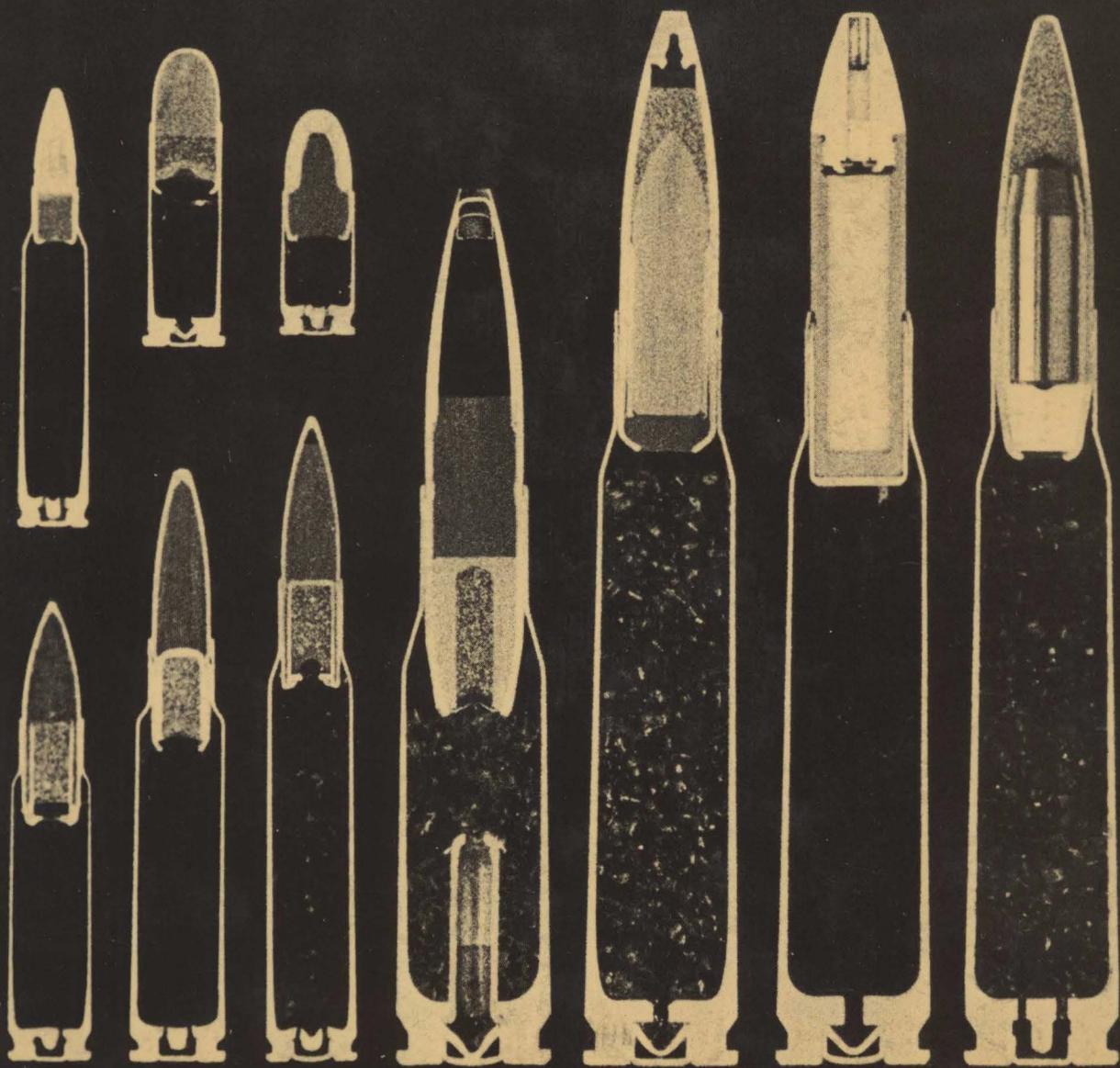
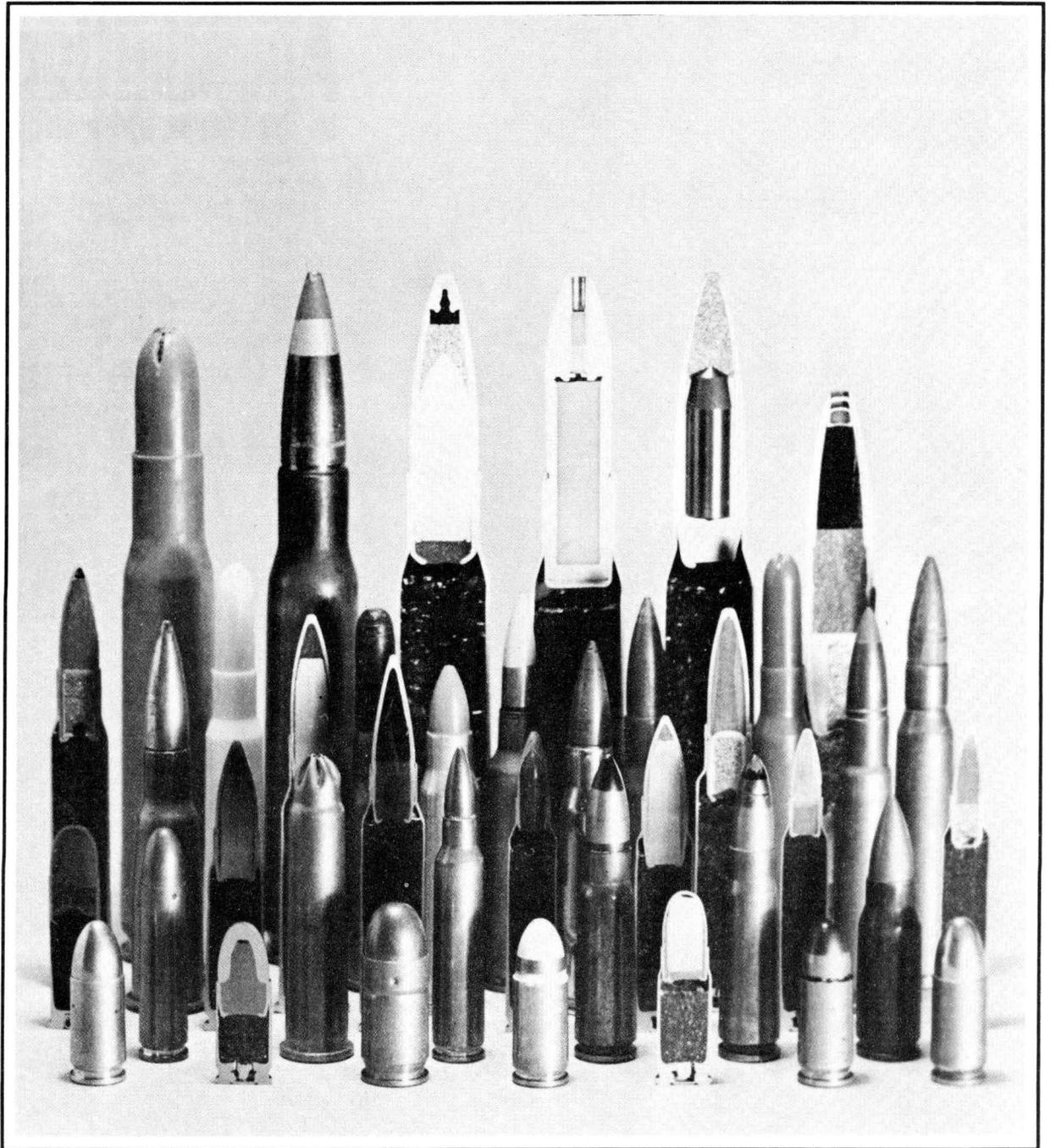


Military Small Arms
Ammunition
of the World, 1945-1980 P. Labbett



Military Small Arms
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Military Small Arms

Ammunition

of the World, 1945-1980

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Drawings and Packages chapter by P. J. F. Mead

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List of Abbreviations

ACP Automatic Colt Pistol
AP armour-piercing
API armour-piercing incendiary
APIT armour-piercing incendiary tracer

CN cupro-nickel
CNCS cupro-nickel, clad steel
CENTO Central Treaty Organization
DI dark ignition or delayed ignition (tracer)

GM gilding metal
GMCS gilding metal, clad steel

HE high explosive
HEI high explosive incendiary
HEIT high explosive incendiary tracer
HV high velocity

LMG light machine-gun
MG machine-gun
MMG medium machine-gun
MSC mild steel core
MV muzzle velocity

NATO North Atlantic Treaty Organization

OV observed velocity

RCL Recoilless
SEATO South East Asia Treaty Organization
SFMG sustained fire machine-gun
SL self-loading
SLR self-loading rifle
SMG submachine-gun

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Preface

Interest in weapons, particularly guns, is widespread, and to cater for, or indeed to fuel this interest, books about small arms proliferate. The intrinsic value of these books varies according to the amount of research that has been undertaken. Irrespective of their value as works of reference, few books about small arms do more than touch lightly upon the ammunition fired from the weapons concerned. This seems illogical if one bears in mind the fact that, in the absence of ammunition, the finest pistol, rifle or submachine-gun becomes little more than a rather inefficient — and expensive — club.

Not only is the ammunition as important as the gun, but its study is interesting in its own right; especially in the fields of crime and insurgency it can yield dividends. Evidence in the form of spent cases may be found at the scene of a crime long after the weapon and its user have vanished. The correct identification of these and of ammunition samples can provide important data for the police and Intelligence agencies operating against terrorists and insurgents.

It is hoped that this book will provide, under one cover, aids to the correct identification of ammunition by calibre and type, by origin, and with reference to the ballistics and performance of the cartridge

concerned and to the main classes of weapons in which it is fired. Since a cut-off point is necessary if the information is to be contained within a handy format, the main portion of the book deals with ammunition and manufacturers from 1945 only, and is restricted to calibres under 20mm.

P. Labbett, 1980

1. Introduction to Military Small Arms Ammunition

Ammunition for military small arms consists today almost entirely of centrefire cartridges although for training purposes some small calibre rimfire ammunition is in use and, historically, rimfire ammunition was used by a number of countries in a service rôle at the start of the metallic cartridge era in the 1860s. Rimfire training ammunition in use today is not included in this book.

COMPONENTS OF THE CENTREFIRE CARTRIDGE

A centrefire cartridge consists of four main components: case, primer, charge and bullet. Each of these is discussed in detail.

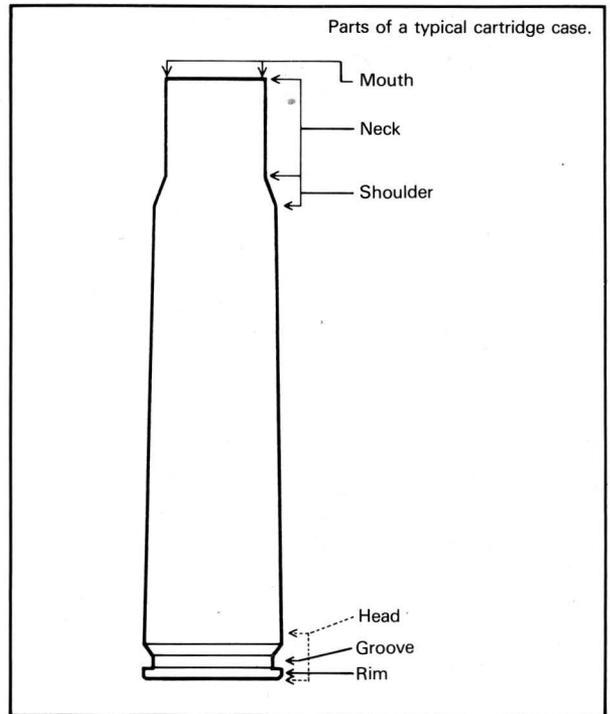
The cartridge case

The case is the main component and offers the most detailed means of identifying the cartridge. It usually consists of a cylindrical metal container holding the other three main components. It may be made of any one of a number of materials.

Plastic cases may be encountered with training ammunition such as blank or dummy, and, more rarely, with grenade-propelling cartridges. At their present level of development, plastics have not been found suitable for ball and other service ammunition, although they have been used in this way on an experimental basis.

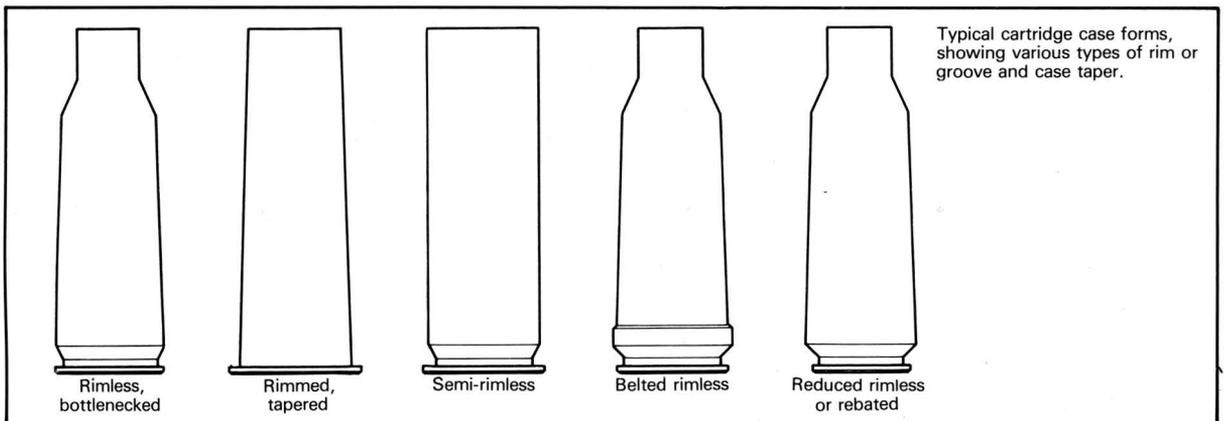
Experimental 'caseless' ammunition has also been produced. The case is, in effect, made from solid propellant moulded into the correct shape, into which the cap or primer is fitted at one end and the bullet fitted at the other. The case becomes entirely consumed when fired.

Ammunition for service use is invariably made with metal cartridge cases, as is most training ammunition also. In the main, brass is the metal most widely used for case production, and a typical cartridge brass has about 70 per cent copper and about 30 per cent zinc in its composition. Steel is also widely used, especially in Eastern Europe and China. Steel cases have to be protected against rust, the protection



taking the form usually of a copper or brass wash, or of a hard-wearing, heat-resistant lacquer.

The cartridge case is recessed at the rear end to receive the primer or cap which contains a sensitive composition and which, when struck, initiates the propellant charge inside the case. The other end of the case is open and into the opening is secured the bullet.



Cartridge cases are categorized by certain features in their design, and the following terms arise:

Belted rimless Here, the rimless case has, around the rear portion of the case and forward of the groove, a raised belt or ridge.

Bottle-necked A bottle-necked case is one where the case mouth is sharply reduced in diameter to match the diameter of the bullet.

Crimped For blank ammunition or grenade-propelling cartridges, the case mouth is often closed with a crimp to ensure the charge is securely contained. The crimp may be a short crimp, often referred to as a rose crimp, or it may be a long twisted crimp which effectively increases the total length of the case beyond the length of a ball case.

Rimless A rimless cartridge is one where a groove is cut into the head, into which the extractor of the weapon fits as the round is fed into the chamber, allowing the empty case to be extracted after firing.

Rimmed Here, instead of the case having a groove, the rear end of the case has a protruding flange, against which the extractor fits, allowing the case to be extracted.

Semi-rimless (or semi-rimmed) Here, the cartridge case has a groove, as in a rimless cartridge, but the circumference of the cartridge base protrudes beyond the width or diameter of the case itself.

Reduced rimless (or rebated) Here, the cartridge case has a groove, as in a rimless cartridge, but the circumference of the cartridge base is smaller than the width or diameter of the case itself.

Straight case Where the sides of the case wall are parallel from the rim or groove forward to the case mouth.

Tapered case Where the sides of the case make a complete taper from the base of the case to the case mouth.

The primer

The primer, also known as the cap, consists of a cup of soft metal holding very sensitive cap composition. The cap fits into a cap chamber formed as a recess in the base of the

cartridge case. One or more flash holes or tubes connect the cap chamber with the interior of the cartridge case itself. When the firing pin or striker of the weapon hits the primer, the composition is squeezed against a small anvil and ignited, causing a flash to pass through into the interior of the case, thus igniting the main propellant charge, which in turn converts to gas under high pressure and forces the bullet out of the cartridge case neck and into and through the barrel.

