

Heavy Duty Equipment Technician Level 4

Heavy Duty Equipment Technician

Unit: A3 Pre-IP Review

Level: Four

Duration: 60 hours

Theory: 60 hours

Practical: 0 hours

Overview:

This unit offers senior apprentices a systematic review of skills and knowledge required to pass the Interprovincial ("Red Seal") Examination. The unit helps the apprentice integrate on-the-job learning with the content of in-school technical training. As well, the unit explains the significant role of Red Seal Interprovincial certification in the trade. It also provides an orientation to the Interprovincial exam's unique features. **Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a 'Pass/Fail' grade will be recorded for the unit in its entirety.**

Objectives and Content:	Percent of Unit Mark (%)
<p>1. Describe the significance, format and general content of Interprovincial (Red Seal) Examinations for the trade of Heavy Duty Equipment Technician.</p> <ul style="list-style-type: none"> a. Scope and aims of Red Seal system; value of certifications b. Obligations of candidates for IP certification <ul style="list-style-type: none"> • Relevance of IP Examinations to current, accepted trade practices; industry-based national validation of test items • Supplemental Policy (retesting) • Confidentiality of examination content c. Multiple-choice format (four-option) item format, Red Seal/Apprenticeship Manitoba standards for acceptable test items d. Government materials relevant to the IP Examinations for apprentice Heavy Duty Equipment Technicians <ul style="list-style-type: none"> • National Occupational Analysis (NOA); prescribed cope of the skills and knowledge which comprise the trade • NOA "Pie-chart" and its relationship to content distribution of IP Examination items • Manitoba Apprentice Portfolio, especially the NOA-based Practical Training Record Book and task/sub-task checklists as these relate to apprentice's coverage of the skills and knowledge of his/her trade 	n/a
<p>2. Identify resources, strategies and other considerations for maximizing successful completion of written exams.</p> <ul style="list-style-type: none"> a. Personal preparedness <ul style="list-style-type: none"> • Rest • Nutrition • Personal study regimen • Prior experience in test situations (e.g. Unit Tests) b. Self-assessment, consultation and personal study plan 	n/a

- Self-assessment of individual strengths/weaknesses in trade related skills and knowledge
- Approved textbooks
- Study groups

3. Review program content of all technical training units (from Levels 1 to 4 inclusive) n/a

Heavy Duty Equipment Technician

Unit: G2 Hydraulic Components, Testing & Diagnosis

Level: Four

Duration: 53 hours

Theory: 15 hours

Practical: 38 hours

Overview:

This unit of instruction will provide the Heavy Duty Equipment Technician apprentice with the working knowledge required to understand hydraulic theory, as well as work on hydraulic components and systems.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Describe the operation of open centre hydraulic systems.	10%
a. Operating principles	
b. Testing procedures	
2. Describe the operation of closed centre hydraulic systems.	10%
a. Operating principles	
b. Testing procedures	
3. Describe the operation and testing of hydro-drive systems.	10%
a. Operating principles	
b. Testing procedures	
4. Describe manufacturers' maintenance procedures for hydraulic system components.	10%
a. Removal and replacement of filters, strainers and conditioners	
b. Interpretation of circuit schematics and symbols	
5. Diagnose common faults in hydraulic systems.	20%
a. Gathering of information	
• Manufacturers' service information	
b. Discussion with operator	
c. Visual inspection	
d. Operational testing	
• Warming of hydraulic oil	
• Measurement of actuator cycle times	
• Check of hydraulic stall speed	
• Testing of hydraulic cylinders	
e. Use of hydraulic test equipment	

- Pressure testing
 - Neutral pressure
 - Working pressure
 - Maximum system pressure
- Flow testing
 - Actuator test for leakage
 - Flow meter testing
- f. Analysis of information
- g. Conclusion of analyzed information

6. Describe the cause of hydraulic system component failure 20%

- a. Diagnosis of failure – failure analysis
- b. Contamination failures
 - Built-in
 - Ingressed
 - Internally generated
- c. Overpressure failures
- d. Cavitation failures
- e. Aeration
- f. Wear
 - Abrasion
 - Erosion
 - Adhesion

7. Describe procedures for removing and replacing hydraulic system components. 20%

- a. General safety precautions
- b. Importance of manufacturer's manual
- c. Hydraulic lines and fittings
 - Maximum pressure rating
 - Capacity
 - Line type
 - Steel pipe
 - Steel tubing
 - Hoses
- d. Replacement of major hydraulic components
 - Importance of cleanliness
 - Proper lifting techniques
 - Pump and motor coupling condition & alignment
 - Directional control valve replacement
 - Adjustment of system relief valve

Heavy Duty Equipment Technician

Unit: I5 Engine Electronic Reprogramming and Troubleshooting

Level: Four

Duration: 27 hours

Theory: 13 hours

Practical: 14 hours

Overview:

This unit of instruction provides the Heavy Duty Equipment Technician apprentice with a strong understanding of engine electronic programming / troubleshooting (including the rationale for changeable parameters). As well, the unit provides the working knowledge required to actually perform reprogramming and troubleshooting tasks.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define the rationale for modifying operational parameters.	20%
a. Customer requirements	
b. Customer-accessible vs. dealer/manufacturer parameters	
c. Liability and environmental issues	
2. Describe and perform the logistics of modifying end-user applications.	80%
a. Effect of modifications	
• Machine structure & integrity	
• Environment	
b. Additional results of modifications	
• Machine structure & integrity	
