

The Forces of Montcalm and Wolfe, Inc.

Standing Rules of Operation
(2007)

Standing Rule 4 – Artillery Safety Rules

The intent of these rules is to insure the safe firing of artillery at reenactments. Omission of specific detail or individual interpretation of these rules will not be an excuse for unsafe activity! Common sense must prevail at all times. The safe firing of artillery requires the cooperation of all persons concerned.

SECTION 1: General Safety Regulations For All Artillery Pieces

- A. An inspection of each piece must be conducted prior to that piece participating at any event. This inspection shall be conducted by the Forces Provost or an assigned Deputy or the Unit's Safety Officer in addition to the event's safety officer if so required. See attached inspection form for details of the points to be examined.
- B. The U.S. government does not require a manufacturer's proof testing of their barrels, nor is there any requirement for a restored or relined barrel or for that matter, a so called "Homemade Piece". Therefore, in the interest of safety, all barrels are to have been proved, viewed, maintained, cleaned and oiled prior to any service. A proofing report, detailing procedures and data attesting to the guns ability to perform reliably, using the manufactures maximum recommended powder charges for properly constructed guns will be required! This report shall be signed, dated and kept with the gun at all times. The barrel will be marked indicating that this procedure has taken place. (The burden of proof testing lies upon the owner or owners and not the Forces of Montcalm and Wolfe Inc.)
- C. In the event that any unsafe conditions exist or develop, i.e. spectator or participant obstruction, equipment malfunction, etc., the gun captain has the authority to call out, "cease fire." A hand signal must be performed in conjunction with the call, allowing others the knowledge that a problem exists. The hand is held in front of the face, palm outward and moved rapidly in a waving motion. Upon this signal all operations concerning firing and movement of ammunition shall cease. This condition will remain in effect until the appropriate safety personnel (the gun captain, a gunnery commander if more than one gun is present, or Provost Officer) reviews and resolves the situation. Only then can the "all clear" be given and activities resumed.
- D. Participants on a gun crew must be eighteen year of age or older regardless of their position on that crew.
- E. There shall be no inappropriate behavior around the gun while firing procedures are in progress.
- F. Consumption of alcoholic beverages or illegal substances will not be permitted or tolerated. It is imperative that gun captains be responsible for their crews in this regard to insure the safe handling of these guns.
- G. General Safety Rules Document (Standing Rule 3) applies to these rules.
- H. No gun shall be wadded or fired with loose powder. All firing will be done with cartridges made of aluminum foil only.
- I. Use cannon grade or I Fg black powder for charges only.
- J. Each step of the firing procedure must be performed for every firing. A minimum of two (2) dry fire sequences will be performed before loading with ammunition. Each crew member shall be trained and

knowledgeable in all procedures and safety rules.

- K. Hearing and eye protection is strongly recommended for all crew members.
- L. When blank firing, no wadding will be used nor should it be necessary for a realistic report.
- M. The minimum time between rounds shall be three (3) minutes. Note: Some historical sites require longer time frames between rounds, Forces' Rules will then defer to the more stringent regulations or policies set by these sites.

SECTION 2: General Safety Rules for Cannons

- A. There shall be a fifty foot (50 ft.) danger zone visibly established (rope line, etc.) between spectators and the gun. No one is to be in front of the muzzle at any time. There will be no smoking within the danger zone. The ammunition box will be located twenty-five feet (25 ft.) behind the gun and attended at all times.
- B. No person will place any part of their body directly in front of the muzzle! Furthermore, any crew member operating the rammer, worm, or sponge shall not grasp these tools in any fashion where the thumb is used to encircle the handle of this equipment. Always keep the thumbs on the same side of toe handle as the fingers!
- C. No gun shall be fired at any person. A down range danger zone of one hundred fifty feet (150 ft.) must exist, allowing the minimum safe distance for any person to be in front of the Muzzle of a gun shooting blank cartridges only provided that the tube of the piece is elevated to at least twenty (20) degrees. This will include a radius of thirty (30) degrees to either side of the center line of bore. In the event that an artillery piece cannot elevate to the required twenty (20) degrees, then the down range measurement will be three hundred feet (300 ft.).

