



Department of the Air Force
HQ AEDC (AFMC)
Arnold AFB, TN 37389

Safety, Health, and Environmental Standard

Title: AUDIBLE ALARMS AND VISUAL SIGNALS
Standard No.: B7
Effective Date: 07/29/2011

The provisions and requirements of this standard are mandatory for use by all personnel engaged in work tasks necessary to fulfill the AEDC mission. Please contact your safety, industrial health and/or environmental representative for clarification or questions regarding this standard.

Approved:

Contractor/ATA Director
Safety and Health Group

Air Force Functional Chief



Safety, Health, and Environmental Standard

AUDIBLE ALARMS AND VISUAL SIGNALS

1.0 INTRODUCTION/SCOPE/APPLICABILITY

This standard provides information to effect AEDC-wide consistency in the use of audible alarms and visual signals that communicate warning and designate the boundaries of controlled hazardous areas. Sirens and lights used on emergency vehicles and emergency management sirens are excluded from this standard.

Various siren tones used exclusively by Emergency Management to inform personnel base wide of severe weather conditions, hazardous material releases, exercises, attack warnings and all clear tones of the Giant Voice System are not addressed in this standard.

2.0 BASIC HAZARDS/HUMAN FACTORS

Audible and visual warning signals must be standardized and uncomplicated so that when the situation arises, employees can take prompt and proper action.

3.0 DEFINITIONS

Audible Alarm – A device that emits sounds (such as a siren, horn, buzzer or bell) used to alert employees of danger, provide emergency assistance to fellow employees, or protect property and equipment from possible damage.

Local Area — A component part of a larger building or test complex, such as a test cell or tunnel or the immediate surrounding work area.

Muting Plates — Circular plates drilled with holes and installed over the end of sirens to reduce noise levels.

Operating Contractor – A long-term contractor directly accountable to the Air Force for the AEDC mission; term used to identify the AEDC Operation, Maintenance, Information Management and Support Contractor.

Outside Contractor/Subcontractor – An organization employed by a contractor or the Air Force to do construction, maintenance, repair or other work at AEDC. There is no employment relationship, control or supervision of the subcontractor's employees by AEDC contractors. Also referred to as the construction contractor.

4.0 REQUIREMENTS/RESPONSIBILITIES

4.1 Requirements

4.1.1 Audible Alarms

- 4.1.1.1 Building alarms are to be used only as a signal for the immediate evacuation of entire buildings and local alarms such as horns are to be used only as a signal for the immediate evacuation of rooms or local areas.
- 4.1.1.2 Bells, buzzers or other electrical sounds (not sirens or horns) are to be used to signal operators or to identify an event or circumstance that requires action or attention, such as operation out of limits, system failure, power loss and other abnormal events or equipment operation (e.g., crane, hoist, or vehicle movements).
- 4.1.1.3 Man-in-Cell alarms are to be used when there is a possibility of a person's being trapped or disabled inside a test cell or tunnel. Where feasible, the alarm is to be connected so that it shuts down the operation. Where feasible, alarms in control rooms should be both visual and audible.
- 4.1.1.4 These alarms, where provided, must produce a distinct sound that is easily distinguished from other sounds.
- 4.1.1.5 These alarms must have an emergency auxiliary power source that automatically activates when the normal power source fails.
- 4.1.1.6 These alarms must be supplemented with flashing red lights and warnings at a manned control station.

4.1.2 Audible Alarm Conventions

- 4.1.2.1 Audible alarms must be located in the area to be evacuated, so that they draw attention to an event or the indication of an event.
- 4.1.2.2 Audible alarms must be labeled with signs that explain the meaning of the alarm. The action to be taken when the alarm sounds should be defined by adjacent signs, operator training or supportive written instructions.
- 4.1.2.3 Audible alarms must be engineered and installed to cover space requirements properly so that they can be heard over ambient noise levels. Low-volume sirens or larger sirens with muting plates may be used in low-noise areas.
- 4.1.2.4 When audible alarms are activated automatically, the reason for the alarm must be indicated by a flashing light and alarm at a manned control station so that required action can be taken, except when bells or buzzers are used on locally operated equipment and the reason for the alarm is obvious. The color of the flashing light must be consistent with the requirements for visual signals.
- 4.1.2.5 Manually operated sirens and horns should, when possible, be accompanied by an announcement to evacuate the designated area immediately.
- 4.1.2.6 If sirens and horns are used in areas where extreme or variable noise levels may make them ineffective, they must be supplemented with revolving lights.

