



Standard Guide for Training of Personnel Operating in Mountainous Terrain (Mountain Endorsement)¹

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1. Scope

1.1 This guide establishes the minimum training, including general and field knowledge, skills, and abilities, for search and rescue personnel who conduct operations in mountainous terrain.

1.2 A Mountain Endorsement is intended only for those individuals capable of operating in the difficult conditions found in mountainous terrain, at altitudes that may have a negative impact on human physiology.

1.3 Specifically, Mountain Endorsed individuals may, under qualified supervision, perform their normal duties safely and effectively in mountainous terrain.

1.4 A Mountain Endorsement alone is not sufficient to indicate that an individual has the knowledge, skills, and/or abilities to perform any specific duties, including search and rescue operations, other than those defined within this guide.

1.5 This guide alone does not provide the minimum training requirements for performing operations in partially or fully collapsed structures, in- or on-water, in confined spaces, underground (such as in caves, mines, and tunnels), or in an alpine environment.

1.6 Type I-IV teams (as defined in F1993) which may utilize personnel trained to this guide are Kind A (wilderness), Kind B (urban), and Kind C (mountainous), Kind D (disaster/collapse), Kind E (inland water), Kind G (cave), Kind H (mine), Kind I (avalanche), Kind J (evidence/cadaver), Kind K (aircraft), and/or Kind L (unclassified).

1.7 Mountain Endorsed SAR personnel must work under qualified supervision, as deemed appropriate by the Authority Having Jurisdiction (AHJ).

1.8 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

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2. Referenced Documents

2.1 *ASTM Standards*:²

F1773 Terminology Relating to Climbing, Mountaineering, Search and Rescue Equipment and Practices

F1993 Classification System of Human Search and Rescue Resources

F2209 Guide for Training of Level I Land Search Team Member

F2752 Guide for Training for Level I Rope Rescue (R1) Rescuer Endorsement

2.2 *Other References*:

National Wildfire Coordinating Group (NWCG) publication PMS 304-2, "Fitness and Work Capacity"

"Mountaineering: The Freedom of the Hills," 8th ed.

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *alpine environment, n*—mountainous terrain, typically above tree line, where the ability to negotiate routes rated Class 2–5³ is required and where travel is further affected by any combination of altitude, extreme weather, extensive exposure to snow/ice obstacles, avalanche risk, and crevasses. In general, the alpine environment includes all mountainous terrain above 3,500 meters.

3.1.2 *alpine ice axe, n*—as defined by the UIAA (Union Internationale Des Associations D'Alpinisme), a Type B ice tool (the UIAA Basic type) with lower strength, for use in general circumstances, as on glacier for snow hiking, for ski mountaineering, etc., and which meets the requirements of UIAA 152 or CE EN 13089:2011.

3.1.3 *exposure, n*—the degree to which a person is exposed on a high, sheer, and unsheltered rock face.

3.1.4 *mountainous terrain, n*—a tract of land characterized by steep slopes and great variations in elevation, where the

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.

³ Route Class is defined by the Yosemite Decimal System: Ronald C. Eng and Julie Van Pelt, eds., *Mountaineering: The Freedom of the Hills*, 8th ed. (Seattle, WA: Mountaineers Books, 2010), p. 564.

ability to negotiate routes rated Class 2–4⁴, and occasionally Class 5⁵, is required, and where travel is limited by steep to vertical rock, steep forested or brush-covered terrain, talus slopes, boulder fields, and occasional snow and/or ice obstacles.

3.1.5 *qualified supervisor, n*—an individual with demonstrated knowledge or competence in a task, to whom the AHJ has granted the authority to observe and oversee an individual performing that task.

3.2 For definitions of other terms used in this guide, see Terminology F1773, Guides F1993, F2209, and F2752.

4. Significance and Use

4.1 This guide establishes a minimum standard for training of SAR personnel who conduct operations in mountainous terrain.

4.1.1 Mountain Endorsed individuals are required to have, at a minimum, the knowledge, skills, and abilities pertaining to safe movement individually, or as a member of a team, in mountainous terrain.

4.1.2 Every person who is identified as Mountain Endorsed shall meet the requirements of this guide.

4.1.3 Mountain Endorsed individuals shall be entitled to add the prefix “Mountain Endorsed”) to their current training levels.

4.2 This guide only establishes the minimum knowledge, skills, and abilities required for a person to operate in mountainous terrain as a part of a larger team. No other skills are included or implied.

