

## E-1 Design & Performance Standards 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 **Ambulance Performance Standards**, AMD 001-025, 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**, (change notices 1 & 2) 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*,

#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)
- u. FSAM
- v. EMSP

#### 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) Emergency lighting flash rate
  - (6) Proper emergency light configuration and types and interior lighting & mirrors
  - (7) 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) Tire load range
  - (3) Tire inflation pressure/balancing
  - (4) Spare tire and jack requirements
- g. Heating system requirements
- h. Air-Conditioning system
  - (1) Requirements
  - (2) Cab defroster performance
- i. Ventilation systems
  - (1) carbon monoxide testing
- j. Radio Frequency (RF) grounding
  - (1) Radio frequency suppression for alternators
- k. Battery system and components
  - (1) Battery conditioner
  - (2) 12 volt DC electrical test
- l. Fuel capacity & range
- m. Door
  - (1) Latch requirements
  - (2) Door open warning
  - (3) Walk-through door
- n. 125 volt Ac and inverter
  - (1) Operations
  - (2) 125 VAC grounds
  - (3) 125 VAC GFCI
  - (4) 125 VAC outlets
- o. Noise level requirements
- p. Driveline
  - (1) Requirements
- q. Cot retention & Patient Seating
  - (1) Requirements
  - (2) Cot mounting clearances
  - (3) Occupant Head Clearance
- r. 12 volt electrical
  - (1) Service loop
  - (2) Generating system
  - (3) Wiring installation/antenna
  - (4) "Schottky" Diode
  - (5) 12 volt interruptible chassis & module power
  - (6) Master module disconnect device
  - (7) 12 volt circuit breaker panel
  - (8) Voltmeter
  - (9) Low voltage warning device
- 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
  - (5) Amount of oxygen
- v. Grab handle requirement
- w. Fording requirements
- x. Siren PA and Speakers
  - (1) Performance tests
  - (2) Speaker mounting
- 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
  - (1) Decibel rating
- ee. Rear step
  - (1) testing requirements
    - ee..1.1 weight
    - ee..1.2 deflection test
  - (2) Independent rear step
  - (3) Combination rear step
- ff. Warranty

### 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 ai 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. Gasolines engines
- o. Fire extinguisher servicing

### 4. Principles of 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
  - 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