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Standard Guide for Training Emergency Medical Services Ambulance Operations¹

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1. Scope

1.1 This guide provides minimum training standards for Emergency Medical Services (EMS) Ambulance Operators including legal aspects, operator qualifications and testing, history of EMS vehicle operations, vehicle types/equipment, safety, physical forces, mechanics, pre-run, operations, post-run, and special circumstances.

1.2 This guide promotes the safe and efficient delivery of the ambulance, equipment, crew, passengers, and patients, during all phases of the delivery of EMS involving the ambulance, at all times exercising the highest degree of care for the safety of the public. This guide may be applied to the driving of other EMS vehicles that do not necessarily provide patient transportation.

1.3 This guide shall be used as the basis for all programs relevant to the training of the emergency medical services operators.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

¹ This guide is under the jurisdiction of ASTM Committee F30 on Emergency Medical Services and is the direct responsibility of Subcommittee F30.02 on Personnel, Training and Education.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

F1177 Terminology Relating to Emergency Medical Services (Withdrawn 2018)³

F1230 Specification for Minimum Performance Requirements for Emergency Medical Service (Ems) Ground Vehicles (Withdrawn 1997)³

F1258 Practice for Emergency Medical Dispatch

F1517 Guide for Scope of Performance of Emergency Medical Services Ambulance Operators

2.2 Federal Specification:⁴

KKK 1822C Federal Specification for the Star-of-Life Ambulance

3. Terminology

3.1 For definitions of other emergency medical terms, see Terminology F1177:

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *ambulance operations*—the efficient delivery of the ambulance, equipment, crew, passengers, and patients during all phases of the delivery of EMS involving the ambulance, at all times exercising the highest degree of care for the safety of the public.

3.2.2 *ambulance service provider*—as outlined in this guide, a person, company, corporation, or political entity responsible for operation, maintenance, or policy-making, or all three, regarding emergency medical vehicle operations.

3.2.3 *bona fide occupational qualification (BFOQ)*—the skills and knowledge relevant to the performance of a specific task.

3.2.4 *departure check*—the visual check of the vehicle and surrounding area, ensuring that equipment and supplies have been retrieved and properly stored and that all compartment doors are secured.

3.2.5 *egress check*—the visual check of the vehicle and surrounding area prior to operating the ambulance.

3.2.6 *emergency mode*—as defined by individual state statutes that refer to emergency vehicles, equipment, and operations.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401.

TABLE 1 Emergency Medical Services Ambulance Maintenance Guidelines for Checklist Completion

| Runs per week (per vehicle) | Full check | Quick check |
|-----------------------------|------------|-------------|
| 0 to 1 | every 96 h | every 24 h |
| 2 to 3 | every 72 h | every 24 h |
| 4 to 7 | every 48 h | every 24 h |
| 8 to 50 | every 24 h | every 12 h |
| 50+ | every 24 h | every 8 h |

3.2.7 *full check*—a comprehensive and systematic evaluation of the ambulance at specified intervals, including documentation of the inspection, deficiencies, and their corrective actions.

3.2.8 *operator*—a person who operates or assists with the operation of an ambulance.

3.2.9 *driver*—the individual responsible for operating the ambulance in a safe and efficient manner, exercising the highest degree of care.

3.2.10 *technician*—the individual responsible for patient care.

3.2.11 *post-run*—the managed return of the ambulance and operators to optimal pre-run readiness.

3.2.12 *pre-run*—all aspects of assuring response readiness.

3.2.13 *quick check*—an abbreviated version of the full check, focusing on the major operational functions of the vehicle.

3.2.14 *reaction time*—from the time the operator identifies the hazard until the appropriate action is taken.

3.2.15 *response mode management*—the response mode of the ambulance shall be determined by dispatch protocols based on (dispatch) determinants as approved by the medical director. The determinants shall be consistent with Practice **F1258**.

3.2.16 *stopping distance*—the distance the vehicle travels until it comes to a stop after the brakes are applied.

4. Significance and Use

4.1 This guide provides minimum training guidelines for safe and efficient ambulance operations.

4.2 Ambulance providers and educators should follow this guide for the development of educational and training programs.

4.3 This guide is intended to promote safe and efficient ambulance operations and to reduce morbidity, mortality, and property loss associated with ambulance operations.

