

QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR FOOD PROCESSING

What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack – Cold Storage Technician

SECTOR: FOOD PROCESSING

SUB-SECTOR: FRUITS AND VEGETABLES, DAIRY PRODUCTS, MEAT AND POULTRY, FISH AND SEAFOOD

OCCUPATION: REFRIGERATION

REFERENCE ID: FIC/Q7004

ALIGNED TO: NCO-2004/NIL

Brief Job Description: A Cold Storage Technician is responsible for handling installation of refrigeration system and components, refrigerant charging and storage of food in the cold storage room by maintaining storage parameters such as temperature and relative humidity in food processing units.

Personal Attributes: A Cold Storage Technician must have the ability to plan, organize, prioritize, calculate and handle pressure. The individual must have a mechanical aptitude and must possess reading, writing and communication skills. In addition, the individual must have stamina and professional hygiene.

Job Details

Qualifications Pack Code	FIC/Q7004		
Job Role	Cold Storage Technician		
Credits (NSQF)	TBD	Version number	1.0
Sector	Food Processing	Drafted on	23/08/15
Sub-sector	Fruit And Vegetable, Dairy Products, Meat And Poultry, Fish And Sea Food	Last reviewed on	04/09/18
Occupation	Refrigeration	Next review date	30/06/19

Job Role	Cold Storage Technician
Role Description	A Cold Storage Technician is responsible for handling installation of refrigeration system and components, refrigerant charging and storage of food in the cold storage room by maintaining storage parameters.
NSQF level	4
Minimum Educational Qualifications	Preferably Class 12/ Diploma /ITI with certification in refrigeration
Maximum Educational Qualifications	Not applicable
Training (Suggested but not mandatory)	1. Installation of refrigeration unit 2. Maintenance of refrigeration equipments and components 3. Designing and construction of cold storage facility 4. Various refrigeration techniques 5. GMP 6. HACCP 7. QMS 8. Computer basics and ERP 9. Training in Food Safety Standards and Regulations (as per FSSAI) (Mandatory)
Minimum Job Entry Age	18 years
Experience	1-3 years in a cold storage unit
Applicable National Occupational Standards (NOS)	Compulsory: 1. FIC/N7010 Prepare and maintain work area and refrigeration requirements 2. FIC/N7011 Handle cold storage facility for storing food 3. FIC/N7012 Complete documentation and record keeping related to the cold storage facility

	4. FIC/N9003 Food safety, hygiene and sanitation for storage
Performance Criteria	As described in the relevant OS units

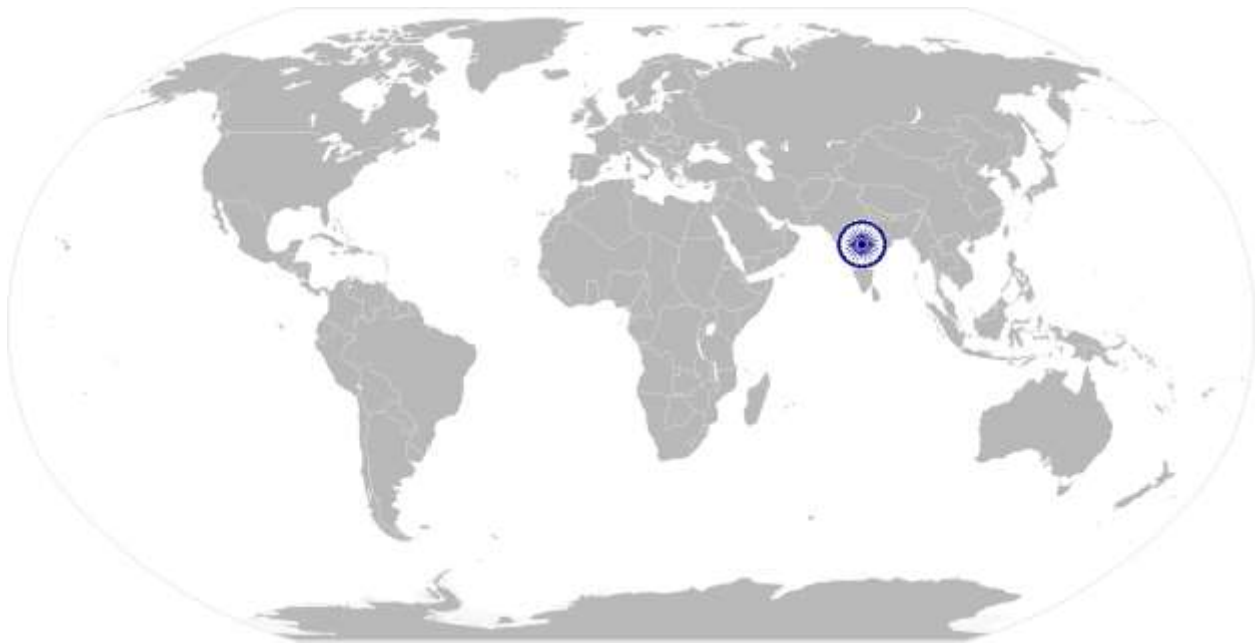
Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standards which apply uniquely in the Indian context.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Qualifications Pack	Qualifications Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working 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.

Acronyms

Keywords /Terms	Description
CIP	Clean In Place
COP	Clean Out Of Place
ERP	Enterprise Resource Planning
FIFO	First In First Out
FEFO	First Expiry First Out
FSSAI	Food Safety and Standards Authority of India
GMP	Good Manufacturing Practice
GHP	Good Hygiene Practices
HACCP	Hazard Analysis and Critical Control Point
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
NVEQF	National Vocational Educational Qualification Framework
NVQF	National Vocational Qualification Framework
OS	Occupational Standard
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council
SOP	Standard Operating Procedure
QMS	Quality Management System

National Occupational Standard



Overview

This OS unit is about preparing work area for hygiene and safety, ensuring performance and maintenance of refrigeration equipments and components as per the specifications and standards of the organization.

FIC/N7010
Prepare and maintain work area and refrigeration equipments
National Occupational Standard

Unit Code	FIC/N7010
Unit Title (Task)	Prepare and maintain work area and refrigeration equipments
Description	This OS unit is about preparing work area for hygiene and safety, ensuring performance and maintenance of refrigeration equipments and components as per the specifications and standards of the organization.
Scope	This unit/task covers the following: • Prepare and maintain work area for refrigeration • Prepare and maintain refrigeration equipments
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Prepare and maintain work area for refrigeration	PC1. clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests PC2. ensure that the work area is safe and hygienic for food processing PC3. dispose waste materials as per defined SOPs and industry requirements
Prepare and maintain refrigeration equipments	PC4. check the working and performance of all equipments used in storage facility such as compressor, condenser, evaporator, fans, sensors, thermostat, humidity meter, etc. PC5. clean the equipments used with approved sanitizers following SOP PC6. attend minor repairs/faults of all equipments, if required
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: - KA1. organization standards, process standards and procedures followed in the organisation - KA2. types of products produced by the organisation - KA3. code of business conduct - KA4. dress code to be followed - KA5. job responsibilities/duties and standard operating procedures - KA6. internal processes such as procurement, store management, inventory management, quality management and key contact points for query resolution - KA7. provision of wages, working hours and accident compensation as per organisation policy - KA8. food safety and hygiene standards followed

