

E-1 Design & Performance Standards and Preventive Maintenance of Ambulances

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

Ambulance Performance Standards, AMD 001-015, NTEA, AMD Division, 37400 Hills Tech Dr., Farmington Hills, MI 48331-3414 248-489-7090. Available for no charge at <http://www.ntea.com/WorkArea/showcontent.aspx?id=1346>

KKK-A-1822F **Federal Specification for the Star-of-Life Ambulance**, download for no charge at <http://www.ntea.com/WorkArea/showcontent.aspx?id=1352>

OSHA Publications: Online order form for OSHA Publications- <http://www.osha.gov/pls/publications/publication.html> or call 202-693-1999

#3084 *Chemical Hazard Communication*,

#3088 *How to Plan for Workplace Emergencies and Evacuations*

#3186 *Model Plans and Programs for the OSHA Bloodborne Pathogens and Hazard Communications Standard*..

Any general truck repair maintenance manual and any Material Safety Data Sheet

LEARNING OBJECTIVES FOR THE E-1 EXAM

1. Definitions or Terms

- a. Types of ambulances
- b. Gradeability
- c. Payload
- d. Ramp breakover
- e. KKK-A-1822/Ambulance
- f. Weight Distribution
- g. Approach & departure angle
- h. Radio frequency interference (R.F.I.)
- i. Battery chargers & invertors
- j. Rectifier
- k. KKK-A-1822/Scope
- l. Wattage(power)/amperage(current)
- m. Relay
- n. AMD Standards
- o. Curb weight
- p. Test criteria
- q. FMVSS (Federal Motor Vehicle Safety Standards)
- r. AMECA (Automotive Manufacturers' Equipment Compliance Agency)
- s. OSHA (Occupational Safety and Health Administration)
- t. AD (Additional Duty)

2. General Requirements

- a. Emergency lighting and mirrors
 - (1) Primary mode warning lights
 - (2) Secondary mode warning lights
 - (3) Warning light maximum average electrical load
 - (4) Check out lights
 - (5) Hand held spot light
 - (6) Emergency lighting flash rate
 - (7) Mirror size
 - (8) Proper emergency light configuration and types and interior lighting & mirrors
 - (9) Interior lighting requirements
- b. Proper operation of marker and turn signals
- c. Speed & acceleration
 - (1) Requirements
 - (2) Sustained speed
 - (3) Gradeability at speed
- d. Engine starting requirements
- e. Vehicle Physical Dimensions
 - (1) Maximum loading height
 - (2) Minimum angle for ramp breakover
 - (3) Minimum allowable departure angle
 - (4) Minimum angle of approach
 - (5) Ground clearance
- f. Vehicle weight rating and payload
 - (1) Payload calculations & axle loading
 - (2) Grille guard
 - (3) Tire load range
 - (4) Tire inflation pressure/balancing
 - (5) Two wheel drive and 4 wheel drive
 - (6) Spare tire and jack requirements
- g. Heating system requirements
- h. Air-Conditioning system
 - (1) Requirements
 - (2) Cab defroster performance
- i. Ventilation systems
- j. Radio Frequency (RF) grounding
 - (1) Radio frequency suppression for alternators
- k. Battery system and components
 - (1) Battery disconnect switch
 - (2) On board charge
 - (3) 12 volt DC electrical test
- l. Fuel capacity & range
- m. Door
 - (1) latch requirements
 - (2) Door open warning
 - (3) walk-through door removal
- n. 125 volt Ac and invertor
 - (1) Operations
 - (2) 125 VAC grounds
 - (3) 125 VAC GFCI
 - (4) 125 VAC outlets
- o. Noise level requirements
- p. Driveline
 - (1) Requirements
 - (2) Skid plate
- q. Cot retention
 - (1) Requirements
 - (2) Cot mounting clearances
- r. 12 volt electrical and load manager
 - (1) 12 volt SAE standard
 - (2) Minimum wire size requirement
 - (3) Service loop
 - (4) Generating system
 - (5) Wiring installation/antenna
 - (6) "Schottky" Diode
 - (7) Load Manager
 - (8) 12 volt interruptible chassis & module power
 - (9) Master module disconnect device
 - (10) 12 volt circuit breaker panel
 - (11) Voltmeter
- s. Suction Aspirator System
 - (1) Suction aspirator primary
- t. Seats and seat belt requirements
- u. Oxygen system
 - (1) Oxygen system hose
 - (2) Oxygen pressure reducing & regulating valve
 - (3) Oxygen system leak testing
 - (4) Oxygen tank retention
- v. Grab handle requirement
- w. Fording requirements
- x. Siren PA
- y. Mirrors, wipers, & safety equipment
 - (1) Requirements
 - (2) Fire Extinguishers

