

## QUALIFICATIONS PACK - OCCUPATIONAL STANDARDS FOR LOGISTICS SECTOR



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### 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 Chain Engineering Specialist

**SECTOR:** LOGISTICS

**SUB-SECTOR:** Cold Chain Logistics

**OCCUPATION:** Engineering

**REFERENCE ID:** LSC/Q9201

**ALIGNED TO:** NCO-2015/ NIL

The Cold Chain Engineering Specialist is responsible for energy efficiency management, overseeing modified atmosphere requirements for products, water and effluent treatment and managing engineering system.

**Brief Job Description:** The individual at work manages energy efficiency in cold chain by analyzing data related to energy use, identifying inefficiencies and implementing ways to minimize them. The person is also responsible for maintaining equipments for temperature and storage conditions, undertaking water and effluent treatment in the plant and managing control systems of the refrigeration system components

**Personal Attributes:** The job requires the individual to have high concentration for long periods of time, excellent vision, high stamina, good hand eye coordination and ability to work in cold temperatures for long duration.

<b>Qualifications Pack Code</b>	<b>LSC/Q9201</b>		
<b>Job Role</b>	<b>Cold Chain Engineering Specialist</b>		
<b>Credits(NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Sector</b>	<b>Logistics</b>	<b>Drafted on</b>	<b>23/08/16</b>
<b>Sub-sector</b>	<b>Cold Chain Logistics</b>	<b>Last reviewed on</b>	<b>11/01/17</b>
<b>Occupation</b>	<b>Engineering</b>	<b>Next review date</b>	<b>11/01/20</b>
<b>NSQC Clearance on</b>	<b>NA</b>		

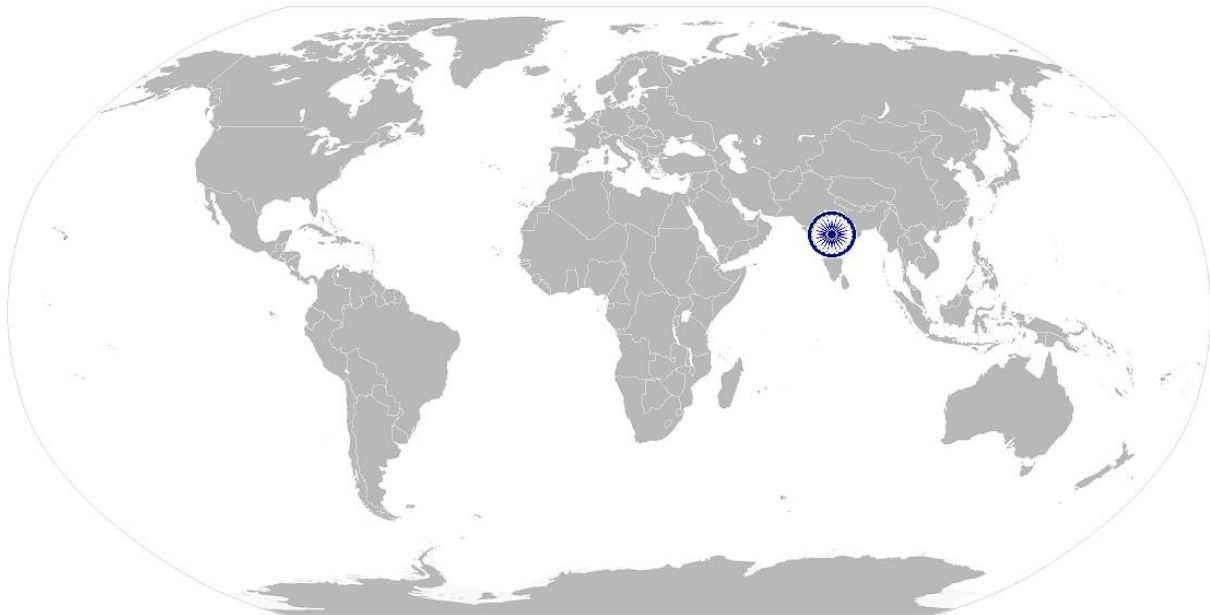
<b>Job Role</b>	<b>Cold Chain Engineering Specialist</b>
<b>Role Description</b>	Managing energy efficiency in the cold chain, overseeing modified atmosphere requirements for products, water and effluent treatment and managing engineering system
<b>NSQF</b>	6
<b>Minimum Educational Qualifications</b>	ITI/Diploma
<b>Maximum Educational Qualifications</b>	Engineering graduate
<b>Training (Mandatory)</b>	HAZMAT training
<b>Minimum Job Entry Age</b>	25 years
<b>Experience</b>	Minimum preferable 5 years in cold room system engineering
<b>Applicable National Occupational Standards (NOS)</b>	<p><b>Compulsory:</b></p> <ol style="list-style-type: none"> <li><a href="#">LSC/N9201 Manage energy efficiency in the cold chain</a></li> <li><a href="#">LSC/N9202 Oversee modified atmosphere requirements for the products</a></li> <li><a href="#">LSC/N9203 Undertake water and effluent treatment programme</a></li> <li><a href="#">LSC/N9204 Manage engineering system for the cold chain</a></li> <li><a href="#">LSC/N9901 Maintain food and personnel safety, health and hygiene in cold storage plant</a></li> <li><a href="#">LSC/N9902 Communicate effectively with colleagues and clients</a></li> </ol> <p><b>Optional:</b></p> <ol style="list-style-type: none"> <li>NA</li> </ol>
<b>Performance Criteria</b>	As described in the relevant OS units

Definitions

Keywords /Terms	Description
Core Skills/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 NOS, these include communication related skills that are applicable to most job roles.
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 functional analysis and form the basis of NOS.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
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.
National Occupational Standards (NOS)	NOS are Occupational Standards which apply uniquely in the Indian context
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Organisational Context	Organisational 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.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
Qualifications Pack(QP)	Qualifications Pack comprises the set of NOS, together with the educational, training and other criteria required to perform a job role. A Qualifications Pack is assigned a unique qualification pack code.
Qualifications Pack Code	Qualifications Pack Code is a unique reference code that identifies a qualifications pack.
Scope	Scope is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on the quality of performance required.
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.
Sub-functions	Sub-functions are sub-activities essential to fulfil the achieving the objectives of the function.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.

Acronyms	Keywords /Terms	Description
	NSQF	National Skills Qualifications Framework
	QP	Qualifications Pack
	OS	Occupational Standards
	OH&S	Occupational Health and Safety
	PPE	Personal Protective Equipment
	HR	Human Resources

# National Occupational Standard



## Overview

This unit is about analyzing energy usage in various processes of the cold chain, identify areas to improve efficiency and undertake measures for the same.

**LSC/N9201**

**Manage energy efficiency in the cold chain**

National Occupational Standard

<b>Unit Code</b>	<b>LSC /N9201</b>
<b>Unit Title (Task)</b>	<b>Manage energy efficiency in the cold chain</b>
<b>Description</b>	This OS unit is about analyzing energy usage in various processes of the cold chain, identify areas to improve efficiency and undertake measures for the same.
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>Analyse data related to energy usage</li> <li>Identify inefficiencies in energy consumption and ways to fix them</li> <li>Implement ways to minimize energy inefficiencies</li> </ul> <p><b>Range:</b> compressor, condenser, evaporator, temperature and humidity sensor, thermostat, occupancy sensor and daylight sensor</p>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Analysing data related to energy usage</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC1. identify parameters impacting energy usage</p> <p>PC2. perform correlation between energy consumption and the parameters identified to impact energy usage</p> <p>PC3. monitor electrical energy consumption, temperature, relative humidity (RH) and air pressure</p> <p>PC4. define threshold for parameters in energy consumption</p> <p>PC5. check all thermostat set points</p> <p>PC6. evaluate costs and benefits of re-piping the facilities</p> <p>PC7. perform thermographic inspection to analyse cold areas where there is poor insulation</p>
<b>Identifying inefficiencies in energy consumption and ways to fix them</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC8. separate energy consumption of refrigeration system from the energy used by the whole plant</p> <p>PC9. identify the quantum of undercooling and overcooling during the analysis period</p> <p>PC10. identify the impact of weather conditions on the energy consumed</p> <p>PC11. explore ways to control lighting by daylight sensors and occupancy sensors</p> <p>PC12. identify ways to adjust chiller or refrigeration equipment to achieve better performance</p> <p>PC13. look for ways to promote renewable energy by utilizing bio-waste to generate bio-gas, wherever possible</p> <p>PC14. improve evaporator performance by looking for ways to reduce fan motor horsepower</p>
<b>Implementing ways to minimize energy inefficiencies</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC15. use eco-friendly refrigerants with minimal global warming potential of ozone depleting substances</p> <p>PC16. ensure to pick air cooled condenser or evaporative condenser based on the refrigerant used, size of the system and availability of water</p>



**LSC/N9201**

**Manage energy efficiency in the cold chain**

	<p>PC17. achieve optimal energy usage conditions for the chiller</p> <p>PC18. improve part-load performance for evaporators, condensers and compressors</p> <p>PC19. reduce refrigeration load by checking under-floor heating, insulation levels, warehouse doors usage</p> <p>PC20. reduce load in lighting of the warehouse, by using high efficiency lighting (sodium lights or high frequency fluorescents)</p> <p>PC21. employ automatic refrigerant leak detection systems</p> <p>PC22. reduce heat load by improving insulation and reducing air leakage</p> <p>PC23. select low power consumed per ton of refrigeration, while upgrading evaporator units</p> <p>PC24. upgrade to high efficiency condenser units</p> <p>PC25. use sliding doors instead of traditional freezer doors, which are better insulated, require low maintenance, reduce frost build up, thereby reducing overall energy consumption</p> <p>PC26. use energy efficient PVC strip curtains for the cold storage doors or air curtains, to reduce air exchange during door openings</p> <p>PC27. ensure that the floor heaters are working properly and well protected for the deep freezers</p>
<p><b>Knowledge and Understanding (K)</b></p>	
<p><b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)</p>	<p>The individual on the job needs to know and understand:</p> <p>KA1. minimum acceptable standards for energy efficiency required by the company</p> <p>KA2. corporate policy regarding methods of calculating contribution to global warming</p> <p>KA3. how to undertake yearly energy audits on the plant</p> <p>KA4. organizational policies and guidelines</p> <p>KA5. reporting structure</p> <p>KA6. communication with relevant people in the organization to take their buy-in for energy optimizing activities</p> <p>KA7. refrigerant usage with its relevant safety and security procedures</p> <p>KA8. procedures to follow during system emergency issues</p> <p>KA9. roles and responsibilities of labourers in the cold storage area</p>
<p><b>B. Technical Knowledge</b></p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. how to measure electrical energy consumed, temperature, relative humidity and air pressure</p> <p>KB2. how to regularly collect data regarding temperature set point, discharge and suction pressure, operating hours of the chiller etc</p> <p>KB3. relation between carbon emissions and refrigerant leaks</p> <p>KB4. how to analyse what proportion of energy is used for each of the following - chiller/refrigeration, warehouse lighting, dock and freezer doors, battery charging, freezer floor heating, maintenance activities, storage and reefer vehicles</p> <p>KB5. application of refrigeration for different types of products</p> <p>KB6. characteristics of the products dealt with</p> <p>KB7. cold storage and transport requirement conditions for products dealt with</p> <p>KB8. various data acquisition systems available for plant refrigeration</p>

**LSC/N9201**

**Manage energy efficiency in the cold chain**

	<p>KB9. understand the principles of cooling system design, carbon dioxide cascading, defrost system and purgers (for air and water)</p> <p>KB10. understand the harmful effects of frost and ways to keep it out of the refrigerated spaces</p> <p>KB11. types of refrigeration compressors available</p> <p>KB12. how to perform thermal profile by collection of data from temperature sensors</p> <p>KB13. how to record ambient conditions</p> <p>KB14. how to alert in case of critical deviations in energy usage</p> <p>KB15. chiller operations, compressor sequencing, and capacity regulation</p> <p>KB16. how precooling of condenser air in air cooled system increases energy efficiency</p> <p>KB17. collecting operational parameters for refrigeration equipment and/or chiller used</p> <p>KB18. under-floor heating system to know how pump and heating is controlled</p> <p>KB19. usage of occupancy sensor and daylight sensor</p> <p>KB20. different techniques to control defrosting</p> <p>KB21. selection of accessories and tools required for various activities</p>
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**Skills (S)**

