Compilation of Specifications of US Army Infantry Ammunition

From the Mexican War to the Civil War

By Will Thoms

Revision 0.1

Forward

When I began reenacting, I did not know where to go for historically correct ammunition dimensions and construction. Here I have compiled that information from, primarily, 3 sources; US Army ordnance manuals printed in 1841, 1850, and 1862.

My reason for these selections is that the 1862 Manual, of which I was already familiar, did not include information on the older weapons which saw service during the Civil War. So, I set out to find a manual which preceded the Model 1855 rifled-musket, but also hopefully would have been used during the Mexican-American War. I ended up finding manuals printed in 1841 and 1850 (commissioned in 1847). While these two are very much alike, they separately include the technical information I was seeking. I also consulted a copy of a Confederate ordnance manual, but it was nearly identical to the preceding US version.

You will find in this document dimensions of projectiles and cartridges, and instructions on the construction of cartridges, bundles, and ammunition boxes. These are transcriptions from the original manuals, to which I was, for the most part, faithful. I have made some editing changes to make them somewhat more readable and I highlighted information which I find important, added some notes in brackets, and omitted information which I did not feel was important. This document is geared toward the individual reenactor or skirmisher who is making their own ammunition in their home; not the industrial setups from the 1800s with child labor.

In the future, I may also work to include information from European manuals on common, imported weapons.

Section 1 – Excerpts from

Chapter Tenth: Ammunition and Military Fireworks

Ordnance Manual, US 3rd Edition (1862 print) and CS 1st Edition (1863 print)

Ammunitions for Small Arms

There are two kinds of cartridges used in service – the ball-cartridge, made with a single elongated ball; and the buckshot-cartridge, made with fifteen buckshot.

Ball-Cartridges

Making Balls – Lead balls are **made by compression**, by means of machines for that purpose. Balls thus made are **more uniform in size and weight, smoother, more solid, and give more accurate results, than cast balls.**

The lead is first cast into round cylindrical bars, .58 and .63 inch in diameter for the calibres .58 and .69 inch respectively, and 21 inches long, and then rolled to .46 and .56 inch in diameter for the same calibres respectively; length, 25 inches. These bars are fed to the machine, which cuts off a part sufficient for one ball and transfers it to a die, in which the ball is formed, with cavity and rings, the surplus metal being forced out in a thin belt around the ball in the direction of its axis. The balls are trimmed by hand, with a knife, and are then passed through a cylinder-gauge of the proper size.

…

Bullet-moulds are provided to cast balls, where the pressed balls cannot be had.

The mould is so constructed as to trim the balls by a single operation before they are taken from the mould.

Buckshot are compressed by machines in a similar manner to balls. They are also readily obtained from private shot-works.

To Grease the Balls – Place them on their bases on a tin frame capable of holding about 50 balls, and immerse it in a melted mixture of **1 part of tallow and 8 of beeswax**, kept warm, until the cylindrical part of the ball is covered. Remove the frame, and let it stand till the grease hardens.

To Cut the Paper

Materials – *Paper and pencil.*

Implements – 1 *cutting-board*, 80 inches square; 1 *iron ruler*, 88 inches long; 1 *lever*, 1 *cord*, 1 *large knife*, 1 *sandstone*, 1 *trapezoid [pattern] of hard wood or iron*.

Cut the paper first into strips of a width equal to the length of a trapezoid, and then into trapezoids using the pattern as a guide.

The paper and ruler are kept from moving by means of a lever, one end of which is fixed and the other is moved by the foot by means of a cord and treadle.

The knife is held in both hands.

From 6 to 8 reams may be cut at a time in this way.

A cutting machine, like that used by bookbinders, facilitates the operation when many hands are employed.

When only a knife and ruler are used, about 12 sheets are cut at a time.