4.1.3 Visual Signal Applications

- 4.1.3.1 **RED** — DANGER, evacuate immediately, keep out, keep away, hazardous operation in progress—do not enter, hazardous abnormal condition--needs immediate attention.
- 4.1.3.2 **AMBER** or **YELLOW** — CAUTION, impending hazardous condition. See AEDC Safety, Health, and Environmental Standard B3, Control of Hazardous Areas using Safety Signs, Markers, and Barricades.
- 4.1.3.3 **GREEN** — SAFE, conditions satisfactory. (In general, green lights should be used only in areas that are normally hazardous.)

4.1.4 Visual Signal Conventions

- 4.1.4.1 Visual signals that identify a controlled area, hazardous area or abnormal condition must be of flashing or rotating type.
- 4.1.4.2 Multiple visual signals are to be arranged as follows:
- 4.1.4.3 Vertical arrangement: Red above, amber or yellow in the center and green below.
- 4.1.4.4 Horizontal arrangement: Red to the left, amber or yellow in the center and green to the right.
- 4.1.4.5 Visual signals must be easily distinguishable from ambient light and, when used outside, must be visible in direct sunlight.
- 4.1.4.6 Where red lights are used and are not supplemented by audible alarms, they must be provided with two bulbs or dual fixtures so that one of the signals remains lighted if the other fails. When rope barricades are used, only one fixture is required.
- 4.1.4.7 At control stations, automatic flashing lights used to signal abnormal or hazardous situations must be supplemented with bells or buzzers to draw attention to the flashing lights.

4.2 Responsibilities

- 4.2.1 When alarm systems and warning devices must be disabled, the persons operating the protected system must be made aware of the disablement, and provisions must be made for reactivating the system or device.
- 4.2.2 Audible alarms and visual signals must be supplemented with signs or labels or other means of identification. See Safety, Health, and Environmental Standard B3
- 4.2.3 Electrical installations involving audible alarms and visual signals must conform to the National Electrical Code.

- 4.2.4 Audible alarms and visual signals must be tested periodically (i.e., monthly, quarterly or semiannually) to ensure proper operation. Fire protection and other alarms and signals whose failure could result in death, serious injury or major equipment damage must be tested at least once every six months according to internal procedures established by the contractor. Tests should be scheduled and coordinated to cause minimum confusion and be documented upon completion.

5.0 TRAINING

- 5.1 New or transferred employees must be trained initially and all employees trained periodically in the use, appearance and meaning of audible alarms and visual signals. This training is conducted via Computer Based Training (CBT), Toolbox Topics, and/or instructor lead classroom sessions as needed.
- 5.2 Operating Contractor Safety and Health will provide initial training for operating contractor employees. Periodic review and area-specific training in audible alarms and visual signals may be accomplished via toolbox session, group safety meeting or other means as determined by supervision.
- 5.3 Outside contractors are informed of AEDC audible alarms and visual signals via training video presented by Operating Contractor Safety and Health or AEDC/SE. Outside contractors will be briefed on area/local specific alarms and action plans by Master Work Permit Issuing Official, area manager/supervisor or their representative.

6.0 REFERENCES

AEDC Engineering Design Standard T-3 Engineering Design and Drafting Practices

AEDC Safety, Health, and Environmental Standard B, Control of Hazardous Areas using Safety Signs, Markers, and Barricades

National Electrical Code (NEC) Article 500