

Reference Materials: Note: This exam may contain some "accepted practice" type questions not found in the reference material **NFPA 1911**, *Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus 2007* edition. National Fire Protection Association, Quincy, MA, (800) 344-3555 or www.nfpa.org

Allison Publications: The new EVS (Emergency Vehicle Series) lineup will include the 3000EVS and 4000EVS close ratio models and the 3500EVS and 4500EVS wide ratio models.

Mechanics tips booklets and Operators Manuals can be downloaded online for no charge at www.allisontransmission.com

Mechanics Tips Booklets:

HT700 #MT1366EN
HT700 Electronic # MT1958EN
1000/2000 4th gen #MT4007EN
3000/4000 4th gen #MT4015EN
3000/4000 WTEC III #MT3004EN
1000/2000 Pre 4th gen #MT3190EN
MD/HD/B WTEC III #MT2159EN

Operators Manuals:

Allison Shift Selector Operation #SA3360EN
3000/4000 EVS 4th gen #OM3656EN
1000/2000 EVS 4th gen #OM3761EN
AT/MT/HT #OM1334EN
MT(B), HT(B) CEC #OM1957EN
MD/HD WTEC III #OM2995EN
MD/HD WTEC II #OM2157EN

Preventive Maintenance Manuals:

AT/MT/HT #PM2572EN
1000/2000 4th gen In-chassis maint. #GN4008EN

Troubleshooting Manuals - optional

Driveline Troubleshooting #TS2714EN
MD/HD WTEC II #TS2470EN
3000/4000 WTEC III #TS2973EN
3000/4000 4th gen #TS3989EN
1000/2000 pre 4th gen #TS3192EN
1000/2000 4th gen #TS3977EN
AT/MT/HT Hydraulic controls #TS1838EN
CEC I Controls #TS2712EN
CEC splash-proof controls #TS1960EN
Principles of Operation Manuals - optional
3000/4000 WTEC III #PO2454EN
3000/4000 4th gen #PO4016EN
1000/2000 pre 4th gen #PO3065EN
1000/2000 4th gen #PO4009EN

Service Manuals - optional

MT600 #SM1317EN
HT700 Hydraulic #SM1270EN
HT700 Electronic #SM2004EN
3000 WTEC #SM2148EN
4000 WTEC #SM2457EN
3000 4th gen #SM4013EN
4000 4th gen #SM4014EN
1000/2000 pre 4th gen #SM2191EN
1000/2000 4th gen #SM4006EN
Downloadable at www.allisontransmission.com
Technician tips
Fluid and filter information
Service tool information
Technical publications
Warranty information
Transmission identification

Note: Allison "DOC" for PC-service tool has a digital full version of all series electronic troubleshooting manuals imbedded in the computer program.

LEARNING OBJECTIVES FOR THE F-6 EXAM

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

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| <p>a. Hydraulic systems</p> <ol style="list-style-type: none"> (1) Clutch applications (2) Rear governor operation (3) Clutch apply sequence <p>b. Torque Converters</p> <ol style="list-style-type: none"> (1) Components of a torque converter (2) Function of a torque converter (3) Lock up clutch operation <p>c. Driving Tips</p> <ol 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 | <p>d. Model Numbers</p> <ol style="list-style-type: none"> (1) Model number breakdown (2) Location of number on transmission <p>e. Water Pump Operations</p> <ol style="list-style-type: none"> (1) Shift sequence <p>f. External Component Identification</p> <ol style="list-style-type: none"> (1) Mechanical modulator (2) Shift selectors (3) Neutral safety switch <p>g. 3000/4000 series shift selector function</p> <p>h. 3000/4000 series lockup mode</p> |
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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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| <p>a. PTO Installation</p> <ol style="list-style-type: none"> (1) Gaskets / sealing material (2) Sealing compounds <p>b. Dipstick Calibrations & Fluid Levels</p> <ol style="list-style-type: none"> (1) Fluid level checks (2) Hot check (3) Fluid types (4) Filter and fluid change intervals (5) Level check using shift selector (6) Sump screen (7) Calibration (8) Electronic fluid check procedure (9) Filter recommendations (10) Oil filter change procedures <p>c. Identification of shift selector control</p> <ol style="list-style-type: none"> (1) Identification (2) External linkage adjustments (3) Manual selector shaft and retaining nut | <p>d. Driveline and Output flanges</p> <ol style="list-style-type: none"> (1) Retaining nut reuse (2) Phasing and angularity (3) Output flange and seal (4) Removal and installation of output flange (5) Driveline inspections <p>e. NFPA 1911 PM inspections</p> <p>f. NFPA 1911 Out-of-Service criteria</p> <p>g. NFPA 1911 service recommendations</p> <p>h. Periodic inspection and care</p> <ol style="list-style-type: none"> (1) vehicle cooling system check (2) fluid leak repair (3) Unusual sounds (4) Exterior inspection <p>i. Preparing vehicle for transmission installation</p> |
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3. Troubleshooting Procedures: Understand basic troubleshooting procedures. Identify problems that can be corrected in chassis requiring seeking 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) Lock up pressure
- (3) Governor malfunction
- (4) Pump mode
- (5) Governor identification
- (6) Shift inhibits

c. PTO installations

- (1) Backlash adjustments
- (2) External identifications
- (3) Pressure port locations
- (4) Signal port locations
- (5) PTO operations

d. Fluid checks

- (1) Impact of aerated fluid
- (2) Fluid levels
- (3) Noise occurring
- (4) Fluid leak diagnostics
- (5) Contaminations
- (6) Breather
- (7) NFPA 1911 leakage classes
- (8) High fluid temperature

e. Stall Test

- (1) Purpose
- (2) Warning/caution

f. 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) Diagnostic code indicator
- (8) Troubleshooting - "no codes present"

g. 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) MT-HT voltage requirements
- (3) Power and ground connections
- (4) Status lights MT and HT
- (5) Continuity checks
- (6) "Do not shift" MT and HT
- (7) Status light reset procedure MT and HT
- (8) TPS adjustments
- (9) VIM fused circuits
- (10) Welding caution
- (11) Identification of WTEC 2 controls
- (12) Identification of WTEC 3 controls
- (13) Identification of 4th generation controls
- (14) Identification of MY 09 4th generation controls
- (15) Prognostics functionality for MY 09

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
- (5) Mobile radio installation locations (RFI)
- (6) Intermittent Faults
- (7) "Do Not Shift" light
- (8) 4th generation codes

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) MT and HT descriptions
- (2) Accumulator
- (3) Accumulator locations

b. Retarder operating parameters

- (1) Fluid temperature
- (2) Activation signal
- (3) Oil cooler
- (4) MT and HT retarder malfunction
- (5) Safety feature
- (6) Fluid level

6. Reference Materials: Understanding of 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) Reverse signal switch
- (8) Using www.allisontransmission.com
- (9) Obtaining technical assistance
- (10) Downloadable technical publications