The primer itself is secured in the cap chamber by one of the following methods:

Ringing, an annular strike upon the metal surrounding the chamber;

Burring, the metal around the chamber is burred inwards;

Staking, usually with three small equidistant punches at the chamber's edge;

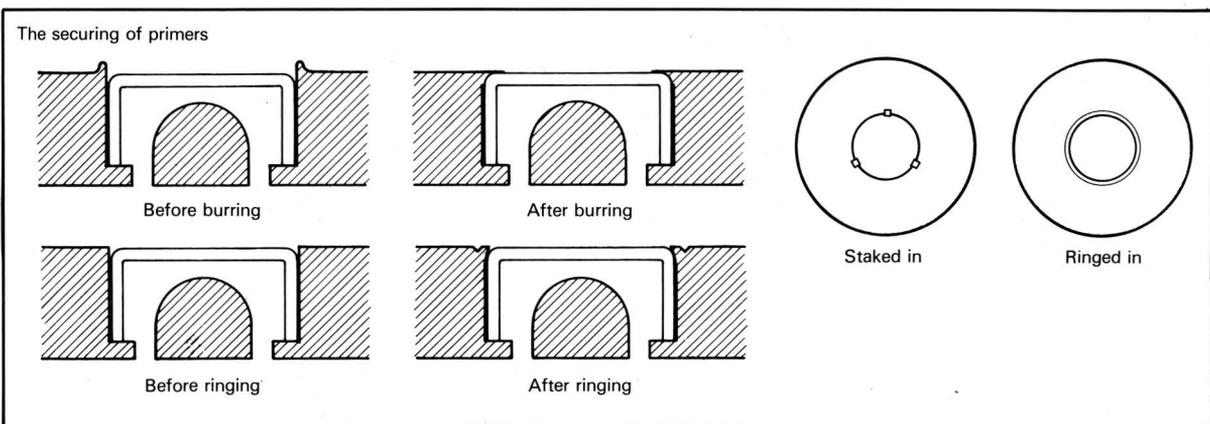
Press fitting, by the tightness of the fit;

Screw fitting, found on some large calibres only.

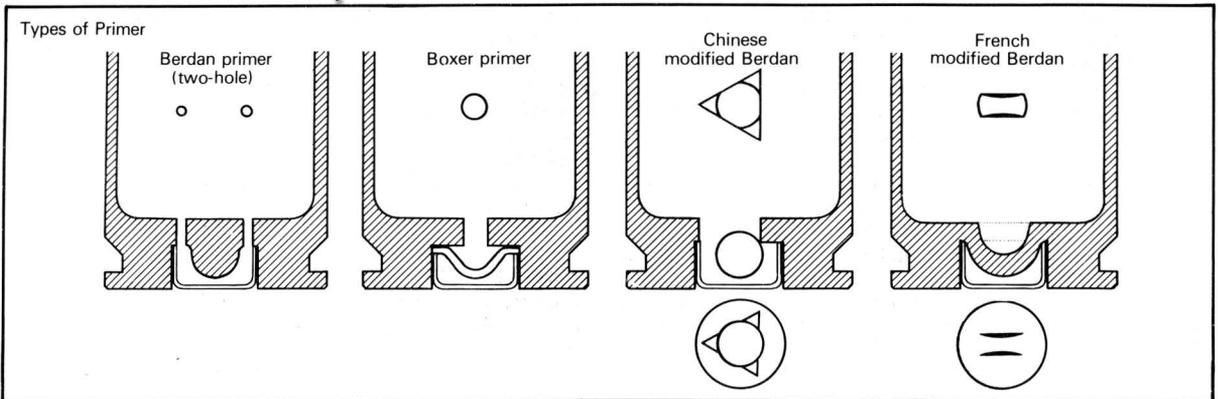
The primers themselves fall into two basic categories, often referred to as the Boxer primer and the Berdan primer. *The Boxer primer* has one central fire hole between the cap chamber and the case interior. The cap itself holds an integral anvil.

The Berdan primer usually has two fire holes, although the number may vary. The fire holes are usually off-centre, and the centre of the cap chamber is raised in the form of an anvil, so that the anvil is integral with the case.

Modified primer systems are found, especially with larger calibre cartridges, where primer tubes may be a feature of the design. The tube leads up from the fire hole well into the centre space of the case interior, causing ignition of the charge at a different rate from what would have been applicable with simple fire holes. Also, in some of the larger calibres, ignition of the cap composition is not by striker blow, but by an electrical discharge, caused by the completion of a circuit when the striker or firing pin comes into contact with the cap.



Introduction



More recently, two new, modified forms of primer have appeared, one originating in France and one in China. Both are variants of the Berdan principle, in that the anvils are not integral with the primer. In the French primer, a narrow strip of metal is forced up from the floor of the cap chamber, forming a mound, with a hole in the floor left underneath. The mound acts as an anvil, and the fire hole is the gap left under the mound. A conventional Berdan primer cap is used. With the Chinese primer, so far encountered only in heavy machine-gun ammunition, a central, triangular fire hole is bored through the floor of the cap chamber, and into this is forced a small metal ball, too large in diameter to pass through, which is held in the triangular hole, with a considerable portion still protruding back into the cap chamber. This portion of the ball acts as an anvil for a conventional type Berdan primer cap.

The propellant charge

Most propellants fall into two major categories, double-based or single-based.

Double-based propellants consist in the main of two ingredients, nitroglycerine and nitrocellulose, whose proportions vary considerably with different manufacturers. Cordite, which for many years was the British standard propellant, originally had 58 parts of nitroglycerine to 37 parts of nitrocellulose. These proportions were switched in a later form of cordite, — Cordite MD, so that the nitroglycerine was reduced to 37 parts with a corresponding increase in the nitrocellulose. Other countries, notably the United States, have used double-based powders extensively also.

Single-based propellants tend to be preferred for rifle calibre cartridges, and double-based powders generate more heat and cause more barrel erosion. The greater the proportion of nitroglycerine, the greater the heat and erosion. Nitrocellulose is the basic single-based propellant in service in most parts of the world, and contains no nitroglycerine. Depending upon the rate of burn requirements in particular types of ammunition, nitrocellulose powder comes in flakes,

grains or small cylinders, rather similar to macaroni, but very much smaller.

A refinement on the basic powder form is encountered in ball powder, which originated on a commercial scale in the United States, but is now manufactured elsewhere also. This is basically a nitrocellulose powder which, under safer conditions than apply with other powders, is processed at a solvent stage of manufacture into balls, which are segregated by size. In the original American process the balls are coated with nitroglycerine to impart greater energy to the powder.

Bullets

For pistols and submachine-guns and for rifle calibre weapons, a wide variety of bullet forms exist. For ball ammunition the following are the main design characteristics. *The nose* of the bullet may be flat-tipped, round-nosed or pointed, the curved portion of a pointed bullet being referred to as the ogive. An extreme form of point where the sides of the nose are straight also exists.

The rear of the bullet may be flat-based or boat-tailed (also known as streamlined). With a boat-tailed bullet, the last portion of the bullet is angled inwards. Some flat-based bullets may be found with a recess in the base, usually existing to move the centre of gravity forward.

The sides of the bullet usually contain a parallel portion, which takes the engraving in the barrel. The neck of the cartridge case is usually secured to this portion, often with the neck coned or crimped into a cannelure around the centre circumference of the bullet. Very occasionally, the bullet of certain calibres may be found with raised driving bands instead of cannelures, and the raised portion engages with the rifling of the weapon.

Service bullets are normally compound in nature, i.e., not of solid metal, but consisting of a number of components. Normally there is an outer envelope or jacket made of metal (steel, cupro-nickel, gilding metal, or brass) and a core made of lead alloy or of mild steel, although other materials such as plastics or wood can also be used. The inclusion of a mild

steel core does not bestow any significant armour-piercing performance on a ball bullet, whereas a hard steel core or a core of tungsten carbide does.

Apart from armour-piercing bullets with hard cores, other specialized bullet loadings exist where a chemical filling is added for special effect. Included in this category of bullet are:

Tracer, where a chemical filling in the rear of the bullet burns in flight and indicates where the bullet has travelled;

Observation, where a chemical filling, usually in the nose, gives a flash and/or a puff of smoke upon impact, to indicate 'strike' to the firer;

High Explosive, where an explosive charge explodes either upon impact or in flight (through a self-destroying device);

Incendiary, where the incendiary composition, usually contained near the nose, ignites upon impact;

Combination, where any of the above, including armour-piercing, may be combined together in one projectile.

Large calibre projectiles for heavy machine-guns or cannon will have, on occasions, further bullet components, including fuzes, gaines (or boosters) and self-destroying elements.

Bullets are secured in the neck of the cartridge case in a variety of ways:

Press fitting, where the bullet is retained by the closeness of the fit;

Indenting, where indents in the case neck fit into the bullet cannelure;

Coning, where the case mouth is coned inwards into the bullet cannelure;

Canneluring, where a cannelure is indented into the case mouth, matching the bullet cannelure;

Crimping, where the edge of the case mouth is crimped downwards into the bullet cannelure;

Stabbing, where three or four stabs press through the case neck either into the bullet cannelure or into the bullet envelope itself.

NOMENCLATURE

The calibre and designation of a cartridge may be arrived at in a number of ways, not all of them logical. In some instances, the calibre portion of a cartridge's title is purely nominal, chosen either to avoid confusion with another known cartridge of similar bullet diameter, or almost at random. Sometimes the calibre designation is a correct representation of the actual calibre.

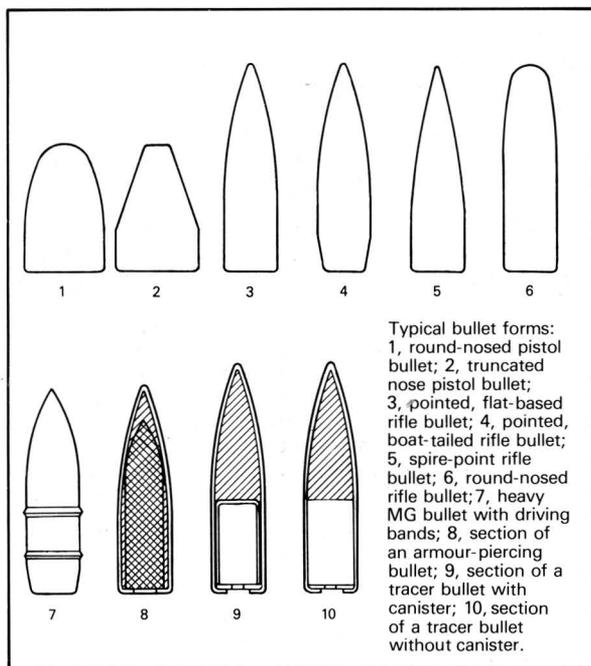
Normally the calibre of a cartridge, when correctly expressed, and as part of the formal designation, is less than the actual bullet diameter. For example, the 7.62mm NATO cartridge has a bullet with a diameter of 7.8mm. The calibre in the formal designation is normally arrived at by measuring the inside of the barrel across the diameter. Occasionally, however, as for example with the 9mm Parabellum, the bullet diameter matches the calibre stated in the title exactly.

The custom is spreading of describing a cartridge by a two-part metric designation, one part being the calibre and the other the cartridge case length. Thus, the Russian 7.62mm M.43 cartridge, with a case length of 38.6mm is known as the 7.62mm × 39 cartridge. A rimmed cartridge has sometimes added to its designation the letter 'R', so, for example, the Russian rimmed 7.62mm machine-gun cartridge is known as the 7.62mm × 54.R.

CARTRIDGE IDENTIFICATION

The best way of identifying a cartridge is by reference to the box or package label of the container in which the cartridge was packed. Loose cartridges are not identifiable in this way, and often the packages themselves have no labels, or the labels have only incomplete information printed thereon. Measuring the case length and the bullet diameter of a cartridge, and from the bullet diameter assessing the nominal calibre of the cartridge represents a reasonably good way of matching the cartridge against a known metric nomenclature. To assess the type of bullet, country of manufacture, date and factory making the cartridge, certain other marks on loose cartridges often afford means of identification.

Bullet type. Very often special bullet loadings such as tracer, armour-piercing, etc., are indicated by the bullet tip being coloured in accordance with a colour code appropriate for a particular country. In certain countries, the bullet type is indicated by a code stamped on the base of the cartridge case, or by a coloured primer annulus, but this is comparatively rare.



Introduction

Country of origin. This may be apparent if the correct metric cartridge nomenclature is established, but the most likely way is by determining the name of the factory where the round was made.

Factory or manufacturing company. Most military cartridges have a headstamp, i.e., a series of marks struck into the metal of the cartridge base. Included in the headstamp is usually a factory identifying number or code letters. Details of world manufacturing codes are shown elsewhere in this book. The manufacturer's code letter in the headstamp does not necessarily prove that the particular manufacturer who uses the code made the cartridge, although it usually does. It must be remembered however that some ammunition is 'custom-made' and marked accordingly. For example, Factory 'A' for one reason or another, has ammunition made for it by Factory 'B' which often may be of different nationality. In such instances, Factory 'A' will frequently require Factory 'B' to place the normal headstamp codes appropriate to Factory 'A' on the headstamp, including 'A's own factory codes.

Date. The date is included on the headstamp of most military cartridges, either as a two- or a four-digit stamp, but a few countries use three digits. Occasionally ammunition will be found with the date digits replaced by a code letter.

Primer annulus colour. Many military cartridges have a coloured primer annulus. Very often this has no significance and is merely a sealing lacquer to keep out damp. In some countries, however, the annulus colour denotes either the nature of the bullet or a special purpose intended for the cartridge.

Case neck seal colour. Some ammunition is found with a coloured lacquer over the join between bullet and case neck. This coloured ring usually has no special significance and merely indicates the presence of the lacquer to keep out damp. Occasionally, however, this coloured sealing band indicates that the ammunition is specially packed and sealed for tropical service, although in the past, the bullet type on certain classes of Japanese ammunition was indicated by the colour of the neck sealing band.

Small calibre rifle and machine-gun cartridges in service between 1886 and 1939*

Common title	Metric designation	Nationality**
6.5mm Arisaka	6.5mm x 50.8	Japanese, Type 38 (Model 1905)
6.5mm Carcano	6.5mm x 52.4	Italian (Model 1891)
6.5mm Mannlicher	6.5mm x 53.6	} Romanian (Model 1893)
6.5mm Mannlicher	6.5mm x 53.6	
6.5mm Mannlicher-Schoenauer	6.5mm x 53.9	Greek (Model 1903)
6.5mm Mauser	6.5mm x 55	Swedish (Model 1894), Norwegian (Model 1896)
6.5mm Mauser-Vergueiro	6.5mm x 58	Portuguese (Model 1904)
7mm Mauser	7mm x 57	Spanish (Model 1890)
7.35mm Carcano	7.35mm x 51	Italian (Model 1938)
7.5mm Schmidt-Rubin	7.5mm x 55.4	Swiss (Model 1889/90)
7.5mm MAS	7.5mm x 54	French (Model 1929)
7.62mm Mosin-Nagant	7.62mm x 54	Russian (Model 1891)
7.65mm Mauser	7.65mm x 54	Belgian (Model 1889)
7.7mm Semi-Rimless	7.7mm x 57.5	Japanese, Type 92 (Model 1932), machine-guns only
7.7mm Rimless	7.7mm x 57.5	Japanese, Type 99 (Model 1939)
7.92mm Mauser	7.92mm x 57	German (Model 1888)
7.92mm Schwarzlose	7.92mm x 57.R	Netherlands (Model 1908), machine-guns only
7.92mm Colt	7.92mm x 61	Norwegian, adopted 1938, machine-guns only
8mm Mannlicher	8mm x 50.5	Austrian (Models 1889/90)
8mm Siamese	8mm x 52	Siamese, Type 66
8mm Lebel	8mm x 50	French (Model 1886)
8mm Mannlicher	8mm x 56	Hungarian (Model 1935)
8mm Krag	8mm x 58	Danish (Model 1889)
8mm Breda	8mm x 59	Italian (Model 1935), machine-guns only
8mm Bofors	8mm x 63	Swedish (Model 1932), mainly for machine-guns
.303in British	7.7mm x 56	British, adopted 1889
.30in-40 Krag	none	United States, adopted 1892
.30in-03 U.S.	none	United States, adopted 1903
.30in-06 U.S.	7.62mm x 63	United States, adopted 1906

*Smokeless powder loaded only. **With date of first adoption.

2. Ammunition Development to 1939

Metallic small arms ammunition, first introduced into general military service during the 1860s, developed rather slowly during the next seventy-five years. Two basic stages of development took place, both of which can be traced back to the constraints imposed by the type of propellant available and, to some extent, by the construction of the bullets then in use.

Initially, black powder, which was the only available propellant until the 1880s, imposed a restriction on the use of small calibre rifles. From the 1860s onwards, military calibres tended to fall within the bracket 10.5mm — 12.5mm, and the 11mm calibre, albeit with a different cartridge case for each country, was the most widely used. Average muzzle velocity for an 11mm black-powder cartridge was approximately 1,400fps (427mps). Attempts were made to produce smaller calibres with black-powder propellant, but a reduction to 9.5mm proved to be the practical downward limit. In these black-powder cartridges the bullets were of lead alloy.

The second basic stage was reached in the 1880s when smokeless powder arrived on the scene. This propellant, apart from bestowing significant tactical advantages upon the firer, gave much higher velocities which, together with the development of composite bullets, enabled small calibre, high-velocity rifles to become a reality. Composite bullets had a jacket or envelope of steel, cupro-nickel or similar metal, enclosing a core of lead alloy. The new breed of rifles were mostly introduced during the last fifteen years of the nineteenth century and, depending upon nationality, ranged in calibre from 6.5mm to 8mm. Most of the cartridges were common to both rifle and infantry machine-gun. Muzzle velocity for this class of cartridge usually lay within 2,200—2,500fps (670—760mps), although higher velocities were achieved with one or two cartridges.