To Make the Cartridge

Implements – 2 *boxes* to hold cylinders, 20 inches long, 8 inches wide, and 4 inches high, in the clear, made of ½-inch boards, without a cover: they are placed on their sides, their backs inclined against the partition in the middle of the cartridge-table, the front resting on cleats nailed to the table; 1 *former*, cylindrical, of hard wood, of the same diameter as the ball, 6 to 7 inches long, one end pointed, almost as much as the ball [this helps prevent the paper from tearing when choking cartridges], and marked with a shallow groove 4.0 inches from the end; 1 *sabot or frame*, tacked to the table, to hold balls, placed at the left of the workspace; 1 *spool* of thread, turning on a vertical spindle fixed in the table near the balls; 1 *choking-string*, made of 4 or 5 cartridge-threads twisted together, about 9 inches long, with a wooden toggle at the end – fastened to the edge of the table, at the right of the workspace; 1 *knife-blade*, 1½ inches long, hooked, driven into the front of the table below and near the choke-string.

To Form the Cylinder – Lay the trapezoids on the table with the side perpendicular to the bases [the "height" in the table below] toward the workman, the broad end [the "long base"] to the left. Take the former in the right hand and lay it on a trapezoid, the groove in the former against the right edge of the paper, bringing the pointed end 1/3 inch from the broad end of the paper; envelop the former with the paper; then, with the fingers of the left hand laid flat upon the paper, turn the former and roll all the paper upon it; hold it with the left hand, and draw gently upon the choking-string in the right, take one turn around the cylinder at about 1/3 inch from the end; hold the former firmly in the left hand, and draw gently upon the choking-string, pressing at the same time with the left forefinger upon the projecting end of the cylinder, thus folding it neatly down upon the end of the ball [of the former].

Having choked the cylinder close, carry it to the right side, and, with the thread in the right hand, take two half-hitches firmly around the part that has been choked; cut the thread on the knife blade, and press the choke in a cavity in the table; place the former, with a cylinder on

it, on a **second trapezoid**; put a ball over the end of the former [the skirt facing the tube and the former, for Burton cartridges]; roll the paper on the former and the ball; hold the cylinder in the left hand and choke and tie it as just described for the inner cylinder; withdraw the former, pressing the cylinder with the left hand, and place it in the box.

… [charge the inner cylinder] …

To Pinch the Cartridge – Take the cartridge in the right hand, strike it lightly on the table to settle the powder; flatten the empty part of the cylinder, and bend it, flush with the top of the powder, at right angles to the cartridge, the oblique side of trapezoid on top, the cartridge standing vertical on the table; fold the flattened part in the direction of its length with two folds from the exterior, meeting in the middle; bend this folded end back on itself, and strike it on the table to set the folds.

To Bundle Cartridges [Arsenal Packs]

Utensils – 1 *box* without ends or top: width equal to 5 times the diameter of the ball, height equal to twice that diameter, and length that of the cartridge. It is tacked to the table, the sides parallel to and near the edge of the table.

Put the wrapper in the box, the long side perpendicular to the edge of the table, the middle of the paper in the middle of the box; place, parallel to the sides of the box, two tiers of 5 cartridges each, the balls alternating; bring the short ends of the paper together, and fold them twice close down on the cartridges; insert a package of caps in the end of the bundle next to the ends of the lower tier; fold the wrapper on the ends, and tie the bundle, first in the direction of the length, then its breadth, with the twine fastened in a single bow-knot. The wrappers are of different colors, to distinguish the cartridges for the different arms.

Cases for Percussion Caps – These are rolled on a former, .54 inch in diameter, choked at one end and tied. Twelve caps are put in, and the case is closed by twisting the open end of the case.

Packing Cartridges – Cartridges are packed in boxes containing 1,000 each. Five tiers of bundles are laid flat in a single row along one side of the box; the rest are placed on edge, the caps alternately up and down. *Blank cartridges* are packed in boxes of 2,000 each; the bundles are placed on end, the caps alternately up and down.