SECTION 3: Safety Rules During Battle Re-enactments For Cannons

- A. The cannon should always be considered loaded and dangerous.
- B. Gun crews must observe and insure that no person(s) are in the danger zone before firing. "Cease fire" must be called if this situation exists.
- C. Cannons must be positioned where they will not be firing directly into troop occupied areas. Any deviation must be coordinated and approved before the tactical begins.
- D. All non-firing personnel adjacent to guns shall be at least thirty feet (30 ft.) from either side and rear of the piece.
- E. While firing a piece in a tactical, the gun crew must display a red flag to indicate that a gun is "live". After the gun crew has fired their predetermined number of rounds and the gun is clear and secured, the crew will display a white flag to indicate that the piece is "safe". Signal flags are to be a minimum of two (2) feet square and flown at a minimum of eight (8) feet from the top edge of the flag to the ground.
- D. If a gun is to be overrun as part of a tactical demonstration, the gun crew will "die" in place. There will be no simulated combat for the possession of the gun. During the assault no one is to be directly in front of the muzzle. The gun crew shall not abandon their gun for any reason.

SECTION 4: Firing of Cannons

- A. Preparation for firing.
 - 1. The firing site must be -inspected to insure that it is capable of establishing the fifty foot (50 ft.) danger zone around the gun.
 - 2. Direction of fire must be selected to insure that no participant or spectator will encroach upon the down range danger zone required for the gun. When possible this zone should be clearly marked.

3. The gun must be on a stable base, roll must be limited, and in such a way that it cannot tip over.
4. Cannons set in a row shall have muzzles in line and parallel at least thirty feet (30 ft.) apart from each other.

B. Firing Procedure For Cannons

1. ... "Clean Vent"... /... "Appretez le Cannon"
Cleaning the vent is the first step in the loading-firing sequence. This is to insure that the vent is free of any debris or remnants from a previous firing. An appropriately sized bronze wire brush on a suitable (non-sparking) rod or the priming pick may be used. This instrument is to be run into the vent twice during the procedure.
2. ... "Stop the Vent"... I..." Appretez le Cannon"
The vent is to be tightly sealed using thumb pressure during the entire cleaning and loading sequence. A gloved hand with thumb stall attached shall be used. No air should escape from the vent during the entire loading procedure.
3. ... "Search"... (worm the bore) /... "Sandez"... -
The tube will be searched each time before firing. The worm will be rotated and withdrawn three (3) times to pick up any cartridge remnants and to loosen any powder residue. The worm should fit closely to insure cleaning of debris. Under no circumstances is the gun to be loaded if debris is in the tube!
4. ... "Sponge"... I... "Ecouvilliez"... -
The tube will be wiped out with a wet (not sopping) sponge. The tight fitting sponge head is dipped into the sponge bucket and the excess water is wrung out by rolling or shaking the sponge near the ground. The sponge will be inserted and pushed to the bottom of the bore; when contact is made it shall be rotated at least Woe before being completely withdrawn. The sponge should be inspected after each swab to insure any debris clinging to it can be removed before sponge is re-inserted into the tube. This procedure shall be repeated Wee more but the sponge need not be re-immersed in water. It is imperative during this procedure that any smoldering residue from a fired cartridge or any debris missed by the worm be extinguished or removed at this time. Furthermore, a tight seal shall be maintained on the vent so that any indication of a fracture may be spotted or heard. For this reason it is advised that after the last round is fired, the gun should be sponged while hot to insure that a crack has not developed.
5. Repeat 3.B.3 and 3.B.4.
6. ... "Handle Cartridge".-J..."Prenez la Cartouche"... -
The designated gunner shall remove a single (1) cartridge from the ammunition chest and places it in his leather pass box. He shall insure that the lid of the chest is closed before advancing. The flap of the pouch will remain closed until he reaches the appropriate gunner assigned to receive the Cartridge. At this time he will remove the cartridge from the pouch and with both hands transfer it to that person, twisted end first.
7. ... "Place Cartridge".../..."Meftez la Cartouche dans le Cannon"
The cartridge shall be placed in the tube with the twisted end towards the muzzle. It is imperative that as little of the hand and no part of the body be exposed to the muzzle while insertion is taking place. The opposite hand should be placed on the top of the gun barrel to ground against static electricity.
8. ... "Ram Cartridge".../..."Bourez"
The cartridge rammed down the tube with sufficient force to seat it against the back of the bore. It is required that all rammer's be smoothly tapered to allow a hand to open quickly should a premature ignition occur. It is also strongly recommended that a shepherd's crook rammer be used to insure that no part of the body is exposed to the plane of the muzzle. The rammer shall be marked to indicate the amount of shaft protruding from the muzzle when the charge is fully seated. The rammer shall be grasped underhanded (palm up) with one hand, thumb to the side. Then, with one continuous stroke, seat the cartridge. Do not pound.
9. ... "Pierce Cartridge".../..."Percez"... -
The cartridge is picked through the vent with the priming wire (non-sparking) held by the shaft between gloved fingers.
10. ... "Prime".../..."Armorcez"
Priming powder is poured into the vent with a small amount allowed to remain on top of the vent.