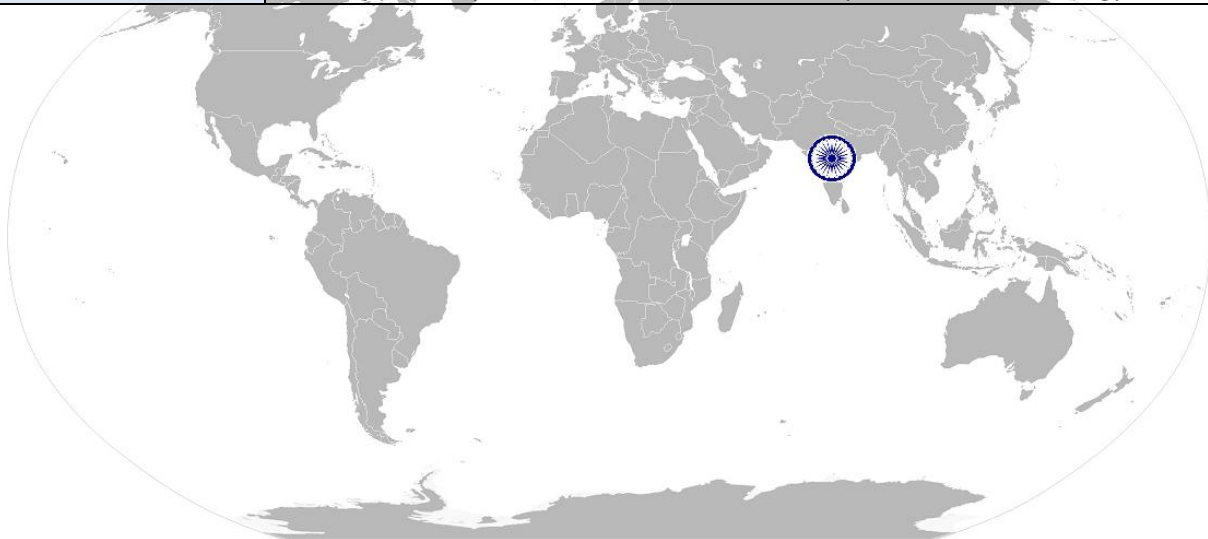
<b>A. Core Skills/ Generic Skills</b>	<b>Reading Skills</b>
	The user/individual on the job needs to know and understand how to: SA1. read about energy consumption patterns by different processes in cold chain SA2. read about energy efficiency improvement techniques SA3. read safety instructions
	<b>Writing Skills</b>
	The user/individual on the job needs to know and understand how to: SA4. note down energy consumption SA5. prepare report on the efficacy of energy efficiency techniques employed
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA6. communicate to the workers, on the precautions to be taken regarding energy inefficiencies in the cold chain SA7. interact with other employees to work efficiently
	<b>B. Professional Skills</b>
<b>Decision Making</b>	
The user/individual on the job needs to know and understand how to: SB1. choose from multiple energy saving alternatives in the plant functioning SB2. decide on the priority of tasks planned	
<b>Plan and Organize</b>	
The user/individual on the job needs to know and understand how to: SB3. plan and organize incremental targets towards achieving energy efficiency SB4. plan resources by selecting, training, and ensuring discipline amongst them	
<b>Customer Centricity</b>	
Not Applicable	



**LSC/N9201**

**Manage energy efficiency in the cold chain**

	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB5. spot origins of process disruptions SB6. re-schedule tasks in case of delays or requirements by other departments in the organization
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB7. interpret equipment and process diagrams to identify which components can work more efficiently SB8. analyze relation between energy consumed and plant parameters SB9. analyze time series data, regarding temperature, humidity or air pressure SB10. analyze critical recurring issues and identify measures to solve the same
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB11. use acquired knowledge to trace inefficiencies in the process SB12. plan and prioritize tasks based on the implications of the energy inefficiencies

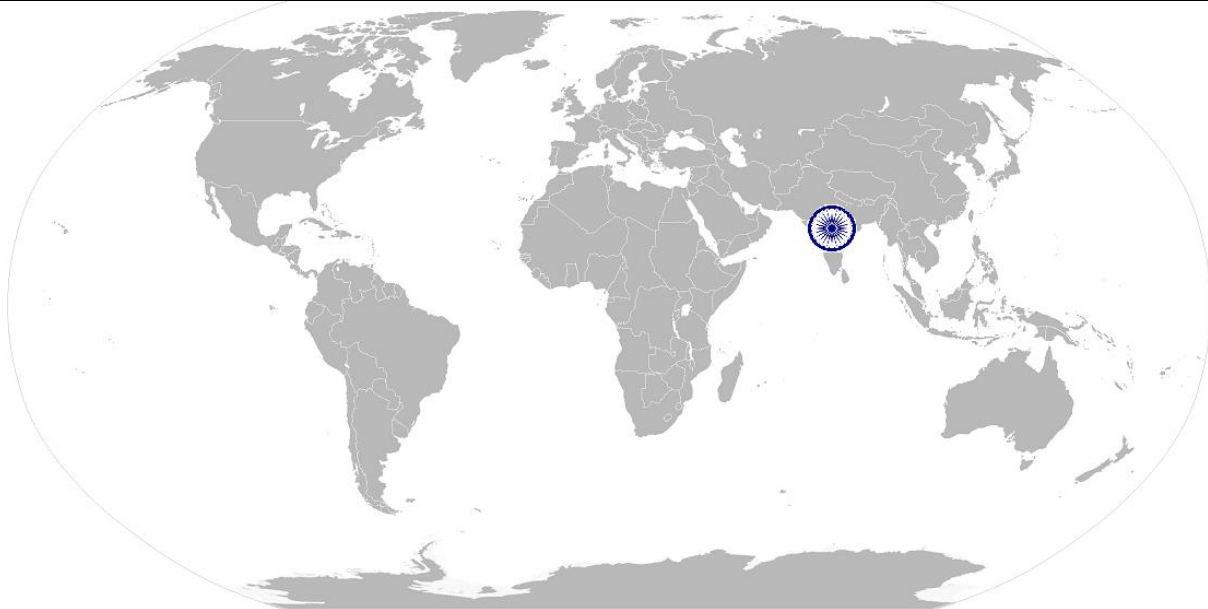


**LSC/N9201**

**Manage energy efficiency in the cold chain**

**NOS Version Control**

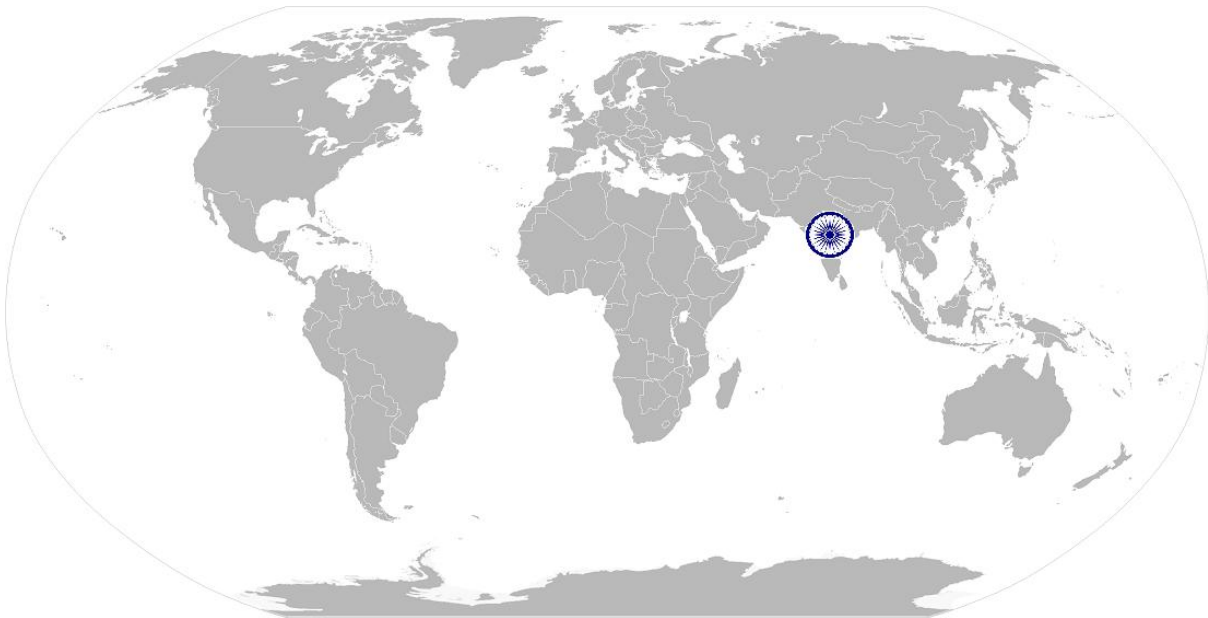
<b>NOS Code</b>	<b>LSC/N9201</b>		
<b>Credits(NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Logistics</b>	<b>Drafted on</b>	<b>23/08/16</b>
<b>Industry Sub-sector</b>	<b>Cold chain logistics</b>	<b>Last reviewed on</b>	<b>11/01/17</b>
<b>Occupation</b>	<b>Engineering</b>	<b>Next review date</b>	<b>11/01/20</b>



LCC/N9202    **Oversee modified atmosphere requirements for the products**

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# National Occupational Standard



## Overview

This unit is about preparing, maintaining and monitoring cold room, container and equipment for modified atmosphere requirements of various products.

**LSC/N9202      *Oversee modified atmosphere requirements for the products***

National Occupational Standard

<b>Unit Code</b>	<b>LSC /N9202</b>
<b>Unit Title (Task)</b>	<b>Oversee modified atmosphere requirements for the products</b>
<b>Description</b>	This OS is about preparing, maintaining and monitoring cold room, container and equipment for modified atmosphere requirements of various products
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>• Prepare and monitor cold room or container for modified atmosphere storage</li> <li>• Prepare and maintain equipment for modified atmosphere conditions</li> <li>• Monitor and report modified atmosphere conditions</li> </ul> <p><b>Range:</b> compressor, condenser, evaporator, temperature and humidity sensor, thermostat</p>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Preparing and monitoring cold room or container for modified atmosphere storage</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC1. maintain temperature ranges ideal for the products stored or transported</p> <p>PC2. maintain concentration of oxygen, carbon dioxide, nitrogen and ethylene as per the commodities stored</p> <p>PC3. consider product heat and set ventilation to control cooling and carbon dioxide level</p> <p>PC4. monitor composition of gases regularly and accurately</p> <p>PC5. monitor for chilling injury symptoms on the products</p> <p>PC6. ensure to keep the room or container sealed</p> <p>PC7. ensure proper sanitation to avoid conditions which favours thriving of pathogenic microorganisms</p>
<b>Preparing and maintaining equipment for modified atmosphere conditions</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC8. assign a resource to maintain records of refrigeration equipment</p> <p>PC9. operate nitrogen generator with its controls and fan blowers</p> <p>PC10. regularly sample air parameters in the cold chamber to check the conditions</p> <p>PC11. understand how to stop the system and replenish the cold chamber with fresh air when required</p> <p>PC12. ensure to retrofit container with purge port assembly, when they contain perishable products and transported, to make it suitable for modified atmosphere use</p> <p>PC13. prepare absorbers and adsorbers of oxygen, carbon dioxide, ethylene and water</p>
<b>Monitoring and reporting modified atmosphere conditions</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC14. ensure that legal requirements are followed while collecting, moving or</p> <p>PC15. prepare documentation regarding modified atmospheric conditions maintained for different products</p> <p>PC16. ensure that maintenance records of relevant equipment and cleaning records in the modified atmosphere storage area are made</p> <p>PC17. report any faults in the readings of required modified atmosphere</p>