FIC/N7010
Prepare and maintain work area and refrigeration equipments

B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. types of chemicals, materials and equipment required for the cleaning and maintenance KB2. cleaning process to disinfect equipment/ tools KB3. supplier/manufacturers instructions related to cleaning and maintenance KB4. calibration procedure and method for equipments handled KB5. knowledge of Food Safety Standards and Regulations (as per FSSAI) KB6. knowledge of legal regulations pertaining to work place such as health and safety, recommended dosage for use of sanitizers, control of substances hazardous to health, handling/storage/ disposal/ cautions of use of sanitizers and disinfectants, fire precautions, occurrences, hygiene practice, disposal of waste, environmental protection, etc.
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the details of food stored, storage parameters and provide necessary information to fill the storage chart SA3. note the details of the refrigeration system and components, maintenance and service reports SA4. note down observations (if any) related to the storage SA5. write information documents to internal departments/ internal teams SA6. note down the data for ERP or as required by the organization
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA7. read and interpret design, drawings and construction of the storage facility SA8. read and interpret the storage methods and conditions for storing all types of food SA9. read and interpret storage parameters for storing various food SA10. read equipment manuals and storage documents to understand the equipments operation and storage requirement SA11. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills)
The user/individual on the job needs to know and understand how to: SA12. discuss task lists, schedules and activities with the supervisor SA13. effectively communicate with the team members SA14. question the supervisor in order to understand the nature of the problem and to clarify queries SA15. attentively listen and comprehend the information given by the speaker SA16. communicate clearly with the supervisor and cross department team on the issues faced during storage process	Decision Making

FIC/N7010
Prepare and maintain work area and refrigeration equipments

B. Professional Skills	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received from the supervisor SB4. plan and prioritize the work based on the instructions received from the supervisor SB5. plan to utilise time and equipment's effectively SB6. organize all process/ equipment manuals so as to access information easily SB7. support the supervisor in scheduling tasks for helper(s)
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB8. understand customer requirements and their priority and respond as per their needs
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB9. support supervisor in solving problems by detailing out problems SB10. discuss the possible solutions with the supervisor for problem solving
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB11. apply domain information about maintenance processes and technical knowledge about tools and equipment
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB12. use common sense and make judgments on day to day basis SB13. use reasoning skills to identify and resolve basic problems SB14. use intuition to detect any potential problems which could arise during operations SB15. use acquired knowledge of the process for identifying and handling issues

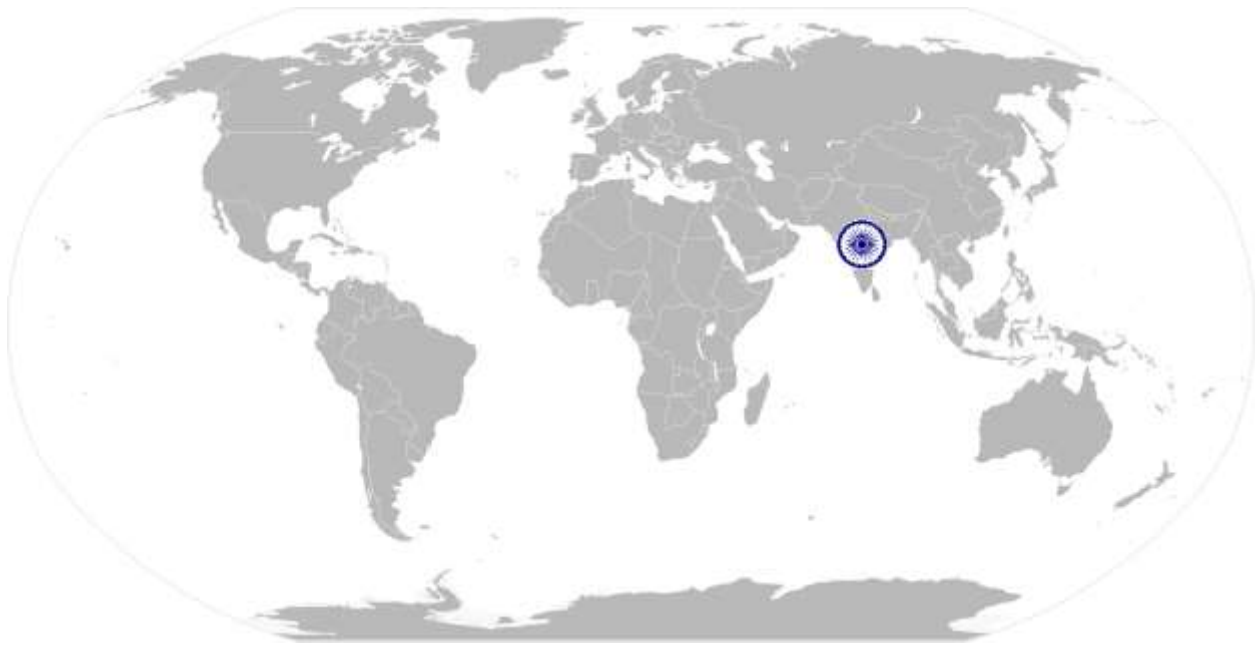
FIC/N7010
Prepare and maintain work area and refrigeration equipments

NOS Version Control

NOS Code	FIC/N7010		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/08/15
Industry Sub-sector	Fruit And Vegetable, Dairy Products, Meat And Poultry, Fish And Sea Food	Last reviewed on	04/09/18
Occupation	Refrigeration	Next review date	30/06/19

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National Occupational Standard



Overview

This OS unit is about handling refrigeration system and components and storing food in cold storage room/chamber while maintaining storage parameters, as per the specifications and standards of the organization.

FIC/N7011
Handle cold storage facility for storing food

National Occupational Standard

Unit Code	FIC/N7011
Unit Title (Task)	Handle cold storage facility for storing food
Description	This unit is about handling refrigeration system and components and storing food in cold storage room/chamber while maintaining storage parameters, as per the specifications and standards of the organization.
Scope	This unit/task covers the following: • Installation of refrigeration unit • Startup of refrigeration system • Storage of food in cold storage room • Inspection, repair/replacement of refrigeration system and components • Maintenance of refrigeration system and components
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Installation of refrigeration unit	PC1. interpret technical drawings, inspect the location for setting up refrigeration unit, install condensing unit, mount evaporation coil evaporator PC2. install piping following industry refrigeration guidelines and applicable codes to ensure proper operation of the refrigeration system, check all wiring connections PC3. calculate the number of temperature sensors required for the cold storage facility, identify location to place the sensors and place in relevant locations within the cold storage facility to obtain precise reading PC4. charge refrigerant from supply tank to compressor determining charging level through weight and sight glass indication PC5. perform pre-start up checks by verifying sufficient refrigerant is charged, electrical connections are tight, wiring and piping are properly routed and secured, compressor mounting bolts are proper, fan motors and mounting brackets are tight, condensing unit base and evaporator coil are properly secured
Start up of refrigeration system	PC6. start the refrigeration system and check the compressor discharge and suction pressures to ensure they are in the normal operating range, check the liquid line sight glass for proper refrigerant charge, monitor the compressor oil level and add oil if necessary to maintain required level PC7. check the voltage and amperage at the compressor terminals, check the piping and electrical connections for vibration PC8. check fans on the evaporator coil and condensing unit (for air-cooled condenser) to ensure they are operational and turning in the correct direction, check cooling tower (for water-cooled condenser), ensure there is no refrigerant leakage PC9. set the defrost control/timer clock to required time and verify the defrost initiation settings, set temperature control to desired temperature range PC10. check the functioning and performance of sensors and temperature measuring device