Packing boxes – The boxes are made of white pine boards, dovetailed and nailed together, and are furnished with wooden brackets or handled nailed to the end with wrought nails, clenched on the indie; the lids fastened with six 1.75 inch screws. They are painted different colors, to indicate the kind of cartridges. The boxes should be lined with strong paper, and the bundles of cartridges must be packed closely, so as not to shake in transportation. Each boxes should be marked, on each end, with the number and kind of cartridges, and on the inside of the cover with the place and date of fabrication.

Blank Cartridges

Cut the paper into trapezoids as for ball-cartridges; roll the trapezoid on the former, one turn; fold down this much of the paper on the head the the former with the left hand; roll the rest of the paper; fold down the rest of the paper; **touch the fold with a little paste** on the finger; press the end of the former on a ball embedded in the table for the purpose [so the base of the cartridge is concave]; remove the cylinder from the former; place it in a box to dry.

[Insert: table of barrel specs from Chapter 8, "Principal Dimensions, Weights, etc. of Small Arms"]:

Dimensions (in)		Rifle Muskets			Rifles		Pistol Carbine
		1855	1842	Cadet, 1855	1855	1842	1855
Barrel	Diameter of bore	0.58	0.69	0.58	0.58	0.58	0.58
	Variation allowed, more	0.0025	0.015	0.0025	0.0025	0.0025	0.0025
	Diameter at muzzle	0.78	0.85	0.78	0.90	0.90	0.82
	Dia. At breech between flats	1.14	1.25	1.14	1.14	1.15	1
	Lenth without breech-screw	40	42	38	33	33	12
[Rifling] Grooves	Number	3	3	3	3	3	3
	Twist, uniform, 1 turn in	72	72	72	72	72	72
	Width	0.30	0.36	0.30	0.30	0.30	0.30
	Depth at muzzle	0.005	0.005	0.005	0.005	0.005	0.005
	Depth at breech	0.015	0.015	0.015	0.013	0.013	0.008

Kind of Cartridge		Expanding Ball			Blank	Round Ball		Elongated Ball			
						Musket, 1842					
Kind of Arm		Musket of 1842	Musket and Rifle, 1855	Cadet Musket, 1857	Musket and Rifle, 1855	Ball	Buckshot	Pistol Carbine	Revolver, Army	Revolver, Navy	Sharpe's Carbine
Calibre (in)		.69	.58	.58	.58	.69	.69	.58	.44	.38	.54
Ball	Diameter (in)	.685	.5775	.5775		.65		.5775	.46	.39	.56
	Weight (gr)	730	500	450		412		450	216	145	475
Charge of powder (gr)		70	60	50	60	110	110	40	30	17	50
Trapezoid	Height (in)	4.33	4.12	4.12	3.75	4.33	5.5	4.1	2.75	2.4	3
	Long base (in)	4.5	4	4	4.16	5.25	5	4	3.25	2.5	3.25
	Short Base (in)	2.7	2.5	2.5	2.5	3	3	2.5	1.6	1.6	2.25
	No. in sheet	12	16	16	24	12	9	16	30	40	24
Wrapper (bundle)	Length (in)	10	9	9		9		9	8	7.5	10
	Width (in)	8	6.5	6.5		6.5		6.5	6.5	4.9	6.8
	No. in sheet	4	6	6		6		6	6	12	4
	Color			Red		Green	Red	Blue		Blue	
Packaging boxes for 1,000 cartridges	Length (in)	14	14.75		15.5	15.5	15		13.1	10.5	14.75
	Width (in)	12	10.75		11	11.75	10.75		4.6	3.8	8.9
	Depth (in)	7	6.38		6.25	6.75	6.38		3.5	3.25	5.2
	Weight, packed (lb)	135	98			107			28.5	16.5	78
	Color	Lead	Olive	Grey	Olive	Blue	Red	Yellow	Olive	Blue	Olive

[Note: I have in on good authority that Burton minie balls, "expanding balls", were for .58" rifles died down to .574" in diameter to lessen the effects of barrel fouling. I do not have documentation on this yet, but will work to secure it.