Priming cartridges or priming quills are preferred. Priming horns may not be used to directly prime the gun. A small powder measure must be used. The gun captain will raise his hand once the gun has been primed and shall keep it aloft until the command to fire is given. This should signal participants and spectators that there is a primed and loaded gun on the range. If for any reason the gun captain must lower his arm, another member of the crew shall maintain the signal.

11. ...”Fire”.../...”Fue”...

The priming powder or priming quills are ignited with a linstock which is long enough to allow the cannoneer to stand outside the wheels. Fuse firing is not to be used.

SECTION 5: Handling Of Misfires For Cannons

- A. If the primer ignites but the gun fails to fire, the gun captain shall call out "misfire" loud enough to be heard by the gun crew and by those at the perimeter of the danger zone. The gunner will remove his glove and check the temperature of the tube.
- B. Start watch. Wait ten (10) minutes. The wait will be extended to fifteen (15) minutes if the temperature of the tube is still warm to the touch.
- C. After ten (10) minutes have elapsed, the cartridge shall be pierced again, the vent primed and the gun fired following the normal procedures.
- D. If the second attempt does not result in a successful firing, the cartridge will be unloaded. Water shall be used to douse the cartridge through the vent and the muzzle. After waiting the minimum period of ten (10) minutes to insure that no sparks remain, the assistant gunner shall then raise the cascabel and the gun captain will use the worm to remove the cartridge. The gunner then catches the cartridge and disposes of it.

SECTION 6: General Information/Equipment For Cannons

- A. All equipment must meet serviceability standards. Antique guns or guns with sand cored bores should not be fired. There may be exceptions to this rule such as an antique gun or a gun with a sand cored bore which has a new liner and has been test fired may be serviceable, but these must be approved on an individual basis. X-ray or other examinations of the tube may be required to insure safety.
- B. The Provost officer or designated safety officer shall insure that no gun will be fired at an event until an inspection determines that the minimum mandatory equipment is present and serviceable.
- C. Equipment will not be misused, i.e. ramming with a sponge or using the staff of the worm for a hand spike.

SECTION 7: Minimum Equipment Requirements for Canons

- A. Manpower.
No gun will be fired with a crew of less than three (3) persons. Included in this ruling shall be mortars and small marriage "grasshopper" type guns. An exception would be a small stationary gun on a tripod or post which may have a minimum of two (2) persons to operate. Though only one (1) person may be necessary to operate these small guns, it is imperative that a second person oversee that proper safety procedures are being used.

NOTE: So-called wall guns (large bore muskets with flintlock mechanisms) on tripods are not considered cannons.