FIC/N7011
Handle cold storage facility for storing food

Storage of food in cold storage room	PC11.read and understand the work order from the supervisor PC12.check all the features of the cold storage facility, operation of the cooling equipment and ensure readiness PC13.calibrate temperature and humidity measuring instruments of the storage facility PC14.receive food for storage, check the quality of product to be stored in cold storage facility through physical parameters, check the packaging of the product PC15.adjust controls to set storage parameters such as temperature and humidity required for the food of the cold storage room/chamber following the storage parameter chart, check readings to ensure set storage parameters has reached or make required adjustments or set controls in the PLC and monitor system (in case of computerized cold storage units) PC16.weigh and check the temperature of food, transfer it to the cold storage room and load in the racks either manually or using forklift following SOP PC17.check the temperature in cold storage room between the cartons on a pallet or between packages inside a carton to ensure proper air circulation PC18.observe temperature and humidity and adjusts controls to maintain storage parameters during the entire storage period PC19.check temperature of air and stored food periodically for conformance to specifications and standards PC20.inspect the storage products periodically for decay, mold growth, sprouting, shriveling, etc. PC21.unload stored product immediately after specified storage period and check temperature and weight PC22.check the quality of the food from the storage facility through product temperature, and check for shriveling of agricultural produce, freezer burns, mold growth, deterioration, etc. PC23.report any malfunction to the supervisor and implement the suggested corrective action immediately
Inspect, repair/replace refrigeration systems and components	PC24.conduct periodic inspection of refrigeration system and components for correct operation, observe operating condition and need for repair or adjustment PC25.detect refrigerant leak through system pressure, temperature, recharge volume liquid level etc, to repair recover refrigerant, inspect, rectify and recharge the refrigerant PC26.identify malfunction of components, dismantle, repair and replace faulty components PC27.reassemble components, test for correct operation, charge system with correct refrigerant, ensure correct operation of the equipment PC28.ensure equipment is running efficiently and the required operating conditions are maintained in the cold store chambers for operational requirements

FIC/N7011
Handle cold storage facility for storing food

Maintenance of refrigeration system and components	PC29.ensure periodic maintenance of refrigeration system and components following SOP PC30.check the evaporators for ice accumulation/proper defrosting, wash evaporator coils to remove dust and foreign materials drawn into the fins PC31.check evaporator and condenser fan blades for fractures, clean the fan blades, replace worn blades and tighten the fan set screws, lubricate fan motors, replace fan motor if required PC32.check for the operation of defrost controls, ensure defrost heaters are in the correct position for maximum heat transfer to the evaporator coil, check the voltage at each heater terminal and ensure heater terminals are in good condition PC33.remove foreign materials from the drain pan, check the drain line heater (in case of maintaining freezing temperature) PC34.in compressor unit, replace worn condenser motor, check all electrical components and replace damaged wirings and tighten all electrical connections, check and ensure functioning of pressure controls and safety controls, check oil level, ensure working of solenoid valves, check operation of cold room temperature thermostat and clean condenser periodically PC35.check condition of refrigerant line insulation and replace if necessary, check refrigerant level in the system, ensure no refrigerant leak
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. organization standards, process standards and procedures followed in the organisation KA2. types of products produced by the organisation KA3. code of business conduct KA4. dress code to be followed KA5. job responsibilities/duties and standard operating procedures KA6. internal processes like procurement, store management, inventory management, quality management and key contact points for query resolution KA7. provision of wages, working hours and accident compensation as per organisation policy KA8. food safety and hygiene standards followed
B. Technical Knowledge	The user/individual on the job needs to know and understand:

FIC/N7011
Handle cold storage facility for storing food

	KB1. refrigeration principles, techniques and practices KB2. interpreting drawings and diagrams of cold storage system and facility KB3. components of refrigeration system and their installation KB4. types of refrigerants and the procedure to handle them KB5. methods to calibrate the testing equipments and equipments in the storage facility KB6. types of food that can be stored in cold storage and their storage parameters KB7. control parameters and parameter range for cold storage of various types of food KB8. methods to control temperature and humidity in cold storage facility KB9. methods and procedure to monitor the storage process KB10. methods and procedure to monitor and control the cooling process of the stored food KB11. methods to examine the operation of the cold storage facility KB12. specifications and procedure for checking performance of refrigeration components KB13. procedure for loading, storing and unloading various types of food in the cold storage facility KB14. procedure for charging refrigerant in the refrigeration system KB15. procedure for identifying faults, selecting replacement parts and servicing KB16. procedure and sequence for performing preventative maintenance of cold storage system and its components KB17. procedure for dismantling, repairing, reassembling and testing components KB18. supplier/manufacturers instructions related to cold storage facility and components KB19. basic mathematics KB20. calculation of refrigerant required for the storage area KB21. risks associated with working in extreme temperature conditions and control measures KB22. quality parameters, basic food microbiology and quality assessment based on physical parameters KB23. food safety and hygiene KB24. GMP KB25. HACCP
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the details of food stored, storage parameters and provide necessary information to fill the storage chart SA3. note the details of the refrigeration system and components, maintenance and service reports SA4. note down observations (if any) related to the storage SA5. write information documents to internal departments/ internal teams SA6. note down the data for ERP or as required by the organization
Reading Skills	

FIC/N7011
Handle cold storage facility for storing food

	The user/individual on the job needs to know and understand how to: SA7. read an interpret design, drawings and construction of the storage facility SA8. read and interpret the storage methods and conditions for storing all types of food SA9. read and interpret storage parameters for storing various food SA10. read equipment manuals and storage documents to understand the equipments operation and storage requirement SA11. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA12. discuss task lists, schedules and activities with the supervisor SA13. effectively communicate with the team members SA14. question the supervisor in order to understand the nature of the problem and to clarify queries SA15. attentively listen and comprehend the information given by the speaker SA16. communicate clearly with the supervisor and cross department team on the issues faced during storage process
B. Professional Skills	Decision Making
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received from the supervisor SB4. plan and prioritize the work based on the instructions received from the supervisor SB5. plan to utilise time and equipment's effectively SB6. organize all process/ equipment manuals so as to access information easily SB7. support the supervisor in scheduling tasks for helper(s)
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB8. understand customer requirements and their priority and respond as per their needs
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB9. support supervisor in solving problems by detailing out problems SB10. discuss the possible solutions with the supervisor for problem solving
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB11. apply domain information about maintenance processes and technical knowledge about tools and equipment
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB12. use common sense and make judgments on day to day basis SB13. use reasoning skills to identify and resolve basic problems