**LSC/N9202      Oversee modified atmosphere requirements for the products**

	requirements PC18. quantify extended storability of the products dealt with
<b>Knowledge and Understanding (K)</b>	
<b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)	The individual on the job needs to know and understand: KA1. organizational policies and guidelines KA2. reporting structure KA3. refrigerant usage with its relevant safety and security procedures KA4. procedures to follow during emergency issues KA5. roles and responsibilities of labourers in the cold storage area KA6. accessories and tools required for maintaining modified atmosphere
<b>B. Technical Knowledge</b>	The individual on the job needs to know and understand: KB1. typical ratios of different gases used in modified atmosphere requirements for different types of products KB2. importance of having modified atmosphere to control shelf life of various products KB3. different types of processes used to attain modified atmosphere requirements KB4. different types of equipments required in modified atmosphere storage and packing KB5. methods to alter atmosphere, like, controlled atmosphere, modified atmosphere, fresh air exchange, and packaging solutions KB6. benefits and detrimental effects of modified atmosphere on products KB7. storage requirements of various types of products KB8. common commodities which require modified atmosphere KB9. key physical and chemical stages in natural ripening of perishable products KB10. how environmental conditions like cold room temperature and humidity affect life cycle of products KB11. timescales of ripening and how to control them, in case of fresh produce ripening KB12. how the condition of one product is affected by the presence of other products handled alongside in the cold chain KB13. exposure of products to ethylene with regards to its respiration rate and ripening KB14. methods for assessing product quality stored in modified atmosphere conditions KB15. relation between product respiration rate and atmospheric composition KB16. effects of modified atmospheric conditions on the skin colour, firmness, texture of the products KB17. relation between metabolism rate and variations in temperature, relative humidity and oxygen levels
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Reading Skills</b> The user/individual on the job needs to know and understand how to: SA1. read and understand process required for different types of products SA2. read equipment manual to handle its operation

**LSC/N9202**

**Oversee modified atmosphere requirements for the products**

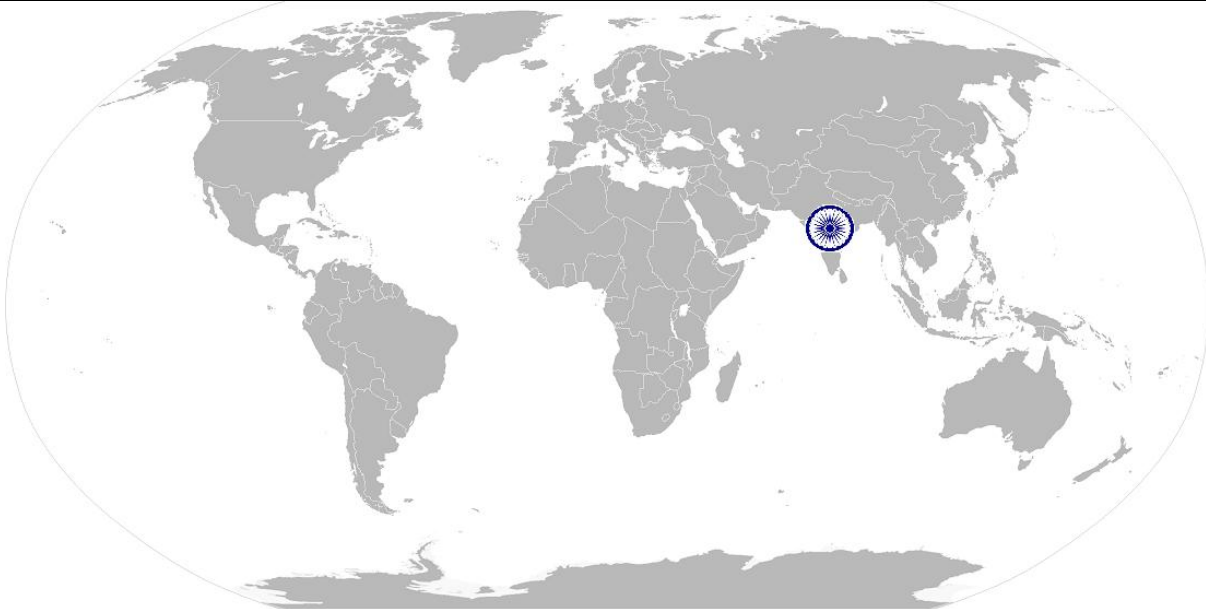
	SA3. read documents regarding modified atmosphere concepts SA4. read safety instructions
	<b>Writing Skills</b>
	The user/individual on the job needs to know and understand how to: SA5. write down process parameters in modified atmospheric conditions SA6. write observations related to the process
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/individual on the job needs to know and understand how to: SA7. communicate all the activities required to be done to the subordinates SA8. listen to the queries and clarify doubts SA9. communicate any issue that may arise in the modified atmosphere process to the concerned technical solver SA10. interact frequently with other employees to work efficiently
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/individual on the job needs to know and understand how to: SB1. decide on the priority of tasks SB2. plan routine checks to ensure modified atmosphere conditions are maintained
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB3. organize tasks and allocate labour resources for the process to maintain modified atmosphere SB4. organize activities based on budgeting constraints
	<b>Customer Centricity</b>
	The user/individual on the job needs to know and understand how to: SB5. enforce exact modified atmosphere storage and hygiene conditions as per the products handled for the organization or for its customers
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB6. solve any work related problems that workers may face SB7. handle allotment of tasks to workers in case of staff shortage or delays in activities
	<b>Analytical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB8. interpret process flowcharts for modified atmosphere required for different products SB9. analyze critical recurring issues and identify measures to solve the same
	<b>Critical Thinking</b>
	The user/individual on the job needs to know and understand how to: SB10. identify ways to minimize chilling symptoms seen on the products SB11. use acquired knowledge to trace issues in the process SB12. understand mathematical models relating respiration of various commodities and atmospheric composition



**LSC/N9202      **Oversee modified atmosphere requirements for the products****

**NOS Version Control**

<b>NOS Code</b>	<b>LSC/N9202</b>		
<b>Credits(NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Logistics</b>	<b>Drafted on</b>	<b>23/08/16</b>
<b>Industry Sub-sector</b>	<b>Cold chain logistics</b>	<b>Last reviewed on</b>	<b>11/01/17</b>
<b>Occupation</b>	<b>Engineering</b>	<b>Next review date</b>	<b>11/01/20</b>



# National Occupational Standard



## Overview

This unit is about undertaking and monitoring water and effluent treatment programme in the plant.

**LSC/N9203**

**Undertake water and effluent treatment programme**

National Occupational Standard

<b>Unit Code</b>	<b>LSC/N9203</b>
<b>Unit Title (Task)</b>	<b>Undertake water and effluent treatment programme</b>
<b>Description</b>	This OS unit is about undertaking and monitoring water and effluent treatment programme in the plant
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>• Undertake water and effluent treatment programme in the plant</li> <li>• Monitor performance of the water and effluent treatment</li> </ul> <p><b>Range:</b> compressor, condenser, evaporator, temperature and humidity sensor, thermostat</p>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Undertaking water and effluent treatment programme in the plant</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC1. ensure that the water treatment programme consists of controlling water circulation, chemical feed and routine monitoring</p> <p>PC2. ensure that treated water is used on the product, to avoid the threat of external pathogens spoiling them</p> <p>PC3. find cost effective ways for treatment and recycle of COD (chemical oxygen demand) waste water</p> <p>PC4. verify water treatment system compatibility with the plant operations</p> <p>PC5. explore options to collect water from evaporator units, if they have defrost unit, and provide them to condenser or cooling tower</p> <p>PC6. ensure to maintain condenser tubes clean after water treatment</p> <p>PC7. identify treated effluent and tweak its treatment, if it is not as per the specification</p>
<b>Monitoring performance of the water and effluent treatment</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC8. record information and document necessary details for generating programme efficacy report</p> <p>PC9. monitor remedial engineering works</p> <p>PC10. explore possibility of rain water harvesting in case there is large roof surfaces for the cold storage plant</p> <p>PC11. confirm that the treatment areas are hygienic and safe</p> <p>PC12. investigate faults and errors and take corrective actions</p> <p>PC13. train operators for water and effluent treatment procedures employed</p> <p>PC14. monitor overfeed or underfeed of water treatment chemicals</p> <p>PC15. inspect chemical feed system to check for leaks</p>
<b>Knowledge and Understanding (K)</b>	

**LSC/N9204**

**Manage engineering system for the cold chain**

<p><b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. importance of having water and effluent treatment programme in accordance with the operating procedures of the company</p> <p>KA2. compliance and site specific requirements of the water and effluent treatment programme that should be in accordance with</p> <p>KA3. how to wear protective gear while handling or overseeing water and effluent treatment</p> <p>KA4. corrective actions that can be taken in accordance with company procedures</p> <p>KA5. organizational policies and guidelines</p> <p>KA6. reporting structure</p> <p>KA7. refrigerant usage with its relevant safety and security procedures</p> <p>KA8. safety procedures in using chemicals for the treatment</p> <p>KA9. procedures to follow during emergency maintenance and repair issues</p> <p>KA10. procedures for safe transport and disposal of waste materials</p>
<p><b>B. Technical Knowledge</b></p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. importance of effective water treatment for efficient and reliable refrigeration system operation</p> <p>KB2. water related problems that can happen in the cold store plant, like corrosion and microbiological growth</p> <p>KB3. how to make a risk assessment for work tasks in the cold chain where water or effluent is generated</p> <p>KB4. different types of treatment systems available for water waste and effluent</p> <p>KB5. concepts of microbiology and water chemistry which applies to effluent treatment</p> <p>KB6. how to do legionella (bacteria) risk assessment</p> <p>KB7. how to take measures to prevent cross contamination of various products dealt with in the cold chain</p> <p>KB8. how to plan and record performance monitoring for the programme</p> <p>KB9. how to determine feasible recovery rate for recycling of water</p> <p>KB10. primary and secondary treatment methods of effluent waters</p> <p>KB11. application of refrigeration for different types of products</p> <p>KB12. usage of ozone in tertiary treatment to remove odour, colour and micro organisms in sewage water</p> <p>KB13. harmful effects of overfeeding and underfeeding water treatment chemicals</p>
<p><b>Skills (S)</b></p>	
<p><b>A. Core Skills/ Generic Skills</b></p>	<p><b>Reading Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. read water and effluent treatment standards and procedures</p> <p>SA2. read safety instructions</p> <p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand:</p> <p>SA3. how to make documentation regarding water and effluent treatment activities</p> <p><b>Oral Communication (Listening and Speaking skills)</b></p>