4.4 This guide is intended to assist those who are responsible for the development and implementation of policies and procedures for ambulance operations.

4.5 Topics or concepts listed in this guide are intended to serve as an outline of materials to be covered in the training of ambulance operators.

5. Legal Aspects

5.1 The training of the ambulance operator shall include all federal and state laws and local ordinances including the

provider's policies governing emergency medical vehicle operations. The operator/driver shall have a clear understanding of the impact of those laws on the operation of the vehicle.

5.1.1 *Constitutional Law*—Laws derived from the U.S. Constitution governing the patient's right before, during, and after transport.

5.1.2 *Statutory Law*—Laws derived from legislative acts.

5.1.3 *Ordinances*—Laws or guidelines enacted by a governing municipal body or its agent.

5.1.4 *Rules and Regulations*—Guidelines enacted by an agency that have the force of law that are intended to provide greater specificity about statutory laws.

5.1.5 *Case Law*—Judicial interpretation of statutory law, rules, or regulations that have been decided in a court of law.

5.1.6 *Consolidated Omnibus Reconciliation Act (COBRA)/Omnibus Reconciliation Act (OBRA) Laws*.

5.2 Integration of state laws and local ordinances with company policies/procedures. Company policy should incorporate into guidelines the principles of applicable state laws, local ordinances, rules, and regulations.

5.3 *Highest Degree of Care (Law of Due Regard)*—A general principle, frequented in case law, that holds the ambulance operator responsible for his actions regardless of perceived exemptions from traffic laws governing the emergency vehicle operator.

5.4 *Legal Issues:*

5.4.1 *Negligence*—Any action that violates a standard of practice or care related to ambulance operation.

5.4.2 *Abandonment*—Terminating care or transportation prior to being relieved by other qualified health care providers. Once a patient provider relationship is established, it must continue until responsibility for the patient is assumed by a provider of equal or higher qualifications.

5.4.3 *Emergency Medical Dispatch*—An organized system of emergency medical dispatching principles intended to provide guidelines for ambulance operations as delineated in Practice **F1258**.

5.4.4 *Multiple Responding Units:*

5.4.4.1 *Vehicle Separation*—The operator shall be trained to maintain a minimum 300-ft buffer zone between the ambulance and other emergency vehicles on the same route of travel.

(1) Weather, traffic conditions, or other factors may cause the operator to increase the length of the buffer zone for the safe operation of the ambulance.

5.4.4.2 *Escorts*—The operator shall be informed of the hazards involved in the use of emergency vehicle escorts and be trained to avoid such practices.

(1) The operator shall be trained to discourage private, non-emergency vehicles from following the ambulance during transport.

5.4.5 *Interacting with Public Safety Agencies:*

5.4.5.1 *Command*—Ambulance operations shall be consistent with operational guides delineated in Incident Command System (ICS).

5.4.5.2 *Communication*—Ambulance communication systems should allow the ambulance operator to communicate with other public safety agencies.

5.4.5.3 *Coordination*—Cooperative guidelines shall be established with other public safety agencies in order to provide a safe and adequate response.

5.4.6 *Motor Vehicle Accidents Involving the Ambulance:*

5.4.6.1 *Reporting*—The ambulance operator shall receive instructions regarding reporting guidelines for ambulance related accidents/incidents in accordance with state laws, local ordinances, rules or regulations, and organizational policies and procedures.

5.4.7 *Mitigation/Documentation Mechanical Failures:*

5.4.7.1 *Scheduled Maintenance*—The ambulance operator shall be trained in the importance of a scheduled maintenance program.

5.4.7.2 *Vehicle and Equipment Inspections*—The ambulance operator shall be trained in the fundamentals and application of vehicle and equipment inspections.

5.4.7.3 *Reporting of Deficiencies*—The ambulance operator shall understand the importance of inspecting the ambulance and equipment, and shall be familiar with the reporting procedures utilized by the provider. The ambulance operator shall be familiar with provider policies in regard to major deficiencies which have an affect on the serviceability of the vehicle.

6. Operator Qualifications to Drive

6.1 The training of the ambulance operator shall include the components of evaluation techniques which may be utilized in screening the operator candidate:

6.1.1 *Medical Fitness to Drive*—Operators shall be subject to periodic medical evaluations as determined by the ambulance service provider. The purpose of the physical examination is to determine whether the operator has the physical ability to adequately perform his or her duty as an operator of emergency vehicles. (See Guide **F1517**.)