FIC/N7011
Handle cold storage facility for storing food

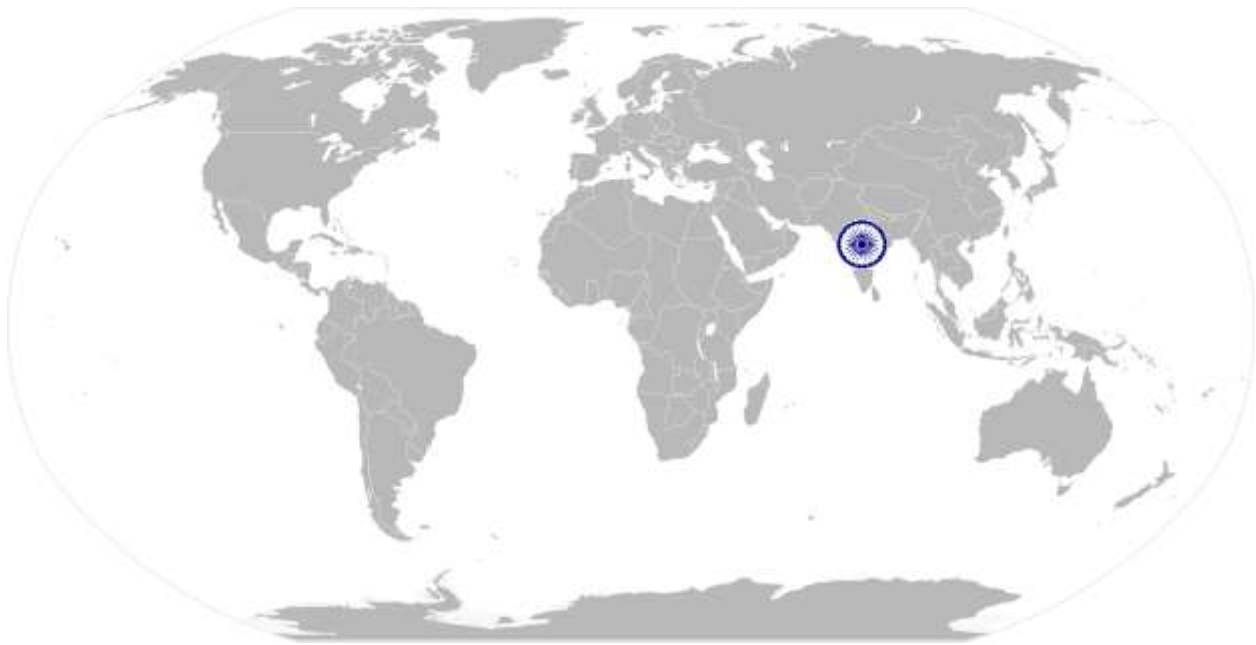
	SB14. use intuition to detect any potential problems which could arise during operations SB15. use acquired knowledge of the process for identifying and handling issues
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NOS Code	FIC/N7011		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/08/15
Industry Sub-sector	Fruit And Vegetable, Dairy Products, Meat And Poultry, Fish And Sea Food	Last reviewed on	04/09/18
Occupation	Refrigeration	Next review date	30/06/19

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National Occupational Standard



Overview

This OS unit is about documenting and maintaining records of food stored in the cold storage facility, storage parameters, maintenance of refrigeration system and components of cold storage facility.

FIC/N7012

Complete documentation and record keeping related to the cold storage facility

National Occupational Standard

Unit Code	FIC/N7012
Unit Title (Task)	Complete documentation and record keeping related to the cold storage facility
Description	This unit is about documenting and maintaining records of food stored in the cold storage facility, storage parameters, maintenance of refrigeration system and components of cold storage facility.
Scope	This unit/task covers the following: • Document and maintain records of stored food in the cold storage facility • Document and maintain records of storage parameters • Document and maintain records of maintenance of refrigeration system
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Document and maintain records of stored food in the cold storage facility	PC1. document and maintain records of all incoming food to the storage room/facility, types and varieties of food, weight of food, farmer/vendor details, grown area / geographical location, receiving date, label details such as date of manufacture, date of expiry, quality parameters, date of loading in cold storage facility, intended storage period, outgoing date, type of packaging, loading pattern, storage location within the cold storage unit, etc. following SOP PC2. document and maintain records of all outgoing food from the cold storage facility such as type and varieties of food, weight of food, actual storage period, losses from incoming to outgoing period, quality of food during unloading from cold storage unit, packaging condition, etc. following SOP PC3. maintain record of observations (if any) related to storage PC4. load the details in ERP system for future reference PC5. verify the documents and track details in cases of concerns
Document and maintain records of storage parameters	PC6. document and maintain records of parameters such as temperature, relative humidity of the food before loading in the cold storage facility, during storage period and during unloading from the storage facility for each food stored following SOP PC7. document and maintain records of parameters such as temperature, relative humidity of the cold storage room/facility before loading, during storage and during unloading following SOP PC8. maintain record of observations or deviations (if any) related to storage parameters PC9. load the details in ERP system for future reference PC10. verify the documents and track details in cases of concerns
Document and maintain records of maintenance of refrigeration system	PC11. document and maintain records of the technical drawings of cold storage room/chamber, refrigeration system and components, electrical lines, etc. PC12. document and maintain records of refrigeration system such as type of refrigeration unit, type of refrigerant, quantity of refrigerant used, cooling

FIC/N7012

Complete documentation and record keeping related to the cold storage facility

	system followed, component details such as type of compressor, condenser, evaporator, fans etc following SOP PC13. document and maintain records of operating conditions of cold storage room by recording temperature of food and air in the cold storage room/chamber, compressor pressure, ice formation etc PC14. document and maintain records of preventive maintenance, routine checks, inspections, faults identified, repairs, replacements, refrigerant leak, recharge, quantity and kind (new, reused or recycled etc of refrigeration system and components following sop PC15. maintain record of observations or deviations (if any) PC16. load the details in ERP system followed by the organisation for future reference PC17. verify the documents and track details in cases of concerns
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KA1. organization standards, process standards and procedures followed in the organisation KA2. types of products produced by the organisation KA3. code of business conduct KA4. dress code to be followed KA5. job responsibilities/duties and standard operating procedures KA6. internal processes like procurement, store management, inventory management, quality management and key contact points for query resolution KA7. provision of wages, working hours and accident compensation as per organisation policy KA8. food safety and hygiene standards followed
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. documentation system followed in the organization like, loading and unloading chart, storage chart, storage parameter chart, refrigeration system and components report etc KB2. details to be recorded and maintained on food stored in cold storage facility KB3. details to be recorded and maintained on preventive maintenance , routine checks, service, repairs, replacements, etc KB4. methods to document and maintain records on observations (if any) related storage process KB5. methods to track back the record from incoming to outgoing produce for storage KB6. basic computer knowledge KB7. entering the details in ERP system followed by the organisation
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the details of food stored, storage parameters and provide necessary information to fill the storage chart