**LSC/N9204**

**Manage engineering system for the cold chain**

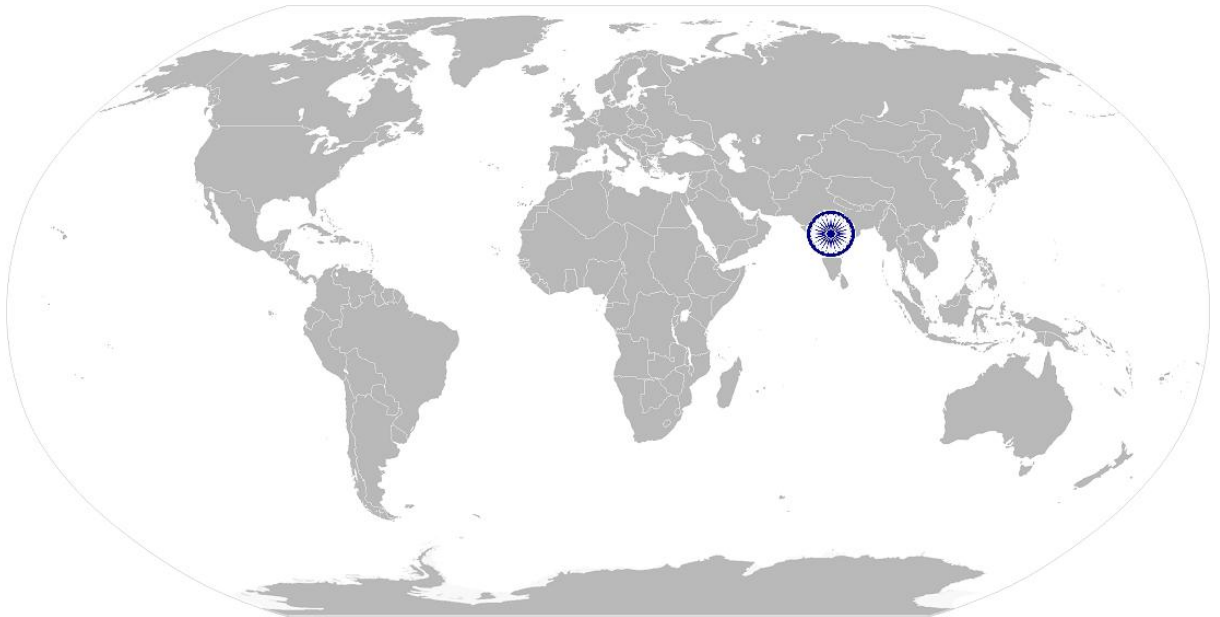
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SA4. communicate to workers clearly about the requirements in water and effluent treatment activities</p> <p>SA5. interact frequently with other employees to work efficiently</p> <p>SA6. mentor all the workers under supervision to increase operational effectiveness</p>
<p><b>B. Professional Skills</b></p>	<p><b>Decision Making</b></p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB1. decide on the extent of water and effluent treatment done, based on the hygiene requirements and the products</p>
	<p><b>Plan and Organize</b></p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB2. plan maintenance activities as per standard requirements and manufacturer's instructions</p> <p>SB3. plan equipment service based on its working condition</p>
	<p><b>Customer Centricity</b></p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB4. enforce storage and hygiene conditions as per the products handled for the organization or for its customers</p>
	<p><b>Problem Solving</b></p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB5. ensure to solve operating problems as per best practices</p> <p>SB6. re-schedule tasks in case of delays or requirements by other departments in the organization</p>
	<p><b>Analytical Thinking</b></p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB7. interpret schematic diagrams of the treatment procedures</p> <p>SB8. analyze efficacy of the treatment programme employed</p> <p>SB9. find ways to reduce sewer costs</p> <p>SB10. analyze critical recurring issues and identify measures to solve the same</p>
<p><b>Critical Thinking</b></p>	
<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB11. interpret outputs from the water and effluent treatment programs applied</p> <p>SB12. use acquired knowledge to trace faults in the process</p>	

LSC/N9204

Manage engineering system for the cold chain

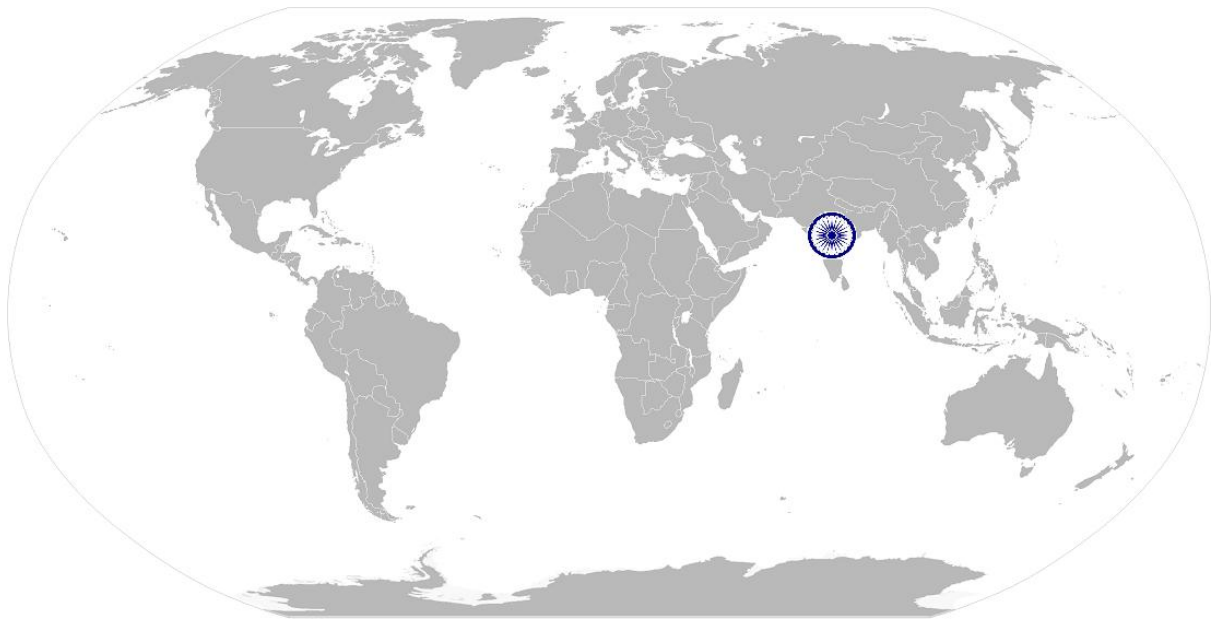
## NOS Version Control

NOS Code	LSC/N9203		
Credits(NSQF)	TBD	Version number	1.0
Industry	Logistics	Drafted on	23/08/16
Industry Sub-sector	Cold chain logistics	Last reviewed on	11/01/17
Occupation	Engineering	Next review date	11/01/20





# National Occupational Standard



## Overview

This unit is about managing engineering system for the cold chain.

**LSC/N9204**

**Manage engineering system for the cold chain**

<b>Unit Code</b>	<b>LSC/N9204</b>
<b>Unit Title (Task)</b>	<b>Manage engineering system for the cold chain</b>
<b>Description</b>	This OS unit is about managing engineering system for the cold chain
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>• Manage control system for the main components of refrigeration system - evaporators, condensers and compressors</li> <li>• Identify the need for revamping existing facilities</li> <li>• Prepare documentation regarding management of engineering system</li> </ul> <p><b>Range:</b> compressor, condenser, evaporator, temperature and humidity sensor, thermostat</p>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Managing control system for the main components of refrigeration system - evaporators, condensers and compressors</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC1. automate the operation of evaporators, condensers and compressors as much as possible</p> <p>PC2. minimize the power consumption for evaporators, condensers and compressors combined</p> <p>PC3. control evaporators when the cold room has attained desired temperature</p> <p>PC4. ensure that hydraulic oil is adapted to the temperatures operated at the cold store</p>
<b>Identifying the need for revamping existing facilities</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC5. identify different components of engineering system employed which needs to be checked at regular intervals</p> <p>PC6. plan and schedule the frequency with which each component in the facility needs to be examined</p> <p>PC7. analyse pressure drop between condenser and evaporator, to check if it crosses two pounds</p> <p>PC8. examine insulated pipes which show signs of corrosion or frost appearances</p> <p>PC9. examine corroded parts to analyse and decide regarding the need for re-insulation or maintenance</p>
<b>Preparing documentation regarding management of engineering system</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC10. record information and document regarding operations of evaporators, condensers and compressors</p> <p>PC11. document power consumption of refrigeration system at regular intervals</p> <p>PC12. record observations made in the analysis of existing facilities and the needs identified for its revamp</p>
<b>Knowledge and Understanding (K)</b>	

**LSC/N9204**

**Manage engineering system for the cold chain**

<p><b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. organizational policies and guidelines KA2. reporting structure KA3. refrigerant usage with its relevant safety and security procedures KA4. procedures to follow during emergency system issues KA5. roles and responsibilities of labourers in the cold storage area KA6. control system handling procedures for refrigeration equipment KA7. procedures for safe transport and disposal of waste materials KA8. costs and energy consumption of various equipments used in the organization</p>
<p><b>B. Technical Knowledge</b></p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. importance of control method for refrigeration system KB2. mechanism of simple vapour compression refrigeration system and air refrigeration system KB3. types of evaporators and factors affecting its heat transfer capacity KB4. types of compressors, and the parameters for its working, like discharge pressure, suction pressure, compression ratio, compressor capacity and volumetric efficiency KB5. types and working of condensers, and factors affecting its capacity KB6. application of refrigeration for different types of products KB7. working of hand operated expansion valve KB8. understand different process freezing techniques like contact freezing and air blast freezing KB9. that a facility needs a re-piping if pressure drop between condenser and evaporator crosses two pounds KB10. how to check pressure drop by using pressure gauges KB11. types, properties and thickness of insulation requirements</p>
<p><b>Skills (S)</b></p>	
<p><b>A. Core Skills/ Generic Skills</b></p>	<p><b>Reading Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. read about equipment engineering and understand its working SA2. read and comprehend technical documents regarding mechanics and hydraulic aspects of cold chain engineering SA3. read safety instructions</p> <p><b>Writing Skills</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA4. note down problems in the system SA5. write down process notes regarding observations in mechanics and hydraulics of all equipments used SA6. make analytical document or report regarding existing engineering systems</p> <p><b>Oral Communication (Listening and Speaking skills)</b></p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA7. communicate and seek inputs from workers regarding working of various components SA8. communicate to workers clearly about the requirements in managing control systems</p>

**LSC/N9204**

**Manage engineering system for the cold chain**

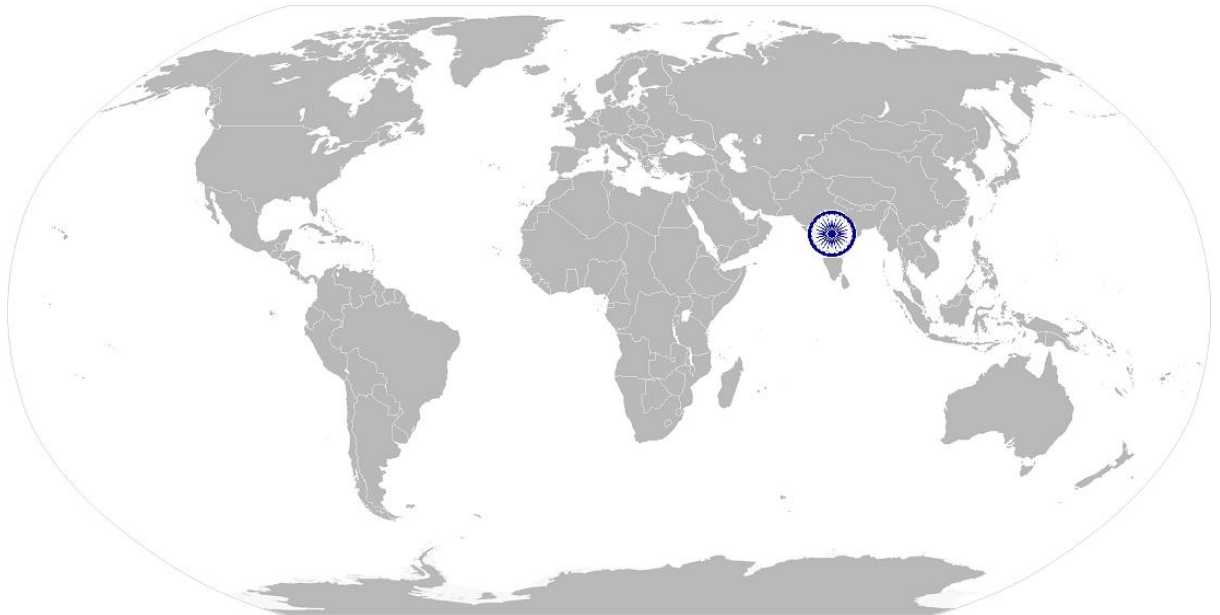
	<p>SA9. communicate technical knowledge regarding equipment functioning</p> <p>SA10. listen and understand all queries or doubts the workers have in mechanics or hydraulic aspects of cold chain engineering</p>
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/ individual on the job needs to know and understand how to:
	SB1. resolve emergency situations in system functioning
	<b>Plan and Organize</b>
	The user/ individual on the job needs to know and understand how to:
	SB2. plan training activities
	SB3. organize practical learning techniques
	SB4. plan maintenance activities as per standard requirements and manufacturer's instructions
	SB5. plan equipment service based on its working condition
	<b>Customer Centricity</b>
Not Applicable	
<b>Problem Solving</b>	
The user/ individual on the job needs to know and understand how to:	
SB6. help solve all queries or difficulties faced by trainees	
SB7. re-schedule tasks in case of delays or requirements by other departments in the organization	
SB8. handle allotment of tasks to workers in case of staff shortage or delays in activities	
<b>Analytical Thinking</b>	
The user/ individual on the job needs to know and understand how to:	
SB9. interpret equipment diagram and information to identify how each component is engineered to work	
SB10. analyze critical recurring issues and identify measures to solve the same	
SB11. assess working condition of various equipments	
SB12. plan activities to minimize effects on normal working of the organization	
<b>Critical Thinking</b>	
The user/ individual on the job needs to know and understand how to:	
SB13. optimize working of control systems in refrigeration equipment	
SB14. use acquired knowledge to trace technical errors in the plant	