6.2 *Authorization:*

6.2.1 The authorization of ambulance operators must be based on Bona Fide Occupational Qualification (BFOQ) pursuant to the task of ambulance operations.

6.2.2 Authorization shall be based upon cognitive evaluation of the operator regarding laws, guidelines, and policies relating to ambulance operation during emergency and non-emergency modes.

6.3 A periodic review of the operator's state motor vehicle record for the previous three years with specific attention to traffic convictions concerning:

6.3.1 Speed.

6.3.2 Careless and imprudent driving.

6.3.3 Driving under the influence of alcohol or other mind-altering substances.

6.3.4 Moving violations/other violations.

6.3.5 Suspension of driver's license.

6.4 A review of the operator's motor vehicle accidents for the previous three years.

6.5 The operator shall possess a valid motor vehicle license, and any other certification required by state or local laws or regulations.

6.6 The operator's qualifications and continuing education shall be reviewed annually.

7. Operator Testing

7.1 The training of the ambulance operator shall include the components of evaluation techniques which may be utilized in screening the operator candidate:

7.1.1 Psychological testing.

7.1.2 Physical agility.

7.1.3 Driving evaluation.

7.1.4 Cognitive evaluation.

8. History of EMS Vehicle Operation

8.1 The training of the emergency vehicle operator shall include the history of EMS vehicle operation:

8.1.1 Evolution of ambulance driving from high-force pursuit driving to low G-force driving techniques.

8.1.2 Changes in vehicle design and dynamics.

8.1.3 Evolution of governmental regulation.

8.1.3.1 Specification **F1230**, Minimum Performance Requirements for Emergency Medical Service Ground Vehicles.

8.1.3.2 Federal standards KKK 1822C: "A" through current specifications.

9. Vehicular Types and Equipment

9.1 The training of the ambulance operator shall include the different ambulance classifications (Types I, II, III, and specialty response vehicles) including maneuverability, handling, weight distribution, payload allowance, and GVWR.

10. Loss Control and Safety Issues in the Operations of Ambulances

10.1 *Preventive Maintenance*—The ambulance operator shall be trained in basic techniques, documentation, and rationale for preventive maintenance.

10.1.1 The operator should follow provider policies or manufacturer's suggested maintenance schedule, or both, for the ambulance.

10.2 *Operator Fatigue*—The ambulance operator shall be trained in the recognition of the adverse affects of excessive fatigue. The provider/operator shall be familiar with methods and policies used to prevent fatigue-related operator dysfunction.

10.3 *Interactive Crew Roles*—Operators shall receive instruction on the importance of interactive roles utilized to lessen risk exposure, such as the ground guide/driver relationship in backing the ambulance or the driver/technician relationship in approaching controlled intersections.

10.4 *Unsafe Thought Patterns*—The operator shall be made aware of the importance of concentration on the driving task at hand and should be aware of dangerous practices such as allowing the nature of the emergency to affect driving techniques or other high-risk behavior.

10.5 *Resolving Conflict*—The driver shall be trained to make determinations regarding the safe operation of the ambulance. The operator shall be aware that the senior medical

crew member shall make determinations regarding transportation mode and patient destination.

10.6 *Patient Handling Equipment*—The ambulance operator shall be trained in the proper operation, storage, and handling of all equipment used in the treatment and transport of the patient.

10.7 *OSHA Guidelines*—The operator/provider shall be trained in the utilization of OSHA guidelines pertaining to factors affecting the operation of the emergency vehicle.

10.8 *Hazmat Guidelines*—The operator shall be trained to adhere to the regulations and guidelines regarding ambulance operations near a hazardous material environment.

11. Vehicular Dynamics

11.1 *Low-Force Driving*—The operator shall be trained to utilize low-force driving techniques in order to minimize fatigue, stress, mechanical degradation, and other risks associated with operation of the ambulance.

11.2 *Physical Forces*—The operator shall be trained regarding the impact of physical forces on the ambulance during various operational maneuvers.

11.3 *Weight Transfer*—The operator shall be trained regarding effects that weight transfer may have on the operation of the ambulance.