FIC/N7012

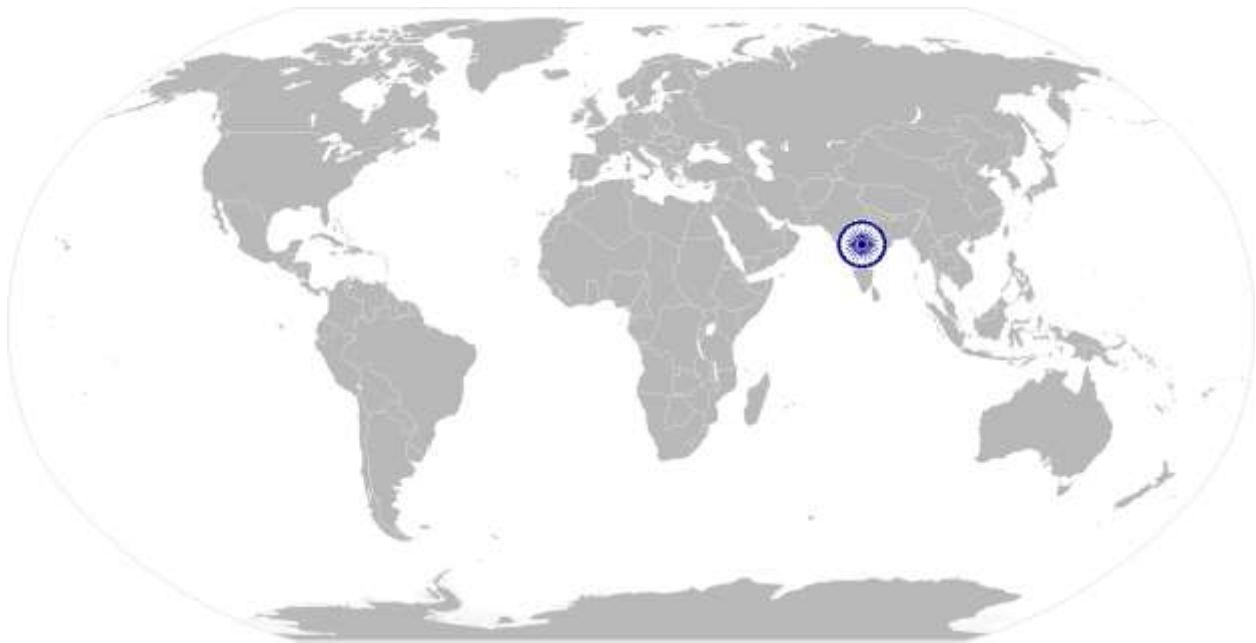
Complete documentation and record keeping related to the cold storage facility

	SA3. note the details of the refrigeration system and components, maintenance and service reports SA4. note down observations (if any) related to the storage SA5. write information documents to internal departments/ internal teams SA6. note down the data for ERP or as required by the organization
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA7. read and interpret design, drawings and construction of the storage facility SA8. read and interpret the storage methods and conditions for storing all types of food SA9. read and interpret storage parameters for storing various food SA10. read equipment manuals and storage documents to understand the equipments operation and storage requirement SA11. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills)
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B. Professional Skills	Decision Making
	The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received from the supervisor SB4. plan and prioritize the work based on the instructions received from the supervisor SB5. plan to utilise time and equipment's effectively SB6. organize all process/ equipment manuals so as to access information easily SB7. support the supervisor in scheduling tasks for helper(s)
	Customer Centricity
	The user/individual on the job needs to know and understand how to: SB8. understand customer requirements and their priority and respond as per their needs
	Problem Solving
	The user/individual on the job needs to know and understand how to: SB9. support supervisor in solving problems by detailing out problems SB10. discuss the possible solutions with the supervisor for problem solving

FIC/N7012

Complete documentation and record keeping related to the cold storage facility

	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB11. apply domain information about maintenance processes and technical knowledge about tools and equipment
	Critical Thinking
	The user/individual on the job needs to know and understand how to: SB12. use common sense and make judgments on day to day basis SB13. use reasoning skills to identify and resolve basic problems SB14. use intuition to detect any potential problems which could arise during operations SB15. use acquired knowledge of the process for identifying and handling issues

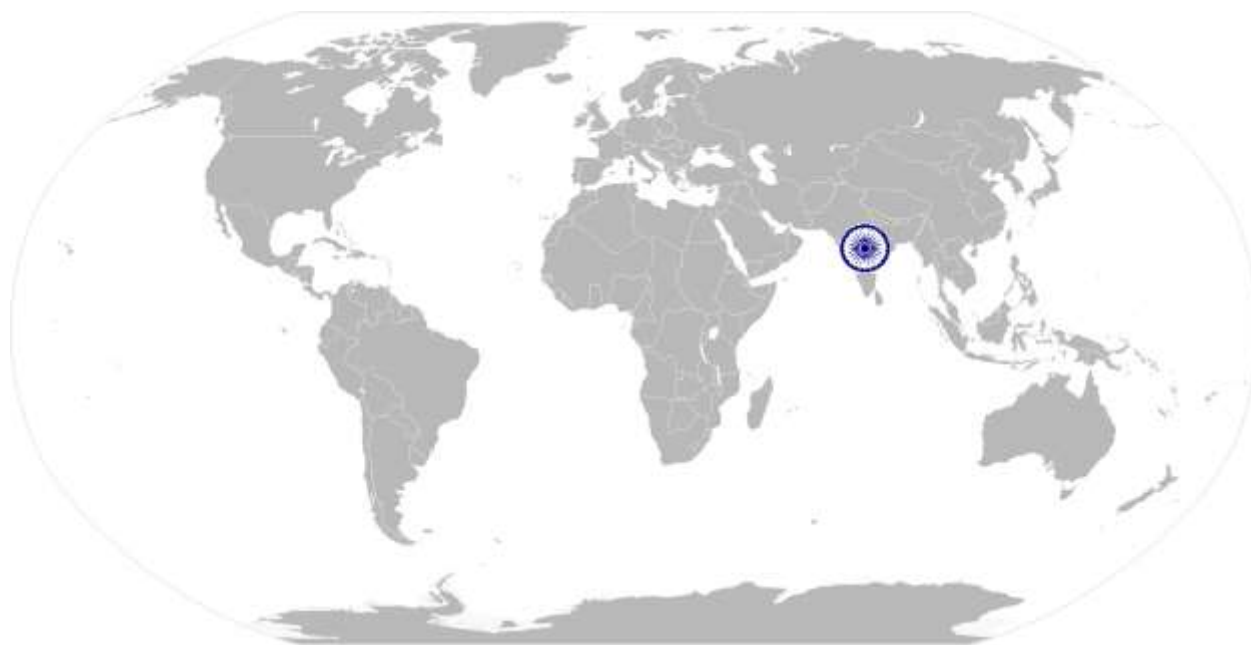


FIC/N7012

Complete documentation and record keeping related to the cold storage facility

NOS Version Control

NOS Code	FIC/N7012		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/08/15
Industry Sub-sector	Fruit And Vegetable, Dairy Products, Meat And Poultry, Fish And Sea Food	Last reviewed on	04/09/18
Occupation	Refrigeration	Next review date	30/06/19

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National Occupational Standard



Overview

This OS unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for storage.

