech/ME in Dairy Technology or Food Engineering or</li> <li>• B.Sc. (home Sc.) /B. Tech/BE in Dairy Technology or Food Engineering or</li> <li>• Diploma in Dairy Technology or Food Engineering (dairy) with 4 years of hand on experience in a bakery industry.</li> </ul>
4a	<b>Domain Certification</b>	Certified for Job Role: “ <u>Dairy Processing Equipment Operator</u> ” mapped to QP: “ <u>FIC/Q2002, v1.0</u> ”. Minimum accepted score is 80%
4b	<b>Platform Certification</b>	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “MEP/Q0102”. Minimum accepted score is 80 % as per FICSI guidelines.
5	<b>Experience</b>	<ul style="list-style-type: none"> <li>• M.Sc./M. Tech/ME in Dairy Technology or Food Engineering with 1-2 years of hands on experience in a bakery industry, or</li> <li>• B.Sc. (home Sc.) /B. Tech/BE in Dairy Technology or Food Engineering with 2-3 years of hands on experience in dairy industry, or</li> <li>• Diploma in Dairy Technology or Food Engineering (dairy) with 4 years of hand on experience in a bakery industry.</li> </ul>

## Assessment Criteria

<b>CRITERIA FOR ASSESSMENT OF TRAINEES</b>	
<b>Job Role</b>	<b>Dairy Processing Equipment Operator</b>
<b>Qualification Pack</b>	<b>FIC/Q2002</b>
<b>Sector Skill Council</b>	<b>Food Processing</b>

### Guidelines for Assessment

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

		Marks Allocation			
		Total Marks	Out Of	Theory	Skills Practical
<b>1. FIC/N2005: (Prepare and maintain work area and process machineries for operating dairy processing equipments)</b>	PC.1 Clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests	<b>100</b>	25	10	15
	PC2. Ensure that the work area is safe and hygienic for food processing		10	3	7
	PC3. Dispose waste materials as per organization standards and industry requirements		15	5	10
	PC4. Check the working and performance of all machineries and tools used for the process such as filter, homogenizer, pasteurizer, separator, clarifier, packaging machines, etc.		15	5	10
	PC5. Clean the machineries and tools used with recommended sanitizers following specifications and organization standards		15	5	10
	PC6. Place the necessary tools required for the process		5	2	3
	PC7. Attend minor repairs/ faults of all machines, if required		7.5	2.5	5
	PC8 Select and set the machines and tools required		7.5	2.5	5
			<b>100</b>	<b>35</b>	<b>65</b>
<b>2. FIC/N2006: (Prepare for operating dairy process machineries and production of various dairy products)</b>	PC1. Read and understand the production order from the supervisor	<b>100</b>	5	2	3
	PC2. Ensure working and performance of all machineries required for process		10	4	6
	PC3. Report malfunctions of machine, if any, to the supervisor		5	2	3
	PC4 Calculate the process time for effective utilization of machineries and manpower		5	2	3
	PC5. Allot responsibilities/ work to the assistants and helpers		5	2	3
	PC6. Refer process chart/ product flow chart/formulation chart for product(s) produced		5	2	3
	PC7. Check the quality of raw materials by verifying the quality analysis report and assessing its physical parameters		10	4	6
	PC8. Connect pipes between holding tanks and process equipment		15	5	10
	PC9. Assemble fittings, valves, bowls, impeller shaft, strainers and other parts of equipment to prepare for production		15	5	10

	PC10. Start machine and check the working condition and performance of the machine		10	2	8
	PC11. Make minor adjustments and repairs (if required)		10	3	7
	PC12. Keep the tools accessible to attend repairs/faults in case of breakdown		5	2	3
			<b>100</b>	<b>35</b>	<b>65</b>
<b>3. FIC/N2007: ( Operate dairy processing machineries)</b>	PC1. Turn valves to pump sterilizing solution and rinse by passing water through pipes to sterilize equipments	<b>100</b>	3	1	2
	PC2. Start pump to transfer measured volume of milk into the holding tank for storing until processing		3	1	2
	PC3. Set and control metering devices that measure and allow required volume of milk at all stages of processing		4	1	3
	PC4. Open valves to allow milk through filter to remove sediment		3	1	2
	PC5. Adjust controls of the separator and set process parameters like speed to separate cream and skim milk		6	2	4
	PC6. Open valves to allow milk into homogenizer and set controls for required fat level in milk to produce standardized milk		3	1	2
	PC7. Set process parameters like temperature, time etc of the pasteurizer to pasteurize milk and cream		6	2	4
	PC8. Turn valves to admit steam into pipes of the pasteurizer		3	1	2
	PC9. Open valves to allow milk/cream into pasteurizer to pasteurize milk/cream		3	1	2
	PC10. Observe temperature and pressure gauge of the pasteurizer to control and maintain process parameters		6	2	4
	PC11. Set process parameters of the chilling tank like temperature, time		6	2	4
	PC12. Turn valves to circulate refrigerant and pre-cooled water through coils to cool milk		3	1	2
	PC13. Open valves to allow milk into the chilling tank for cooling		3	1	2
	PC14. Pump specified amounts of liquid or powder ingredients like skim milk, starter culture, rennet, stabilizer, neutralizer, flavours etc into milk in		7	3	4