Once these small calibre, high-velocity cartridges had been adopted, they remained in service, basically unchanged, for the next forty years. Their number was added to — and a few vanished — between the wars, but, in the main, the patterns in service remained remarkably constant.

If there was any impetus at all in rifle calibre cartridge design during the period which ended in 1939, it was in the direction of improved propellants and, where appropriate, in the production of special bullet forms such as tracer, armour-piercing, or incendiary for use against targets such as aircraft. On the whole, the tactical thinking of the period between 1900 and 1939 imposed no significant effect upon the design of small arms or their ammunition.

One change which did occur was the establishment on an international scale, of a completely new class of cartridge between the wars. These were large calibre cartridges of between 12.7mm and 20mm for heavy machine-guns in aircraft, for the anti-aircraft or anti-tank rôle, or in heavy anti-tank rifles. In essence they were often upscaled versions of rifle calibre designs, and embodied no special design features except that sometimes the bullet incorporated extra refinements.

That the rifle calibre cartridge of 1939 was virtually identical with that of 1900 is hardly surprising. Except in the

United States, rifles in service everywhere in 1939 were based upon those in service forty years earlier, and since tactical doctrine, particularly for infantry, changed but little during this period, the original rifles were adequate. They were long, heavy, usually bolt-operated, had limited magazine capacity and in the hands of a marksman were effective beyond a thousand metres range. Most land service machine-guns in 1939 were designs that had come into service during or before the First World War and usually fired the rifle cartridge.

In the total upheaval of the Second World War, most of the rifle calibre cartridges referred to, and most of the large calibre heavy machine-gun or anti-tank rifle cartridges vanished for ever. Only a few survived after 1945 and fewer still remain in service today.

3. Ammunition Development since the Second World War

While small arms ammunition development between the two world wars remained fairly stagnant, some stirrings could be detected in the sphere of self-loading rifle development which led later to new concepts in ammunition design.

From about the beginning of this century virtually every major army had evidenced interest to some degree in self-loading rifles, but such interest had rarely led to serious consideration of adopting them. For example, Britain had examined and tried more than thirty designs of semi-automatic or automatic rifle between 1900 and 1930, but none of them was seriously considered for adoption.

During the 1930s, the two countries principally concerned with developing self-loaders were the United States and the U.S.S.R. Both finally succeeded in producing designs that eventually went into production on a large scale; the Americans, with their Garand which became standard issue for the entire U.S. Army during the war, and the Russians, with their Tokarev which, while used in large numbers, was dwarfed during the war by the conventional bolt-action Nagant. Both these rifles used the standard existing rifle cartridge of the country concerned; the .30in-06 for the Garand and the 7.62mm × 54 for the Tokarev. Germany's initial attempts to produce a self-loading rifle during the early stages of the war were also based upon their own standard rifle cartridge, the 7.92mm × 57 Mauser cartridge.

What these rifles gave to their users was a rapidity of fire impossible with bolt-action weapons. However, the result was a heavy, awkward rifle with (except for the Tokarev) limited magazine capacity. No special tactical doctrine accompanied these rifles which were used in exactly the same settings as the existing bolt-action types.

In the mid 1930s, the Germans had begun to study the whole question of rifle armament, and although this did not bear fruit until well into the war, it directly influenced most post-1945 rifle and cartridge design.

The Germans developed the whole concept of armoured warfare on land to a pitch which had never previously been thought possible, and they paid considerable attention to the correct balance between armour and infantry. Later in the war, they successfully put into practice the 'battlegroup' theory, where small sub-units of all arms acted and fought together against a numerically superior enemy. As part of these concepts, the Germans had set out to produce a self-loading rifle of superior design, and they had appreciated at an early stage that the existing full-power rifle cartridge was too powerful and too long for their purpose, besides imposing virtually insurmountable disadvantages. In their approach to cartridge design, they accepted that modern tactics rarely, if ever, required riflemen to engage targets at ranges much beyond 400-500 metres, and ranges below that would be the norm. They were, therefore, prepared to design a cartridge, specifically for the new rifle, which would fire a lighter bullet, require less propellant and, in consequence, could have a far shorter case length. In addition to the advantages of reduced cartridge weight and simpler weapon design (shorter cartridge case), the interior ballistics of the new-style cartridge gave reduced recoil

characteristics, which permitted a reduction in weight.

In all, about eight different cartridges were tested, ranging in calibre between 7mm and 8mm, all with short cases the longest of which was 46mm. Eventually the Germans chose, probably for inherent economic advantages, a shortened version of the standard 7.92mm × 57 Mauser cartridge. This round, which kept the case head of the Mauser cartridge, was in steel, and had a case length of only 32.8mm and a bullet weight of 125 grains (8.1 grams). These 7.92mm Kurz (short) cartridges were designated 'Pistolen Patronen 43.m.E.'.

The new ammunition, together with quantities of two prototype weapon versions were subjected to an intense baptism of fire late in December 1941 on the Eastern Front during the Wehrmacht's retreat from Moscow. Large quantities of both types of weapon were rushed to the front and proved their value in the bitter fighting which ensued. One of these prototypes was selected for service and became known as the MP.43 (later, MP44); it was finally designated Sturmgewehr 44. As 'Sturmgewehr' or 'assault rifle', it supplied the generic name for a whole series of foreign rifles and cartridges that were to appear in many countries after 1945. The German MP.43 had earned a reputation for itself during the last three years of the war,



and its value had not gone unrecognized by the Allies, who saw in it a new class of weapon, firing a cartridge that would set future trends in infantry ammunition.

Post-1945 ammunition development for self-loading rifles, or assault rifles, can be broken down into distinct categories. Initially, development was entirely with short-cased cartridges, which still fell within the calibre brackets which had obtained for ordinary rifle calibre ammunition prior to 1939. This initial stage varied again, between nationalities, some nations being directly and clearly influenced by the German design, and others developing along more independent lines, although mostly the result was still the production of a cartridge similar to the German Kurz Patrone.

Subsequently, and progressively from the late 1950s, development of rifles and ammunition has entered a new phase, with the accent on even lighter and handier weapons than were represented by the immediate post-1945 trend, and calibres far smaller than those of the post-1945 series or the pre-1939 infantry weapons. The ultra-small calibres recently developed in the West, particularly in the United States, have not yet been fully accepted for service in Western Europe and in many other countries, but a strong likelihood exists that they will be. NATO has, from 1 January 1980, followed this trend, adopting a small-calibre cartridge.

IMMEDIATE POST-1945 DEVELOPMENT

U.S.A.

The United States was possibly the first Western country to attempt to produce a new, short-cased cartridge. They elected to retain the .30in calibre and a bullet weight of 150 grains. Development started in 1945 and continued for a number of years, and three basic forms of cartridge case emerged, of three different lengths, 47mm, 49mm and 51mm. Unlike the Germans, the Americans at that time did not grasp the opportunity to match the ballistics of the new cartridges to a new tactical concept, and the official guiding policy of the U.S. Army was that the new cartridge should have ballistics and penetrative power equal to the existing full power .30in-06 series, in particular, the M.2 ball. By insisting upon this, and thereby accepting the heavy recoil inherent in a full-power cartridge, the U.S. Army, in effect, was accepting that its future rifle would be heavy enough to accept the high recoil energy. The 47mm and 49mm case lengths were eventually discarded, and work was concentrated upon the 51mm case. The basic 51mm case was designated 'Case, cartridge light rifle, calibre .30in FA.T-E3', the design being dated 3 June 1949. Upon this case, a whole series of experimental cartridges were based for trial during



1, 7.92mm x 57mm Mauser; 2, 7.92mm x 33mm Kurz; 3, 6.5mm x 43mm, German; 4, 7.62mm x 38mm, German; 5, 7.62mm x 40mm, German; 6, .30in-06, U.S.A.; 7, .30in (47mm case), U.S.A.; 8, .30in (49mm case), U.S.A.; 9, .30in (51mm case), U.S.A.; 10, 6mm SAW

Ammunition Development since the Second World War

the period ending in 1953, the most well known being the cartridge .30in T.65.E3. The 51mm cartridge case was usually referred to as the T.65 case.

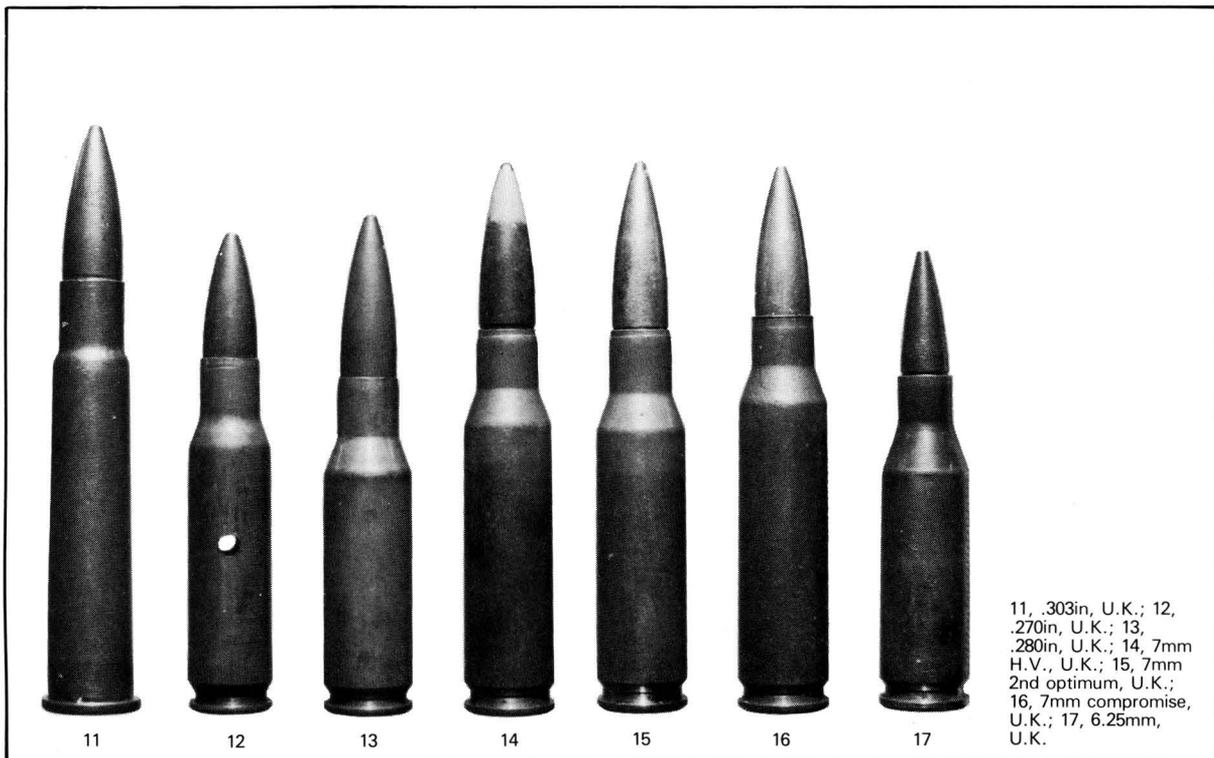
The T.65 case retained the old .30in-06 rim and head, and the T.65.E3 cartridge developed 50,000psi (radial) and a muzzle velocity of between 2,700 and 2,850fps (823-868mps) with its 150-grain bullet. It was the .30in T.65 case that, after competitive trials against 7mm opponents, was finally adopted as standard by NATO in 1953 as the basis for the 7.62mm NATO cartridge.

United Kingdom

While the United States was busy cramming into a shorter cartridge case the ballistics that nullified most of the advantages offered by a true assault rifle cartridge, Britain had also embarked upon a significant cartridge development programme. Before the end of the war in 1945, Britain formed the 'Small Arms Calibre Panel' to determine the ideal calibre for a small arms cartridge to meet the published General Staff requirement. This panel went back to first principles on a theoretical basis, and then conducted firing trials in a number of calibres to prove their theories. The work was carried out comprehensively, and the S.A.C.P. report was published in March 1947. The conclusions of the

panel were 'that the standard round should be of the smallest possible calibre since this will mean the lightest rifle and automatic gun and the smallest and lightest ammunition with all its attendant advantages'. The panel went on to say that, to meet the G.S. specification which did not allow the use of tungsten carbide cores for armour-piercing bullets, the calibre should be about .27in (6.85mm), but if tungsten carbide were permitted, or the armour-piercing clause relaxed, there would be an advantage in using a smaller calibre of .25in (6.35mm), which was the smallest calibre considered by the panel.

As a direct result of the S.A.C.P. report, work was started in Britain which resulted in the design of two different cartridges. The first to appear was originally called the .276in which came out in mid 1947. For cosmetic reasons, the title (but not the dimensions) changed to .280in. In September 1947, it was decided to produce the second cartridge, the .270in. The .280in case was 43.1mm long and the .270in case was 46mm long. The intention was to develop both cartridges with a full range of bullets, but the one to be accepted was to have, in the ball version, performance at fighting ranges equal to the M.2 ball cartridge of the U.S. Army (.30in-06). By November 1948, it had been decided to abandon the .270in and work was concentrated on the .280in



(later known as the .280in/30 when its case head and extractor groove was slightly modified).

For trials staged in the United States in 1950, the .280in/30 cartridge was chambered in the British EM.2 rifle and the Belgian FN rifle (which Britain entered as a second string). The trials, conducted with great fairness by the U.S. Army, came out in favour of the .280in calibre, but the U.S. General Staff declined to accept the findings and insisted upon the retention of the .30in calibre. Britain, in collaboration with Belgium and Canada, then designed a series of longer cased 7mm cartridges with which they hoped to persuade the U.S. Army to abandon the .30in calibre T.65 cartridge. (In the meantime, the .280in/30 had been designated 7mm Mark I.z). In 1953, further trials took place between the longer cased 7mm variants and .30in calibre variants of the T.65, at the end of which the .30in T.65 was adjudicated the winner by a short head. The three 7mm long-cased types referred to above were the 7mm High Velocity (case of 49.5mm), the 7mm compromise (51mm T.65 case necked to 7mm) and the 7mm second optimum (case 49.15mm).

The T.65 case, matched with the Belgian-designed SS.77 lead-cored ball bullet of 144 grains (9.33 grams), became the standard NATO 7.62mm ball cartridge from late 1953. This cartridge remains in service today, not only in NATO, but in

many parts of the world, being manufactured by more than fifty countries.

U.S.S.R.

The development work of the United States and Britain (aided by Belgium and Canada, and with France much in evidence in the 1953 trials) succeeded only in producing for NATO a new cartridge that was very far away from the concept identified by the German Kurz Patrone or by the British Small Arms Calibre Panel. On the other side of the post-1945 fence, in the U.S.S.R., things were going differently.

As has been shown, the U.S.S.R. was one of the few countries to have seriously considered self-loading rifles before the war, and one of the few to have had large numbers of them in service during the war. Russian sources state that, before the outbreak of hostilities with Germany in 1941, the Soviet Union had also begun work on a new small calibre cartridge specifically for self-loading rifles. This cartridge was in 5.45mm calibre, but once war had broken out and the need to maximize resources on standard arms had become clear, work on the 5.45mm project was halted. According to the Russian sources referred to, work on a new intermediate-power cartridge was resumed in 1943. There



Ammunition Development since the Second World War

can be no doubt at all that, during the interim period, the Russians had been favourably impressed with the German approach to assault rifles, manifested by the prototype to the MP.43, first encountered by the Red Army late in 1941. In particular, the German solution to the cartridge problem, solved by shortening their existing 7.92mm case and using a light bullet, seems to have appealed to the Russians. They could not shorten their own existing 7.62mm case, because this was a rimmed design and consequently quite unsuited as the base for a new cartridge, but they could retain their existing calibre, and this they did. The design of the resulting Soviet cartridge has been attributed to N. M. Yelizarov and B. V. Semin, and the 7.62mm cartridge itself was designated the Model 1943. The Russians state that Simonov self-loading carbines chambered for the M.43 cartridge were first used in action in 1944 on the First Byelorussian front.

The Russian 7.62mm Model 1943 cartridge has a 38.6mm case, and the ball bullet weighs 123 grains (8 grams). Muzzle velocity is 2,330fps (710mps). It is, in the true sense, an assault rifle cartridge, designed to be used at intermediate ranges only, offering acceptable levels of recoil in a light and handy weapon. Its popularity in world terms is such that, apart from being the standard rifle cartridge in the armies of the Warsaw Pact, it is standard in Communist China, North Korea, and Vietnam and is manufactured by a dozen other countries. In addition, largely for political reasons, it is the cartridge usually used by dissident movements worldwide.

Parallel to the efforts of the United States, Britain and the Soviet Union, much work was carried out in other countries during the ten years or so that followed peace in 1945. Some of it was very directly attributable to German influence, some was less so.