It has also been said that the Confederate standardized on a Bitish-pattern rifled-musket cartridge. I will look to find evidence of that as well.]

Section 2 – Excerpts from

Chapter Tenth: Ammunition and Military Fireworks

Ordnance Manual, 2nd Edition (1841 and 1850 prints)

Flints

The best flints are translucent, with a smooth surface, of a uniform tint of light yellow or brown color, and slightly conchoidal fracture. They are generally obtained from England or France.

The parts of a flint are: the edge or bevel, the back, the sides, the face (slightly convex), and the bed or lower face (slightly concave); in using the flint, the bevel is placed uppermost. There are three sizes for military service; musket, rifle and pistol flints. A good musket flint will last for more than 50 fires [total]. Flints are issued to the troops in the proportion of 1 to 20 rounds.

Dimensions *inches*	Musket		Rifle		Pistol	
	Min.	Max.	Min.	Max.	Min.	Max.
Whole length	1.20	1.50	0.97	1.20	0.93	1.10
Width	1.08	1.13	0.79	0.88	0.83	0.92
Thickness at the back	0.26	0.33	0.20	0.29	0.21	0.27
Length of the bevel	0.39	0.55	0.41	0.71	0.30	0.42

The rifle and the musketoon take the same flint. In the inspection of flints, first verify their dimensions with a gauge giving the maximum and minimum dimensions; see that the bevel is free from spots and irregularities of surface, that the face and bed are nearly parallel and have not too great a curvature.

… [Packing Flints] …

The weights vary according to the kind of flint, the black and inferior kind being the heaviest.

Cartridges for Small Arms

Kind *[1841 print]*	Balls		Charges of powder				Remarks
	Diameter (in)	No. in lb.	Weight (gr)	No. in lb.	Ratio to wgt of ball	Blank cartridge (gr)	
Musket	0.64	18	130	54	1-3rd	117	Musket powder
Musketoon	0.64	18	85	82	2-9th	77	
Hall's carbine (.69)	0.64	18	75	93	1-5th	68	Rifle powder
Hall's carbine (.54)	0.525	32	75	93	1-3rd	68	

Hall's rifle	0.525	32	100	70	4-9th	90	
Common rifle	0.525	32	100	70	4-9th	90	
Pistol	0.525	32	50	140	2-9th	45	

These charges include priming, about 6 gr. to 12 gr., for all the arms except the carbine which has a percussion lock. [Note: Scott's manual of arms instructs to fill the pan.]

***Buckshot* are 0.3 in. in diameter**; weight, about 170 to 1 lb.

Kind, Percussion *[1850 print]*	Balls		Charges of powder				Remarks
	Diameter (in)	No. in lb.	Weight (gr)	No. in lb.	Ratio to wgt of ball	Blank cartridge (gr)	
Musket	0.65	17	110	64	1-4th	75	Musket powder
Musketoon	0.65	17	75	93	1-5th	75	
Hall's carbine (.54)	0.525	32	75	93	1-3rd	60	Rifle powder
Rifle	0.525	32	75	93	1-3rd	60	
Pistol	0.525	32	30	233	1-7th	30	

["Rifle" here almost certainly refers to the Model 1841, though it is not explicitly mentioned.]

***Buckshot* are 0.31 in. in diameter**; weight, about 150 or 155 in 1 lb.

Cartridges are made either with *single ball, 1 ball and 3 buckshot,* or sometimes with *12 buckshot,* and they are designated accordingly.