- B. Ammunition Chest.
This chest must be in good condition with a self-closing lid restricted to opening at no greater than a 60° angle. It must be capable of holding ammunition only (no lighters, matches, used slow match, flashlights or batteries). Chest must have a lock, and be kept away from sparks, cigarettes, moisture and flying objects. Construction must be of non-sparking materials, i.e. wood, brass, bronze (no iron or steel fixtures).
- C. Leather Pass Box.
Used for carrying cartridges from ammunition chest to cannon. Constructed of sturdy leather with shoulder strap and flap.

- D. Gloves.
Minimum of three (3) pairs of heavy gauntlet leather gloves are required. Gloves must be worn by each crew member who will handle ammunition and powder, or who are exposed to the muzzle of the cannon.
NOTE: A thumb stall is not a substitute for a glove.
- E. Water Bucket.
A serviceable bucket large enough for the sponge to be completely immersed in water.
- F. Sponge.
A cloth-covered cylinder on a staff capable of sealing the bore when wet. It must be capable of forcing water out of the vent when rammed home. Any substitute that does not meet these criteria will not be permitted.
- G. Worm.
An iron or steel worm of single or double tine. It shall be at least two-thirds the diameter of the bore. For small bore cannons (inch to inch and a half) a screw-type worm (often made by cutting and filing a stout spring) may be used.
- H. Rammer.
A wooden cylinder 7/8-the diameter of the bore, with a handle. Rammers shall be tapered or trumpeted with no lands or shoulders over its entire length to insure that the hand opens in the event of a premature discharge. Shepherd's crook rammers are strongly recommended.
- I. Vent Pick or Priming Wire.
A serviceable wire of a non-sparking material, 1/8" to 3/16" diameter, pointed on one end with a handle or ring on the other end.
- J. Linstock.
A metal or wooden device used to securely hold the slow match. The linstock must be long enough (approximately 2 or more feet to permit the cannoneer to stand outside the wheels) to insure the safe firing of the cannon.
- K. Slow Match.
A 100% cotton cord soaked in potassium nitrate solution, then dried. Do not use butane lighters or other pressurized devices to light slow match around artillery.
NOTE: A test burn should be conducted to ensure that an adequate coal is formed.
- L. Tube.
Iron, steel, brass or bronze is suitable. It must be free from cracks, deep pitting or rust striations. There can be no evidence of spalling in the bore. The touch-hole must be smaller than 1/4 inch. Trunnions must be present and serviceable. There can be no cracking about the cascabel. Cast iron guns alone have low ductile properties. All tubes of iron must be lined with a high pressure seamless or drawn over mandrel (D.O.M.) steel tubing liner with breech plug. Wall thickness of liner must be engineered according to bore size and appropriate pressure rating. Breech plug may be threaded and pinned or 100% (A.S.M.E. certified) welded if materials are weldable and retain their strength, both require expert installation by competent manufacturers. Length of breech plug will be equal to the diameter of the bore. -
NOTE: Some materials cannot be welded unless they are properly heat treated. All tubes having a touch hole greater than 1/4 inch shall have a touch hole liner installed by a competent manufacturer to repair them to a serviceable condition. Steel guns must be capable of withstanding high pressures and will be made of materials certified as such. Sand cored bores should not be fired. (see general information rule 6-A).

- M. Carriage.
The carriage must be sturdy enough to permit the safe firing of the gun.
- N. Signal Flags.
There must be two signal flags; one red (live) and one white (safe). These flags must be a minimum of two (2) feet square and must be displayed at a minimum height of eight (8) feet from the top edge of the flag to the ground.
- O. Priming Devices.
1. Priming Cartridge. A paper cartridge containing 120 grains more or less of 2FFg or 3FFFg black powder to prime gun.
 2. Priming Quill. A sealed paper tube (drinking straw) filled with, -,FFFfG black powder with a disk at the top used to prime the gun.

SECTION 8: Other Equipment.

