

Model Curriculum

Bulk Milk Cooler (BMC) Operator

SECTOR: AGRICULTURE & ALLIED
SUB-SECTOR: DAIRYING
OCCUPATION: MILK COLLECTION & HANDLING
REF ID: AGR/Q4204, V1.0
NSQF LEVEL: 4



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

AGRICULTURE SKILL COUNCIL OF INDIA

for the

MODEL CURRICULUM

Complying to National Occupational Standards of

Job Role/Qualification Pack: **'Bulk Milk Cooler (BMC) Operator'** QP No. **'AGR/Q4204 NSQF Level 4'**

Date of Issuance: July 30th, 2017

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



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Authorised Signatory
(Agriculture Skill Council of India)

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Bulk Milk Cooler (BMC) Operator

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Bulk Milk Cooler (BMC) Operator”, in the “Agriculture & Allied” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Bulk Milk Cooler (BMC) Operator		
Qualification Pack Name & Reference ID.	AGR/Q4204, v1.0		
Version No.	1.0	Version Update Date	
Pre-requisites to Training	Class 10/ Diploma /ITI certification, preferably		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Prepare and maintain work area and process machineries for operating Bulk Milk Cooler(BMC): Introduction to Bulk Milk Cooler, Prepare and maintain work area along with process machineries and tools • Prepare for operating Bulk Milk Cooler: Plan equipments utilization and organize procured milk and equipments • Operate Bulk Milk Cooler and ensure cleaning and maintenance post cooling : Operation process of Bulk Milk Cooler, Procedure to clean and maintain equipments post cooling • Maintain documentation and record keeping related to operation of Bulk Milk Cooler: Basics of computer and ERP • Maintain Safety, Hygiene and Sanitation for Bulk Milk Cooler: Safety and sanitation related function, safety practices 		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of “Bulk Milk Cooler (BMC) Operator” Qualification Pack issued by “Agriculture Skill Council of India”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	Introduction Theory Duration (hh:mm) 05:00 Practical Duration (hh:mm) 00:00 Corresponding NOS Code Bridge Module	<ul style="list-style-type: none"> Understand General Discipline in the class room (Do's & Don'ts) Learn and Practice Basic skills of communication Learn and Practice Basic reading capabilities to enable reading of signs, notices and/or cautions at site Get acquainted with the Dairy Industry Understand the process of milk procurement Understand the Role of a Bulk Milk Cooler (BMC) Operator and the progression pathway 	Laptop, white board, marker, projector
2	Prepare and maintain work area and process machineries for operating Bulk Milk Cooler(BMC) Theory Duration (hh:mm) 15:00 Practical Duration (hh:mm) 30:00 Corresponding NOS Code AGR /N4215	<ul style="list-style-type: none"> Identify types of BMC and the cooling system Maintain cleanliness at the work area through approved sanitizers and ensure hygienic condition for processing milk Dispose off waste material as per organization's standard and industry requirement Check the functioning and performances of the equipments Ensure no leakage of refrigerant of Bulk Milk Cooler by using following test; bubble test ,halide torch test, nessler's reagent, sulphur candle test, electronic test detector Arrange necessary tools required and set the machine Attend any minor repair and damage Familiarize with the legal regulations pertaining to the work place 	Laptop, white board, marker, projector, Fat and SNF analyser , kit for adulteration test , Lactometer , fat testing centrifugal machine. Field visit is a must for this section to familiarize and demonstrate the functions of BMC
3	Prepare for operating Bulk Milk Cooler (BMC) Theory Duration (hh:mm) 15:00 Practical Duration (hh:mm) 30:00 Corresponding NOS Code AGR/N4216	<ul style="list-style-type: none"> Familiarize with types of procured milk and dairy products Familiarize with different kind of machineries used for processing each kind of product Handle all processing units Familiarize with sanitary standard to handle farm milk cooling and handling tank Compute basic mathematics Handle and store sanitizers and disinfectant Understand the processing order 	Laptop, white board, marker, projector Field visit is a must for this section to familiarize and demonstrate the functions of BMC