Czechoslovakia

During its brief life between the two wars, Czechoslovakia had earned a reputation as a producer of high quality military arms, and after the war the Czechs retained that position. The plants had been run by the Germans during the war, and some German influence can be detected in post-war Czech ammunition design and production, during the period prior to the Communist take-over. Prior to 1950, there was little direct coordination on armament design between the Czechs and the Soviet Union. In 1946, the Czech General Staff had decreed that the future cartridge would be rimless in type, and of 7.62mm calibre. In 1949, a cartridge of 7.5mm nominal calibre was produced, with a case length of 45mm. This was designated the Z-49 cartridge, and by 1950 prototype SLRs and LMGs had been produced for this round. Shortly afterwards a further instruction was issued, ordering the calibre to be changed to 7.62mm, which necessitated a redesign of weapons and cartridge. The new 7.62mm cartridge, of 45mm case length was known as the Z-50, and when it was finally approved by the Czech Minister of National Defence (with the knowledge and consent of the Soviet Army advisers) in 1952, it became the Model 1952 cartridge. The M.52 cartridge was an intermediate power round that deserves to be considered as a true assault rifle

cartridge, and it remained in Czech service until the end of 1954 or 1955 when, under the provisions of the Warsaw Pact, the Czechs standardized on the Russian M.43 cartridge, also in 7.62mm calibre.

Finland

Having fought as allies of the Germans against Russia during the 1939-45 war, the Finns had had the opportunity of seeing the Sturmgewehr at first hand, and from the right end. Probably because of this, they began to develop their own rifle and ammunition for it, and the ammunition chosen retained the basic Finnish calibre of 7.62mm. (The basic Finnish cartridge was the Russian 7.62mm × 54.) The case of the new round was 35mm long. The first firing trials took place in January 1944, and the results were insufficiently promising, since the trials ended in September 1944. Prior to these trials with 7.62mm short ammunition, the Finns had conducted trials late in 1942 with special 9mm calibre short-cased ammunition, but these trials were even briefer.

France

At the end of the war France occupied the Mauser factory at Oberndorf, and therefore 'inherited' a large quantity of material, including the prototype Sturmgewehr 45 which



was being developed by Mauser, and a large number of technicians. Some of these apparently volunteered to serve for a while in the French armament industry, and Vorgrimmler was one of them, interrupting his migration to Spain to spend some time in France. In 1948, the French developed a 7.65mm rifle cartridge which, with a light 94-grain bullet (6.1 grams) and a 34.8mm case length, was an interesting possibility, but which achieved however, only limited experimental production.

Spain

After 1945, Spain found itself host to sundry German armament technicians, the most important of whom seems to have been Vorgrimmler. He had been a head of department at the Mauser factory at Oberndorf. In fact, according to post-war Intelligence charts, he ran Department 370.2 which was responsible for automatic weapons for aircraft. Nevertheless, Vorgrimmler designed ground weapons for C.E.T.M.E. in Madrid, and for these weapons, which included assault rifles of advanced design, specially developed ammunition was produced in Spain. Apart from producing ammunition with cases similar to the German Kurz Patrone, and which retained the 7.92mm calibre, Spain produced a number of other short-cased cartridges in

7.62mm and 7.92mm calibre. The Spanish paid particular attention to bullet design for these cartridges, and manufactured a wide range of projectiles of advanced design, including composite bullets of plastic and aluminium, and bullets of non-conventional ogive length and design. None of the Spanish experimental cartridges was adopted.

Switzerland

Between the wars, Switzerland had produced at least three short-cased 7.5mm cartridges, at least one of which was intended for a light machine-gun. The main reason for this series of cartridges is unknown, but it seems unlikely that they formed part of any programme similar to that carried out with the Sturmgewehr in Germany.

The Swiss, however, were impressed with the German weapon and cartridge, and immediately after the war modified a Sturmgewehr 44 for trial purposes. In due course they developed a series of assault rifles, which led to the production in 1952, of the version intended for issue, the Model 52, which was modified a year later as the Model 53. These final versions were produced in limited quantity only and were not finally adopted. A special short-cased cartridge was developed for these experimental weapons, and this first appeared in 1948. A modified version with an improved



22, 7.62mm CETME, Spanish; 23, 7.92mm CETME, Spanish; 24, 7.92mm CETME, Spanish; 25, 7.92mm (Kurz) CETME, Spanish; 26, 7.62mm x 51mm CETME, Spanish; 27, 7.5mm, Swiss; 28, 5.6mm (Eiger), Swiss; 29 and 30, 7.62mm x 42mm, French; 31 and 32, 9mm x 40mm, French.

Ammunition Development since the Second World War

shoulder appeared in 1950. The Swiss retained their basic 7.5mm calibre for these short cartridges, but reduced the bullet weight to 123 grains (8 grams). The case length was 37.8mm. Muzzle velocity was 2,198fps (670mps).

Other short-cased ammunition

Apart from the mainstream activity referred to, other less significant events took place at this time. The Argentinians produced the original German 7.92mm Kurz cartridge (but with brass cases not steel) for a short period during the early 1950s, but it did not enter full service there. Denmark produced an experimental cartridge, the 7mm × 36 Madsen, and had indeed also produced, prior to the war, an earlier design, the 7mm × 44 Weibel. Neither of these cartridges proceeded very far.

Perhaps the two most interesting short-cased experimental cartridges to be produced towards the end of this period were West German in origin. These, both produced under contracts placed with I.W.K. by the Bundeswehr, were intended to provide data for the Bundeswehr who, as a result of joining NATO were obliged to adopt the 7.62mm NATO cartridge and did not like the prospect. The Bundeswehr, more than any other element of the Western Alliance, appreciated the true value of an assault rifle firing the correct cartridge, and had few illusions about the value of the 7.62mm NATO round in that rôle. The two cartridges were 7.62mm × 40 (actual case length 39.7mm), and 6.5mm × 43 (actual case length 42.7mm), both produced in 1962.

ULTRA-SMALL CALIBRE DEVELOPMENT

All the post-1945 development referred to so far was based upon full calibre cartridges, irrespective of the country of origin, and irrespective of the extent to which the original German Sturmgewehr had influenced the development. The only true assault rifle cartridge to be adopted, as a result of all this or earlier work, was the Russian 7.62mm × 39 Model 1943 cartridge. NATO and other Western-aligned countries had adopted a hybrid which was to prove less and less satisfactory as an assault rifle cartridge as time went by.

U.S.A.

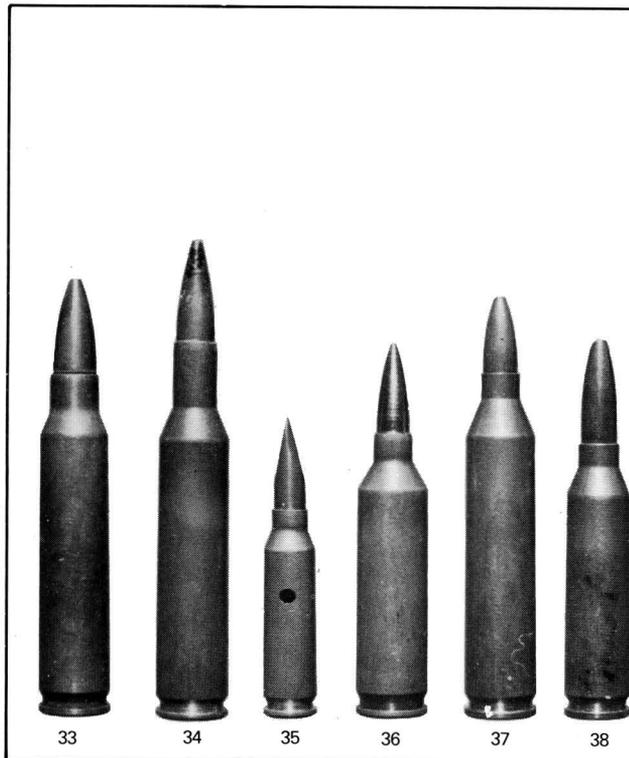
As a result of extensive research programmes initiated in the United States during the 1950s, concerning the problems of increasing hit probability and wound effect for infantry, it was included that, provided its velocity was high enough, a rifle of calibre smaller than .30in (or 7.62mm) would offer great wounding power, improved ballistics and reduced recoil in a light-weight weapon. One of these programmes was called 'Project Salvo', and included in the ammunition tested was high-velocity .22in (5.6mm) calibre. Although the official attitude of U.S. Ordnance was in opposition to the trend expressed in Project Salvo, some official support was given to private companies to produce a rifle and ammunition that would meet the Salvo parameters for the ideal rifle. As a direct result of this, fourteen AR-15 rifles in 5.56mm calibre were delivered for trial to the U.S. Army in

May 1957. Adoption by the army did not follow, but the U.S. Air Force did eventually accept the rifle, renaming it the M.16, in 1960. Subsequently, the U.S. Army issued the rifle, known in army service as the M.16.A.1, for limited service in Vietnam, and eventually it was general issue for the entire army.

Thus it was that the United States who, in the mid 1950s, had forced the over-powered 7.62mm NATO cartridge upon its largely reluctant European Allies who favoured a smaller calibre intermediate-power cartridge, turned in its tracks and unilaterally adopted an ultra-small calibre cartridge in the 1960s.

The 5.56mm cartridge adopted by the United States had a 44.5mm case, and fired a 55-grain (3.56 gram) bullet at 3,170fps (966mps). It was an effective cartridge, at least up to the infantry fighting ranges defined in Project Salvo as a maximum of 450 metres.

The 5.56mm × 45 cartridge inspired much interest in many parts of the world, and apart from causing many countries to produce their own versions of it, also caused a series of other small calibre cartridges of roughly comparable performance to be designed. None of these alternative cartridges have been adopted, although one, the British 4.85mm round recently has been under competitive trial against 5.56mm × 45 ammunition in the NATO Small Arms Calibre Trials.



Ammunition Development since the Second World War

Germany, Federal Republic of

Mainly for Heckler and Koch rifles, but also in part for Mauser, a number of cartridges were developed in West Germany, some of which, it is believed, were manufactured in Spain. None of these cartridges, with the possible exception of the 4.6mm, was a serious contender for adoption. The German range consisted of the 4mm × 37 (actual case 36.6mm) which was probably for a Mauser prototype rifle, the 4.3 × 45 (actual case 44.8mm), the 4.6mm × 36 (actual case 35.6mm) and the 4.9mm × 45 (actual case 44.5mm).

Spain

Spanish arsenals made some of the cartridges used in Germany, including the 4.6mm × 36. In addition, Spain manufactured a 4mm × 27 cartridge dating from 1974.

Switzerland

In the early 1970s, Switzerland embarked upon a serious project designed to find a replacement for the Model 1911 cartridge in 7.5mm. The project resulted in a number of cartridge designs, the most important of which was a 5.6mm cartridge of large case capacity, the case being 48.2mm long and 11.9mm in rim diameter. Firing a 57-grain (3.7 gram)

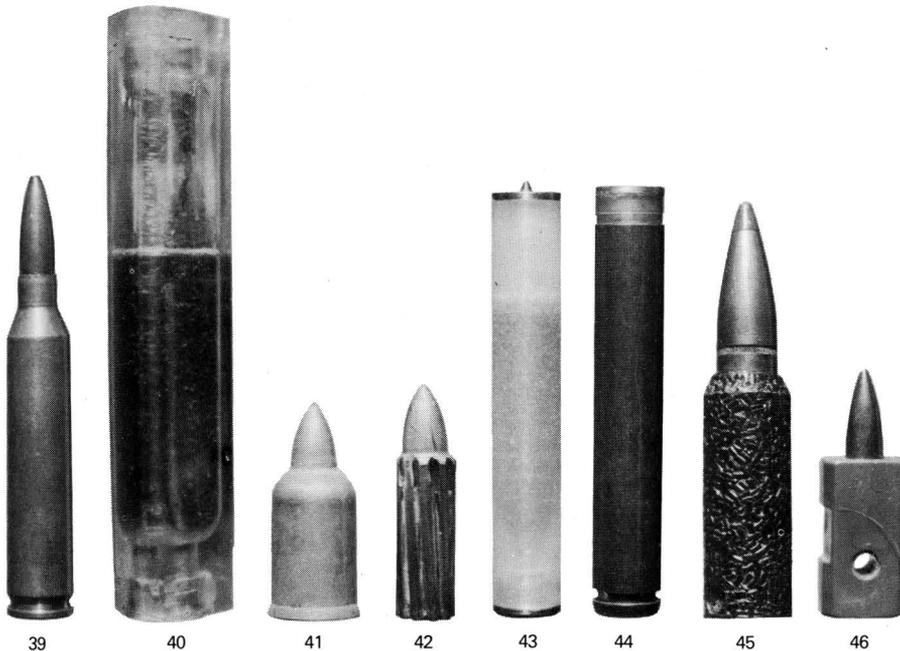
bullet, muzzle velocity was 3,444fps (1,050mps). This cartridge came close to adoption, being designated the Model 1976, but was finally shelved. Against the current trend, Switzerland is likely to seek a larger calibre solution.

United Kingdom

Having concluded in the period around 1969 that the ideal infantry calibre was 6mm or just over, Britain, to meet revised requirements, developed a smaller cartridge in the early 1970s. The initial design, based upon the U.S. 5.56mm cartridge, was a 44mm case length 4.85mm calibre round. Later the case neck was lengthened to give a case length of 48.9mm. The 55-grain (3.56 gram) bullet has a published muzzle velocity in the rifle of 2,740fps (836mps). This cartridge was entered by Britain in the recent NATO trials.

U.S.S.R.

Russia has very recently taken into service a new, small calibre cartridge for the AKS 74 assault rifle now being issued to the Soviet Army. The rifle is of nominal calibre 5.45mm and the cartridge of conventional design, rimless, with a 39mm case length. In the late 1960s and early 1970s, the U.S.S.R. provided various experimental 5.6mm cartridges also.



33, 5.5mm M.193, U.S.A.; 34, 4.85mm, U.K.; 35, 4mm x 27mm, German; 36, 4mm x 37mm, German; 37, 4.3mm x 45mm, German; 38, 4.6mm x 36mm, German; 39, 4.9mm x 45mm, German; 40, tround, U.S.A.; 41, Schirnecker, Belgium; 42, fired Schirnecker, Belgium; 43 and 44, cylindrique cartridges, Belgium; 45, 7.62mm caseless, U.S.A.; 46, 4.7mm caseless (dummy), German.

4. Individual Cartridge Profiles

This Chapter is intended to give a fairly detailed outline of each main cartridge type manufactured since 1945, and includes an 'obsolete' section covering ammunition usually not made after 1945, but which was in use or was encountered for a limited period of time after 1945. It is intended that, where appropriate, Chapter 4 be read in conjunction with Chapter 5.

The headings in Chapter 4 are the common title headings, for ease of recognition. Where possible, the official designations or alternative titles are also shown, including those metric designations commonly encountered. Metric designations indicate the calibre in millimetres followed by the case length in millimetres. This latter measurement is often rounded to the nearest whole number. It has been the

practice sometimes to add to the metric designation the letter 'R' where the case is rimmed, but this is now often omitted, and it is usually omitted here.

The weights and measurements shown are mean measurements, often taken from samples of the ammunition, and variations between these and manufacturing specification figures can occur. The term 'muzzle velocity' is used throughout for convenience, and in fact the velocity figures usually relate to mean or instrumental velocity measured at a set distance from the muzzle.

The list of manufacturers under each cartridge profile enables easy cross-reference to be made to individual country sheets in Chapter 5, for further information on particular cartridges.

6.35mm Browning SL Pistol

Metric designation: 6.35mm x 15.5.

Other designations: .25in ACP.

The case is of brass, semi-rimless and straight-sided.

Measurements

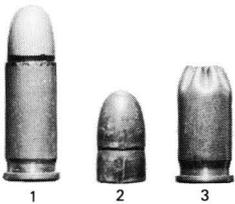
Case length:	15.5mm
Head diameter:	7.0mm
Rim diameter:	7.6mm
Bullet diameter:	6.4mm
Overall length of cartridge:	22.8mm

Bullets

The usual bullet weight is 50 grains (3.24 grams). Military loadings usually have a rounded ogive and full metal jacket with a lead alloy core. Soft-point or all-lead bullets have also been made.

Muzzle velocity

This varies according to place of manufacture, but usually falls within the bracket 830-880fps (253-268mps).



6.35mm Browning: 1, ball cartridge; 2, bullet; 3, blank cartridge.

Outline history

Originated in Belgium in 1906, for use in the Browning SL pistol produced by Fabrique Nationale at that time. Has been widely used in Europe and elsewhere, but is not a powerful cartridge and is unsuitable as a military round.

Principal manufacturers since 1945

(for military or police use)

Argentina, Brazil, Italy, Spain, Switzerland, South Africa, Yugoslavia.

7.62mm Tokarev

Metric designation: 7.62mm x 25.

Other designations: 7.62mm (Model 30); 7.62mm, Type 50 Chinese.

This automatic pistol cartridge is also used in submachine-guns. It has a rimless bottle-necked case of brass or steel.

Measurements

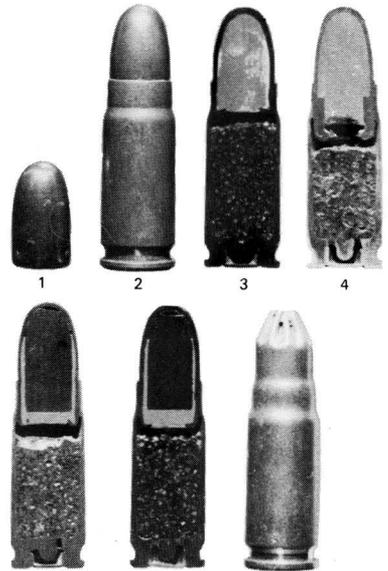
Case length:	24.85mm
Head diameter:	9.7mm
Rim diameter:	9.85mm
Bullet diameter:	7.8mm
Overall length of cartridge:	34.7mm

Bullets

The standard Soviet ball bullet, the Type P, is a lead-cored round-nosed design weighing 85 grains (5.51 grams). A Type P.41 armour-piercing incendiary and a Type PT tracer also exist in the U.S.S.R. Apart from these Russian designs, a variety of other bullet forms have been made elsewhere, some under the name of 7.63mm Mauser (the 7.63mm Mauser cartridge has a case having the same measurements as the Tokarev, and the two types are interchangeable). Bullets specifically for the Mauser cartridge vary in weight from 80-92 grains (5.19-5.96 grams).