Making Cartridges

Dimension of Paper for Cartridges (in)		Sheets		Trapezoids			
		Length	Breadth	Height	Long side	Short side	No. in sheet
Musket	Ball, or ball and buckshot	16.5	13	4.33	5.25	3	12
	Blank	20	15	4	4.75	2.75	20
	12 Buckshot	16.5	13	5.5	5	3	9
Rifle	Ball	16.5	13	4	4.25	2.25	16
	Blank	20	15	3	4.25	2.25	30
Pistol	Ball *[1841]*	16.5	13	3.3	4.25	2.25	20
	Ball *[1850]*	16.5	13	2.75	4.25	2.25	24
	Blank	20	15	2.5	4.25	2.25	36

To Cut the Paper

Implements. 1 *cutting board,* 30 in. square – 1 *pattern*, of hard wood or iron, of the dimensions of each of the papers [the trapezoids above] – 1 *rule [ruler]*, of hard wood, 38 in.

long, 1.5 in. wide, and 0.5 in. thick, to cut by – 2 *laboratory* (shoe) *knives* – 2 *sand stones*, for sharpening the knives on.

The paper is first cut into strips of a width equal to the length of a trapezoid, and then into trapezoids, by means of the patterns; cut about 12 sheets at a time.

To Make the Cylinders

Implements and utensils, for each workman for making cylinders: 2 *boxes* for the empty cylinders, made of ½ in. boards; interior dimensions, 20 in. long, 8 in. wide, and 5 in. high, without a cover; they are placed upon the sides, facing each side of the cartridge table which is furnished with brackets to receive them, and also with a small enclosure or *locker* for balls, at the right hand of each workman – 1 *spool of thread*, turning on a vertical iron spindle fixed in the table near the shot locker; 1 lb. of thread is required for 10,000 single ball musket cartridges, being 8½ inches to a cartridge – 1 *choking string*, made by twisting together 4 or 5 cartridge threads; fastened to the edge of the table, at the right hand of the workman – 1 pair of *scissors*, to cut the thread – 1 ***former***, cylindrical, of hard wood, **of the same diameter as the ball**; one end convex, the other concave, to receive 1/3 of the ball; length 6 or 7 inches.

Take the paper in the left hand, the former in the right; lay the paper on the table, with the side perpendicular to the bases towards the workman, the broad end to the left; place the former with its convex end at the broad end of the paper; turn it so as to envelop it with the paper, then with the left hand laid flat upon the paper, roll all the paper upon the former; seize it with the left hand, and with the choking string in the right hand, take one turn around the cylinder at about half an inch from the end, to which distance the end of the former is withdrawn; hold the former firmly in the left hand, and draw gently upon the choking string, pressing at the same time, with the left fore-finger, upon the projecting end of the cylinder, thus folding it neatly down upon the end of the former.

Having choked the cylinder, carry it to the right side, and with the twine in the right hand, take two turns and a half hitch firmly around the part that has been choked; withdraw the former and introduce the ball, following it to the end of the cylinder with the former reversed ; raise the whole again, and with the same thread (which is never cut until the cartridge is finished), take two half hitches just upon the upper side of the ball, between it and the concave end of the former; the operation is expedited by rolling the ball placed in the concave end of the former and choking the paper over it. Cut the thread and place the cartridge in the box which stands fronting the workman.

For ball and buckshot cartridges. Roll and choke the paper, put in 3 buckshot, follow them with the former, and take a half hitch of thread over them; then insert the ball as before.

Buckshot cartridges have 4 tiers of 3 buckshot each, inserted like the first, with a half hitch between them, and finishing with a double hitch.

[1841 print] For Common rifles, the ball is prepared by being enveloped in a square piece of fine *muslin*, or of soft thin *leather*, or of *bladder*, tied over it and leaving a projecting end about ½ in. long, which, after being trimmed with scissors, and the whole saturated with tallow, is introduced into the paper cylinder which is choked over it and fastened by two turns and a double hitch.

[1850 print] For rifles, the ball is prepared by being enveloped in square piece of fine *muslin*, or of soft thin *leather*, or of *bladder*, tied over it and leaving a projecting end about ½ in. long, which after being trimmed with scissors, is introduced into the paper cylinder which is choked over it and fastened by two turns and a double hitch.