	milk tanks to make dairy products, such as toned milk, flavoured milk, curd, paneer, ice-cream etc				
	PC15. Set and maintain process parameters like temperature, pressure, speed, time etc for various dairy processing equipment to produce milk products		7	3	4
	PC16. Start pump and agitator, observe pressure and temperature gauges, opens valves of dairy processing equipment to fill, stir, and steam/heat milk to produce milk products		7	3	4
	PC17. Check the quality of products produced at various stages of processing through physical parameters, sample products and transfer to quality lab for analysis		5	2	3
	PC18. Set batch code, date code and filling volume of the packaging machines		3	1	2
	PC19. Open valves to allow dairy products into packaging machine for packing		2	0.5	1.5
	PC20. Check the weight of packed dairy products for conformance to organisation standards		2	0.5	1.5
	PC21. Record time, temperature, pressure and volume readings during each stage of processing		3	1	2
	PC22. Report malfunction/discrepancies/concerns to department supervisor for immediate action.		2	1	1
	PC23. Turn valves to pump recommended sterilizing solution and rinse water through pipes for cip (clean-in-place) of tanks and processing equipment following sop		4	1	3
	PC24. Clean the work area using recommended cleaning agents and sanitizers		2	0.5	1.5
	PC25. Attend minor repairs/faults of all machines (if any)		2	0.5	1.5
	PC26. Ensure periodic (daily/weekly/monthly/quarterly/half yearly/annual) maintenance of all machines and equipment following the sop or suppliers instructions manual		2	1	1
			<b>100</b>	<b>35</b>	<b>65</b>
<b>4. FIC/N2008: ( Complete</b>	PC1. Document and maintain records of raw material processed in the		10	6	4

<b>documentation and record keeping related to operation of dairy processing equipments)</b>	equipments such as type of raw materials, tag details such as supplier details, receiving date/ date of manufacture, expiry date, supplier quality document, quality parameters for all raw materials, internal quality analysis report, storage condition etc, as per company standards	<b>100</b>			
	PC2. Maintain record of observations (if any) related to raw materials		5	3	2
	PC3. Load the raw materials details in ERP for future reference		5	3	2
	PC4. Verify the documents and track from finished product to raw materials, in case of quality concerns and during quality management system audits		5	3	2
	PC5. Document production details like the products handled, production sequence, equipments and machinery details, efficiency and capacity utilization of equipment etc		10	6	4
	PC6. Document process details such as type of raw material used, process parameters like temperature, time, pressure, etc. (as applicable) for entire production in process chart or production log for all products produced		15	9	6
	PC7. Document batch size, production yield, and wastage of raw materials, energy utilization and final products produced		10	6	4
	PC8. Maintain record of observations (if any) or deviations related to process and production		5	3	2
	PC9. Load the production and process details in ERP for future reference		5	3	2
	PC10. Verify documents and track from finished product to ingredients, in case of quality concerns and for quality management system audits		5	3	2
	PC11. Document and maintain records on the types of finished products produced		3	2	1
	PC12. Document the finished products details such as batch number, time of packing, date of manufacture, date of expiry, other label details, primary, secondary and tertiary		7	4	3

	packaging materials for all finished products, storage conditions, etc. as per company standards				
	PC13. Maintain record on observations or deviations (if any) related to finished products		5	3	2
	PC14. Load the finished product details in ERP for future reference		5	3	2
	PC15. Verify the documents and track from finished product to ingredients, in case of quality concerns and for quality management system audits		5	3	2
			<b>100</b>	<b>60</b>	<b>40</b>
<b>5. FIC/N9001: ( Food safety hygiene and sanitation for processing food products)</b>	PC1. Comply with food safety and hygiene procedures followed in the organisation	<b>100</b>	5	2	3
	PC2. Ensure personal hygiene by using of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.		6	1	5
	PC3. Ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters		5	2	3
	PC4. Pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations		10	4	6
	PC5. Clean maintain and monitor food processing equipment periodically, using it only for specified purpose		5	2	3
	PC6. Use safety equipment such as fire extinguisher, first aid kit and eyewash station when required		10	4	6
	PC7. Follow housekeeping practices by having designated area for materials/tools		5	2	3
	PC8. Follow industry standards like GMP and HACCP and product recall process		10	4	6
	PC9. Attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them		5	1	4
	PC10. Identify, document and report problems such as rodents and pests to management		5	1	4
	PC11. Conduct workplace checklist audits before and after work to ensure safety and hygiene		5	1	4
	PC12. Document and maintain raw		4	1	3

	material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system				
	PC13.Determine the quality of food using criteria such as aroma, appearance, taste and best before date, and take immediate measures to prevent spoilage		5	2	3
	PC14.Store raw materials, finished products, allergens separately to prevent cross-contamination		5	2	3
	PC15.Label raw materials and finished products and store them in designated storage areas according to safe food practices		5	2	3
	PC 16.Follow stock rotation based on FEFO/ FIFO		10	4	6
			<b>100</b>	<b>35</b>	<b>65</b>