- (3) Head cushions
- z. Engine exhaust and cooling system
 - (1) Air pollution control
- aa. Engine protection requirements
- bb. Star of Life
 - (1) Certification requirements
 - (2) Performance tests
 - (3) General body & cab construction
 - (4) Safety labels
- cc. Engine high idle speed control automatic
- dd. Back up alarm

3. Safety/FMVSS & OSHA

- a. Bloodborne pathogens
- b. Right-to-Know Law
- c. Material Safety Data SHEET (MSDS)
- d. Biohazard warning
- e. Seat belts, seats, and air bags
- f. Brake dust
- g. Hazardous materials
- h. Oxygen system safety/restraints
- i. AMD Step and bumper requirements and safety
- j. Sharps storage area
- k. Electrical system hazards
- l. NHTSA (National Highway Traffic Safety Administration)
- m. Personal safety requirements
- n. Gasoline engines
- o. Fire extinguisher servicing

4. Principles of Maintenance and Troubleshooting

4.1 Troubleshooting and Repair

- a. Heating and Air-Conditioning systems
- b. Tire wear characteristics
 - (1) such as tire & wheel balance
- c. Steps of Troubleshooting
- d. Brakes
 - (1) Troubleshooting Procedure
 - (2) Uneven lining wear
 - (3) Brake fade
 - (4) Brake pull condition
 - (5) Heat checking
- e. Starting system
 - (1) Troubleshooting procedure
 - (2) Proper engine starting procedures
 - (3) Glow plug systems
- f. Cooling system
 - (1) Troubleshooting
 - (2) Overheat conditions
- g. Battery boost procedure
- h. Diesel engines
 - (1) Recommended idling procedure and shutdown
 - (2) Oil dilution/contamination
- i. Electrical systems
 - (1) Purpose of a rectifier
 - (2) Purpose of a battery conditioner
 - (3) Problems caused by use of incorrect bulbs
 - (4) Faulty ground

4.2 Preventive Maintenance

- a. Tire rotation
- b. Oil types (rating)
- c. Oil change intervals
- d. Differential service
- e. Preventive maintenance steps
- f. Tire/wheel inspection
 - (1) Wheel lug torque
 - (2) Wheel balance

- j. Radio antennas
 - (1) Ground plane
- k. Suspension & steering systems
 - (1) Vehicle loading effects
 - (2) Ride height
 - (3) Spring Mounts & U bolts
 - (4) Air suspension
- l. Exhaust systems
- m. Diesel fuel injection systems
 - (1) Leaking/dripping injectors
 - (2) Cold start injection timing advance
- n. Vehicle charging systems
 - (1) Torsional vibrations
 - (2) Radio interference
 - (3) Alternators
- o. Towing procedures
- p. Welding precautions
- q. Batteries
- r. Transmission troubleshooting
- s. Wheel bearings
 - (1) Proper adjustment
 - (2) Wheel seats
- t. Alternators
 - (1) Radio interference
- u. Air filters/restriction indicators

- g. Drive line
 - (1) Inspection and service
 - (2) Effects of drive line angles
- h. Brakes inspection and service
- i. Accessory drive belts
- j. Transmission fluid level and condition
- k. Complete visual inspection