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> • Ensure proper functioning of machineries • Take precautions as per the rules prior to operating BMC • Calculate process time • Delegate work to the assistants or helper efficiently • Understand all kinds of charts pertaining to the BMC process • Conduct Quality checks of the procured milk • Pre-cool the milk following the checklist • Follow the process of checking and then starting the machine • Attend any repairing of machine 	
4	<p>Operate Bulk Milk Cooler (BMC) and ensure cleaning and maintenance post cooling</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm) 30:00</p> <p>Corresponding NOS Code AGR/N4217</p>	<ul style="list-style-type: none"> • Check the insulating material • Obtain sample milk following the SOP • Open the outlet and start the pump after measurement and sampling • Create over agitation by turning off the agitator • Monitor the volumetric meter • Use of thermostat • Understand the process parameters • Understand the entire method with practical experience from storage of chilled milk for further processing to record time, temperature, pressure, volume reading at each stage. • Address any discrepancies or malfunction to the supervisor • Clean equipment by manual scrubbing and automatic washing • Recognise and know the application of cleaning agents and sanitizers • Clean and check the condition of condensing unit, agitator regularly 	<p>Laptop, white board, marker, projector</p> <p>Field visit is a must for this section to familiarize and demonstrate the functions of BMC</p>
5	<p>Complete documentation and record keeping related to operating Bulk Milk Cooler(BMC)</p> <p>Theory Duration (hh:mm) 15:00</p> <p>Practical Duration (hh:mm) 15:00</p>	<ul style="list-style-type: none"> • Use ERP system • Enter data in ERP system of the organization for future reference • Document and maintain records of procured milk processed in the equipment such as tag details • Verify and maintain documents for quality management system audits • Document and manage details pertaining to process of milk, type of procured milk used, batch size, wastage disposal, any discrepancies 	<p>Laptop, white board, marker, projector, ERP software</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code AGR/N4218		
6	Ensure safety, hygiene and sanitation for cooling milk in BMC Theory Duration (hh:mm) 15:00 Practical Duration (hh:mm) 15:00 Corresponding NOS Code AGR/N4219	<ul style="list-style-type: none"> • Understand contamination and adulteration • Understand different types of hazards and their prevention methods • Follow personal hygiene • Get acquainted with Food Safety Standards and Regulation • Get acquainted with safety norms, quality parameters, quality assessments, labelling and marking • Ensure hygienic condition for BMC and maintain cleanliness regularly • Conduct regular workplace checklist audits • Use safety equipment • Follow housekeeping practices • Attend training on hazard management • Convey supervisor regarding any rodents and pest problem. Record the data • Determine quality of milk • Store and label procured milk, chemicals, allergens etc 	Laptop, white board, marker, projector, Sanitizer, Personal protective equipment Like: safety gloves, Safety boots, hairnet First Aid Kit: Bandages, Adhesive bandages, Betadine Solution / ointment, Pain relief spray / ointment, Antiseptic liquid; Antidote, Phone directory, Search lights, fire extinguisher,
	Total Duration: Theory Duration (hh:mm) 80:00 Practical Duration (hh:mm) 120:00	Unique Equipment Required: Laptop, white board, marker, projector, Audio-visual aids, PPEs, Fat and SNF analyser , kit for adulteration test , Lactometer , fat testing centrifugal machine	

Grand Total Course Duration: **200 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Agriculture Skill Council of India](#))

Trainer Prerequisites for Job role: “Bulk Milk Cooler (BMC) Operator” mapped to Qualification Pack: “AGR/Q4204, v1.0”

Sr. No.	Area	Details
1	Description	Trainer is responsible for educating the trainees – Ensuring theoretical & practical training on the operation of refrigeration/cooling equipment for the procured milk
2	Personal Attributes	Trainer should be Subject Matter Expert. He/ she should have good communication, leadership, observation and practical oriented skills.
3	Minimum Educational Qualifications	Diploma in Veterinary /Animal Husbandry / Dairying
4a	Domain Certification	Certified for Job Role: “Bulk Milk Cooler (BMC) Operator” mapped to QP: “AGR/Q4204, v1.0”. Minimum accepted score is 80%.
4b	Platform Certification	Certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “MEP/Q0102”. Minimum accepted % as per respective SSC guidelines is 80%.
5	Experience	<ul style="list-style-type: none"> • M.V.Sc. • M Sc (Animal Science) • B. V. Sc. • B. Tech (Dairy) • B. Sc Agriculture with 2 years of relevant experience • Any Graduate with 3 years of relevant experience • Diploma in veterinary /Animal Husbandry / Dairying with 3 years of relevant work experience • VLDA (Veterinary livestock development assistant) with 2 years of relevant work experience

Assessable outcomes	Assessment criteria for outcomes	Total Marks	Out Of	Theory	Skills Practical
1. AGR/Q4215 Prepare and maintain work area and process machineries for operating Bulk Milk Cooler (BMC)	PC1. Clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests	100	10	3	7
	PC2. Ensure that work area is safe and hygienic for milk processing		10	3	7
	PC3. Dispose waste materials as per organisation standards and industry requirements		15	4	11
	PC4. Check the working and performance of all machineries and equipments used for the process such as agitator, inlet, manhole, air vent, outlet etc.		15	5	10
	PC5. Clean the machineries and tools used with recommended sanitizers following specifications and organisation standards		15	4	11
	PC6. Ensure that there is no leakage of refrigerant from any part of the BMC; the following tests can be used:		10	3	7
	• Bubble test				
	• Halide torch test				
	• Nessler's reagent				
	• Sulphur candle test				
	• Electronic test detector				
	PC7. Place the necessary tools required for process		5	2	3
	PC8. Attend minor repairs/faults of all machines, if required		10	3	7
PC9. Select and set the machines and tools required	10	3	7		
		100	30	70	
2. AGR/Q4216 Prepare for operating Bulk Milk Cooler (BMC)	PC1. Read and understand the processing order i.e. the amount of milk that is to be cooled from the supervisor	100	5	2	3
	PC2. Ensure working and performance of all machineries required for process		5	2	3