LSC/N9204

Manage engineering system for the cold chain

**NOS Version Control**

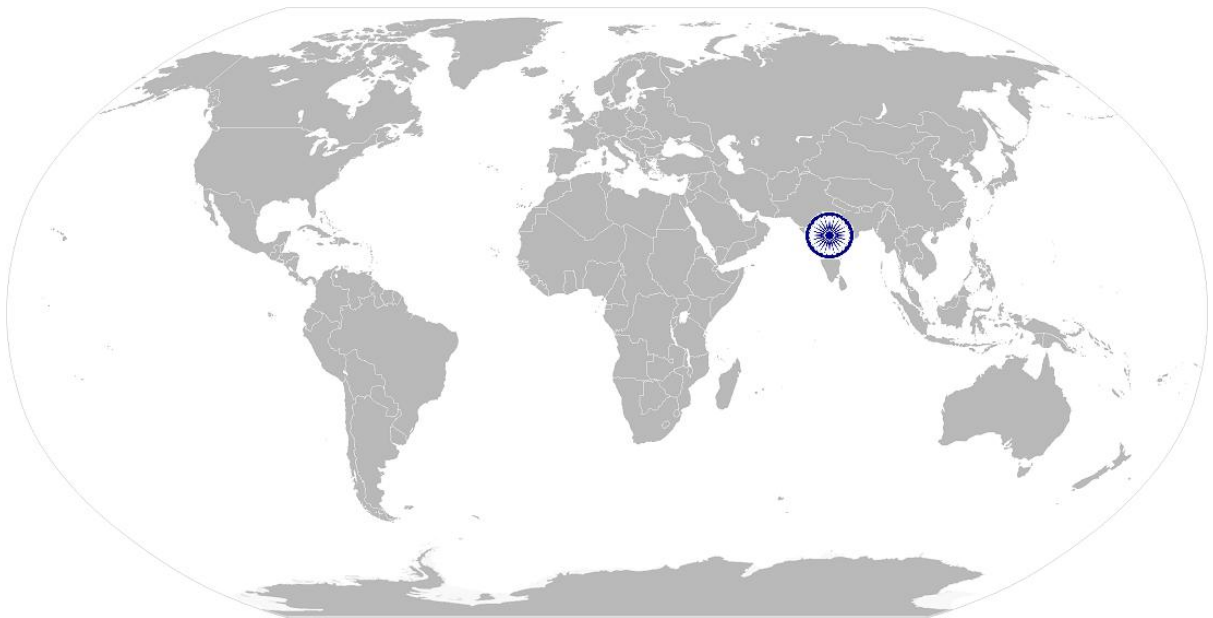
<b>NOS Code</b>	<b>LSC/N9204</b>		
<b>Credits(NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Logistics</b>	<b>Drafted on</b>	<b>23/08/16</b>
<b>Industry Sub-sector</b>	<b>Cold chain logistics</b>	<b>Last reviewed on</b>	<b>11/01/17</b>
<b>Occupation</b>	<b>Engineering</b>	<b>Next review date</b>	<b>11/01/20</b>



**LSC/N9901 Maintain food and personnel safety, health and hygiene in cold storage plant**

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# National Occupational Standard



## Overview

This unit is about complying with safety, health and hygiene at the workplace to have a hazard-free environment and avoid downtime.



**LSC/N9901 Maintain food and personnel safety, health and hygiene in cold storage plant**

National Occupational Standard

<b>Unit Code</b>	<b>LSC/N9901</b>
<b>Unit Title (Task)</b>	<b>Maintain food and personnel safety, health and hygiene in cold storage plant</b>
<b>Description</b>	This OS unit is about complying with safety, health and hygiene at the workplace to have a hazard-free environment and avoid downtime
<b>Scope</b>	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> <li>• Take precautionary measures to avoid work hazards</li> <li>• Follow standard health, safety and hygiene procedures</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Taking precautionary measures to avoid work hazards</b>	<p>To be competent, the user/ individual must be able to:</p> <p>PC1. assess the various health, safety and environmental hazards in the cold storage</p> <p>PC2. take necessary steps to eliminate or minimize the hazards</p> <p>PC3. analyze the causes of accidents at the workplace</p> <p>PC4. take preventive measures to avoid risk of cold burns and other injury due to contact with hot surfaces, gas, fire, hot fluids/ liquids, etc.</p> <p>PC5. ensure the employees have access to first aid kit when needed</p> <p>PC6. ensure to use personal protective equipment and safety gear such as gloves, jacket, footwear etc. for loading and unloading material in cold rooms to protect themselves from hypothermia, frostbite etc</p> <p>PC7. ensure to display safety signs at places where necessary for people to be cautious</p> <p>PC8. use rubber mats in the places where floors are constantly wet</p> <p>PC9. ensure electrical precautions such as insulated clothing, adequate equipment insulation, dry work area, switch off the power supply when not required, etc</p> <p>PC10. display emergency exit plan at prominent places and have emergency assembly area earmarked as a grid for easy counting of on duty associates and workers.</p> <p>PC11. unplug the control panel, compressor, condensor etc before performing maintenance</p> <p>PC12. report to the superior on any problems and hazards identified</p> <p>PC13. install fire alarms (electrical/manual) in cold store/deep freeze and keep other safety devices like hammer/mallet in the storage area</p>
<b>Following standard health, safety and hygiene procedures</b>	<p>To be competent, the user/individual must be able to:</p> <p>PC14. maintain appropriate ventilation in the cold rooms to avoid unacceptable accumulation of heat, condensation or odours</p> <p>PC15. check and review the cold storage areas frequently</p> <p>PC16. stack items in an organized way and use safe lifting techniques to reduce risk of injuries from handling procedures at the storage areas</p> <p>PC17. ensure no sign of pest infestation and install rodent traps, fly glues and insectocutors wherever needed</p> <p>PC18. follow hygiene &amp; sanitation standards of Government bodies like FSSAI, APEDA and /or EIA or importing countries like FAO, EU standards after PC 20</p>

## LSC/N9901 Maintain food and personnel safety, health and hygiene in cold storage plant

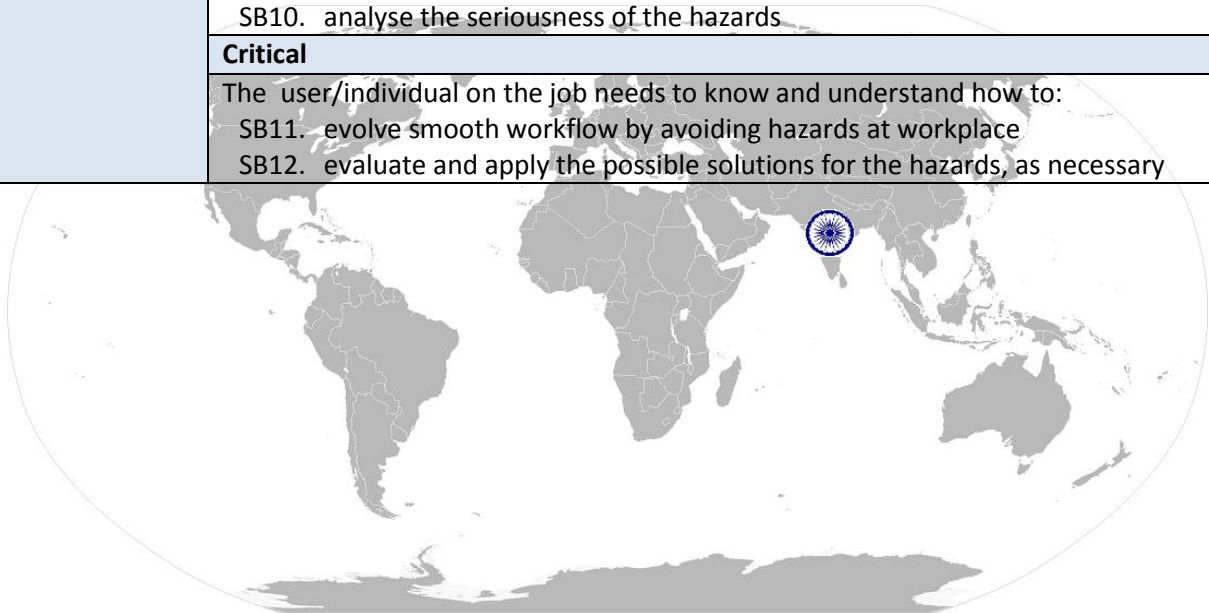
	<p>PC19. use effective loading and unloading systems</p> <p>PC20. proper stock rotation (First in First out) to be practised</p> <p>PC21. segregate damaged/ non-conforming products from other products to designate area for appropriate disposition</p> <p>PC22. fumigate containers depending upon product and contamination or as per customers' requirement</p> <p>PC23. avoid smoking, spitting, eating etc near food storage area</p> <p>PC24. ensure reefers are covered, clean, free from pest infestation &amp; other contaminants</p> <p>PC25. dispose cold storage plant waste in the designated areas safely as per company's policies and rules</p> <p>PC26. ensure to be safe while handling machines(generator, compressor, condensor etc), gas (ammonia) and chemicals(ethylene, refrigerants etc)</p> <p>PC27. keep the floors free from oil, water and grease to avoid slippery surface</p> <p>PC28. cut nails regularly and avoid applying nail paint. Avoid wearing bangles, rings, and chains in cold storage</p> <p>PC29. wash hands with soap solution and dry under a dryer as they enter for duty or after using wash room</p> <p>PC30. periodic examination of protective devices, pressure vessels and pipelines, and parts of pipework by a competent person to prevent defect that may give rise to danger</p> <p>PC31. ensure workers suffering from abscess, boils etc should be relieved from food handling</p> <p>PC32. develop personal hygiene habits like brushing teeth, taking shower everybody, wearing clean and tidy clothes after ironing etc</p>
<b>Knowledge and Understanding (K)</b>	
<p><b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)</p>	<p>The individual on the job needs to know and understand:</p> <p>KA1. company's HR policies on personnel management</p> <p>KA2. company's reporting structure</p> <p>KA3. occupational health and safety standards</p> <p>KA4. cold storageplant inspection checklist</p> <p>KA5. company's sanitary standard operating procedures</p> <p>KA6. procedures to follow during emergency maintenance issues</p> <p>KA7. technical standards for design and construction of cold storages: Bureau of Indian standards(BIS), International standard(ISO) etc</p>
<p><b>B. Technical Knowledge</b></p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. the purpose and usage of protective gears such as gloves , jackets etc. while working</p> <p>KB2. use of first aid at workplace</p> <p>KB3. cold storage order 1980</p> <p>KB4. food safety and standards act 2006</p>

