

Reference Materials: Note: This exam may contain some "accepted practice" type questions not found in the reference material

NFPA 1910: Standard for the Inspection, Maintenance, Refurbishment, Testing and Retirement of In-Service Emergency Vehicles and Marine Firefighting Vessels (**NFPA 1911 section**) 2024 edition (800) 344-3555 or www.nfpa.org

Allison Publications:

Mechanics Tips and Operators Manuals <https://allisontransmissionpublications.com/> Under Technical Publications- each publication is \$18.75 and available to order print book or members can order ebook

1000/2000 EVS Products

OM8471 -5th & 6th Gen Controls

MT7325EN - 5th & 6th Gen. Mech. Tips

3000/4000 EVS Products

MT4015EN - Mechanics Tips

MT7151EN - 5th & 6th Gen Mech Tips

OM8491 - 5th & 6th Gen Op Man

Shift Selector - n/c

SA7497EN - 5th & 6th Gen

Drivelines

TS2714EN - Driveline Troubleshooting Man.

Service Tips-available electronically for no charge <https://hub.allisontransmission.com/bulletins>

TI8807EN Rev BB Fluid/Filter Change Recommendation

TI8591EN Rev C Towing

TI8596EN Allison DOC® V2017.1.0

TI8952EN REV B Water & Ethylene Glycol

TI8989EN Allison DOC for 6th Gen Controls Release

LEARNING OBJECTIVES

1. Operating Principles: Understand basic operating principles of Allison On-Highway transmissions as found in emergency vehicles to include:

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| <ul style="list-style-type: none"> a. Hydraulic systems <ul style="list-style-type: none"> (1) Clutch applications (2) Clutch apply sequence b. Torque Converters <ul style="list-style-type: none"> (1) Components of a torque converter (2) Function of a torque converter (3) Lock up clutch operation c. Driving Tips <ul style="list-style-type: none"> (1) Downhill braking/using engine to slow the vehicle (2) Proper towing techniques (3) Coasting (4) Cold weather starts (5) Using hydraulic retarder (6) Rocking out (7) Normal PTO operation | <ul style="list-style-type: none"> d. Model Numbers <ul style="list-style-type: none"> (1) Location of number on transmission e. Water Pump Operations <ul style="list-style-type: none"> (1) Shift sequence f. External Component Identification <ul style="list-style-type: none"> (1) Shift selectors g. 3000/4000 series shift selector function <ul style="list-style-type: none"> (1) Oil life monitor (2) Prognostics enabled h. 3000/4000 series lockup mode i. 5th Gen Shift Inhibits |
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2. Preventive Maintenance Support: Understand preventive maintenance support of the Allison Transmission as found in emergency vehicles to include:

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| <ul style="list-style-type: none"> a. PTO Installation <ul style="list-style-type: none"> (1) Gaskets / sealing material (2) Sealing compounds b. Dipstick Calibrations & Fluid Levels <ul style="list-style-type: none"> (1) Fluid level checks (2) Hot check (3) Approved "TES" fluid types & compatibility (4) Filter and fluid change intervals/mixtures (5) Level check using shift selector (6) Sump screen (7) Dipstick Calibration (8) Electronic fluid check procedure (9) Filter recommendations (10) Oil filter change procedures (11) Oil life calculation (12) Fluid Importance | <ul style="list-style-type: none"> c. Identification of shift selector control <ul style="list-style-type: none"> (1) Identification (2) External linkage adjustments <ul style="list-style-type: none"> (a) Driveline and Output flanges (3) Phasing and angularity (4) Output flange and seal (5) Driveline inspections d. NFPA 1910 PM inspections e. NFPA 1910 Out-of-Service criteria f. NFPA 1910 service recommendations g. Periodic inspection and care <ul style="list-style-type: none"> (1) vehicle cooling system check (2) fluid leak repair (3) Unusual sounds (4) Exterior inspection h. Preparing vehicle for transmission installation <ul style="list-style-type: none"> (1) Torque converter i. 1000/2000 Transmission Removal |
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3. Troubleshooting Procedures: Understand basic troubleshooting procedures. Identify problems that can be corrected in chassis and those requiring outside assistance to include:

- a. Driveline
 - (1) Driveline test (coast)
 - (2) Power train test (road speed)
 - (3) Engine test (RPM)
- b. Shift complaints
 - (1) Diagnosis
 - (2) Pump mode
 - (3) Shift inhibits
- c. PTO installations/operation
 - (1) Backlash adjustments
 - (2) External identifications
 - (3) Pressure port locations
 - (4) Signal port locations
 - (5) PTO pressure installation
- d. Fluid checks
 - (1) Impact of aerated fluid
 - (2) Fluid levels
 - (3) Noise occurring
 - (4) Fluid leak diagnostics
 - (5) Contaminations
 - (6) Breather maintenance
 - (7) NFPA 1911 leakage classes
 - (8) High fluid temperature
- e. Diagnostic reference material
 - (1) Code descriptions
 - (2) Power and ground
 - (3) Opens, shorts, short to ground
 - (4) Understanding schematics
 - (5) Welding precautions
 - (6) Range selection/ shift inhibit
 - (7) Mode indicator LED
 - (8) Troubleshooting - "no codes present"
- f. Checks and Adjustments
 - (1) Road test

4. Electronic Controls: Basic understanding of Allison electronic controls to include:

- a. Electronic control systems
 - (1) Electronic software series
 - (2) Power and ground connections
 - (3) Continuity checks
 - (4) TPS adjustments
 - (5) VIM fused circuits
 - (6) Welding caution
 - (7) Identification of WTEC 2 controls
 - (8) Identification of WTEC 3 controls
 - (9) Identification of 4th generation controls
 - (10) Identification of MY 09 4th generation controls
 - (11) Prognostics
 - (a) Oil life
 - (b) Wrench icon
 - (c) Trans Health driving requirements
 - (12) Shifts/Convergence
 - (a) Unadaptive
 - (b) Adaptive
- b. 3000/4000 series trouble codes
 - (1) Number of stored trouble codes
 - (2) Checking logged diagnostic codes
 - (3) Main codes and sub codes
 - (4) "Check trans" light action
 - (a) Service Indicator
 - (5) Mobile radio installation locations (RFI)
 - (6) Intermittent Faults
 - (7) "Do Not Shift" light
 - (8) 4th & 5th generation codes
 - (9) 5th gen speed sensor codes
 - (10) Datalink
 - (11) 6th gen
 - (a) hardware level
 - (b) cybersecurity
- c. 1000/2000 series
 - (1) Accessing diagnostic trouble codes (DTC)
 - (2) "Check transmission" light action

5. Output Retarder: Understanding of Allison Transmissions output retarders to include:

- a. Components
 - (1) Accumulator/Air System
 - (2) Accumulator locations
 - (3) Retarder locations
- b. Retarder operating parameters
 - (1) Fluid temperature
 - (a) 5th Gen controls
 - (2) Activation signal
 - (3) Oil cooler
 - (4) Safety feature
 - (5) Fluid level

6. Reference Materials: Understanding Allison Transmission reference material to include:

- a. Understanding Allison Reference Material
 - (1) Owner assistance
 - (2) Stall test procedures
 - (3) Adjustment procedures for TPS and mechanical modulator
 - (4) Engine to transmission adaptation requirements
 - (5) Oil change intervals
 - (6) Speed sensors
 - (7) Allison website