Muzzle velocity

With the 85-grain (5.51-gram) ball bullet, standard muzzle velocity is 1,500fps (457mps).



7.62mm Tokarev: 1, ball 'P' bullet; 2, ball cartridge; 3, ball cartridge type P, sectioned; 4, tracer cartridge type PT, sectioned; 5, ball, steel core (U.S.S.R.); 6, ball, steel core (Czech); 7, blank.

Outline history

The original Mauser 7.63mm cartridge was introduced in Germany in 1896. The case itself was virtually identical with the earlier 7.65mm Borchardt, which was significantly less powerful, and the Borchardt progressively vanished from the scene, the 7.63mm Mauser gaining in use and popularity as time went by. The 7.62mm Tokarev SL

pistol was designed around the Mauser case, and the Tokarev cartridge was introduced into Soviet service as the Model 1930, and under the 7.62mm calibre designation.

Principal manufacturers since 1945
Brazil, Bulgaria, China (Nationalist and Communist), Czechoslovakia, Poland, Portugal, Spain, Turkey, U.S.S.R., Yugoslavia.

7.62mm Nagant Revolver

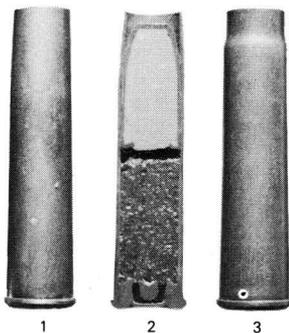
Metric designation: 7.62mm × 38.R.
The case for this round is rimmed and has tapered sides, the taper becoming accentuated at the mouth. With some Nagant ammunition made outside the U.S.S.R., the mouth taper is replaced by a distinct bottle-neck. The bullet is contained entirely within the case and is not visible except from above. Only brass has been noted as a case material; elasticity of case material being of added value in a design where the bullet has to pass the case mouth upon being fired.

Measurements

Case length: 38.5mm
Head diameter: 9.0mm
Rim diameter: 9.6mm
Bullet diameter: 7.8mm

Bullets

The Russian service bullet is jacketed with a lead alloy core, and has a truncated tip. This bullet weighs 106 grains (6.87 grams) but, with bullets manufactured other than in the U.S.S.R., weights of as little as 95



7.62mm Nagant revolver: 1, ball cartridge (U.S.S.R.); 2, sectioned ball cartridge (U.S.S.R.); 3, ball cartridge, alternative necking.

grains (6.15 grams) occur.

Muzzle velocity

With the standard U.S.S.R. ball, 950fps (290mps).

Outline history

The Nagant revolver was introduced into Imperial Russian service in 1895. It was a seven-chambered weapon and was unusual in that, as the hammer falls the cylinder moves forward to surround the rear of the barrel, giving reduced gas escape. Other countries such as Poland also used the 7.62mm Nagant cartridge before the war, and the cartridge was manufactured throughout Europe, including the U.K. and Turkey. Although now obsolete for service use in the U.S.S.R., this cartridge is still used for competition shooting.

Principal manufacturers for military use since 1945
U.S.S.R.

7.65mm Browning SL Pistol

Metric designation: 7.65mm × 17.
Other designations: 7.65mm (Model 1897); .32in ACP.

The case is of brass or lacquered steel (brass predominating) and is straight-sided and semi-rimless.



7.65mm Browning SL pistol: 1, ball cartridge; 2, bullet.

Measurements

Case length: 17mm
Head diameter: 8.5mm
Rim diameter: 9.0mm
Bullet diameter: 7.85mm
Overall length of cartridge: 24.9mm

Bullets

Considerable variations exist, and full-jacketed, jacketed with soft point, and all-lead types have been used. Weights vary between 55 and 75 grains (3.57 - 4.86 grams).

Muzzle velocity

With a 67-grain (4.35-gram) jacketed bullet, 1,066fps (325mps).

Outline history

This cartridge was first introduced in 1900 in Belgium by Fabrique Nationale for the Modèle 1897 pistol. It has been used in a wide variety of pistols, and produced in many countries. It can also be chambered in the .38in Smith and Wesson revolver. In addition, a true rimless version exists for use in a Chinese silenced pistol.

Principal manufacturers for military or police use since 1945

Argentina, Australia, Austria, Belgium, Czechoslovakia, Germany (East), Italy, Korea (North), Spain, Switzerland, Yugoslavia.

7.65mm MAS Auto Pistol

Other designations: 7.65mm Pistolet Mitrailleur (Model 1938); 7.65mm Long, French; 7.65mm (Model 1925) French.

The case is rimless and straight-sided, with Berdan primer, and may be of steel or brass.

Measurements

Case length: 19.7mm
Head diameter: 8.5mm
Rim diameter: 8.5mm
Bullet diameter: 8.85mm
Overall length of cartridge: 30.3mm

Bullet

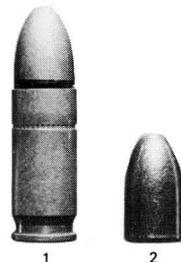
The bullet is round-nosed and flat-based, fully-jacketed with a lead alloy core. The weight is 89 grains (5.77 grams).

Muzzle velocity

984fps (300mps).

Outline history

This cartridge was introduced into French service in 1935 for use in the Browning-type M. 1935 SL Pistol. Later its use was extended to the M. 1938



7.65mm MAS SL pistol: 1, ball cartridge; 2, bullet.

Individual Cartridge Profiles

submachine-gun. The cartridge was made in France only, and was generally considered underpowered for SMG work. The case for the M.1935 is virtually identical with an earlier cartridge manufactured in the United States in 1918, known as the .30in Pedersen cartridge, for use in an attachment to the U.S. service Springfield rifle. There is little doubt that the French cartridge is modelled upon the American case. The sole producers of this cartridge have been situated in France.

7.65mm Parabellum

Other designations: 7.65mm (Model 1900) Swiss; 7.65mm Bergmann Submachine-gun; .30in Luger. The case is rimless and bottle-necked, and usually Berdan primed. Only brass cases are issued in this calibre, although aluminium cased ammunition has been issued in Switzerland.

Measurements

Case length:	21.5mm
Head diameter:	9.8mm
Rim diameter:	10.0mm
Bullet diameter:	7.8mm
Overall length of cartridge:	29.8mm



7.65mm Parabellum ball cartridge.

Bullets

The standard military bullet is round-nosed, flat-based and fully-jacketed with lead alloy core, weighing 93 grains (6.03 grams). Other bullet forms also exist, including soft-point jacketed designs, and truncated nose full jacket.

Muzzle velocity

For a standard military loading (Swiss), 1,300fps (396mps).

Outline history

The first military adoption was in 1900 when the Swiss Army took the 7.65mm cartridge into service with a Parabellum

pistol. It was also used in Switzerland in submachine-guns.

Principal manufacturers since 1945
Brazil, Finland, Portugal, Switzerland.

.32in Smith & Wesson Revolver

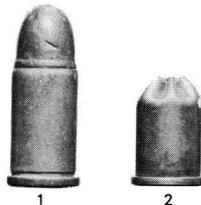
Other designations: .32in Short. The case for this cartridge is rimmed and straight-sided.

Measurements

Case length:	15.3mm
Head diameter:	8.5mm
Rim diameter:	9.4mm
Bullet diameter:	8.0mm
Overall length of cartridge:	23.3mm

Bullets

A wide variety of bullet forms are found with this cartridge, with weights of between 70 and 90 grains (4.54-5.83 grams). Bullet forms include fully-jacketed lead-core designs and solid lead.



.32in Smith and Wesson revolver: 1, ball cartridge; 2, blank cartridge.

Muzzle velocity

Varies with manufacturer and bullet type, but the 86-grain (5.57-gram) bullet has a velocity of *c.*700fps (213mps).

Outline history

This cartridge was first produced in the United States approximately 100 years ago. It is chambered in a very wide variety of revolvers, and has been manufactured in most of the major arms-producing countries of the world.

.357in Magnum

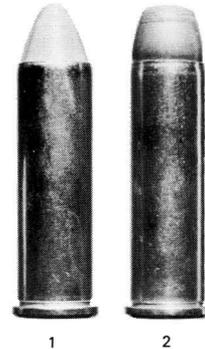
Other designation: .357in Smith & Wesson.

The case for this cartridge is straight-sided and rimmed. Ammunition is usually of U.S. origin and has Boxer primers. Silvered cases are common.

Measurements

Case length:	32.5mm
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Head diameter:	9.5mm
Rim diameter:	11.0mm
Bullet diameter:	9.0mm
Overall length of cartridge:	37.5mm-40.5mm, depending upon bullet type.



.357in Magnum: 1, ball cartridge (metal piercing); 2, ball cartridge.

Bullets

Bullet forms include: round-nose fully-jacketed, with lead alloy core; half-jacketed with exposed lead tip; solid lead, flat nose; conical, fully-jacketed; teflon coated 'KTW' type, metal piercing. Weight, irrespective of bullet form, is usually 158 grains (10.24 grams).

Muzzle velocity

Standard with the 158-grain (10.24-gram) bullet is 1,450fps (442mps).

Outline history

This cartridge was first introduced in the United States, in 1935 and is generally reckoned to be one of the most powerful pistol cartridges in general manufacture. Unlike most cartridges of this general size, the designation (.357in) actually corresponds to its bullet diameter.

Principal manufacturers
U.S.A.

.38in Smith & Wesson

Other designations: .38in S & W Short; .380in Enfield; .380in Ball Mk 1; .380in Ball Mk 2; 9.65mm Revolver.

The case is of brass, straight-sided and rimmed, and may have Boxer or Berdan primers. Some cases have a cannellure at varying points around the case. Some commercial cases are silvered.

Measurements

Case length:	19.3mm
Head diameter:	9.6mm

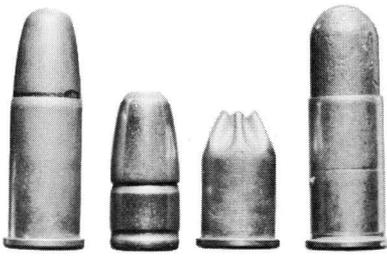
Rim diameter: 11.0mm
 Bullet diameter: 9.1mm
 Overall length of cartridge: 31.0mm for standard British Mk 2, but length varies with bullet type.

Bullets

A very wide assortment of bullets exists for this cartridge, which will not be covered in detail here. Solid lead bullets come in two main weight brackets, c. 150 grains (9.75 grams) and c. 200 grains (12.96 grams). Fully-jacketed bullets also fall within two main brackets, c. 145 grains (9.4 grams) and c. 200 grains (12.96 grams).

Muzzle velocity

For a 145-150-grain (9.4-9.75-gram) bullet, usually c. 750fps (229mps). 200-grain (12.96-gram) bullets usually have velocities of c. 630fps (192mps). The British Mk 2 service bullet, weighing 178 grains (11.53 grams), has a velocity of 600fps (183mps).



.38in Smith and Wesson revolver: 1, .380in Ball Mk 2 (U.K.); 2, Mk 2 bullet; 3, blank cartridge; 4, ball cartridge (commercial).

Outline history

The original .38in S & W cartridge was introduced in the United States in the 1870s and has been produced and used in many parts of the world. The British service .380in Enfield revolver cartridge, using the same case, was approved for service in 1930.

Principal manufacturers for military use since 1945

Australia, Belgium, Canada, France, India, Singapore, South Africa, Spain, Turkey, United Kingdom.

.38in Special Revolver

Other designations: .38in S & W Special; .38in/44 S & W Special. This cartridge has a rimmed, straight-

sided case, with Boxer or Berdan primer depending upon place of manufacture. Cases of commercial manufacture are commonly nickelled.

Measurements

Case length: 29.3mm
 Head diameter: 9.5mm
 Rim diameter: 11.0mm
 Bullet diameter: 9.0mm
 Overall length of cartridge: 39.0mm or less depending upon bullet type. Some bullet types are entirely contained within the case.

Bullets

A very wide variety of bullets exists, of many different forms and weights, from 200 grains to c. 70 grains (12.96 grams-4.53 grams). The standard weight is usually taken as 158 grains (10.24 grams).

Muzzle velocity

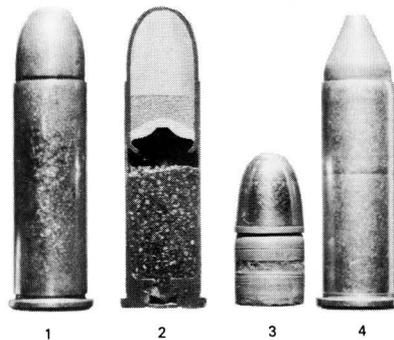
Varies considerably with bullet weight and place of manufacture. As examples, the Spanish 154-grain (10-gram) bullet has a velocity of 1,033fps (315mps). The 200-grain (12.96-gram) U.S. Police-type bullet usually has a velocity of 750fps (229mps).

Outline history

The .38in Special cartridge was introduced in the United States, in about 1902, being of particular interest to police forces and for competition shooting.

Principal manufacturers for military or police use since 1945

Argentina, Austria, Belgium, Brazil, Canada, Finland, Indonesia, Japan,



.38in Special revolver: 1, ball cartridge; 2, sectioned ball cartridge; 3, alternative bullet; 4, ball cartridge (metal piercing).

Morocco, Philippines, South Africa, Spain, Sweden, Thailand, Turkey, United Kingdom (limited), U.S.A., Yugoslavia.

9mm Corto/Court/Kurz/Short

Other designations: .380in ACP; 9mm Beretta; 9mm (Model 1934) Italian. The case for this cartridge is rimless and straight-sided. Berdan primers are usually used except for U.S. manufactured ammunition which has used Boxer primers.



9mm Corto: 1, ball cartridge; 2, bullet.

Measurements

Case length: 17.1mm
 Head diameter: 9.5mm
 Rim diameter: 9.5mm
 Bullet diameter: 9.0mm
 Overall length of cartridge: 25.0mm

Bullets

Although soft-point bullets exist, most bullets for this cartridge are flat-based and round-nosed, with lead alloy cores. Weight 93 grains (6.03 grams), but variations will be found.

Muzzle velocity

Varies with country of manufacture, c. 860-960fps (262-293mps).

Outline history

This cartridge was introduced for a Colt automatic pistol in America in 1908, and soon afterwards its use spread to various parts of Europe.

Principal manufacturers for military or police use since 1945

Argentina, Austria, Belgium, Egypt, Finland, France, Italy, Peru, Spain, Turkey, Yugoslavia.

9mm Makarov

Metric designation: 9mm x 18. U.S.S.R. service designation: 9mm PM.

Chinese service designation: 9mm (Model 59).

The case is rimless and straight-sided.

Individual Cartridge Profiles

Ignition is by Berdan primer. Cases may be of steel (copper washed or lacquered) or, less usually, of brass.

Measurements

Case length: 17.8mm
 Head diameter: 9.8mm
 Rim diameter: 9.85mm
 Bullet diameter: 9.25mm
 Overall length of cartridge: 24.7mm

Bullets

Two ball bullets exist, different in internal construction, but both weighing 93 grains (6.03 grams). Both have full metal jackets, and are round-nosed and flat-based. The older of the two designs has a lead alloy core, while the later version has a steel insert in the core.

Muzzle velocity

1,043fps (318mps).



9mm Makarov ball cartridge.

Outline history

This cartridge was designed in the U.S.S.R. and adopted, with the 9mm Makarov SL pistol, in 1951. In 1952, the Stechkin pistol (capable of automatic fire and intended for use at greater ranges than the Makarov) was adopted also, and this weapon also chambered the 9mm Makarov cartridge. The 9mm cartridge is now the standard pistol cartridge of the Warsaw Pact armies.

Principal manufacturers

China, France, Germany (East), Poland, U.S.S.R.

9mm Police

Metric designation: 9mm × 18.

The case is straight-sided and rimless, of brass and Boxer primed.

Measurements

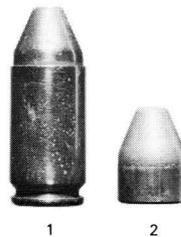
Case length: 17.8mm
 Head diameter: 9.8mm
 Rim diameter: 9.5mm
 Bullet diameter: 9.0mm
 Overall length of cartridge: 25.4mm

Bullet

Flat-based, truncated point, with full jacket and lead alloy core. Weight 99.5 grains (6.45 grams).

Muzzle velocity

1,017fps (310mps).



9mm Police: 1, ball cartridge; 2, bullet.

Outline history

This cartridge bears a very close resemblance to the 9mm Ultra first made by Geco in Germany prior to 1945. It also has a case very similar to that of the Soviet 9mm Makarov. The 9mm Police was developed in the last few years to meet a demand for use in a lightweight blowback operated pistol, for internal security use, where power greater than that offered by the 7.65mm Browning or the 9mm Corto was needed and where the 9mm Parabellum was too powerful for that type of action. Another factor was the need to use a cartridge case not interchangeable with the normal 9mm Parabellum.