PC3. Report malfunctions of machine, if any, to the supervisor	15	5	10
PC4. Ensure that the following precautions are taken before starting the BMC everyday:	10	3	7
<ul style="list-style-type: none"> Wear goggles, gloves and overalls to protect eyes and to prevent direct contact of refrigerant with the skin, which can cause burns; especially when charging or discharging refrigerant 			
<ul style="list-style-type: none"> Make sure that the service cylinder is not overfilled 			
<ul style="list-style-type: none"> Do not expose cylinders to direct sunlight, radiation heat or convected heat from other appliances 			
<ul style="list-style-type: none"> Avoid discharge near naked flames or flame producing appliances 			
<ul style="list-style-type: none"> Avoid direct contact with refrigerant/oil solutions from hermetic system 			
PC5. Calculate the process time for effective utilization of machineries and manpower	5	2	3
PC6. Allot responsibilities/ work to the assistants and helpers	5	2	3
PC7. Refer process chart/ product flow chart/formulation chart for product(s) produced	5	2	3
PC8. Check the quality of procured milk by verifying the quality analysis report from the milk tester and assessing its physical parameters	5	1	4
PC9. Pre-cool the milk by passing it through the plate cooler/plate heat exchanger by connecting the inlet of the pre-cooler with the outlet of the hauling tank	5	1	4
PC10. Follow the checklist for proper pre-cooling of the milk:	15	5	10
<ul style="list-style-type: none"> Connect the water and milk flow pipes in opposite directions 			
<ul style="list-style-type: none"> Fit filter on milk line before plate cooler 			

	cooling tank is not at the specified temperature			
	PC10. Open outlet valves to allow chilled milk to enter the storage for further processing	3	1	2
	PC11. When the milk has been removed from the bulk tank, disconnect the hose from the outlet valve and cap the hose	3	1	2
	PC12. Check the volume of the chilled milk after it's temperature has been lowered to the recommended temperature	3	1	2
	PC13. Record time, temperature, pressure and volume readings during each stage of cooling	3	1	2
	PC14. Report malfunction/discrepancies/concerns to department supervisor for immediate action.	3	1	2
	PC15. In case of manual scrubbing	5	2	3
	<ul style="list-style-type: none"> Lift open the hinged covers to permit easy access to the interior surfaces of the tank 			
	<ul style="list-style-type: none"> Clean the interiors of the tank using recommended cleaning agents and sanitizers 			
	<ul style="list-style-type: none"> Give additional cleansing attention to areas which are difficult to reach e.g. corners, internal valve fittings 			
	PC16. In case of automatic washing:	5	2	3
	<ul style="list-style-type: none"> Turn on the high pressure spray nozzles which are mounted on the end of a flexible whip suspended down into the center of the interior 			
	<ul style="list-style-type: none"> Ensure that the surfactants and detergents, used to dissolve the fats left on the interior of the tank, are in sufficient quantity 			
	PC17. Clean the exterior of the milk cooler using recommended cleaning agents and sanitizers	5	1	4
	PC18. Check condition of condensing unit regularly	5	1	4
	PC19. Clean the condensing unit regularly and straighten the fins if found dented or pressed	5	1	4

	energy utilization				
	PC8. Maintain record on 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		10	7	3
	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 the finished/cooled milk details such as catchment area, batch number, time of cooling, date of procurement and processing, date of expiry, other label details, , storage conditions etc, as per organisation standards		5	3	2
	PC12. Maintain record on observations or deviations (if any) related to finished products		5	3	2
	PC13. Load the finished product details in ERP for future reference		5	3	2
	PC14. Verify the documents and track from finished product to ingredients, in case of quality concerns and for quality management system audits		10	7	3
			100	60	40
5. AGR/Q4219 Safety, hygiene and sanitation for cooling milk in BMC	PC1. Comply with safety and hygiene procedures followed in the organisation	100	5	1	4
	PC2. Ensure personal hygiene by use of gloves, hairnets, masks, ear plugs, goggles, shoes, etc.		10	3	7
	PC3. Ensure hygienic production, by inspecting procured milk, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters		10	3	7
	PC4. Clean, maintain and monitor bulk milk cooler and other equipments periodically, using it only for the specified purpose		10	3	7
	PC5. Use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required		10	3	7
	PC6. Follow housekeeping practices by having designated area for materials/tools		5	1	4

	PC7. Attend training on hazard management to understand types of hazards such as physical, chemical and biological hazards and measures to control and prevent them		10	3	7
	PC8. Identify, document and report problems such as rodents and pests to management		5	2	3
	PC9. Conduct workplace checklist audits before and after work to ensure safety and hygiene		5	1	4
	PC10. Document and maintain procured milk, packaging material, process and finished products for the credibility and effectiveness of the food safety control system		5	3	2
	PC11. Determine the quality of milk using criteria such as odour, appearance, taste and best before date, and take immediate measures to prevent spoilage		15	5	10
	PC12. Store procured milk, finished products, allergens separately to prevent cross-contamination		5	1	4
	PC13. Label procured milk and finished products and store them in designated storage areas according to safe food practices		5	1	4
			100	30	70
	TOTAL	500	500	180	320