## LSC/N9901 Maintain food and personnel safety, health and hygiene in cold storage plant

	<p>KB5. reporting procedure or heirarchy for signs of damage and potential hazards</p> <p>KB6. methods to minimize accidental risks</p> <p>KB7. safe storage and handling of chemicals like refrigerants, ammonia, ethylene etc</p> <p>KB8. loading and unloading systems</p> <p>KB9. standard operating procedure for safety drills and equipment maintenance</p> <p>KB10. operation of machines: compressor, condensor, evaporator etc</p> <p>KB11. emergency procedures to be followed in case of an mishap such as fire, accidents, etc. and communication of safety instructions to subordinate staff</p> <p>KB12. emergency responses in case of malfunctioning of refrigeration equipment as a whole or its components like evaporator, condenser or compressor</p> <p>KB13. solid, liquid and gaseous waste disposal, treatment norms and equipment</p> <p>KB14. necessary action to be taken for the hazards identified</p> <p>KB15. knowledge of Quality systems like BRC, FSSAI, ISO, FSSC, HACCP etc</p>
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Reading Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA1. read and interpret the relevant organisation policies, procedures and diagrams that identify health, safety and safe environmental practices.</p> <p>SA2. read job sheets, company policy documents and information displayed at the workplace for health, safety and environment.</p> <p>SA3. read notes/comments from the senior</p>
	<b>Writing Skills</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SA4. fill up documentation related to health, safety and environmental standards, if required</p>
	<b>Oral Communication (Listening and Speaking skills)</b>
<p>The user/individual on the job needs to know and understand how to:</p> <p>SA5. verbally report health, safety and environmental hazards and poor organisation practice.</p> <p>SA6. communicate to the supervisor about the work health, safety and environmental issues</p> <p>SA7. receive instructions from supervisor on minimizing the risks</p> <p>SA8. communicate with co-workers about the precautions to be taken for hazards free work</p>	
<b>B. Professional Skills</b>	<b>Decision Making</b>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. take preventive measures for the identified hazards</p> <p>SB2. select appropriate hand tools and personal protection equipment</p> <p>SB3. identify first aid needs in case of an injury</p>

## LSC/N9901 Maintain food and personnel safety, health and hygiene in cold storage plant

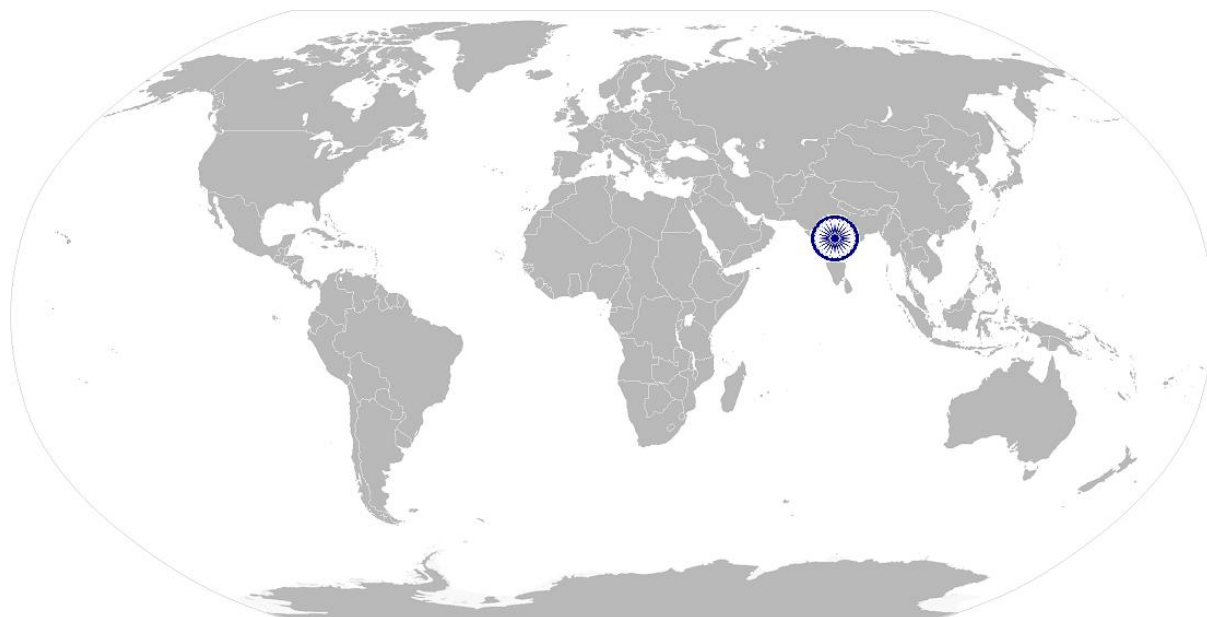
	<b>Plan and Organize</b>
	The user/individual on the job needs to know and understand how to: SB4. formalize and display evacuation plan at strategic locations
	<b>Customer Centricity</b>
	The user/ individual on the job needs to know and understand how to: SB5. ensure targeted product delivery by practicing stipulated standards of occupational health safety and environmental measures
	<b>Problem Solving</b>
	The user/individual on the job needs to know and understand how to: SB6. take care of personal and equipment protection SB7. identify the hazards and suggest possible solutions
	<b>Analytical</b>
	The user/individual on the job needs to know and understand how to: SB8. use safety equipment such as fire extinguisher during fire accidents SB9. store tools in a safe way SB10. analyse the seriousness of the hazards
	<b>Critical</b>
	The user/individual on the job needs to know and understand how to: SB11. evolve smooth workflow by avoiding hazards at workplace SB12. evaluate and apply the possible solutions for the hazards, as necessary



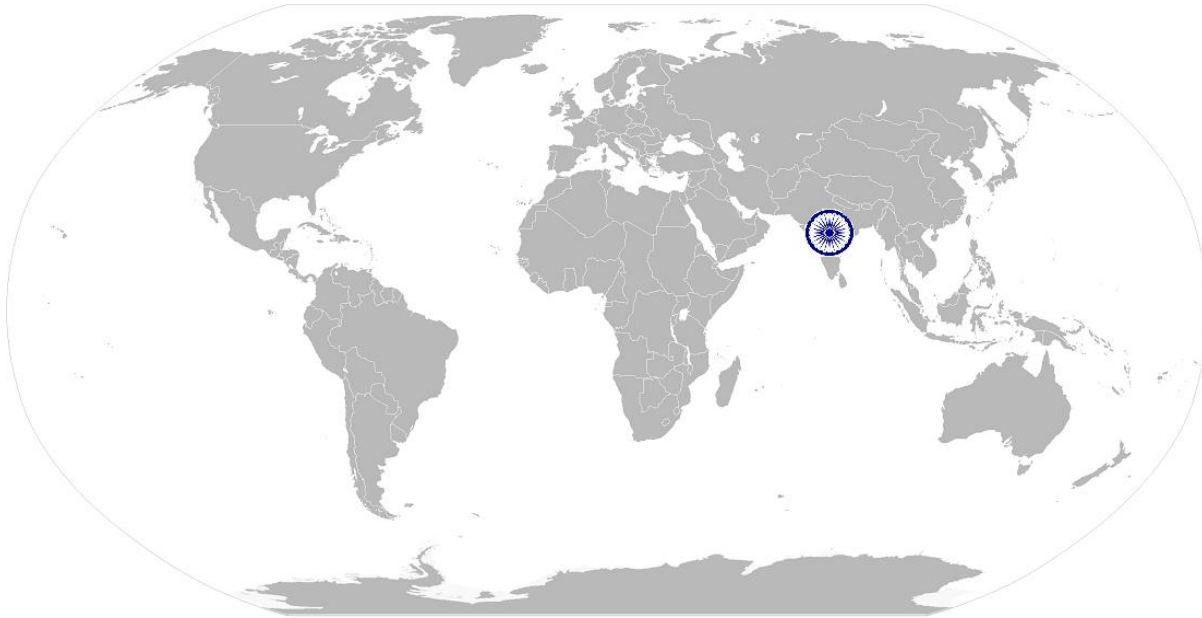
**LSC/N9901 Maintain food and personnel safety, health and hygiene in cold storage plant**

**NOS Version Control**

<b>NOS Code</b>	<b>LSC/N9901</b>		
<b>Credits(NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Logistics</b>	<b>Drafted on</b>	<b>08/08/16</b>
<b>Industry Sub-sector</b>	<b>Cold chain logistics</b>	<b>Last reviewed on</b>	<b>11/01/17</b>
<b>Occupation</b>	<b>Engineering</b>	<b>Next review date</b>	<b>11/01/20</b>



# National Occupational Standard



## Overview

This unit is about coordinating and communicating effectively with seniors, colleagues and clients to achieve a smooth workflow.



**LSC/N9902**
**Communicate effectively with colleagues and clients**

<b>Unit Code</b>	<b>LSC/N9902</b>
<b>Unit Title (Task)</b>	<b>Communicate effectively with colleagues and clients</b>
<b>Description</b>	This OS unit is about coordinating and communicating effectively with seniors, colleagues and clients to achieve a smooth workflow
<b>Scope</b>	This unit/task covers the following: <ul style="list-style-type: none"> <li>• Interact with seniors</li> <li>• Communicate with colleagues</li> <li>• Communicate effectively with clients</li> </ul>
<b>Performance Criteria(PC) w.r.t. the Scope</b>	
<b>Element</b>	<b>Performance Criteria</b>
<b>Interacting with seniors</b>	To be competent, the user/ individual must be able to: PC1. understand the work output requirements, targets, performance indicators and incentives PC2. deliver quality work on time and report any anticipated reasons for delays PC3. escalate unresolved problems or complaints to the relevant superior PC4. communicate project progress proactively to the superior PC5. receive feedback on work standards PC6. document the completed work schedule and handover to the superior
<b>Communicating with colleagues</b>	To be competent, the user/ individual must be able to: PC7. exhibit trust, support and respect to all the colleagues in the workplace PC8. aim to achieve hassle free cold chain operation PC9. help and assist colleagues with information and knowledge PC10. seek assistance from the colleagues when required PC11. identify the potential and existing conflicts with the colleagues and resolve PC12. pass on essential information to other colleagues on timely basis PC13. maintain the etiquette, use polite language, demonstrate responsible and disciplined behaviors to the colleagues PC14. interact with colleagues from different departments: ripening chamber, cold storage, transport, packhouse etc to effectively carry out the work among the team and understand the nature of their work PC15. put team over individual goals and multi task or share work where necessary supporting the colleagues PC16. highlight any errors of colleagues, help to rectify and ensure quality output PC17. work with cooperation, coordination, communication and collaboration, with shared goals and supporting each others performance
<b>Communicating effectively with clients</b>	To be competent, the user/ individual must be able to: PC18. ask relevant questions to the client and identify their needs PC19. possess strong knowledge on market and cold chain operation PC20. brief the client clearly on potential costs and challenges involved in the cold chain industry PC21. communicate with the client in a polite, professional and friendly manner PC22. build effective but impersonal relationship with the client