Manufacturers

Austria.

9mm Parabellum

Metric designation: 9mm × 19.

Other designations: 9mm Luger; 9mm Glisenti; 9mm Pistolet Patrone 08.

The case is rimless and straight-sided. Cases of brass, steel or aluminium have been used with service loadings, and ignition is usually with Berdan primers, but Boxer primed ammunition has been made in various parts of the world.

Measurements

Case length: 19.1mm
 Head diameter: 9.8mm
 Rim diameter: 9.8mm
 Bullet diameter: 9.0mm
 Overall length of cartridge: 29.6mm (standard)

Bullets

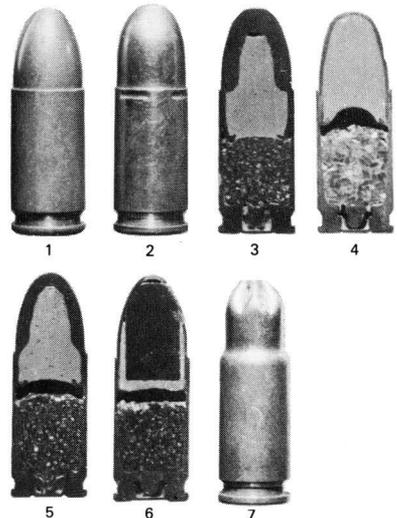
A variety of service bullet forms exists. The most common current form is the round-nosed flat-based bullet with full metal jacket and lead alloy core. This type comes in two standard weights, 115 grains (7.45 grams) and 125 grains (8.1 grams). Earlier ball bullets had a truncated nose form, with lead alloy core; the bullet weight for this form was usually 124 grains (8.04 grams). Bullets with a mild steel core element have also been fairly widely used, and here the steel displaces the heavier lead, giving a lighter bullet weight which is usually c. 100 grains (6.48 grams). Other types produced include tracer, deep-penetrating (semi-armour-piercing) and heavy bullets for silenced weapons.

Muzzle velocity

Varies considerably with type of bullet and place of manufacture. Typical velocities are: British Mk 2.z (with 115-grain (7.45-gram) bullet) 1,300fps (397mps); Belgian ball (with 123.4-grain (8.0-gram) bullet) 1,148fps (350mps).

Outline history

This cartridge first appeared in 1904 when it was adopted by the Imperial



9mm Parabellum: 1, ball cartridge (U.K.); 2, ball cartridge (Switzerland); 3, deep penetrating steel tip (Belgium); 4, Ball Mk 2.z (U.K.); 5, deep penetrating steel tip (Sweden); 6, steel core ball (Czech); 7, blank cartridge (Czech).

German Navy for use in a Parabellum pistol. The German Army followed with adoption in 1908. It is possibly the most widely used and manufactured cartridge in the world, and is suitable for use in both the SL pistol and the submachine-gun.

Principal manufacturers since 1945
 Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Burma, Cambodia, Canada, Chile, China, China (Taiwan), Colombia, Czechoslovakia, Denmark, Dominica, Egypt, Finland, France, Germany (East), Germany (West), Greece, India, Indonesia, Iran, Iraq, Israel, Italy, Japan, Lebanon, Malaysia, Morocco, Nepal, Netherlands, Nigeria, Norway, Pakistan, Peru, Portugal, South Africa, Spain, Sweden, Switzerland, Syria, Turkey, United Kingdom, U.S.A., Venezuela, Vietnam (South), Volta, Yugoslavia.

9mm Steyr

Other designation: 9mm (Model 1912) Austrian.

The case is rimless and straight-sided, of brass and Berdan primed.

Measurements

Case length: 22.7mm
 Head diameter: 9.6mm
 Rim diameter: 9.7mm
 Bullet diameter: 9.0mm
 Overall length of cartridge: 32.8mm

Bullet

Round-nosed, flat-based with full metal jacket and lead alloy core. The weight is 115 grains (7.45 grams).

Muzzle velocity
 1,100fps (335mps).

Outline history

This cartridge was first adopted by Austria in 1912 for a Steyr SL pistol. Later it was also used in the Austrian



9mm Steyr ball cartridge.

MP 34 submachine-gun. The 9mm Steyr is easily confused with the 9mm Bergmann Bayard (Largo) cartridge.

Manufacturers since 1945
 Chile, Italy.

9mm Largo

Other designations: 9mm Bergmann Bayard; 9mm Bayard; 9mm Bergmann No. 6; 9mm (Model 1910) Danish.

The case has straight sides, very slightly tapered, and is rimless. Ignition is Berdan, and case material is brass.

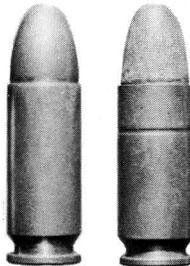
Measurements

Case length: 23mm
 Head diameter: 9.6mm
 Rim diameter: 9.7mm
 Bullet diameter: 9.0mm
 Overall length of cartridge: 33.5mm

Bullet

Round-nosed, flat-based and fully-jacketed with lead alloy core. Weight is 126.5 grains (8.2 grams).

Muzzle velocity
 1,200fps (366mps).



1 2

9mm Largo: 1, ball cartridge; 2, blank cartridge.

Outline history

This cartridge originated in Germany at the turn of the century. It was used officially in Belgium and Denmark before the First World War, and was also adopted officially by Spain, who uses it still. It is chambered in SL pistols and submachine-guns.

Manufacturers since 1945
 Spain.

.45in ACP

Metric designations: 11.25mm Norwegian Colt; 11.43mm.

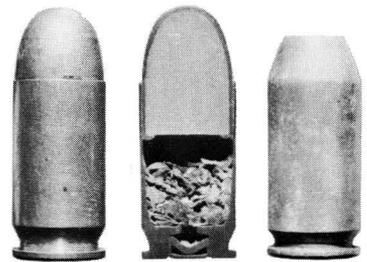
Other designations: .45in Colt Auto; .45in U.S. (Model 1911).

The case is straight-sided and rimless,

usually of brass, but steel cases have been made. U.S. production has Boxer primers, most other uses Berdan.

Measurements

Case length: 22.6mm
 Head diameter: 12.0mm
 Rim diameter: 12.0mm
 Bullet diameter: 11.45mm
 Overall length of cartridge: 32.2mm



1 2 3



4

.45in ACP: 1, ball cartridge; 2, sectioned ball cartridge (U.S.A.); 3, blank; 4, bullet (U.S.A.).

Bullets

The standard U.S. Government ball bullet is fully-jacketed with a lead alloy core and weighs 234 grains (15.16 grams). A wide assortment of ball bullets exists, mostly commercial, weighing from 230 grains to 185 grains (14.9-11.99 grams). Tracer ammunition has also been produced, and metal-piercing cartridges, the latter for use by Police.

Muzzle velocity

The 234-grain (15.16-gram) Government bullet has a velocity of 820fps (250mps).

Outline history

This cartridge first appeared in the United States as a commercial item, and it was only four or five years after this that it was adopted, in 1911, by the U.S. Government for the Colt Model 1911 SL Pistol. The .45in cartridge has also been used in submachine-guns.

Principal manufacturers for military or police use since 1945

Argentina, Belgium, Brazil, China (Nationalist), France, Greece, Italy,

Individual Cartridge Profiles

Japan, Korea (South), Mexico, Norway, Philippines, U.S.A., Yugoslavia.

.455in Revolver

Official British designation: Cartridge

SA Ball Revolver Mk 6 (or 6z).

Other designations: .455in Enfield;

.455in Webley.

The case is straight-sided and rimmed, of brass, with Berdan primer.

Measurements

Case length: 18.9mm

Head diameter: 12.0mm

Rim diameter: 13.4mm

Bullet diameter: 11.5mm

Overall length of cartridge: 31.4mm

Bullets

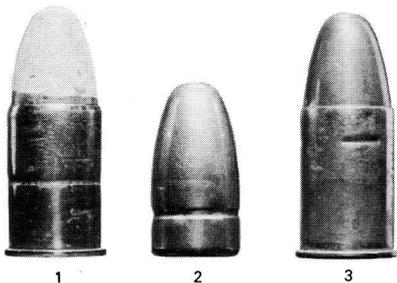
During its long history, this case has been fitted with a large assortment of bullets, military and commercial. The only post-1945 production for military use has been that for the Mk 6 version which is fully-jacketed with a lead core, and has a flat base with rounded nose. The base of the lead core is deeply recessed. Weight is 265 grains (11.17 grams). The 265-grain Mk 2z bullet (see below) may also still be encountered.

Muzzle velocity

Approximately 600fps (183mps).

Outline history

The original Revolver ball cartridge, Mk 2, the first of the series using this case, was approved in British service in 1897. It had a rounded solid lead alloy bullet. The Mk 6, which retained the same bullet weight, was the modernized version of the Mk 2, and the first of the series to take a fully-jacketed bullet. It was approved for



.455in revolver: 1, ball cartridge (commercial); 2, bullet Mk 6 (U.K.); 3, ball cartridge Mk 6 (U.K.).

British service in 1939. Although not retained in service use in Britain after 1945, it was retained for some while in the armies of India and Pakistan.

Manufacturers for military use since 1945

United Kingdom (for export to Pakistan).

5.56mm Remington

Metric designation: 5.56mm × 45.

Other designations: .223in Remington;

.233in Armalite.

The case is rimless and bottle-necked.

The case may be of steel, brass or aluminium (some training ammunition is plastic cased). Ignition is usually

Berdan or Boxer, but French-made ammunition may have the new 'bridge'-

type variation of Berdan priming.

Measurements

Case length: 44.5mm

Head diameter: 9.5mm

Rim diameter: 9.5mm

Bullet diameter: 5.7mm

Overall length of ball cartridge: 57.3mm

Bullets

The standard U.S. ball bullet (M. 193) is boat-tailed and lead-cored, weighing 55 grains (3.56 grams). The corresponding U.S. Tracer (M. 196) weighs 53 grains (3.43 grams). A number of other bullet forms exist. In particular a series of heavier bullets with long slender points and weighing between 68 and 77 grains (4.4-5.06 grams) were produced for developmental reasons in Germany, Holland and the United States. Special bullets, for gendarmerie use and for short-range practice also exist.

Muzzle velocity

The M. 193 ball has a velocity of 3,170fps (966mps).

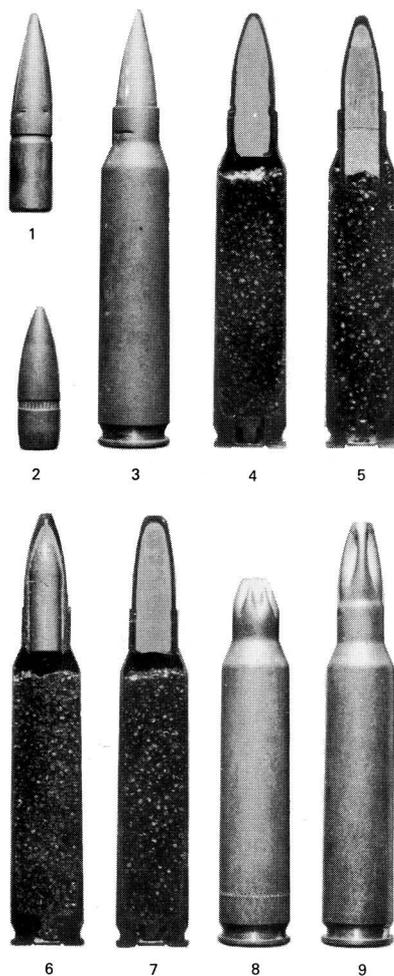
Outline history

This cartridge emerged in the 1950s as a result of the U.S. 'Project Salvo'. The .223in Remington, as this cartridge was then generally called, was one of a number of high-velocity .22in rounds developed at the time, and the cartridge, together with the first AR.15 rifles was submitted for trial in 1957. Subsequently, after adoption by the U.S. Air Force and partial adoption by the U.S. Army in Vietnam, the 5.56mm cartridge and the M.16 rifle (as the

AR.15 became known) were adopted for general issue in the U.S. Army.

Principal manufacturers

Australia (limited), Austria, Belgium, Brazil, Canada, China (Taiwan), Finland, France, Germany (West), Indonesia, Israel, Italy, Japan, Korea (South), Malaysia, Netherlands, Norway, Philippines, Portugal,



5.56mm x 45mm: 1, 77-grain Dutch bullet; 2, M.193 bullet (U.S.A.); 3, Dutch 77-grain ball cartridge; 4, M.193 ball cartridge (Belgium); 5, tracer cartridge (Belgium); 6, A.P. cartridge (Netherlands); 7, Gendarmerie cartridge (Belgium); 8, XM 200 blank (U.S.A.); 9, blank (Belgium).

Singapore, South Africa, Spain, Sweden, Thailand, United Kingdom (limited), U.S.A., Yugoslavia.

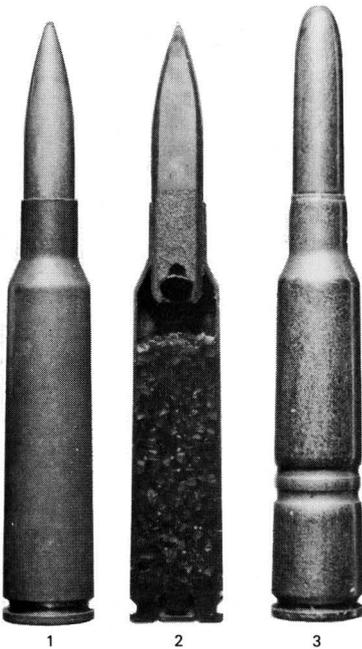
6.5mm Swedish Mauser

Metric designation: 6.5mm × 55;
6.5mm (Model 1894).

The case is rimless and bottle-necked. Steel cases have been made, but brass is standard. Ignition is Berdan priming.

Measurements

Case length:	54.8mm
Head diameter:	12.1mm
Rim diameter:	12.1mm
Bullet diameter:	6.7mm
Overall length of cartridge:	78.0mm



6.5mm Mauser: 1, ball cartridge; 2, sectioned tracer cartridge; 3, drill cartridge.

Bullets

The standard Swedish ball bullet, the M/41 ball, is flat-based and has a pointed ogive. The bullet weight is 140 grains (9.07 grams). Tracer, armour-piercing and short-range ball loadings have also been made.

Muzzle velocity

The M/41 ball has a muzzle velocity of 2,600fps (793mps).

Outline history

This cartridge was adopted by Sweden in 1894 for use in a Mauser rifle, and the cartridge was also in service in Norway. In recent years a tracer variant of this round has been adopted by Britain for use in a sub-calibre rôle with the 84mm Carl Gustav anti-tank weapon.

Manufacturers since 1945

Austria, Denmark, Finland, Japan, Norway, Sweden.

7mm Mauser

Metric designation: 7mm × 57.

The case is rimless and bottle-necked, of brass, with Berdan primers.

Measurements

Case length:	56.8mm
Head diameter:	12.0mm
Rim diameter:	12.0mm
Bullet diameter:	7.3mm
Overall length of cartridge:	77.8mm

Bullet

The standard ball bullet is pointed, with flat base and lead alloy core. The normal bullet weight is 140 grains (9.07 grams).

Muzzle velocity

2,500fps (762mps).



7mm Mauser tracer cartridge.

Outline history

The 7mm Mauser cartridge, with rifle, were adopted by Spain in 1890 and remained in Spanish service until after 1945. This cartridge was used by the Boers in various Mauser rifles during the South African War of 1899-1902, and has been used in several parts of Latin America.

Manufacturers since 1945

Belgium, Brazil, Chile, Finland, Mexico, Spain.

7mm Medium

Metric designation: 7mm × 49.

Other designations: 7mm Belgian Medium No. 2; 7mm Second Optimum.

The case is rimless and bottle-necked, of brass, with Berdan primers.



7mm Medium ball cartridge.

Measurements

Case length:	49.15mm
Head diameter:	11.8mm
Rim diameter:	11.9mm
Bullet diameter:	7.2mm
Overall length of cartridge:	70.7mm

Bullet

The bullet is pointed, with flat base and lead alloy core. Weight 140 grains (9.07 grams).

Muzzle velocity

2,750fps (830mps).

Individual Cartridge Profiles

Outline history

In 1952, as part of the small arms calibre trials conducted by Britain, Belgium and Canada, the Belgian-designed Medium 2 cartridge was employed, being a strong contender at that stage of the trials. It was known in Britain as the Second Optimum cartridge. The trials finally led to the adoption by NATO of the 7.62mm × 51 NATO cartridge, but subsequently Belgium manufactured the 7mm cartridge again for sale to Venezuela. **Manufacturers** Belgium, Canada, United Kingdom.

7.5mm Swiss Rifle

Other designations: 7.5mm (Model 1911); 7.5mm GP 11; 7.5mm Schmidt Rubin.

The case is rimless and bottle-necked. Cases are Berdan primed and now of brass, although steel and aluminium cased ammunition was issued in the past.

