

NATIONAL METAL AND ENGINEERING CURRICULUM

MODULE: MERCHANDISING AND DISPLAY CABINETS (NR18)

PURPOSE: This module aims to provide the student with the knowledge and skills to install, service and maintain merchandising and display cabinets.

NOMINAL DURATION: One module

This module is designed on the assumption that most of the students will achieve the competencies specified in 35 to 40 hours.

The length of time taken to complete a module will vary depending on factors such as teaching method used, knowledge and skills at entry and individual students ability.

PREREQUISITES: System Control (NR12)
Installation (NR11)

LEARNING OUTCOMES: On completion of this module the student will be able to:

1. Identify the various types of merchandising and display cabinets by construction techniques used.
2. Identify components and features of each cabinet type including defrosting arrangements.
3. Read and interpret engineering drawings, layouts and specifications, and establish procedures to install food storage cabinets.
4. Identify and adjust system and defrost controls with reference to control circuit diagrams, to give the required storage conditions.
5. Identify and describe the types of multiple systems used in commercial cabinet applications.
6. Establish the correct methods for commissioning, servicing and maintaining commercial merchandising and display cabinets.

STUDENTS SHOULD BE MADE AWARE OF OCCUPATIONAL HEALTH AND SAFETY ISSUES IN ALL SITUATIONS AND BE EXPECTED TO DEMONSTRATE SAFE WORKING PRACTICES AT ALL TIMES.

OUTLINE OF CONTENT:

This module contains:

1. **Types and Construction**
 - . deep freeze meat, dairy, and fruit and vegetables
 - . multi deck display type
 - . single deck, well type and island cases
 - . glass door/reach-in merchandiser

2. **Components and Features**
 - . condensing units
 - . refrigerant controls
 - . evaporators and fans
 - . defrosting method and mullions
 - . drain facilities and drain heaters
 - . air distribution and air-flow curtains
 - . cabinet air temperature, velocity and direction
 - . accessories
 - . lighting

3. **Layouts and Installation**
 - . location of equipment
 - . equipment site arrangements and building services
 - . access and obstructions
 - . power supply and electrical services
 - . arrangement of piping

4. **System and Defrost Controls**
 - . operating conditions
 - . alarm systems
 - . thermostats and pressure controls
 - . defrost timers and controllers
 - . electrical control circuits

5. **Multiple Systems**
 - . multiple compressors
 - . multiple evaporators
 - . heat reclaim systems
 - . multi-temperature accessories
 - . controls and sequencing

6. **Commission, Service and Maintain**
 - . check and adjust control devices
 - . determine correct air flows
 - . leak testing
 - . normal and abnormal operation
 - . basic servicing techniques

* Details of above Outline topics are available in APPENDIX 1

ON THE JOB TRAINING:

For consolidation, the material in this module should be linked with and complemented by relevant on-job skill practice or other equivalent experience.

PERFORMANCE CRITERIA:

The criteria for each learning outcome should be:

Learning Outcome 1

Assessment:

Short answer tests

Performance:

- a. Identify and describe various food storage cabinets including deep freeze, meat, dairy and fruit and vegetable.
- b. Describe the construction techniques of multi deck display type merchandisers.
- c. Describe the construction of single deck well type and island cases.
- d. Describe the construction techniques of glass door/reach in merchandisers.

Learning Outcome 2

Assessment:

Short answer tests
Practical tests

Performance:

- a. Identify condensing unit types and arrangements.
- b. Name the types of refrigerant controls used.
- c. Describe the evaporator and fan arrangements.
- d. Describe defrosting methods employed on each cabinet including mullion heating.
- e. Identify drain facilities and heaters required.
- f. Explain air distribution methods and the use of air-curtains.
- g. Identify cabinet air temperatures, velocity and direction, including the effect of ambient air draughts on open cabinets.
- h. Identify accessories including oil separators, crankcase pressure regulators and constant pressure valves.
- i. Establish lighting requirements of food storage cabinets.

Learning Outcome 3

Assessment:

Short answer tests

Performance:

- a. Identify correct cabinet locations for various installations.
- b. Determine site arrangements, including building services arrangements.
- c. Identify access and obstruction characteristics.
- d. Determine electrical services arrangements from site drawings.
- e. Describe correct refrigerant piping layouts.

Learning Outcome 4

Assessment: Short answer tests
Practical tests

- Performance:**
- a. Determine approximate operating conditions.
 - b. Describe the function and operation of cabinet alarm systems.
 - c. Identify and adjust thermostatics and pressure controls.
 - d. Identify and adjust defrost timers and controllers.
 - e. Analyse electrical control circuits of the various cabinets and explain the sequence of operation.

Learning Outcome 5

Assessment: Short answer tests

- Performance:**
- a. Describe multiple compressor type systems.
 - b. Describe multiple evaporator systems for both single and multiple temperature applications.
 - c. Describe the operation and control of heat reclaim equipment.
 - d. Identify and describe the operation of multi-temperature accessories including.
 - . solenoid valves - liquid and suction line
 - . crankcase pressure regulating valves
 - . check valves
 - . evaporator pressure regulators
 - e. Discuss general principles of controls and sequence of operation for multiple systems of various types.

Learning Outcome 6.

Assessment: Practical tests

- Performance:**
- a. Check and adjust control devices.
 - b. Determined cabinet air flows are correct.
 - c. Use appropriate leak detection equipment.
 - d. Identify abnormal operation of equipment and components.
 - e. Develop a maintenance check list.
 - f. Apply basic servicing and maintenance techniques.

APPENDIX 1.

Suggested Module Content:

Additional Information

Learning Outcome 6

1. Establish the correct methods for servicing and maintaining merchandising and display cabinets including:
 - checking and replacing driers
 - adjusting belts and pulleys
 - adjust and align couplings
 - check and adjust control devices
 - leak testing
 - pressure test, dehydrate and charge a system

2. Identify correct and incorrect operation of defrost heaters, mullion heaters, cabinet lights and fans.

3. Employ systematic procedures in the detection, identification and rectification of problems in the refrigeration cycle and electrical circuits of merchandising and display cabinets:
 - undercharged/restricted/overcharged systems
 - air in system
 - refrigerant control malfunctions
 - incorrectly set controls
 - failed mullion/drain heaters
 - cyclic defrost - incorrectly set pressure/temperature

ADDITIONAL INFORMATION: MODULE (NR18)

1. SUGGESTED TEACHING/LEARNING STRATEGIES

Student should:

- 1. Select and operate electrical measuring instruments to check wiring and trace faults in circuitry.**

- 2. Select and measure the refrigeration cycle pressure/temperature check points and interpret test readings.**

- 3. Visit a large Supermarket complex to :**
 - (a) identify a range of merchandising and display cabinet types**
 - (b) establish equipment layout and piping installation methods**
 - (c) determine cabinet temperatures for various stored product**
 - (d) identify defrosting methods used on each cabinet**
 - (e) describe heat reclaim methods**
 - (f) Complete a detailed drawing of the merchandising and display cabinets, other refrigeration equipment and plant room equipment layout.**

2. SUGGESTED MINIMUM RESOURCES

3. SUGGESTED ON-JOB TRAINING - FOR MAXIMUM SKILL ACQUISITION