FIC/N9003
Food safety, hygiene and sanitation for storage

National Occupational Standard

Unit Code	FIC/N9003
Unit Title (Task)	Food safety, hygiene and sanitation for storage
Description	This OS unit is about maintaining food safety, hygiene and sanitation in work area and processing unit for storage.
Scope	This unit/task covers the following: • Perform safety and sanitation related functions for storage • Applying food safety practices for storage
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Perform safety and sanitation related functions for storage	PC1. comply with food safety and hygiene procedures followed in the organisation PC2. ensure personal hygiene by using of gloves, hairnets, masks, ear plugs, goggles, shoes, etc. PC3. ensure hygienic production of food by inspecting raw materials, ingredients, finished products, etc. for compliance to physical, chemical and microbiological parameters PC4. pack products in appropriate packaging materials, label and store them in designated area, free from pests, flies and infestations PC5. clean, maintain and monitor food processing equipment periodically, using it only for the specified purpose PC6. use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required PC7. follow housekeeping practices by having designated area for materials/tools PC8. follow industry standards such as GMP and HACCP and product recall process 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 PC10. identify, document and report problems such as rodents and pests to management PC11. conduct workplace checklist audits before and after work to ensure safety and hygiene PC12. document and maintain raw material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system
Applying food safety practices for storage	PC13. determine the quality of produce using criteria such as smell, appearance, taste and take immediate measures to prevent spoilage PC14. store different varieties of produce, chemicals, gases separately to prevent cross-contamination PC15. label produce, chemicals, gases and store in designated storage areas according to safe food practices PC16. follow stock rotation based of storage chemicals on first expiry first out (FEFO) / first in first out (FIFO)
Knowledge and Understanding (K)	
A. Organizational Context	The user/individual on the job needs to know and understand:

FIC/N9003
Food safety, hygiene and sanitation for storage

(Knowledge of the company / organization and its processes)	KA1. organization standards, process standards and procedures followed in the organisation KA2. types of products produced by the organisation KA3. code of business conduct KA4. dress code to be followed KA5. job responsibilities/duties and standard operating procedures KA6. internal processes like procurement, store management, inventory management, quality management and key contact points for query resolution KA7. provision of wages, working hours and accident compensation as per organisation policy KA8. food safety and hygiene standards followed
B. Technical Knowledge	The user/individual on the job needs to know and understand: KB1. possible physical, chemical and biological hazards and methods of prevention of various hazards KB2. personal hygiene requirement KB3. different types of sanitizers used for storage area and equipments and the procedure to use KB4. food laws and regulations KB5. quality parameters and quality assessment based on physical parameters, basic food microbiology KB6. labelling/marketing requirements for produce, chemicals, gases and storing in designated area KB7. cleaning and sanitation of equipments and work area KB8. CIP & COP methods and procedures KB9. storage norms for produce, chemicals, gases etc KB10. stock rotation based on first-in-first-out (FIFO)/first-expiry-first-out (FEFO) KB11. maintain safety check lists for all equipments and follow the checklist KB12. GHP KB13. GMP KB14. HACCP
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. note the information communicated by the supervisor SA2. note the details of food stored, storage parameters and provide necessary information to fill the storage chart SA3. note the details of the refrigeration system and components, maintenance and service reports SA4. note down observations (if any) related to the storage SA5. write information documents to internal departments/ internal teams SA6. note down the data for ERP or as required by the organization
	Reading Skills
The user/individual on the job needs to know and understand how to: SA7. read and interpret the storage methods and conditions for storing all types of food	

FIC/N9003
Food safety, hygiene and sanitation for storage

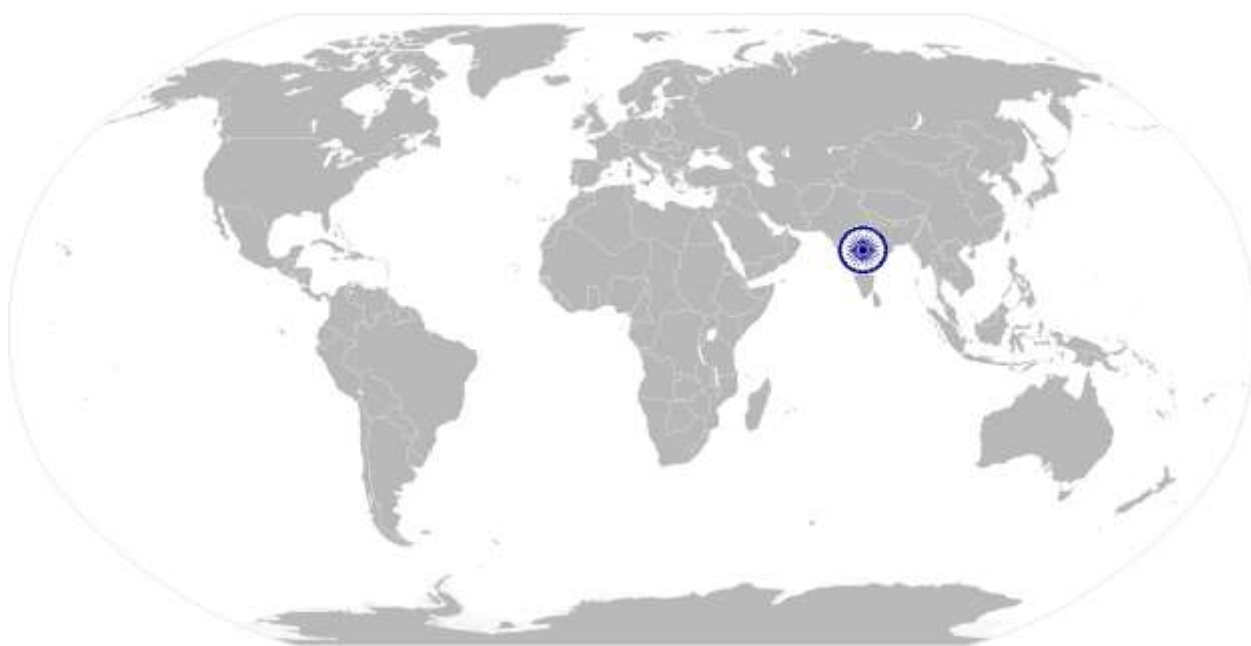
	SA8. read and interpret storage parameters for storing various food SA9. read equipment manuals and storage documents to understand the equipments operation and storage requirement SA10. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills) The user/individual on the job needs to know and understand how to: SA11. discuss task lists, schedules and activities with the supervisor SA12. effectively communicate with the team members SA13. question the supervisor in order to understand the nature of the problem and to clarify queries SA14. attentively listen and comprehend the information given by the speaker SA15. communicate clearly with the supervisor and cross department team on the issues faced during storage process
B. Professional Skills	Decision Making The user/individual on the job needs to know and understand how to: SB1. analyse critical points in day to day tasks through experience and observation and identify control measures to solve the issue SB2. handle issues in case the supervisor is not available (as per the authority matrix defined by the organization)
	Plan and Organize The user/individual on the job needs to know and understand how to: SB3. plan and organize the work order and jobs received from the supervisor SB4. organize raw materials and packaging materials required for all products following the instruction provided by the supervisor SB5. plan and prioritize the work based on the instructions received from the supervisor SB6. plan to utilise time and equipment's effectively SB7. organize all process/ equipment manuals so as to access information easily SB8. support the supervisor in scheduling tasks for helper(s)
	Customer Centricity The user/individual on the job needs to know and understand how to: SB9. understand customer requirements and their priority and respond as per their needs
	Problem Solving The user/individual on the job needs to know and understand how to: SB10. support supervisor in solving problems by detailing out problems SB11. discuss the possible solutions with the supervisor for problem solving
	Analytical Thinking The user/individual on the job needs to know and understand how to: SB12. apply domain information about maintenance Processes and technical knowledge about tools and equipment
	Critical Thinking The user/individual on the job needs to know and understand how to: SB13. use common sense and make judgments on day to day basis SB14. use reasoning skills to identify and resolve basic problems SB15. use intuition to detect any potential problems which could arise during operations