- A. Watch.
A stop watch or pocket watch (a second hand is optional) shall be part of the equipment.
- B. Muzzle and Touch-hole Cover.
A leather or wooden plug to placed and secured in or over the muzzle and touch-hole when gun is not in use. This is to prevent any tampering or unwanted debris from entering the bore at events.
- C. First Aid Kit.
This should include items capable of handling, trauma and injuries.
- D. Flashlight.
To inspect bore prior to usage at events. Extra bulb and batteries should be carried.
- E. Hand Spikes.
Regardless of style, these must be sturdy enough to move the gun without breaking or endangering crew or spectators.
- F. Drag Ropes.
Ropes used to maneuver the gun over rough terrain. This should be of 3/4 inch diameter with an iron or steel hook on one end.
- G. Subscriptions.
One member of gun crew should subscribe to Artilleryman Magazine to keep abreast of recent developments in regards to artillery safety.
- H. Extra bucket of water.
A second bucket of water will be provided at the gun sight to be used in the event of grass fires started by burning embers or as an added safety feature on board in the event that an emergency should occur.

SECTION 9: Ammunition for Canons.

- A. Maximum Powder Charges for Properly Constructed Guns.
1. Powder charges for properly constructed guns shall not exceed the manufacturers recommended loads.
 2. Powder charges shall be made of appropriate recommended powder amounts wrapped in a triple (3) layer of heavy duty aluminum foil With end twisted closed.

NOTE: Smaller bore sizes may require less layers of aluminum foil to ignite with proficiency.

SECTION 10: General Safety Rules for Mortars

- A. There shall be a fifty foot (50 ft.) danger zone visibly established (rope line, etc.) between spectators and the gun. No one is to be in front of the muzzle at any time. There will be no smoking within the danger zone. The ammunition box will be located twenty-five feet (25 ft.) behind the gun and attended at all times.
- B. No gun shall be fired at any person. "Cease fire" must be called if this situation exists. A down range danger zone of one hundred fifty feet (150 ft.) must exist, allowing the minimum safe distance for any person to be in front of the Muzzle of a gun shooting blank cartridges. This will include a radius of thirty (30) degrees to either side of the bore.

SECTION 11: Safety Rules During Battle Re-enactments for Mortars

- A. The mortar should always be considered loaded and dangerous
- B. Powder Charges : Powder charges shall be kept in individual containers which are then contained in a securely constructed ammunition box located 20 feet behind the mortar. (The hinged side of the lid shall be positioned closest to the mortar so that the open side does not face the mortar).
- C. Reloading & Firing Interval : Mortars shall not be reloaded with powder until the cleaning cycle has been completed and no mortar shall fire until 3 minutes have elapsed since last discharge. This regulation is intended to slow down the rate of fire so that all steps of the cleaning and reloading process are kept at a safe and regulated pace.
- D. Angle of Fire : Mortars shall be fired at an angle between 45 and 60 degrees only.
- E. While firing a piece in a tactical, the artillery crew must display a red flag to indicate that a gun is "live". After the artillery crew has fired their predetermined number of rounds and the gun is clear and secured, the crew will display a white flag to indicate that the piece is "safe". Signal flags are to be a minimum of two (2) feet square and flown at a minimum of eight (8) feet from the top edge of the flag to the ground.
- F. If a mortar is to be overrun as part of a tactical demonstration, the crew will "die" in place. There will be no simulated combat for the possession of the gun. During the assault no one is to be directly in front of the muzzle. The gun crew shall not abandon their gun for any reason.

SECTION 12: Firing Procedures for Light Siege Mortars (Less than 5 inches)

- A. Crew Members & Duties: A crew shall consist of a minimum of 2 gunners
- B. Preparing to Fire: No.1 Gunner cleans the vent with the priming wire and then with the vent brush. If mortar is on a platform the platform is then swept.
- C. No.1 Gunner: Tends vent.
 - Brushes Chamber
 - Wet sponges Chamber
 - Brushes Chamber
 - Dry sponges Chamber
 - Wet Sponge Bore
 - Dry Sponge Bore
- D. On the command "HANDLE CARTRIDGE", given by No. 1 Gunner, the No. 2 gunner opens the ammunition chest and takes out one powder charge in its individual container, places the charge in the pass box. No. 2 gunner carries forward the cartridge and gives it to the No.1 Gunner.