## LSC/N9902      Communicate effectively with colleagues and clients

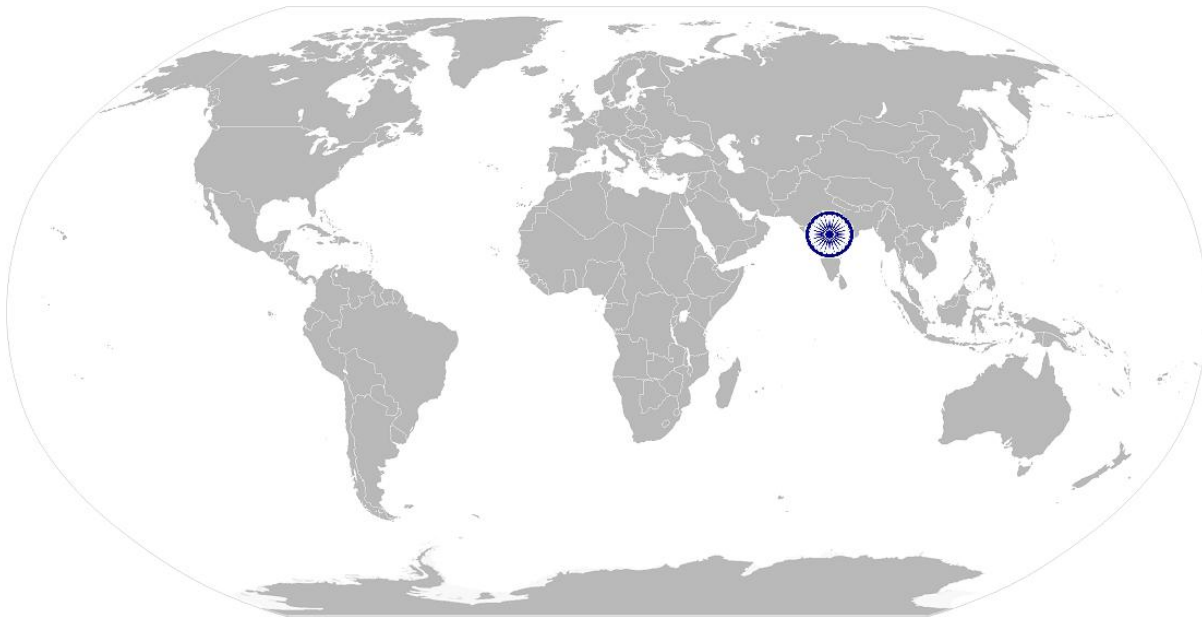
	<p>PC23. ensure the appropriate language and tone are used with clients</p> <p>PC24. listen actively and have a two way communication</p> <p>PC25. be sensitive to the gender, cultural and social differences such as modes of greeting, formality, etc.</p> <p>PC26. understand the client expectations correctly and provide the appropriate products and services</p> <p>PC27. understand the client dissatisfaction and address or escalate their complaints effectively</p> <p>PC28. maintain a positive, sensible and cooperative manner all time</p> <p>PC29. ensure to maintain a proper body language, dress code, gestures and etiquettes towards the client</p> <p>PC30. avoid interrupting the client while they talk</p> <p>PC31. ensure to avoid negative questions and statements to the client</p> <p>PC32. inform the client on any issues or problems before hand and also on the developments involving them</p> <p>PC33. ensure to respond back to the client immediately for their voice messages, e-mails, apps, etc.</p> <p>PC34. develop good rapport with the client and promote other products and services</p> <p>PC35. seek feedback from the client on their understanding to what was discussed</p> <p>PC36. explain the terms and conditions clearly</p>
<b>Knowledge and Understanding (K)</b>	
<p><b>A. Organizational Context</b> (Knowledge of the company / organization and its processes)</p>	<p>The individual on the job needs to know and understand:</p> <p>KA1. vision, mission and values of the company</p> <p>KA2. business and performance of the company</p> <p>KA3. company's policies on personnel management, effective team work at workplace</p> <p>KA4. company's HR policies</p> <p>KA5. company's reporting structure</p> <p>KA6. company's documentation policy</p> <p>KA7. company's customer profile</p> <p>KA8. occupational health and safety standards</p> <p>KA9. company's policy on business ethics and code of conduct</p>
<p><b>B. Technical Knowledge</b></p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. methods for effective communication with various categories of people and the different departments in the organization</p> <p>KB2. significance of team coordination and productivity targets of the organisation</p> <p>KB3. how to record the job activity as required on various types of documents</p> <p>KB4. how to use computer or smartphone to communicate effectively and productively</p> <p>KB5. significance of helping colleagues with specific issues and problems</p> <p>KB6. importance of meeting quality and time standards as a team</p> <p>KB7. how to practice effective listening and talking</p>

## LSC/N9902      Communicate effectively with colleagues and clients

	KB8. effective use of voice tone and pitch for communication KB9. how to demonstrate ethics and convey discipline to the clients KB10. how to build effective working relationship with mutual trust and respect within the team KB11. importance of dealing with grievances effectively and in time
<b>Skills (S)</b>	
<b>A. Core Skills/ Generic Skills</b>	<b>Reading Skills</b>
	The user/ individual on the job needs to know and understand how to: SA1. read job sheets, company policy documents and information displayed at the workplace SA2. read notes/comments from the senior
	<b>Writing Skills</b>
	The user/ individual on the job needs to know and understand how to: SA3. fill up documentation pertaining to job requirement
	<b>Oral Communication (Listening and Speaking skills)</b>
	The user/ individual on the job needs to know and understand how to: SA4. interact with team members to work efficiently SA5. communicate effectively with senior to achieve smooth workflow SA6. communicate effectively with the clients to build a good rapport with them SA7. use language that the client or colleague understands SA8. use the communication systems of the company, e.g., telephone, fax, public announcement systems SA9. E-mail and use Internet for communicating SA10. use of audio-visual aids to communicate complex issues
<b>B. Professional Skills</b>	<b>Decision Making</b>
	The user/ individual on the job needs to know and understand how to: SB1. spot and communicate potential areas of disruptions to work process and report the same SB2. report to supervisor and deal with a colleague individually, depending on the type of concern
	<b>Plan and Organize</b>
	The user/ individual on the job needs to know and understand how to: SB3. plan communication strategy in order to avoid conflicts and work disruption
	<b>Customer Centricity</b>
	The user/ individual on the job needs to know and understand how to: SB4. practice patient listening, careful talking and paraphrasing in order to avoid misunderstanding
<b>Problem Solving</b>	
The user/ individual on the job needs to know and understand how to: SB5. coordinate with different departments and multi-task as necessary SB6. contribute to quality of team work and achieve smooth workflow	

**LSC/N9902      Communicate effectively with colleagues and clients**

	SB7. share work load as required
	SB8. delegate work in consultation with senior or as necessary instead of allowing work to pile up
	<b>Analytical Thinking</b>
	The user/ individual on the job needs to know and understand how to: SB9. resolve recurring inter-personal conflicts by clear and two-way dialogue
	<b>Critical Thinking</b>
The user/ individual on the job needs to know and understand how to: SB10. improve work processes by interacting with others and adopting best practices	

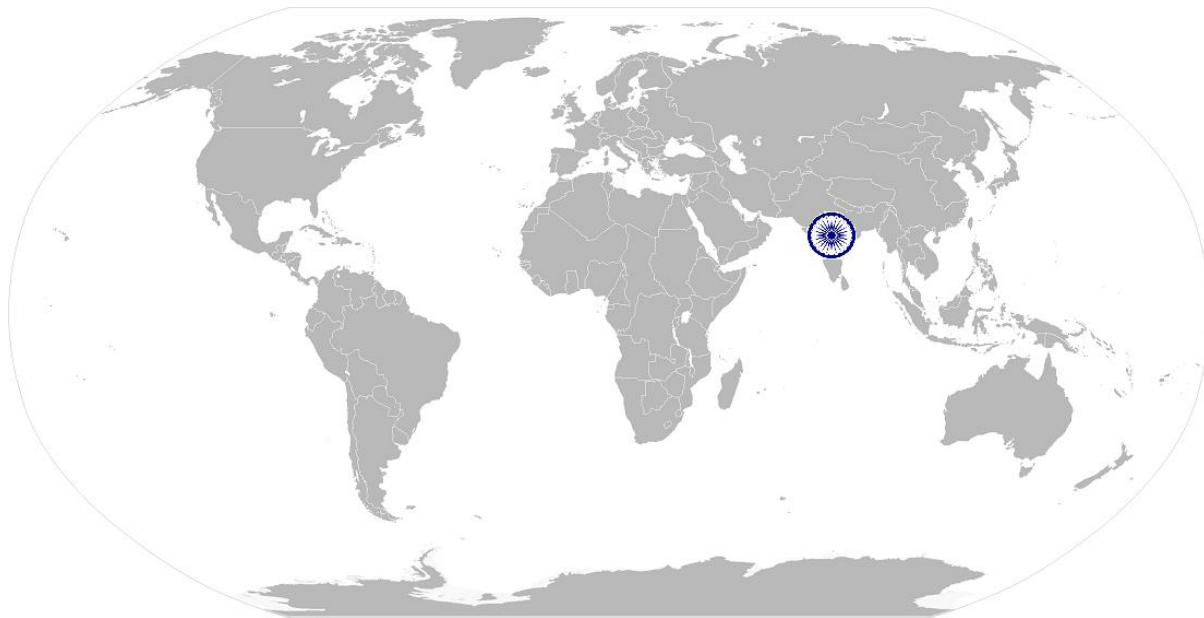


LSC/N9902

Communicate effectively with colleagues and clients

## NOS Version Control

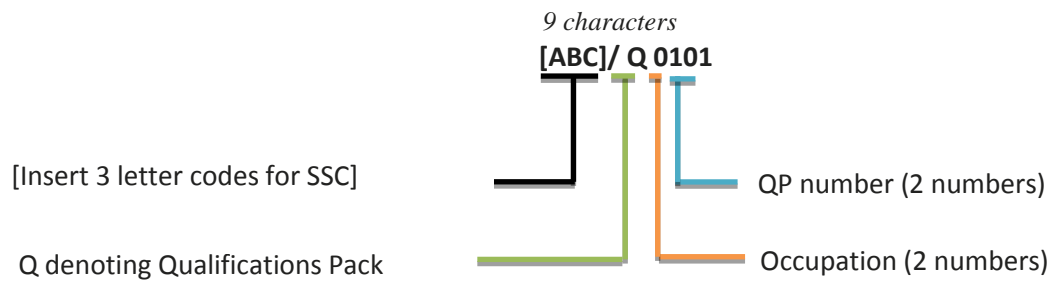
<b>NOS Code</b>	<b>LSC/N9902</b>		
<b>Credits(NSQF)</b>	<b>TBD</b>	<b>Version number</b>	<b>1.0</b>
<b>Industry</b>	<b>Logistics</b>	<b>Drafted on</b>	<b>08/08/16</b>
<b>Industry Sub-sector</b>	<b>Cold chain logistics</b>	<b>Last reviewed on</b>	<b>11/01/17</b>
<b>Occupation</b>	<b>Engineering</b>	<b>Next review date</b>	<b>11/01/20</b>



## Annexure

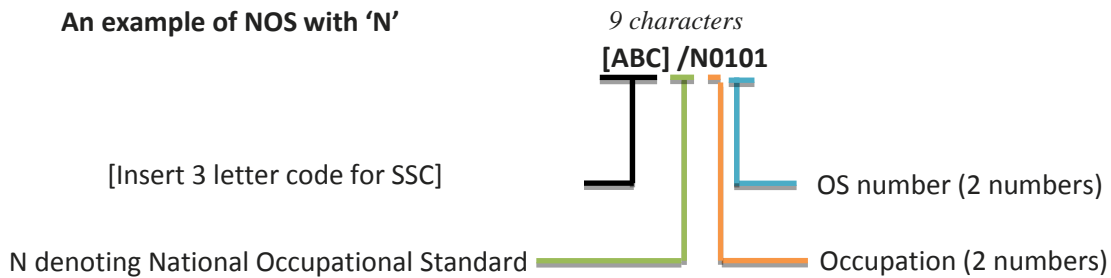
### Nomenclature for QP and NOS

#### Qualifications Pack



#### Occupational Standard

##### An example of NOS with 'N'



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

<b>Sub-sector</b>	<b>Range of Occupation numbers</b>
Land Transportation	11,14
Shipping Transportation	12,14
Air Transportation	13
Warehousing Storage	21,23
Warehouse Packaging	22,23
Courier and Mail Services	30
Shipping / Port Operation	46 – 60
Air cargo operation	61 – 75
EXIM logistics	76 – 85
Cold Chain Logistics	86 - 95
Generic Occupations	96 – 99

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

## CRITERIA FOR ASSESSMENT OF TRAINEES

**Job Role** Cold Chain Engineering Specialist

**Qualification Pack** LSC/Q9201

**Sector Skill Council** Logistics

### 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. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

	<b>Performance Criteria</b>	<b>Total Marks (300)</b>	<b>Out of</b>	<b>Theory</b>	<b>Skills Practical</b>
<b>LSC/N9201 Manage energy efficiency in the cold chain</b>	PC1. identify parameters impacting energy usage; perform correlation between energy consumption and the parameters identified to impact energy usage	50	4	1	3
	PC2. monitor electrical energy consumption, temperature, relative humidity (RH) and air pressure; check all thermostat set points; employ automatic refrigerant leak detection systems		4	1	3
	PC3. define threshold for parameters in energy consumption		3	1	2
	PC4. evaluate costs and benefits of re-piping the facilities; perform thermographic inspection to analyse cold areas where there is poor insulation		3	1	2
	PC5. separate energy consumption of refrigeration system from the energy used by the whole plant; identify the quantum of undercooling and overcooling during the analysis period		3	1	2
	PC6. identify the impact of weather conditions on the energy consumed		3	1	2
	PC7. explore ways to control lighting by daylight sensors and occupancy		4	1	3