Cylinders for blank cartridges are made by folding down the paper over the concave end of the charger, **touching the fold with a little paste**, and pressing it on a ball imbedded in the table for that purpose.

…

1 Folding box for each calibre, made with only two sides; width equal to 5 times the diameter of the ball, height equal to twice that diameter. Two strips of wood nailed on the table will answer the same purpose.

Take the boxes full of cartridge cylinders to the table in the filling room; as they are filled, incline the cylinders over from the empty ones; when all in one box are full, fold the paper down over the powder by two rectangular folds, and place the cartridges before the men who are to bundle them.

Bundling [Arsenal Packs]

[1841 print] Put a wrapper in the folding box and place in it 2 tiers of 5 cartridges each, parallel to each other and to the short sides of the wrapper, the balls alternating; wrap the cartridges, whilst in the folding box, by folding the paper over them; tie them, first in the direction of the length, then of the breadth, with a bit of twine fastened in a single bow-knot.[Flat knot in the 1850 print.] **A bundle of musket cartridges is usually made with 5 single ball and 5 ball and buckshot cartridges.**

[1850 print] A package of 12 percussion caps is placed in each bundle of 10 cartridges, at the end of the bundle. The case for the caps like a cylinder for a rifle cartridge; it is choked at one end and tied; when the caps are inserted it is folded like a cartridge.

Wrapping paper is but slightly sized, with a view to its being immersed, before using it, in a varnish made of bees-wax 4 lbs., linseed oil 1 gill, spirits of turpentine 2 galls, for the purpose of making the paper waterpro of – See Chapter XIII [Chapter VII in 1850 print].

[1850 proportions for 1000 lbs of paper: Bees-wax 133 lbs, linseed oil 10 gallons, spirits of turpentine 135 gallons]

Packing Cartridges

Ball cartridges are packed in kegs or boxes to contain 1000 each. Blank cartridges may be packed in powder barrels.

Kind *[1841 print]*		Height (in)	Length (in)	Width (in)	Weight (empty, lb)	Remarks
Musket	Ball	6.5	15.25	9.5	12	
	Buck and ball	6.5	15.25	10.25	13	Will contain 1500 blank cartridges.
	Buckshot	6.5	15.25	11	13.75	
Musketoon	Ball	6.5	15.25	8	10	
	Buck and ball	6.5	15.25	8.75	11.3	
	Buckshot	6.5	15.25	9.75	12.25	Will contain 1750 blank.
Carbine (.69)	Ball	6.5	15.25	7.25	9	
	Buck and ball	6.5	15.25	8	10	
	Buckshot	6.5	15.25	9.25	11.75	Will contain 1750 blank.
Rifle	Ball	5.5	12.75	10	11.3	Will contain 1250 rifle or 1500 carbine, blank.
	Blank	5.5	12.75	9.5	10.75	
Carbine (.54)	Ball	5.5	12.75	8.5	9.62	
Pistol	Ball	5.5	12.75	8.75	7.62	Will contain 1500 blank.

Kind *[1850 print]*	Depth (in)	Length (in)	Width (in)	Weight (empty, lb)	Weight (packed, lb)
Musket, buck and ball	6.75	15.5	11.75	12	107
Musketoon, ball	6.75	15.5	9	11.5	100
Rifle, ball	5.75	13	11.75	11	60
Hall's Carbine [.54]	5.75	13	11	9	55
Pistol, ball	5.75	13	8	7	45

The boxes are made of 1 in. white pine boards, and furnished with wooden brackets or handles nailed to the ends; the lids fastened with four 1¾ in. screws. They are painted olive color. The kegs or boxes should be lined with strong water proof paper, and the bundles of cartridges must be closely packed, so as not to shake in transportation. Each keg or box should be marked on one end with the number and kind of cartridges; on the inside of the cover, the place and date of fabrication.

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