- E. The No. 1 gunner (wearing gloves) after verifying the chamber and vent have been cleared, he pours the powder charge into the chamber.
- F. The No. 1 gunner returns the powder container to No. 2 gunner.
- G. The No. 1 gunner gives the command "MAKE READY TO GIVE FIRE" after he places a quill in the vent. He stands up and backs away from mortar. The No. 2 gunner picks up the linstock and prepares to give fire.
- H. When the command of "FIRE" (after a full 3 minutes have elapsed since the last discharge) is issued the No. 2 gunner touches off the mortar.
- I. The No. 1 gunner inspects the chamber and bore, if necessary, then begins the cleaning process.
- J. If an additional gunner is available the No. 3 gunner serves at the ammunition chest.
- K. The No. 2 gunner will assist the No. 1 gunner in the cleaning and loading procedures. The handing of tools, implements and such other related items.

SECTION 13: Firing Procedures for Heavy Siege Mortars (Over 5 inches)

- A. Crew Members & Duties: A crew shall consist of a minimum of 3 gunners
- B. No. 1 Gunner sponges the chamber, then wipes it with a wiper which is placed on a stake behind him.
- C. No. 1 Gunner then cleans the vent with the priming wire and then with the vent brush. If mortar is on a platform the platform is then swept.
- D. On the command "Load", given by the officer, the No. 2 gunner opens the ammunition chest and takes out one powder charge in its individual container, places the charge in the pass box and carries forward to the gunnery officer.
- E. The gunnery officer (wearing gloves and sleeve) after verifying the chamber and vent have been cleared, pours the powder charge into the chamber.
- F. The gunnery officer returns the powder container to No. 2 gunner.
- G. When the gunnery officer gives the command ready the No. 1 gunner places a quill in the vent. When the command of fire (after a full five minutes have elapsed since the last discharge) is issued the No. 1 gunner touches off the mortar.
- H. The gunnery officer inspects the chamber and bore, scrapes if necessary, then directs the No. 1 gunner to begin the cleaning process.
- I. If an additional gunner is available the No. 4 gunner serves at the ammunition chest

SECTION 14: Handling of Misfires for Mortars

- A. If the primer ignites but the mortar fails to fire, the gun captain shall call out "misfire" loud enough to be heard by the gun crew and by those at the perimeter of the danger zone. The gunner will remove his glove and check the temperature of the tube.
- B. Start watch. Wait ten (10) minutes. The wait will be extended to fifteen (15) minutes if the temperature of the tube is still warm to the touch.

- C. After ten (10) minutes have elapsed, the vent is re-primed and the mortar fired following the normal procedures.
- D. If the second attempt does not result in a successful firing, the cartridge will be unloaded. Water shall be used to douse the powder through the vent and the muzzle. After waiting the minimum period of ten (10) minutes to insure that no sparks remain, the mortar is emptied.

SECTION 15: General Information/Equipment For Mortars

- A. All equipment must meet serviceability standards. Antique mortars or mortars with sand cored bores should not be fired. There may be exceptions to this rule such as an antique gun or a gun with a sand cored bore which has a new liner and has been test fired may be serviceable, but these must be approved on an individual basis. X-ray or other examinations of the tube may be required to insure safety.
- B. The Provost officer or designated safety officer shall insure that no gun will be fired at an event until an inspection determines that the minimum mandatory equipment is present and serviceable.