Measurements

Case length:	55.4mm
Head diameter:	12.5mm
Rim diameter:	12.6mm

Bullet diameter: 7.8mm
Overall length of ball cartridge: 77.3mm
Bullets

The standard Model 1911 ball bullet is pointed and has a sharp boat-tail, with lead alloy core. The weight is 175 grains (11.34 grams). A variety of earlier model ball bullets exist with round-nosed forms. Armour-piercing and tracer loads were also produced, the standard bullet weight for tracer being 156 grains (10.11 grams).

Muzzle velocity

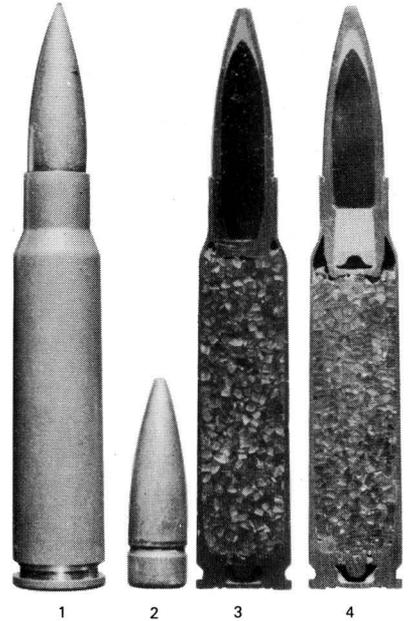
For ball the velocity is 2,600fps (793mps).

Outline history

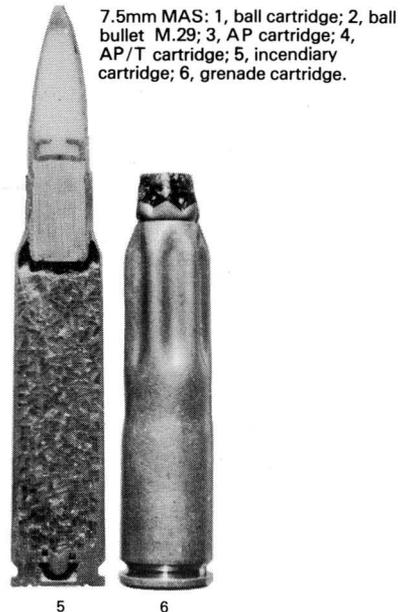
The Swiss officially adopted the first 7.5mm calibre rifle in 1889 and the cartridge for it, the Model 1889/90 had a case that was virtually the same as the present M.1911 case. During the interim, the propellant and the form of bullet have changed considerably, but the basic cartridge form has remained recognizably the same. The later dated 7.5mm French rifle cartridge bears a strong resemblance to the Swiss round. The 7.5mm Swiss cartridge is made only in Switzerland.

7.5mm French MAS

Other designations: 7.5mm (Model 1929); 7.5mm × 54.



7.5mm Swiss: 1, ball cartridge M.1911; 2, ball bullet; 3, tracer cartridge; 4, grenade cartridge; 5, MG blank.



7.5mm MAS: 1, ball cartridge; 2, ball bullet M.29; 3, AP cartridge; 4, AP/T cartridge; 5, incendiary cartridge; 6, grenade cartridge.

The case is rimless and bottle-necked, Berdan primed and made of brass or steel, and, for some short-range ammunition, of aluminium.

Measurements

Case length: 53.5mm
 Head diameter: 12.1mm
 Rim diameter: 12.3mm
 Bullet diameter: 7.8mm
 Overall length of ball cartridge: 75.7mm

Bullets

The standard ball bullet is flat-based with a lead alloy core. Bullet weight is 140 grains (9 grams). An armour-piercing bullet weighing 144 grains (9.3 grams) also exists, as do four types of tracer and an armour-piercing incendiary.

Muzzle velocity

The ball bullet velocity is 2,600fps (793mps).

Outline history

The original French 7.5mm cartridge was the Modèle 1924, which had a case length of 58mm. From this came the Modèle 1929 which bears an uncanny resemblance to the Swiss 7.5mm cartridge. The Modèle 1929 became the standard French rifle calibre cartridge and still is, although French units stationed in West Germany use weapons chambered for the 7.62mm x 51 NATO cartridge.

Manufacturers since 1945

Belgium, Cambodia, France, Japan, Lebanon, Syria, Vietnam (South), Volta, Yugoslavia.

.30in U.S. Carbine

Metric designation: 7.62mm x 33.

Other designation: .30in M.1 Carbine.

The case is rimless and straight-sided, having a slight taper. Ignition is Berdan except for U.S. production and possibly one or two other minor producers.

Measurements

Case length: 32.6mm
 Head diameter: 9.0mm
 Rim diameter: 9.0mm
 Bullet diameter: 7.75mm
 Overall length of cartridge: 42.3mm

Bullets

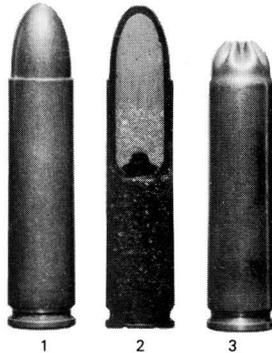
The ball bullet is flat-based and round-nosed, with a lead alloy core. The bullet weight is 112 grains (7.25 grams). A tracer bullet also was taken into U.S. service.

Muzzle velocity

The ball bullet velocity is 1,900fps (579mps).

Outline history

The .30in Carbine was adopted by the U.S. Army in 1941, to take the place of



.30in carbine; 1, ball cartridge; 2, tracer cartridge; 3, blank cartridge.

the pistol normally carried by certain officers and NCOs and soldiers in support units. The cartridge was developed jointly with the Winchester Company, and was based upon an existing commercial .32in cartridge.

Manufacturers since 1945

Austria, Belgium, Brazil, China (Taiwan), Dominica, France, Germany (West), Italy, Japan, Korea (South), Mexico, Netherlands, Norway, Philippines, Portugal, United Kingdom, U.S.A.

7.62mm U.S.S.R. (Model 1943)

Metric designation: 7.62mm x 39.

Other designations: 7.62mm Russian Short; 7.62mm Kalashnikov; 7.62mm, Type 56 Chinese.

The case is rimless and bottle-necked, normally Berdan primed, and may be of brass or steel.

Measurements

Case length: 38.6mm
 Head diameter: 11.2mm
 Rim diameter: 11.3mm
 Bullet diameter: 7.85mm
 Overall length of cartridge: 55.6mm

Bullets

The standard U.S.S.R. ball bullet, the Type PS, has a steel core and is boat-

tailed, weighing 123 grains (7.97 grams). A number of countries use ball bullets with lead core and flat-based, the weight being the same as for the U.S.S.R. type. Standard Soviet bullet types, other than ball, are tracer, armour-piercing incendiary and incendiary ranging.

Muzzle velocity

The muzzle velocity of the Soviet Type PS is 2,330fps (710mps). The flat-based lead-core bullet has a roughly similar performance.



7.62mm x 39mm U.S.S.R.: 1, ball cartridge; 2, sectioned Type PS ball; 3, sectioned tracer; 4, sectioned AP/1; 5, sectioned incendiary ranging; 6, blank cartridge.

Individual Cartridge Profiles

Outline history

Soviet sources show that this cartridge was developed in 1943, and issued in very limited quantities during the last year of the war. In fact, the weapons firing this round and the ammunition itself do not seem to have appeared in full service in the U.S.S.R. until the early 1950s.

Manufacturers

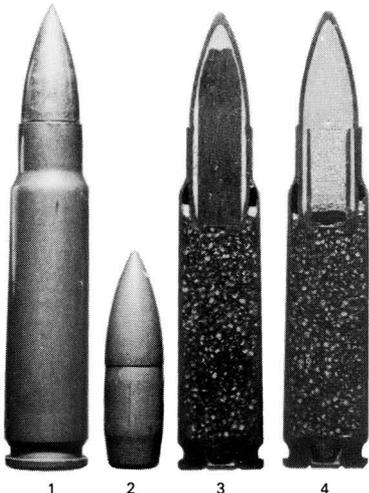
Austria, Belgium, Bulgaria, China (Communist), Czechoslovakia, Egypt, Finland, France, Germany (West), Germany (East), Hungary, Indonesia, Iraq, Israel (unconfirmed), Korea (North), Netherlands, Norway (plastic training ammunition), Pakistan (unconfirmed), Poland, Romania, Sudan (unconfirmed), Syria, U.S.A., U.S.S.R., Yugoslavia.

7.62mm × 45 Czech

Other designations: 7.62mm (Model 1952) Czech; 7.62mm Czech Short. The case is rimless and bottle-necked, Berdan primed, and may be of brass or lacquered steel.

Measurements

Case length:	44.8mm
Head diameter:	11.2mm
Rim diameter:	11.2mm
Bullet diameter:	7.85mm
Overall length of cartridge:	60.0mm



7.62mm x 45mm Czech: 1, ball cartridge; 2, ball bullet; 3, sectioned ball cartridge; 4, sectioned tracer cartridge.

Bullets

The ball bullet is boat-tailed, with steel core, weighing 130 grains (8.43 grams). There is also a tracer bullet.

Muzzle velocity

2,440fps (744mps).

Outline history

A precursor to this 7.62mm cartridge was produced in Czechoslovakia in 1949, with a calibre of 7.5mm. This was the Z.49 cartridge, similar in general appearance to the 7.62mm × 45. The Z.49 was redesigned to allow for the change in calibre and became the Model 1952. The 7.62mm × 45 Model 1952 has been made only in Czechoslovakia.

7.62mm NATO

Metric designation: 7.62mm × 51 NATO.

The case is rimless and bottle-necked, and may be of steel or brass. Some training ammunition may be found with aluminium cases. Ignition may be Berdan or Boxer depending upon place of manufacture.

Measurements

Case length:	50.8mm
Head diameter:	11.8mm
Rim diameter:	11.9mm
Bullet diameter:	7.8mm
Overall length of cartridge:	70.7mm

Bullets

The standard ball bullet weight is 144 grains (9.33 grams), but minor variations occur. Two basic ball bullet forms exist, the boat-tailed lead-cored form, and the boat-tailed form with mild steel core.

A wide variety of short-range practice bullets have been manufactured, mainly in continental Europe, and other standard loadings include tracer, armour-piercing and AP/1.

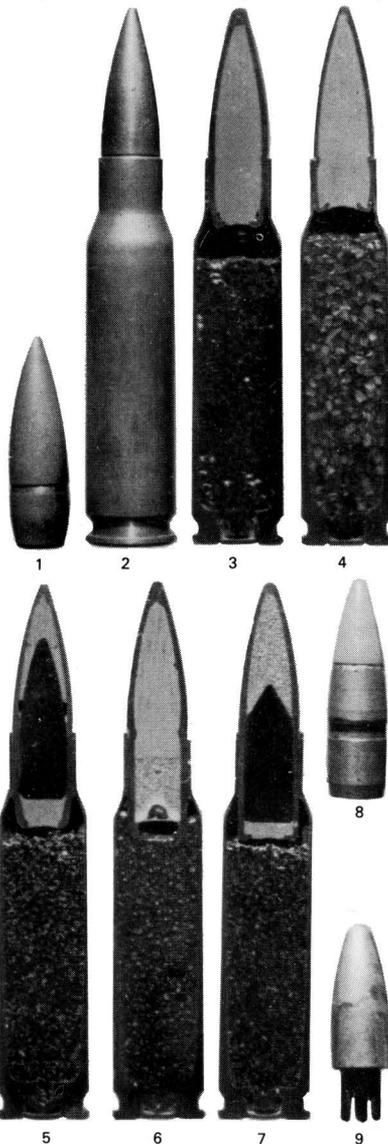
Muzzle velocity

A mean figure of 2,700fps (823mps) for the ball round is the standard NATO velocity.

Outline history

After a series of extensive and complicated trials from 1950 to 1953, NATO adopted the 7.62mm cartridge late in 1953 as the standard small arms calibre cartridge. The basic case design was the U.S. .30in calibre T.65, measuring 51mm, which in turn had been

preceded by two shorter versions, one of 47mm and the other of 49mm length. Notwithstanding its subsidiary



7.62mm NATO: 1, ball bullet M.80; 2, ball cartridge; 3, sectioned ball cartridge (U.K.); 4, sectioned ball cartridge (France); 5, sectioned AP cartridge (U.S.A.); 6, sectioned tracer cartridge (U.S.A.); 7, sectioned AP/1 cartridge (Belgium); 8, German short-range bullet; 9, Belgium short-range bullet.

title, the 7.62mm × 51 cartridge is used throughout the non-communist world.

Manufacturers

Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Burma, Cameroon, Canada, Chile, China (Taiwan), Colombia, Czechoslovakia, Denmark, Dominica, Finland, France, Germany (West), Greece, India, Iran, Israel, Italy, Japan, Korea (South), Malaysia, Mexico, Morocco, Nepal, Netherlands, Nigeria, New Zealand, Norway, Pakistan, Peru, Philippines, Portugal, Saudi Arabia, Singapore, South Africa, Spain, Sudan, Sweden, Syria, Thailand, Turkey, United Kingdom, U.S.A., Venezuela, Volta, Yugoslavia.

7.62mm Mosin Nagant

Metric designation: 7.62mm x 54 or 7.62mm x 53.

Other designations: 7.62mm Russian (Model 1908); 7.62mm Russian (Model 1930); 7.62mm Russian Long. The case is rimmed and bottle-necked, Berdan primed, and may be of steel or brass.

Measurements

Case length: 53.6mm
 Head diameter: 12.3mm
 Rim diameter: 14.4mm
 Bullet diameter: 7.8mm
 Overall length of cartridge: 76.6mm

Bullets

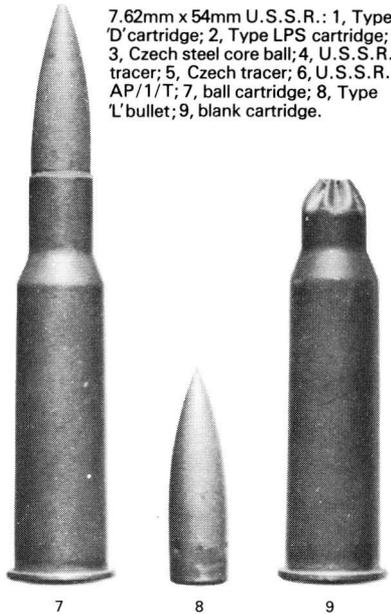
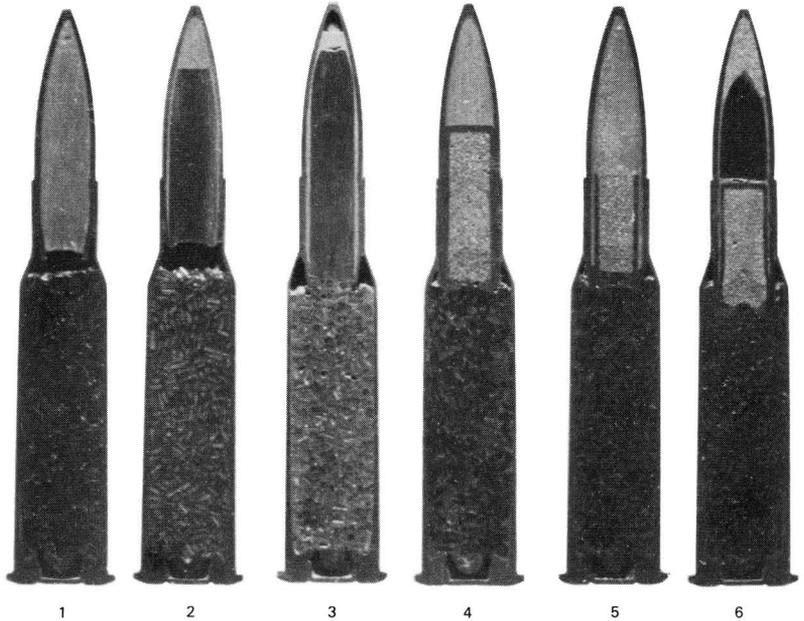
The Model 1908 bullet is a flat-based pointed bullet, with lead alloy core, the base of the bullet being recessed. Weight is 150 grains (9.7 grams). This is the Type 'L'. The Model 1930 bullet is boat-tailed with lead alloy core. The bullet weight is 182 grains (11.8 grams). This is the Type 'D'. A third and more recent bullet is the mild steel cored, boat-tailed bullet weighing 150 grains (9.7 grams). This is the Type 'LPS'. A wide assortment of other bullet types exists in the U.S.S.R., including tracer, AP/1, and incendiary ranging.

Muzzle velocity

Type 'L': 2,830fps (863mps). Type 'D': 2,680fps (818mps). Type 'LPS': 2,850fps (870mps).

Outline history

This cartridge was introduced for use in the Model 1891 Mosin rifle, which was for many years, until after 1945, the



7.62mm x 54mm U.S.S.R.: 1, Type 'D' cartridge; 2, Type LPS cartridge; 3, Czech steel core ball; 4, U.S.S.R. tracer; 5, Czech tracer; 6, U.S.S.R. AP/1/T; 7, ball cartridge; 8, Type 'L' bullet; 9, blank cartridge.

cartridge there, and is used widely elsewhere in the world.

Manufacturers since 1945

China (Communist), Czechoslovakia, Egypt, Finland, France, Hungary, Poland, Spain, Syria, U.S.S.R., Yugoslavia.

.30in-06 U.S.A.

Metric designation: 7.62mm × 63. Other designations: .30in M.2; .30in Browning.