FIC/N9003
Food safety, hygiene and sanitation for storage

SB16. use acquired knowledge of the process for identifying and handling issues

NOS Version Control

NOS Code	FIC/N9003		
Credits (NSQF)	TBD	Version number	1.0
Industry	Food Processing	Drafted on	23/08/15
Industry Sub-sector	Fruit And Vegetable, Dairy Products, Meat And Poultry, Fish And Sea Food	Last reviewed on	04/09/18
Occupation	Refrigeration	Next review date	30/06/19

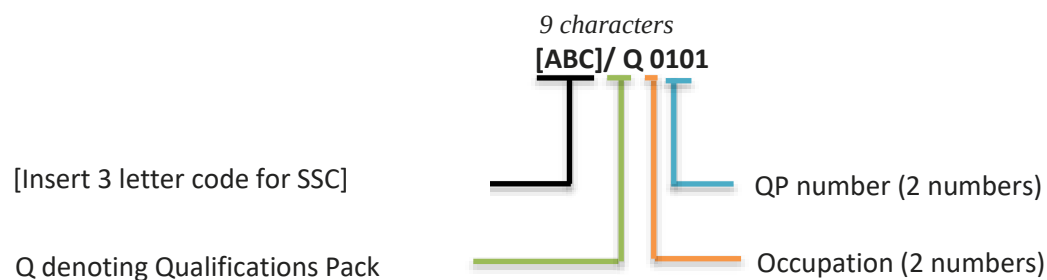
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Qualifications Pack for Cold Storage Technician

Annexure

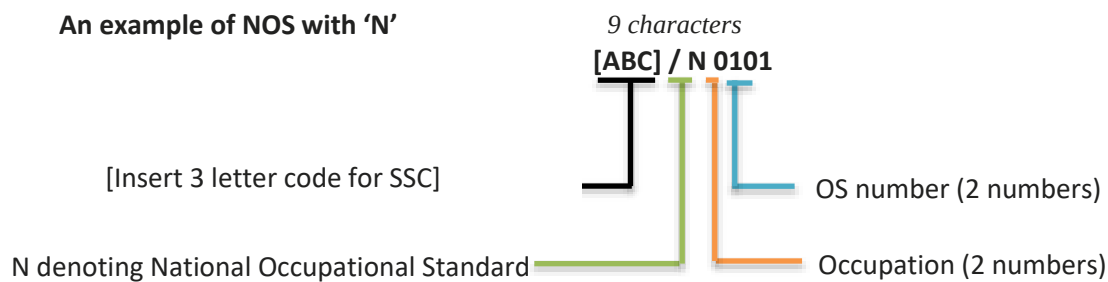
Nomenclature for QP and NOS

Qualifications Pack



Occupational Standard

An example of NOS with 'N'



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Qualifications Pack for Cold Storage Technician

The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Fruit and Vegetable	01 – 09
Food Grain Milling (including Oilseeds)	10 - 19
Dairy products	20 - 30
Meat and Poultry	30 – 40
Fish and Sea Food	40 - 49
Bread and Bakery	50 - 59
Alcoholic Beverages	60 - 69
Aerated water/ soft drinks	
Quality Analysis (involving physical and chemical lab analysis)	76 – 79
Packaging, Refrigeration and Procurement	70 – 75
Miscellaneous	80 – 84
Packaged Foods	85 - 90
Soya Food Processing	90 - 95

Sequence	Description	Example
Three letters	Industry name	FIC
Slash	/	/
Next letter	Whether QP or NOS	Q or N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

Note:

- The range of occupation numbers have been decided based on the number of existing and future occupations in a segment

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Cold Storage Technician

Qualification Pack FIC/Q7004

Sector Skill Council Food Processing

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
1. FIC/N7010 (Prepare and maintain work area and refrigeration requirements)	PC1. Clean and maintain the cleanliness of the work area using approved sanitizers and keep it free from dust, waste, flies and pests	100	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 defined SOP's and industry requirements		15	5	10
	PC4. Check the working and performance of all equipments used in storage facility such as compressor, condenser, evaporator, fans, sensors, thermostat, humidity meter, etc.		15	7	8
	PC5. Clean the equipments used with approved sanitizers following SOP		20	5	15
	PC6. Attend minor repairs/faults of all equipments, if required		15	5	10
			100	35	65

Assessment Criteria

2. FIC/N7011 (Handle cold storage facility for storing food)	PC1. Interpret technical drawings, inspect the location for setting up refrigeration unit, install condensing unit, mount evaporation coil evaporator	100	3	1	2
	PC2. Install piping following industry refrigeration guidelines and applicable codes to ensure proper operation of the refrigeration system, check all wiring connections		3	1	2
	PC3. Calculate the number of temperature sensors required for the cold storage facility, identify location to place the sensors and place in relevant locations within the cold storage facility to obtain precise reading		3	1	2
	PC4. Charge refrigerant from supply tank to compressor determining charging level through weight and sight glass indication		3	1	2
	PC5. Perform pre-start up checks by verifying sufficient refrigerant is charged, electrical connections are tight, wiring and piping are properly routed and secured, compressor mounting bolts are proper, fan motors and mounting brackets are tight, condensing unit base and evaporator coil are properly secured		3	1	2
	PC6. Start the refrigeration system and check the compressor discharge and suction pressures to ensure they are in the normal operating range, check the liquid line sight glass for proper refrigerant charge, monitor the compressor oil level and add oil if necessary to maintain required level		3	1	2
	PC7. Check the voltage and amperage at the compressor terminals, check the piping and electrical connections for vibration		3	1	2
	PC8. Check fans on the evaporator coil and condensing unit (for air-cooled		3	1	2