SECTION 16: Minimum Equipment Requirements for Light Siege Mortars (Less than 5 inches)

- A. A mortar bed or carriage: The carriage must be sturdy enough to permit the safe firing of the gun
- B. A deflector for the vent : *Either attached to the bed or capable of being firmly set in or on the ground behind the mortar so as to prevent primers, primer remnants, or hot gases from traveling more than two feet from the mortar.*
- C. Sponge bucket with water: A serviceable bucket large enough for the sponge to be completely immersed in water.
- D. Sponge, wet, for chamber: A cloth-covered cylinder on a staff capable of sealing the bore when wet. It must be capable of forcing water out of the vent when rammed home. Any substitute that does not meet these criteria will not be permitted .
- E. Sponge, dry, for chamber : A cloth-covered cylinder on a staff capable of drying excess water from the bore and chamber.
- F. Brush, for chamber : used to brush and remove debris from tube and chamber.
- G. Vent brush: a small diameter brush that allows for the cleaning of debris from the vent.
- H. Vent pick: A serviceable wire of a non-sparking material, 1/8" to 3/16" diameter, pointed on one end with a handle or ring on the other end.
- I. Gimlet: a piece of steel of a semi-cylindrical form, hollow on one side, having a cross handle at one end and a worm or screw at the other.
- J. Leather gloves, welders type: Minimum of three (3) pairs of heavy gauntlet leather gloves are required. Gloves must be worn by each crew member who will handle ammunition and powder, or who are exposed to the muzzle of the mortar. Please note that the finger stall is not a substitute for a glove.
- K. Finger stall for vent: A heavy leather sheath for protecting the finger while forming a seal over the vent during the loading process. It must be large enough to fit over the finger of a glove.
- L. Leather priming box: Used for holding priming cartridges or priming quills. Constructed of sturdy leather with flap.
- M. A broom (if a platform is used)

- N. Priming Devices.
1. Priming Cartridge. A paper cartridge containing 120 grains more or less of 2FFg or 3FFFg black powder to prime gun.
 2. Priming Quill. A sealed paper tube (drinking straw) filled with, -, .FFFFG black powder with a disk at the top used to prime the gun.
- O. Linstock: A metal or wooden device used to securely hold the slow match.
- P. Slow Match: A 100% cotton cord soaked in potassium nitrate solution, then dried. Do not use butane lighters or other pressurized devices to light slow match around artillery. NOTE: A test bum should be conducted to ensure that an adequate coal is formed.
- Q. Individual charge containers: Leather or cardboard tubes that hold individual charges which a carried from ammunition chest in Gunner's Pass Box to gunner.
- R. Gunners pass box : Used for carrying cartridges from ammunition chest to cannon. Constructed of sturdy leather with shoulder strap and flap.
- S. Ammunition chest with lock : This chest must be in good condition with a self-closing lid restricted to opening at no greater than a 600 angle. It must be capable of holding ammunition only (no lighters, matches, used slow match, flashlights or batteries). Chest must have a lock, and be kept away from sparks, cigarettes, moisture and flying objects. Construction must be of non-sparking materials, i.e. wood, brass, bronze (no iron or steel fixtures).
- T. Pocket watch or stop watch: A stopwatch or pocket watch (a second hand is optional) shall be part of the equipment.
- U. Signal Flags: There must be two signal flags; one red (live) and one white (safe). These flags must be a minimum of two (2) feet square and must be displayed at a minimum height of eight (8) feet from the top edge of the flag to the ground.
- V. Strongly Recommended : Safety Glasses for gunnery officer and ear plugs for whole crew

SECTION 17 : Minimum Equipment Requirements for Heavy Siege Mortars (Over 5 inches)

- A. A mortar bed or carriage: The carriage must be sturdy enough to permit the safe firing of the gun
- B. A deflector for the vent : *Either attached to the bed or capable of being firmly set in or on the ground behind the mortar so as to prevent primers, primer remnants, or hot gases from traveling more than two feet from the mortar.*
- C. Sponge bucket with water: A serviceable bucket large enough for the sponge to be completely immersed in water.
- D. Sponge, wet, for chamber: A cloth-covered cylinder on a staff capable of sealing the bore when wet. It must be capable of forcing water out of the vent when rammed home. Any substitute that does not meet these criteria will not be permitted .
- E. Sponge, dry, for chamber : A cloth-covered cylinder on a staff capable of drying excess water from the bore and chamber.
- F. Bore wiper: To wipe all debris from bore of mortar
- G. A short stake to hold the wiper: Stake to prevent wiper from having debris from the ground get down the bore of the mortar.