11.4 *Gross Vehicle Weight Rating (GVWR)*—The operator shall be trained regarding the payload capacity of the emergency vehicle, including the adverse effects of overloading.

11.5 *Adverse Driving Conditions*—The operator shall be trained to modify driving techniques to compensate for adverse driving conditions.

12. Major Mechanical Systems

12.1 The operator shall be trained in the basic concepts related to the proper use and function of the following systems:

- 12.1.1 Electrical.
- 12.1.2 Cooling.
- 12.1.3 Braking.
- 12.1.4 Engine/drive train.
- 12.1.5 Fuel.
- 12.1.6 Chassis.
- 12.1.7 Environmental control.
- 12.1.8 Ancillary support equipment.
- 12.1.9 Auxillary power.

13. Pre-Run

13.1 *Geography*—The operator shall be trained regarding the geographical area served by the provider, as well as any locating systems used by the provider.

13.2 *Environmental Factors*—The operator shall be trained to be constantly aware of changing environmental factors and how they may affect ambulance operations.

13.3 *Traffic Patterns*—The operator shall be trained to be aware of traffic flow patterns and road conditions and how they may affect ambulance operations.

13.4 *Quick Check*—The operator shall be trained to perform the quick check as outlined below:

- 13.4.1 Visually checking for fluid leakage.
- 13.4.2 Conducting vehicle warm-up.
- 13.4.3 Checking fluid levels.
- 13.4.4 Condition of belts.
- 13.4.5 Condition of tires.
- 13.4.6 Proper function of emergency lighting.
- 13.4.7 Proper function of lighting system.
- 13.4.8 Proper function of audible warning devices.
- 13.4.9 Vehicle cleanliness.
- 13.4.10 Proper function of communications equipment.
- 13.4.11 Proper function of warning lights.

13.5 *Full Check*—The operator shall be trained to perform the full check as outlined below:

- 13.5.1 Body or glass damage.
- 13.5.2 Proper function of emergency lights.
- 13.5.3 Proper function of operating lights.
- 13.5.4 Condition of tires.
- 13.5.5 Loose or missing lugs on wheels.
- 13.5.6 Proper function and seal of compartment doors.
- 13.5.7 Fluid levels.
- 13.5.8 Fluid leakage.
- 13.5.9 Condition of hoses.
- 13.5.10 Condition of belts.
- 13.5.11 Cleanliness of exterior and interior.
- 13.5.12 Proper function of restraint devices.
- 13.5.13 Proper function of gages.
- 13.5.14 Proper function of windshield wipers/washer.
- 13.5.15 Proper function of communications equipment.
- 13.5.16 Proper adjustment of mirrors.
- 13.5.17 Proper function of audible warning devices.
- 13.5.18 Proper adjustment of seats.
- 13.5.19 Proper adjustment of steering wheel.
- 13.5.20 Condition of fire extinguishers.
- 13.5.21 Proper function of environmental control systems.
- 13.5.22 Inventory of equipment and supplies.
- 13.5.23 Level and alignment of chassis.
- 13.5.24 Proper function of warning indicator lights.

13.6 *Documentation of Problems*—The operator shall be trained in techniques of proper documentation and reporting of problems found through the quick or full check.

14. Operations

14.1 The operator shall be trained in all aspects of emergency vehicle operations as they pertain to the overall prehospital care within the response area. The following subjects shall be included in the training curriculum:

14.1.1 *Response Mode Management:*

14.1.1.1 The operator shall be informed of studies that indicate that 40 % of all ambulance calls are requested as an emergency and of those 20 % are true medical emergencies with less than 5 % being life-threatening.

14.1.1.2 The two response modes are:

(1) *Emergency*—Exercising emergency driving privileges and the utilization of all emergency warning lights and audible warning systems.

(2) *Non-emergency*—Operating the vehicle under all traffic laws which govern the general operation of motor vehicles.

14.2 *Route Selection*—The operator shall, on the basis of known information and pre-run planning, determine the best route of travel.

14.2.1 If the location is unknown, the operator should communicate with the dispatcher or the on-scene personnel for the most direct route of travel.