	<b>Performance Criteria</b>	<b>Total Marks (300)</b>	<b>Out of</b>	<b>Theory</b>	<b>Skills Practical</b>
	sensors; identify ways to adjust chiller or refrigeration equipment to achieve better performance				
	PC8. look for ways to promote renewable energy by utilizing bio-waste to generate bio-gas, wherever possible; use eco-friendly refrigerants with minimal global warming potential of ozone depleting substances		3	1	2
	PC9. improve evaporator performance by looking for ways to reduce fan motor horsepower		3	1	2
	PC10. ensure to pick air cooled condenser or evaporative condenser based on the refrigerant used, size of the system and availability of water		4	1	3
	PC11. achieve optimal energy usage conditions for the chiller; improve part-load performance for evaporators, condensers and compressors		3	1	2
	PC12. reduce refrigeration load by checking under-floor heating, insulation levels, warehouse doors usage; reduce load in lighting of the warehouse, by using high efficiency lighting (sodium lights or high frequency fluorescents); upgrade to high efficiency condenser units		3	1	2
	PC13. reduce heat load by improving insulation and reducing air leakage; select low power consumed per ton of refrigeration, while upgrading evaporator units		4	1	3
	PC14. use sliding doors instead of traditional freezer doors, which are better insulated, require low maintenance, reduce frost build up, thereby reducing overall energy consumption; use energy efficient PVC strip curtains for the cold storage doors, to reduce air exchange during door openings		4	1	3
	PC15. ensure that the floor heaters are working properly and well protected for the deep freezers		2	1	1
	<b>POINTS</b>		<b>50</b>	<b>15</b>	<b>35</b>
	<b>TOTAL POINTS</b>			<b>50</b>	

	<b>Performance Criteria</b>	<b>Total Marks (300)</b>	<b>Out of</b>	<b>Theory</b>	<b>Skills Practical</b>
<b>LSC/N9202 Oversee modified atmosphere requirements for the products</b>	PC1. maintain temperature ranges, concentration of oxygen, carbon dioxide, nitrogen and ethylene ideal for the products stored or transported	50	5	2	3
	PC2. consider product heat and set ventilation to control cooling and carbon dioxide level		4	1	3
	PC3. monitor composition of gases regularly and accurately; monitor for chilling injury symptoms on the products		4	1	3
	PC4. ensure to keep the room or container sealed; regularly sample air parameters in the cold chamber to check the conditions		4	1	3
	PC5. ensure proper sanitation to avoid conditions which favours thriving of pathogenic microorganisms		4	1	3
	PC6. assign a resource to maintain records of refrigeration equipment		3	1	2
	PC7. understand how to stop the system and replenish the cold chamber with fresh air when required		4	1	3
	PC8. ensure to retrofit container with purge port assembly, when they contain perishable products and transported, to make it suitable for modified atmosphere use		3	1	2
	PC9. prepare absorbers and adsorbers of oxygen, carbon dioxide, ethylene and water; operate nitrogen generator with its controls and fan blowers		3	1	2
	PC10. ensure that legal requirements are followed while collecting, moving or		3	1	2
	PC11. prepare documentation regarding modified atmospheric conditions maintained for different products		3	1	2
	PC12. ensure that maintenance records of relevant equipment and cleaning records in the modified atmosphere storage area are made		3	1	2
	PC13. report any faults in the readings of required modified atmosphere requirements		4	1	3
	PC14. quantify extended storability of the products dealt with		3	1	2
	<b>POINTS</b>		<b>50</b>	<b>15</b>	<b>35</b>
	<b>TOTAL POINTS</b>				<b>50</b>

	Performance Criteria	Total Marks (300)	Out of	Theory	Skills Practical
<b>LSC/N9203 Undertake water and effluent treatment programme</b>	PC1. ensure that the water treatment programme consists of controlling water circulation, chemical feed and routine monitoring	50	4	1	3
	PC2. ensure that treated water is used on the product, to avoid the threat of external pathogens spoiling them		3	1	2
	PC3. find cost effective ways for treatment and recycle of COD (chemical oxygen demand) waste water		4	1	3
	PC4. verify water treatment system compatibility with the plant operations		4	1	3
	PC5. explore options to collect water from evaporator units, if they have defrost unit, and provide them to condenser or cooling tower		3	1	2
	PC6. ensure to maintain condenser tubes clean after water treatment		3	1	2
	PC7. identify treated effluent and tweak its treatment, if it is not as per the specification		3	1	2
	PC8. record information and document necessary details for generating programme efficacy report		3	1	2
	PC9. monitor remedial engineering works		3	1	2
	PC10. explore possibility of rain water harvesting in case there is large roof surfaces for the cold storage plant		3	1	2
	PC11. confirm that the treatment areas are hygienic and safe		4	1	3
	PC12. investigate faults and errors and take corrective actions		3	1	2
	PC13. train operators for water and effluent treatment procedures employed		4	1	3
	PC14. monitor overfeed or underfeed of water treatment chemicals		3	1	2
	PC15. inspect chemical feed system to check for leaks		3	1	2
	<b>POINTS</b>		<b>50</b>	<b>15</b>	<b>35</b>
	<b>TOTAL POINTS</b>				<b>50</b>

	Performance Criteria	Total Marks (300)	Out of	Theory	Skills Practical
	PC1. automate the operation of evaporators, condensers and compressors as much as possible		4	1	3

	Performance Criteria	Total Marks (300)	Out of	Theory	Skills Practical
<b>LSC/N9204</b> <b>Manage engineering system for the cold chain</b>	PC2. minimize the power consumption for evaporators, condensers and compressors combined	50	4	2	2
	PC3. control evaporators when the cold room has attained desired temperature		4	1	3
	PC4. ensure that hydraulic oil is adapted to the temperatures operated at the cold store		4	1	3
	PC5. identify different components of engineering system employed which needs to be checked at regular intervals		4	1	3
	PC6. plan and schedule the frequency with which each component in the facility needs to be examined		5	2	3
	PC7. analyse pressure drop between condenser and evaporator, to check if it crosses two pounds		5	2	3
	PC8. examine insulated pipes which show signs of corrosion or frost appearances		4	1	3
	PC9. examine corroded parts to analyse and decide regarding the need for re-insulation or maintenance		4	1	3
	PC10. record information and document regarding operations of evaporators, condensers and compressors		4	1	3
	PC11. document power consumption of refrigeration system at regular intervals		4	1	3
	PC12. record observations made in the analysis of existing facilities and the needs identified for its revamp		4	1	3
	<b>POINTS</b>			<b>50</b>	<b>15</b>
<b>TOTAL POINTS</b>				<b>50</b>	

	Performance Criteria	Total Marks (300)	out of	Theory	Practical
<b>LSC/N9901</b> <b>Maintain food and personnel safety, health and hygiene in cold storage plant</b>	PC1. assess the various health, safety and environmental hazards in the cold storage; take necessary steps to eliminate or minimize the hazards; analyze the causes of accidents at the workplace; take preventive measures to avoid risk of burns and other injury due to contact with hot surfaces, gas, fire, hot fluids/ liquids, etc	50	5	2	3



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PC2.	ensure the employees have access to first aid kit when needed; ensure to use personal protective equipment and safety gear such as gloves, jacket, footwear etc. for loading and unloading material in cold rooms to protect themselves from hypothermia, frostbite etc;	2	1	1
PC3.	ensure to display safety signs at places where necessary for people to be cautious; use rubber mats in the places where floors are constantly wet; ensure electrical precautions such as insulated clothing, adequate equipment insulation, dry work area, switch off the power supply when not required, etc; practice correct emergency procedures: operating fire extinguishers, emergency exits, etc; unplug the control panel, compressor, condensor etc before performing maintenance; report to the superior on any problems and hazards identified	5	2	3
PC4.	install fire alarms (electrical/manual) in cold store/deep freeze and keep other safety devices like hammer/mallet in the storage area	3	1	2
PC5.	maintain appropriate ventilation in the cold rooms to avoid unacceptable accumulation of heat, condensation or odours; check and review the cold storage areas frequently	5	2	3
PC6.	stack items in an organized way and use safe lifting techniques to reduce risk of injuries from handling procedures at the storage areas; use effective loading and unloading systems; proper stock rotation (First in First out) to be practised; segregate damaged/ non-conforming products from other products to designate area for appropriate disposition	5	2	3
PC7.	ensure no sign of pest infestation and install rodent traps, fly glues and insectocutors wherever needed; follow hygiene & sanitation standards of Government bodies like FSSAI, APEDA and /or EIA or importing countries like FAO, EU standards; fumigate containers depending upon product and contamination or as per customers' requirement	5	2	3
PC8.	avoid smoking, spitting, eating etc near food storage area; cut nails regularly	2	1	1

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	and avoid applying nail paint. Avoid wearing bangles, rings, and chains in cold storage; develop personal hygiene habits like brushing teeth, taking shower everyday, wearing clean and tidy clothes after ironing etc; wash hands with soap solution and dry under a dryer as they enter for duty or after using wash room				
PC9.	ensure reefers are covered, clean, free from pest infestation & other contaminants		3	1	2
PC10.	dispose cold storage plant waste in the designated areas safely as per company's policies and rules		5	2	3
PC11.	ensure to be safe while handling machines(generator, compressor, condensor etc), gas (ammonia) and chemicals(ethylene, refrigerants etc); keep the floors free from oil, water and grease to avoid slippery surface		3	1	2
PC12.	periodic examination of protective devices, pressure vessels and pipelines, and parts of pipework by a competent person to prevent defect that may give rise to danger		5	2	3
PC13.	ensure workers suffering from abscess, boils etc should be relieved from food handling		2	1	1
	<b>POINTS</b>		<b>50</b>	<b>20</b>	<b>30</b>
	<b>TOTAL POINTS</b>			<b>50</b>	

	<b>Performance Criteria</b>	<b>Total Marks (300)</b>	<b>out of</b>	<b>Theory</b>	<b>Practical</b>
<b>LSC/N9902</b> <b>Communicate effectively with colleagues and clients</b>	PC1. understand the work output requirements, targets, performance indicators and incentives	50	4	2	2
	PC2. deliver quality work on time and report any anticipated reasons for delays; escalate unresolved problems or complaints to the relevant superior; receive feedback on work standards; document the completed work schedule and handover to the superior		4	2	2
	PC3. exhibit trust, support and respect to all the colleagues in the workplace		3	1	2
	PC4. aim to achieve hassle free cold chain operation		4	2	2
	PC5. help and assist colleagues with information and knowledge; seek assistance from the colleagues when required ; pass on essential information		3	1	2

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	to other colleagues on timely basis; highlight any errors of colleagues, help to rectify and ensure quality output			
PC6.	identify the potential and existing conflicts with the colleagues and resolve	4	1	3
PC7.	maintain the etiquette, use polite language, demonstrate responsible and disciplined behaviors to the colleagues	3	1	2
PC8.	interact with colleagues from different departments: ripening chamber, cold storage, transport, packhouse etc to effectively carry out the work among the team and understand the nature of their work; put team over individual goals and multi task or share work where necessary supporting the colleagues; work with cooperation, coordination, communication and collaboration, with shared goals and supporting each others performance	3	1	2
PC9.	ask relevant questions to the client and identify their needs; brief the client clearly on potential costs and challenges involved in the cold chain industry	4	2	2
PC10.	possess strong knowledge on market and cold chain operation	4	2	2
PC11.	communicate with the client in a polite, professional and friendly manner; build effective but impersonal relationship with the client; ensure the appropriate language and tone are used with clients; listen actively and have a two way communication; be sensitive to the gender, cultural and social differences such as modes of greeting, formality, etc.; maintain a positive, sensible and cooperative manner all time ; ensure to maintain a proper body language, dress code, gestures and etiquettes towards the client; avoid interrupting the client while they talk	6	2	4
PC12.	understand the client expectations correctly and provide the appropriate products and services; understand the client dissatisfaction and address or escalate their complaints effectively; ensure to avoid negative questions and statements to the client; ensure to respond back to the client immediately for their voice messages, e-mails, apps, etc. ; develop good rapport with the client and promote other products and services; inform the client on any issues or problems before hand and also on	6	2	4

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	the developments involving them; seek feedback from the client on their understanding to what was discussed				
	PC13. explain the terms and conditions clearly		2	1	1
	<b>POINTS</b>		<b>50</b>	<b>20</b>	<b>30</b>
	<b>TOTAL POINTS</b>			<b>50</b>	
	<b>GRAND TOTAL</b>	<b>300</b>			