- H. Bore scraper: To scrape the bore of the mortar.
- I. A large spoon: For accessing chamber at the rear of the mortar.
- J. Leather arm sleeve (welders): To be worn by the gunner who will handle ammunition and powder and who is exposed to the muzzle of the mortar.
- K. Brush, for chamber : used to brush and remove debris from tube and chamber.
- L. Vent brush: a small diameter brush that allows for the cleaning of debris from the vent.
- M. Vent pick: A serviceable wire of a non-sparking material, 1/8" to 3/16" diameter, pointed on one end with a handle or ring on the other end.
- N. Gimlet: a piece of steel of a semi-cylindrical form, hollow on one side, having a cross handle at one end and a worm or screw at the other.
- O. Leather gloves, welders type: Minimum of three (3) pairs of heavy gauntlet leather gloves are required. Gloves must be worn by each crew member who will handle ammunition and powder, or who are exposed to the muzzle of the mortar. Please note that the finger stall is not a substitute for a glove.
- P. Finger stall for vent: A heavy leather sheath for protecting the finger while forming a seal over the vent during the loading process. It must be large enough to fit over the finger of a glove.
- Q. Leather priming box: Used for holding priming cartridges or priming quills. Constructed of sturdy leather with flap.
- R. A broom (if a platform is used)
- S. Priming Devices:
 1. Priming Cartridge. A paper cartridge containing 120 grains more or less of 2FFg or 3FFFg black powder to prime gun.
 2. Priming Quill. A sealed paper tube (drinking straw) filled with, -,FFFg black powder with a disk at the top used to prime the gun.
- T. Linstock: A metal or wooden device used to securely hold the slow match.
- U. Slow Match: A 100% cotton cord soaked in potassium nitrate solution, then dried. Do not use butane lighters or other pressurized devices to light slow match around artillery. NOTE: A test burn should be conducted to ensure that an adequate coal is formed.
- V. Individual charge containers: Leather or cardboard tubes that hold individual charges which are carried from ammunition chest in Gunner's Pass Box to gunner.
- W. Gunners pass box : Used for carrying cartridges from ammunition chest to cannon. Constructed of sturdy leather with shoulder strap and flap.
- X. Ammunition chest with lock : This chest must be in good condition with a self-closing lid restricted to opening at no greater than a 60° angle. It must be capable of holding ammunition only (no lighters, matches, used slow match, flashlights or batteries). Chest must have a lock, and be kept away from sparks, cigarettes, moisture and flying objects. Construction must be of non-sparking materials, i.e. wood, brass, bronze (no iron or steel fixtures).
- Y. Pocket watch or stop watch: A stopwatch or pocket watch (a second hand is optional) shall be part of the equipment.

Z. Signal Flags: There must be two signal flags; one red (live) and one white (safe). These flags must be a minimum of two (2) feet square and must be displayed at a minimum height of eight (8) feet from the top edge of the flag to the ground.

W. Strongly Recommended : Safety Glasses for gunnery officer and ear plugs for whole crew

SECTION 18: Extra Equipment for Mortars

A. Muzzle and Touch-hole Cover: A leather or wooden plug to placed and secured in or over the muzzle and touch-hole when gun is not in use. This is to prevent any tampering or unwanted debris from entering the bore at events.

B. First Aid Kit: This should include items capable of handling, trauma and injuries.

C. Flashlight: To inspect bore prior to usage at events. Extra bulb and batteries should be carried.

D. Extra bucket of water: A second bucket of water will be provided at the gun sight to be used in the event of grass fires started by burning embers or as an added safety feature on board in the event that an emergency should occur.

SECTION 19: Ammunition for Mortars.

A. Maximum Powder Charges for Properly Constructed Guns.

1. Powder charges for properly constructed guns shall not exceed the manufacturers recommended loads.