14.3 *Egress Check*—Before beginning the response, the operator shall conduct a brief egress check consisting of the following:

14.3.1 Vehicle/compartment doors are closed and securely latched.

14.3.2 Vehicle hood is closed and securely latched.

14.3.3 Vehicle shore line is disconnected.

14.3.4 All equipment is secured.

14.3.5 Facility egress door is fully opened.

14.3.6 Patient stretcher is in place and secured.

14.4 *Operational Check:*

14.4.1 Utilize vehicle safety restraints.

14.4.2 Adjust the operator's seat.

14.4.3 Adjust the operator's mirrors.

14.4.4 Switch on the battery(-ies) (according to manufacturer's specifications).

14.4.5 Start the engine.

14.4.6 Review all gauges.

14.4.7 Adjust environmental controls.

14.4.8 Activate communication system and contact dispatch.

14.4.9 Adjust tilt wheel (if applicable).

14.4.10 Activate headlights.

14.4.11 Activate the emergency warning lights (if applicable).

14.4.12 Activate the audible emergency warning devices (if applicable).

14.4.13 Partially open the driver's side window.

14.4.14 Evaluate brake pedal resistance.

14.4.15 Place the vehicle transmission in gear.

14.4.16 Activate the turn signal (if applicable).

14.5 *Operator (Crew) Roles:*

14.5.1 Operate the ambulance in a safe and efficient manner, exercising the highest degree of care.

14.5.2 Utilize eye sweep.

14.5.3 *Safe Following Distances:*

14.5.3.1 Maintain a 3 to 4-s following distance between the ambulance and the vehicle directly in front.

14.5.3.2 Operator reaction time will affect safe following distances.

14.5.3.3 Adverse and environmental conditions will affect safe following distances.

14.5.4 Operate the vehicle at a speed that is safe for conditions.

14.5.4.1 Under emergency response conditions, the speed shall not exceed that which is safe for road or environmental conditions. In no case shall the speed exceed 10 mph over the posted speed limit.

14.5.5 Operate all warning devices as appropriate for traffic conditions.

14.5.6 *Ambulance Communication System:*

14.5.6.1 Whenever possible, radio transmissions should be made by another crew member. This will enable the operator to devote full attention to the operation of the vehicle.

14.5.6.2 Whenever possible, the public address system operation should be done by another crew member. This will enable the operator to devote full attention to the operation of the vehicle.

14.5.6.3 The operator and crew members shall be trained in the proper operation of the vehicle communication system. In addition to general knowledge of the communication systems and protocols, the operator must have a total understanding of the emergency services' communication system within their service area.

14.5.6.4 The operator shall also be responsible for the understanding of all communications equipment used within the EMS and provider's system.

14.5.7 Adhere to the agency's policies and procedures in the driving of the emergency vehicle.

14.5.8 Utilize a smooth and constant rate of acceleration.

14.5.9 Use engine compression in slowing the emergency vehicle.

14.5.10 Utilize smooth braking and cornering of the emergency vehicle.

14.5.11 *Ensure Adequate Stopping Distance:*

14.5.11.1 When stopped in traffic, the operator must be able to see five feet of road, in addition to the bumper and both rear tires of the vehicle in front.

14.5.11.2 Exceeding the payload capacity will adversely affect the normal stopping distances.

14.5.11.3 Antilock braking systems (ABS) may affect stopping distances.

14.5.11.4 Operator reaction time will affect stopping distance.

14.5.11.5 Adverse and environmental conditions will affect the stopping distance.

14.5.12 Utilize the 10-s lane change procedure.

14.5.13 Maintain a rear and side space cushion.

14.5.14 *Backing with a Ground Guide:*

14.5.14.1 The operator is responsible for safely backing the emergency vehicle.

14.5.14.2 The operator shall never begin to back the vehicle before it has come to a complete stop.

14.5.14.3 A ground guide should be in place, 8 to 10 ft behind the left rear of the emergency vehicle.

14.5.14.4 Eye, hand, and voice communications must be established between the operator and the ground guide.

14.5.15 Shall be trained in special transport procedures, (neonate, psychiatric, and so forth).

14.5.15.1 Knowledge and use of specialized transport equipment.

14.5.16 Utilize special safety precautions with multiple personnel in the patient compartment.

14.5.16.1 Safety restraints.

14.5.16.2 Overloading.

14.5.16.3 Additional medical personnel.