4.3 Mountain Endorsement only indicates that personnel are qualified to operate safely and effectively in mountainous terrain in their normal area of operations.

4.3.1 A Mountain Endorsement alone does not indicate that an individual possesses adequate field skills and knowledge to make mission-critical decisions.

4.4 This guide is an outline of the topics required for training or evaluating a Mountain Endorsed individual, and may be used to assist in the development of a training document or program.

4.5 This guide can be used to evaluate a document to determine if its content includes the topics necessary for training individuals to operate in the mountainous environment. Likewise, this guide can be used to evaluate an existing training program to see if it meets the requirements in this guide.

4.6 The knowledge, skills, and abilities presented in the following sections are not in any particular order and do not represent a training sequence.

4.7 This guide does not stand alone and must be used with other ASTM Standards to identify the knowledge, skills, and abilities needed to conduct search and/or rescue in the mountainous environment.

4.8 Though this guide establishes only minimum standards, it does not imply that a Mountain Endorsed individual is a “trainee,” “probationary,” or other similarly termed member of an organization.

4.8.1 The AHJ is responsible for determining the requirements and qualifications for its team member ratings.

4.8.2 Nothing in this guide precludes an AHJ from adding additional requirements for its own members.

4.9 Mountain Endorsed individuals shall document training by completion of a position task book, or by field demonstration under qualified supervision. Where proficiency in a skill or ability must be demonstrated, unless stated otherwise it shall be demonstrated for initial qualification, and as often as required by the AHJ.

5. General Knowledge

5.1 The AHJ shall verify that a Mountain Endorsed person possesses both attitude and aptitude for working in mountainous terrain:

5.1.1 The individual must demonstrate the ability to function effectively in highly exposed locations, at altitude, in the conditions normal to that terrain;

5.1.2 The individual must demonstrate the ability to move safely and effectively anywhere in that terrain.

5.2 Mountain Endorsed individuals shall demonstrate knowledge of the following:

5.2.1 The differences between wilderness travel and mountain travel.

5.2.2 Human functional and survival needs in cold, windy, and wet environments, including:

5.2.2.1 Clothing (suitable for all four seasons);

5.2.2.2 Shelter, both emergency and extended stay;

5.2.2.3 Nutrition;

5.2.2.4 Hydration;

5.2.2.5 Hygiene;

5.2.2.6 Sanitation;

5.2.2.7 Individual and team safety issues specific to operating in mountainous terrain.

5.2.3 Medical conditions such as:

5.2.3.1 Acute Mountain Sickness (AMS);

5.2.3.2 High Altitude Pulmonary Edema (HAPE);

5.2.3.3 High Altitude Cerebral Edema (HACE);

5.2.3.4 Hypothermia;

5.2.3.5 Snow blindness;

5.2.3.6 Frostbite.

5.2.4 Risks and hazards specific to mountainous terrain, and methods for avoiding or mitigating them. Such risks and hazards include:

5.2.4.1 Personal fall;

5.2.4.2 Rock fall;

5.2.4.3 Severe and rapidly changing weather;

5.2.4.4 Avalanches if avalanches occur within the normal response area;

5.2.4.5 Rapidly rising water and flash floods.

5.3 If avalanches occur within the normal response area, or if required by the AHJ, Mountain Endorsed individuals shall

⁴ Eng and Van Pelt, eds., p. 564.

⁵ Eng and Van Pelt, eds., p. 564.

have, at a minimum, American Institute for Avalanche Research and Education (AIARE) Level 1, National Ski Patrol (NSP) Level 1, American Avalanche Association (AAA) Level 1, or equivalent avalanche safety and rescue training.

6. Skills and Abilities Specific to Mountainous Terrain

6.1 Mountain Endorsed individuals shall possess and carry sufficient Personal Protective Equipment (PPE) and gear to function effectively in mountainous terrain while maintaining personal safety. This PPE and gear shall include, at a minimum, the following:

- 6.1.1 Head protection (helmet);
- 6.1.2 Hand protection (gloves);
- 6.1.3 Eye protection (glasses/goggles/shield);
- 6.1.4 Sufficient clothing, appropriate to the environment and terrain;
- 6.1.5 Seat harness;
- 6.1.6 Slings/lanyards (for personal use);
- 6.1.7 Ascending equipment;
- 6.1.8 Connectors/carabiners;
- 6.1.9 Descending equipment;
- 6.1.10 Head lamp;
- 6.1.11 Alpine ice axe, if needed, appropriate for terrain in the normal area of operations;
- 6.1.12 Crampons, if needed, appropriate for terrain in the normal area of operations;
- 6.1.13 Avalanche transceiver, probe, and shovel, if avalanches occur within the normal area of operations, or if required by the AHJ.