Assessment Criteria

	condenser) to ensure they are operational and turning in the correct direction, check cooling tower (for water-cooled condenser), ensure there is no refrigerant leakage			
	PC9. Set the defrost control/timer clock to required time and verify the defrost initiation settings, set temperature control to desired temperature range	3	1	2
	PC10. Check the functioning and performance of sensors and temperature measuring device	3	1	2
	PC11. Read and understand the work order from the supervisor	3	1	2
	PC12. Check all the features of the cold storage facility, operation of the cooling equipment and ensure readiness	3	1	2
	PC13. Calibrate temperature and humidity measuring instruments of the storage facility	3	1	2
	PC14. Receive food for storage, check the quality of product to be stored in cold storage facility through physical parameters, check the packaging of the product	3	1.5	1.5
	PC15. Adjust controls to set storage parameters such as temperature and humidity required for the food of the cold storage room/chamber following the storage parameter chart, check readings to ensure set storage parameters has reached or make required adjustments or set controls in the plc and monitor system (in case of computerized cold storage units)	5	2	3
	PC16. Weigh and check the temperature of food, transfer it to the cold storage room and load in the racks either	3	1	2

Assessment Criteria

	manually or using forklift following sop			
	PC17. Check the temperature in cold storage room between the cartons on a pallet or between packages inside a carton to ensure proper air circulation		3	1 2
	PC18. Observe temperature and humidity and adjusts controls to maintain storage parameters during the entire storage period		3	1 2
	PC19. Check temperature of air and stored food periodically for conformance to specifications and standards		3	1 2
	PC20. Inspect the storage products periodically for decay, mold growth, sprouting, shriveling, etc.		3	1 2
	PC21. Unload stored product immediately after specified storage period and check temperature and weight		3	1 2
	PC22. Check the quality of the food from the storage facility through product temperature, and check for shriveling of agricultural produce, freezer burns, mold growth, deterioration, etc.		3	1.5 1.5
	PC23. Report any malfunction to the supervisor and implement the suggested corrective action immediately		2	1 1
	PC24. Conduct periodic inspection of refrigeration system and components for correct operation, observe operating condition and need for repair or adjustment		3	1 2
	PC25. Detect refrigerant leak through system pressure, temperature, recharge volume liquid level etc, to repair recover refrigerant, inspect, rectify and recharge the refrigerant		3	1 2

Assessment Criteria

PC26. Identify malfunction of components, dismantle, repair and replace faulty components		3	1	2
PC27. Reassemble components, test for correct operation, charge system with correct refrigerant, ensure correct operation of the equipment		3	1	2
PC28. Ensure equipment is running efficiently and the required operating conditions are maintained in the cold store chambers for operational requirements		3	1.5	1.5
PC29. Ensure periodic maintenance of refrigeration system and components following sop		1	0.5	0.5
PC30. Check the evaporators for ice accumulation/proper defrosting, wash evaporator coils to remove dust and foreign materials drawn into the fins		2	0.5	1.5
PC31. Check evaporator and condenser fan blades for fractures, clean the fan blades, replace worn blades and tighten the fan set screws, lubricate fan motors, replace fan motor if required		2	0.5	1.5
PC32. Check for the operation of defrost controls, ensure defrost heaters are in the correct position for maximum heat transfer to the evaporator coil, check the voltage at each heater terminal and ensure heater terminals are in good condition		2	0.5	1.5
PC33. Remove foreign materials from the drain pan, check the drain line heater (in case of maintaining freezing temperature)		1	0.5	0.5
PC34. In compressor unit, replace worn condenser motor, check all electrical components and replace damaged wirings and tighten all electrical connections, check and ensure functioning of pressure controls and		4	1	3

Assessment Criteria

	safety controls, check oil level, ensure working of solenoid valves, check operation of cold room temperature thermostat and clean condenser periodically				
	PC35. Check condition of refrigerant line insulation and replace if necessary, check refrigerant level in the system, ensure no refrigerant leak		3	1	2
			100	35	65
3.FIC/N7012 (Complete documentation and record keeping related to the cold storage facility)	PC1. Document and maintain records of all incoming food to the storage room/facility, types and varieties of food, weight of food, farmer/vendor details, grown area / geographical location, receiving date, label details such as date of manufacture, date of expiry, quality parameters, date of loading in cold storage facility, intended storage period, outgoing date, type of packaging, loading pattern, storage location within the cold storage unit, etc. following SOP	100	10	6	4
	PC2. Document and maintain records of all outgoing food from the cold storage facility such as type and varieties of food, weight of food, actual storage period, losses from incoming to outgoing period, quality of food during unloading from cold storage unit, packaging condition, etc. following SOP		5	3	2
	PC3. Maintain record of observations (if any) related to storage		5	3	2
	PC4. Load the details in erp system for future reference		5	3	2
	PC5. Verify the documents and track details in cases of concerns		10	6	4
	PC6. Document and maintain records of parameters such as temperature, relative humidity of the food before loading in the cold storage facility, during storage period and during		15	9	6

Assessment Criteria

	unloading from the storage facility for each food stored following SOP			
	PC7. Document and maintain records of parameters such as temperature, relative humidity of the cold storage room/facility before loading, during storage and during unloading following SOP	10	6	4
	PC8. Maintain record of observations or deviations (if any) related to storage parameters	5	3	2
	PC9. Load the details in erp system for future reference	5	3	2
	PC10. Verify the documents and track details in cases of concerns	5	3	2
	PC11. Document and maintain records of the technical drawings of cold storage room/chamber, refrigeration system and components, electrical lines, etc.	3	2	1
	PC12. Document and maintain records of refrigeration system such as type of refrigeration unit, type of refrigerant, quantity of refrigerant used, cooling system followed, component details such as type of compressor, condenser, evaporator, fans etc following sop	7	4	3
	PC13. Document and maintain records of operating conditions of cold storage room by recording temperature of food and air in the cold storage room/chamber, compressor pressure, ice formation etc	5	3	2
	PC14. Document and maintain records of preventive maintenance, routine checks, inspections, faults identified, repairs, replacements, refrigerant leak, recharge, quantity and kind (new, reused or recycled etc of refrigeration system and components following sop	4	2.5	1.5

Assessment Criteria

	PC15. Maintain record of observations or deviations (if any)		2.5	1.5	1
	PC16. Load the details in ERP system followed by the organisation for future reference		2.5	1.5	1
	PC17. Verify the documents and track details in cases of concerns		1	0.5	0.5
			100	60	40
4. FIC/N9003 (Food safety, hygiene and sanitation for storage)	PC1. Comply with food safety and hygiene procedures followed in the organisation		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 the specified purpose		5	2	3
	PC6. Use safety equipment such as fire extinguisher, first aid kit and eye-wash station when required		10	4	6
	PC7. Follow housekeeping practices by having designated area for materials/tools		5	2	3
	PC8. Follow industry standards such as 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	100	5	1	4

Assessment Criteria

	and biological hazards and measures to control and prevent them			
	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 material, packaging material, process and finished products for the credibility and effectiveness of the food safety control system	4	1	3
	PC13. Determine the quality of produce using criteria such as smell, appearance, taste and take immediate measures to prevent spoilage	5	2	3
	PC14. Store different varieties of produce, chemicals, gases separately to prevent cross-contamination	5	2	3
	PC15. Label produce, chemicals, gases and store in designated storage areas according to safe food practices	5	2	3
	PC16. Follow stock rotation based of storage chemicals on first expiry first out (FEFO / first in first out (FIFO)	10	4	6
		100	35	65