

# Agricultural Equipment Technician Level 4

## Agricultural Equipment Technician

**Unit:** A7 NOA Review

**Level:** Four

**Duration:** 14 hours

Theory: 14 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 IP 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.**

<b>Objectives and Content:</b>	<b>Percent of Unit Mark (%)</b>
<p><b>1. Describe the significance, format and general content of Interprovincial (Red Seal) Examinations for the trade of Agricultural Equipment Technician.</b></p> <ul style="list-style-type: none"> <li>a. Scope and aims of Red Seal system; value of certifications</li> <li>b. Obligations of candidates for IP certification               <ul style="list-style-type: none"> <li>• Relevance of IP Examinations to current, accepted trade practices; industry-based national validation of test items</li> <li>• Supplemental Policy (retesting)</li> <li>• Confidentiality of examination content</li> </ul> </li> <li>c. Multiple-choice format (four-option) item format, Red Seal/Apprenticeship Manitoba standards for acceptable test items</li> <li>d. Government materials relevant to the IP Examinations for apprentice Agricultural Equipment Technicians               <ul style="list-style-type: none"> <li>• National Occupational Analysis (NOA); prescribed cope of the skills and knowledge which comprise the trade</li> <li>• NOA "Pie-chart" and its relationship to content distribution of IP Examination items</li> <li>• 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</li> </ul> </li> </ul>	n/a
<p><b>2. Review NOA.</b></p> <ul style="list-style-type: none"> <li>a. Tasks</li> <li>b. Sub-tasks</li> </ul>	n/a

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## **Agricultural Equipment Technician**

**Unit: E6 Hydrostatic Testing & Diagnosis**

**Level:** Four

**Duration:** 17 hours

Theory: 3 hours

Practical: 14 hours

### **Overview:**

This unit of instruction will provide the Agricultural Equipment Technician apprentice with a working knowledge required to understand and perform testing and diagnostic procedures on hydrostatic systems

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Describe and perform operations tests on hydrostatic systems.</b>	<b>90%</b>
a. Leakage tests	
b. Pressure tests	
c. Torque tests	
<b>2. Describe and perform tests on hydrostatic control systems.</b>	<b>10%</b>
a. System tests	
b. Adjustment of control systems	

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## Agricultural Equipment Technician

**Unit:** F3 Air Conditioning: Diagnostics & Testing

**Level:** Four

**Duration:** 35 hours

Theory: 7 hours

Practical: 28 hours

### Overview:

This unit of instruction provides the Agricultural Equipment Technician apprentice with a working knowledge of diagnosing problems in air conditioning systems, and performing the related testing procedures

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Define and explain terminology relating to repairing unitized bodies.</b>	<b>60%</b>
a. Testing	
b. Refrigerant identification	
c. Testing for refrigerant leaks	
d. Testing system operating pressures and control functions	
e. Observations during performance tests	
f. Observation of government regulations for testing	
g. System tests for low and high pressures using a manifold gauge set	
h. Testing overall system for leaks using recommended equipment and procedures	
<b>2. Repair air conditioning systems and components.</b>	<b>20%</b>
a. Removal and replacement	
• Compressors, evaporators, condensers and control devices	
b. Repair: Compressor, seals and clutches	
c. Compressor drive belt adjustment procedures	
d. Discharging, evacuating recovery, recycling and recharging	
e. Line and leakage repairs	
f. Service procedures	
g. Refrigeration systems service	
h. Retrofitting	
<b>3. Perform inspection, testing and diagnostic procedures on climate control systems.</b>	<b>20%</b>
a. System and component diagnosis with recommended repair	
b. Control system circuit operation (using appropriate test equipment)	

## **Agricultural Equipment Technician**

**Unit: H4 Hydraulic Testing & Diagnosis**

**Level: Four**

**Duration: 25 hours**

Theory: 4 hours

Practical: 21 hours

### **Overview:**

This unit of instruction provides the Agricultural Equipment Technician apprentice with a working knowledge required to test and diagnose hydraulic systems.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Describe the operation of a hydraulic system.</b>	<b>10%</b>
a. Operating principles	
b. Testing procedures	
<b>2. Describe the operation and testing of hydro-drive systems.</b>	<b>10%</b>
a. Operating principles	
b. Testing procedures	
<b>3. Diagnose common faults in hydraulic systems.</b>	<b>70%</b>
a. Gather 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	
• Flow testing	
-Actuator test for leakage	
-Flow meter testing	
f. Analysis of information	
g. Conclusions from analyzed information	
<b>4. Describe the cause of hydraulic system component failure.</b>	<b>10%</b>
a. Diagnosis of failure – failure analysis	
b. Contamination failures	

- c. Overpressure failures
- d. Cavitation failures
- e. Aeration
- f. Wear

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## Agricultural Equipment Technician

**Unit: I4 Electronic Control Management Systems & Diagnostic Tools**

**Level:** Four

**Duration:** 49 hours

Theory: 9 hours

Practical: 40 hours

### Overview:

This unit of instruction provides the Agricultural Equipment Technician apprentice with the working knowledge required to use diagnostic tools. The unit also provides the apprentice with a working knowledge required to diagnose and repair electronic control management systems as they apply to advanced fuel systems, precision farming and other system functions.

<b>Objectives and Content:</b>	<b><u>Percent of Unit Mark (%)</u></b>
<b>1. Review the components and operation of agricultural equipment controllers.</b>	<b>10%</b>
a. Input circuits	
b. Controllers and system data links	
c. Output circuits	
d. Feedback systems	
• Open vs. closed loop operation	
e. Adaptive learning	
<b>2. Describe diagnostic tool fundamentals and how to use them.</b>	<b>30%</b>
a. Principles of digital computers	
b. Overall purpose and concept of diagnostic tools	
c. Data Link Connectors (DLCs)	
d. Diagnostic tool usage	
e. Logical approach to diagnosis	
f. Diagnostic tools	
g. Specific tests	
<b>3. Describe electronic control management.</b>	<b>20%</b>
a. System types	
b. Functions	
c. Components and operation	
<b>4. Describe and perform diagnostic and repair procedures for electronic control management systems.</b>	<b>40%</b>

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