6.2 Each piece of PPE or gear listed in 6.1 shall be certified under a national, or international, life safety standard, if one exists, from an organization such as UIAA, CEN, ASTM, CI, or NFPA.

6.3 Mountain Endorsed individuals shall be equipped to survive in the field for up to 48 hours.

6.4 Mountain Endorsed individuals shall demonstrate the ability to survive and function effectively as part of a self-sustained team, in mountainous terrain, for a minimum of 48 hours, under field supervision.

6.5 Mountain Endorsed individuals shall demonstrate proficiency in the following:

- 6.5.1 Performance of an overnight bivouac in mountainous terrain in winter in the normal area of operations;
- 6.5.2 Winter survival skills, including the ability to construct an improvised shelter;
- 6.5.3 Awareness of dangerous wildlife found in mountainous terrain;
- 6.5.4 Understanding of lightning detection, avoidance, and risk reduction techniques;
- 6.5.5 Safely traversing water hazards;
- 6.5.6 Basic swiftwater survival techniques;
- 6.5.7 Basic mountain weather prediction;
- 6.5.8 Traveling in mountainous terrain at night;
- 6.5.9 Traveling in mountainous terrain during adverse weather conditions;
- 6.5.10 Self-rescue techniques.

6.6 Mountain Endorsed individuals shall demonstrate annually the ability to safely lead an ascent of a Class 4⁶ route.

6.7 Mountain Endorsed individuals shall demonstrate an understanding of the concepts of mission-specific packing for individual operations, and for effective team operations and travel, in mountainous terrain. Examples of this concept include reducing pack loads, sharing gear, and sharing loads among team members.

6.8 Mountain Endorsed individuals shall demonstrate an understanding of helicopter operations in mountainous terrain, including:

- 6.8.1 Safety around helicopters on sloping ground;
- 6.8.2 Traveling in helicopters, including passenger entry, equipment stowage, passenger seating, and exit skills;
- 6.8.3 Passenger actions in the event of an emergency;
- 6.8.4 Completion of the Department of Interior, Office of Aviation Management (DOI OAM), Course A101–Aviation Safety, or equivalent training, is recommended;
- 6.8.5 Ability to identify a safe and functional helicopter Landing Zone (LZ) in mountainous terrain;
- 6.8.6 Mountain Endorsed individuals shall demonstrate annually that they meet the requirements of the Arduous Work Capacity fitness level defined in the National Wildfire Coordinating Group (NWCG) publication PMS 304-2, “Fitness and Work Capacity,” or equivalent.

6.9 Mountain Endorsed individuals shall demonstrate annually that they meet the requirements of a medical fitness standard selected by the AHJ.

7. Search and Rescue Skills and Abilities Specific to Mountainous Terrain

7.1 Mountain Endorsed individuals shall demonstrate the ability to perform a thorough risk assessment before engaging in SAR activities in mountainous terrain. This assessment shall take into consideration applicable and appropriate national, federal, state, tribal, provincial, and local safety standards.

7.2 Mountain Endorsed individuals shall demonstrate an understanding of how search operations are affected by mountainous terrain, including:

- 7.2.1 Lost person behavior;
- 7.2.2 Appropriate navigation tools and techniques;
- 7.2.3 Application of avalanche search techniques, if avalanches occur within the normal response area, or if required by the AHJ;
- 7.2.4 Personal Locator Beacon (PLB) detection and location;

7.3 Mountain Endorsed individuals shall demonstrate the following, including the use of PPE and rescue equipment specific to each:

- 7.3.1 Create anchors on steep and vertical terrain, from rock, snow, and/or ice, capable of supporting a rescue load, using natural and artificial protection (per AHJ requirements);
- 7.3.2 Set bolts in rock for anchors (per AHJ requirements);
- 7.3.3 Safely and effectively move an injured subject in the mountain environment;

⁶ Eng and Van Pelt, eds., p. 564.

7.3.4 Employ small rescue team tactics for operations in mountainous terrain.

8. Keywords

8.1 alpine; avalanche; helicopter; ice; mountain; rescue; rock; rope; search; snow

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