The case is rimless and bottle-necked. U.S. production and some other is Boxer primed, Berdan priming also is common. Cases are generally of brass, but steel cases have also been used.

Measurements

Case length: 63.2mm
 Head diameter: 11.8mm
 Rim diameter: 12.0mm
 Bullet diameter: 7.8mm
 Overall length of ball cartridge: 84.5mm

Bullets

The standard U.S. Ball M.2 is a flat-based lead-cored bullet, weighing 150 grains (9.72 grams). Other standard loadings include armour-piercing, tracer, incendiary and armour-piercing incendiary. Generally, military

standard Soviet bolt-action rifle. Although no longer used in the U.S.S.R. as the service rifle round, it is still the standard medium machine-gun

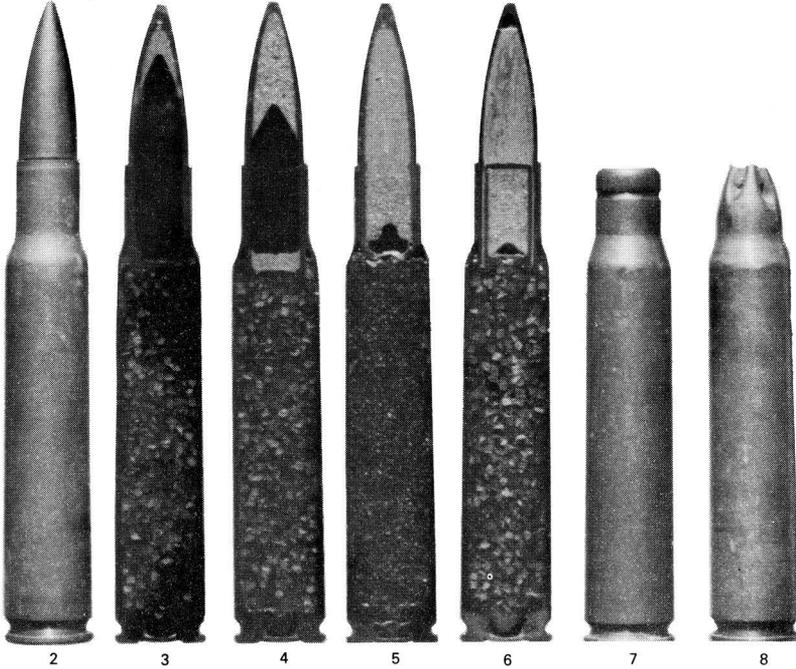
Individual Cartridge Profiles

ammunition in this calibre made elsewhere than in the United States conforms to U.S. specifications so far as bullet design is concerned.



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.30in-06 U.S.A.: 1, M.2 ball bullet; 2, ball cartridge; 3, AP cartridge (Belgium); 4, AP/1 cartridge (U.S.A.); 5, tracer cartridge (U.S.A.); 6, tracer cartridge (Belgium); 7, blank cartridge (U.S.A.); 8, grenade cartridge (U.S.A.).



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Muzzle velocity

M.2 ball: 2,740fps (836mps).

Outline history

The first rimless .30in cartridge in U.S. service was the Model 1903 with a case length of 65.1mm. This case was modified in 1906, by reducing the neck length, and the resulting cartridge was introduced into U.S. service, replacing the Model 1903. The new cartridge is commonly referred to as the .30in-06 after its year of adoption. Although the

M.2 bullet is the commonly encountered ball type, an M.1 ball round using a 173-grain (11.22-gram) bullet also existed, with a boat-tailed lead-cored form.

Manufacturers since 1945

Argentina, Austria, Belgium, Brazil, Cambodia, Canada, China (Taiwan), Colombia, Denmark, Dominica, Ethiopia, Finland, France, Germany (West), Greece, India, Indonesia, Iran, Italy, Japan, Korea (South), Mexico,

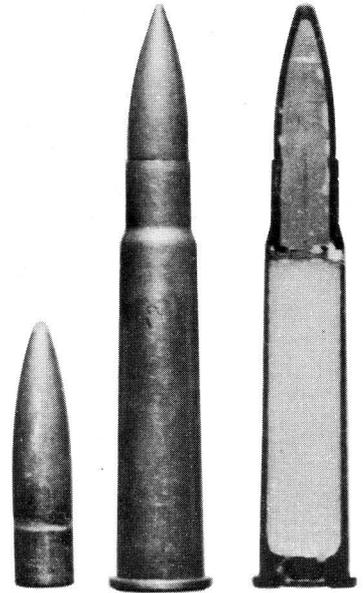
Morocco, Netherlands, Norway, Philippines, Saudi Arabia, South Africa, Spain, Syria, Thailand, Turkey, United Kingdom, U.S.A., Vietnam (South), Yugoslavia.

.303in British

Metric designation: 7.7mm × 56.

Other designation: .303in Lee Enfield.

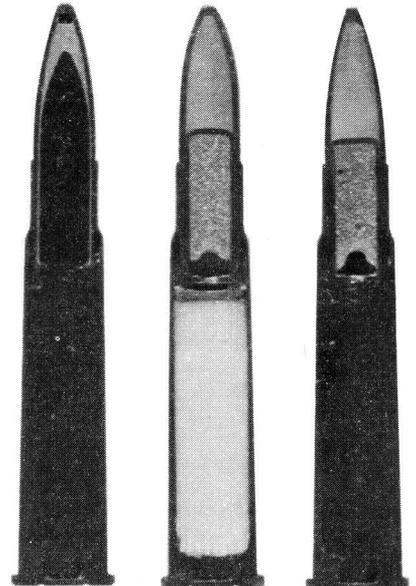
Official British designation for standard Mk 7 ball: Cartridge SA Ball .303in Mk 7.



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.303in British: 1, AP bullet; 2, ball cartridge; 3, ball cartridge; 4, AP cartridge V1; 5, tracer cartridge G.8; 6, tracer cartridge G.3.

The case is rimmed and bottle-necked, of brass with Berdan primer.

Measurements

Case length: 56.0mm
 Head diameter: 11.5mm
 Rim diameter: 13.5mm
 Bullet diameter: 7.9mm
 Overall length of cartridge: 77.2mm

Bullets

The standard British ball bullet introduced in 1910 was the Mk 7, which is flat-based and which has a two-part core. The front core is aluminium (or sometimes a substitute material) and the rear core is lead alloy. Weight is 174 grains (11.27 grams). A Mk 8 bullet exists, for use in medium machine-guns, of the same weight, but with a boat-tailed form. A variety of tracer bullets exist, and other loadings such as incendiary and armour-piercing.

Muzzle velocity

Ball Mk 7: 2,440fps (744mps). Ball Mk 8.z: 2,550fps (777mps).

Outline history

The first in the .303in cartridge series was the Mk 1 blackpowder cartridge approved in 1889. It had Boxer priming, but apart from that, the case of the 1889 cartridge was virtually identical with the final Marks of ammunition used in Britain. The .303in cartridge has been used extensively throughout the world.

Manufacturers since 1945

Australia, Belgium, Burma, Canada, Czechoslovakia, Egypt, Ethiopia, France, Greece, India, Indonesia, Iraq, Israel, Italy, Netherlands, Nigeria, New Zealand, Pakistan, Portugal, South Africa, Spain, Sudan, United Kingdom, Yugoslavia.

7.65mm Mauser

Metric designation: 7.65mm × 54.

The case is rimless and bottle-necked, of brass with Berdan primer.

Measurements

Case length: 53.5mm
 Head diameter: 11.9mm
 Rim diameter: 11.9mm
 Bullet diameter: 7.8mm
 Overall length of cartridge: 75.0mm

Bullets

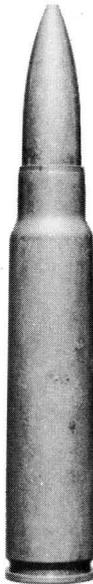
The standard bullet weight for this calibre is 154 grains (9.98 grams), but heavier forms exist also.

Muzzle velocity

2,780fps (857mps).

Outline history

This cartridge was first introduced into Belgium for use with the Mauser Rifle



7.65mm Mauser ball cartridge.

Model 1889. It has also been the service cartridge for Turkey, Argentina, Bolivia, Colombia, Ecuador, Peru, and other countries.

Manufacturers since 1945

Argentina, Belgium, Peru, United Kingdom.

7.92mm Kurz

Metric designation: 7.92mm × 33.

Other designations: Pistolen Patrone 43.m.E.

German nomenclature usually designated this round as 7.9mm rather than 7.92mm.

The case is rimless and bottle-necked.

Post-1945 production is steel or brass cased, and primers are Berdan type.

Measurements

Case length: 32.8mm
 Head diameter: 11.8mm
 Rim diameter: 11.9mm
 Bullet diameter: 8.2mm
 Overall length of cartridge: 47.4mm

Bullet

The bullet is boat-tailed with steel core and weighs 125 grains (8.1 grams).

Muzzle velocity

2,296fps (700mps).

Outline history

Preliminary work on this cartridge began in Germany prior to 1939, and had developed sufficiently for it to be first used in action in Russia in 1941-1942. The weapon finally chosen for this cartridge was the 'Sturmgewehr' MP.43 or StG.44. After the war, experimental production took place in Argentina and Spain.

Manufacturers since 1945

Argentina, Germany (East), Spain.



7.92mm Kurz: 1, ball cartridge; 2, sectioned ball cartridge.

7.92mm Mauser

Metric designation: 7.92mm × 57.

Other designations: 7.92mm BESA.

German nomenclature normally designated this round as 7.9mm rather than 7.92mm.

The case is rimless and bottle-necked. Brass cases are normal, but steel cases are occasionally encountered. Berdan primers.

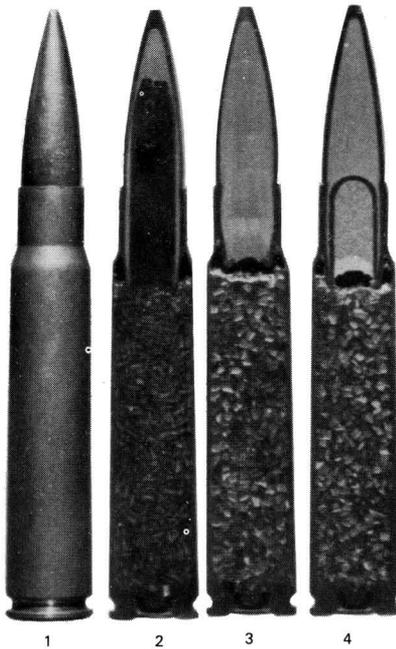
Measurements

Case length: 56.8mm
 Head diameter: 11.9mm
 Rim diameter: 11.9mm
 Bullet diameter: 8.2mm
 Overall length of cartridge: 80.5mm

Bullets

There were two main German bullet forms for ball ammunition, the S ball and the s.S ball. The S ball weight was

Individual Cartridge Profiles



7.92mm x 57mm Mauser:
1, ball cartridge; 2, steel core Czech ball; 3, lead core ball (Egypt); 4, Egyptian tracer; 5, Egyptian AP; 6, blank cartridge; 7, blank cartridge; 8, sS ball bullet.



154 grains (9.98 grams) and the s.S ball was 198 grains (12.83 grams). These forms were in common use in many parts of the world. Both bullets were lead alloy cored, the S being flat-based and pointed, and the s.S being boat-tailed. Later, a number of steel-cored ball bullets appeared, the original being the German SmE. The German design, and the post-war Czech design are typical in having a bullet weight of 178 grains (11.54 grams). A very wide assortment of tracer, incendiary, armour-piercing and other loadings have been manufactured in this calibre.

Muzzle velocity

This varies with country of manufacture. A typical muzzle velocity for an S-type bullet is 2,800fps (854mps). A typical s.S. bullet has a velocity of 2,659fps (808mps).

Outline history

The first cartridge to use this case was the German M.1888 used in the Gewehr 88, an early Mauser design. Using the same case, virtually unchanged, Germany introduced the pointed S bullet in 1898 (The M.1888 had a round-nosed bullet, and the cartridge was far less powerful than the 1898 type). The sS bullet was introduced into German service during the First World War.

Manufacturers since 1945

Belgium, Bulgaria, China (Nationalist), China (Communist), Czechoslovakia, Egypt, France, Germany (East), Germany (West), Greece, Iran, Israel, Norway, Portugal, Saudi Arabia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Yugoslavia.

8mm Lebel Rifle

Other designations: 8mm (Model 1886) French; 8mm (Model 1886) N.

The case is rimmed and bottle-necked, of brass and Berdan primed.

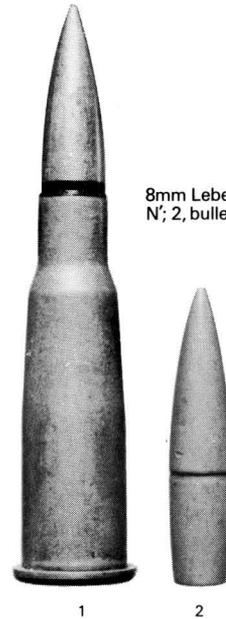
Measurements

Case length:	50.2mm
Head diameter:	13.6mm
Rim diameter:	16.0mm
Bullet diameter:	8.2mm
Overall length of cartridge:	75.0mm

Bullets

The original French bullet was the solid copper alloy 'balle D' which weighed 200 grains (12.96 grams). Between the

two world wars, a lead alloy cored jacketed bullet of the same weight, known as the 'balle N' was introduced. Other loadings produced in France included tracer and armour-piercing. Muzzle velocity 2,380fps (725mps).



8mm Lebel: 1, cartridge 'balle N'; 2, bullet 'balle D'.

Outline history

The 8mm cartridge was introduced into French service in 1886 for use with the Lebel rifle, the original cartridge having the 'balle M' bullet weighing 230 grains (14.91 grams), which was jacketed with a truncated round nose. The solid copper 'balle D' was introduced at the turn of the century and remained the standard French rifle calibre cartridge until it began to be phased out with the arrival of the 7.5mm Modèle 1929. Even so, the 8mm Lebel cartridge remained in service throughout the Second World War and, on a limited basis after. The 8mm cartridge was made in a number of countries, but from 1945 production has been in France and South Vietnam only.

8mm Siamese

Metric designation: 8mm × 52 Siamese.

Other designation: 8mm (Model 66)
Siamese.

The case is rimmed and bottle-necked, of brass and Berdan primed.

Measurements

Case length: 51.5mm
Head diameter: 12.75mm
Rim diameter: 14.15mm
Bullet diameter: 8.15mm
Overall length of cartridge: 75.0mm

Bullets

The ball bullet is flat-based and pointed, fully-jacketed with lead alloy core. Weight is 180 grains (11.67 grams). Tracer ammunition also exists in this calibre.

Muzzle velocity

Not known.

Outline history

This cartridge, which shows signs of Mannlicher parentage, was introduced for a Siamese bolt-action rifle, and ammunition may bear Siamese or Western characters. An earlier 8mm Siamese existed, with slightly shorter case length.

Manufacturers since 1945

Thailand, United Kingdom.



8mm Siamese: 1, ball cartridge; 2, ball bullet.

1

2

8mm Hungarian Mannlicher

Metric designation: 8mm × 56.

Other designations: 8mm (Model 1935)

Hungarian, 8mm (Model 1931)

Hungarian, 8mm (Model 1930)

Austrian.

The case is rimmed and bottle-necked, of brass (although war-time production was sometimes of steel) with Berdan primer.



8mm Hungarian Mannlicher ball cartridge.

Measurements

Case length: 55.5mm
Head diameter: 12.4mm
Rim diameter: 14.1mm
Bullet diameter: 8.3mm
Overall length of cartridge: 76.5mm

Bullet

The bullet weight is 205 grains (13.3 grams).

Muzzle velocity

2,400fps (731mps).

Outline history

Prior to 1935, the Hungarian Army was armed with the older pattern 8mm Austrian Mannlicher, firing the 8mm Austrian cartridge, which was a legacy of the old Austro-Hungarian Empire. In 1935, the Hungarians re-armed with a Mauser type rifle, the M1935, firing a

new 8mm round, designed in Austria as the M.30 but in Hungary known as the M.31 or M.35. During the last two years or so, this cartridge has appeared in various trouble spots in Africa, in the hands of dissident groups.

Manufacturers since 1945
Hungary.

8mm Breda

Metric designation: 8mm × 59.

Other designation: 8mm (Model 1935)

Italian.

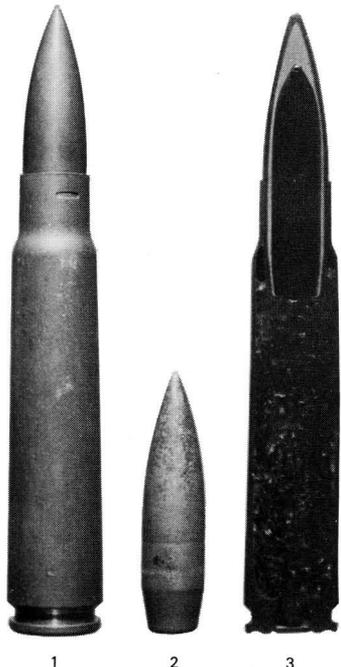
The case is rimless (slightly rebated) and bottle-necked, of brass, with Berdan primer (although some war-time production was steel-cased).

Measurements

Case length: 58.9mm
Head diameter: 12.4mm
Rim diameter: 11.9mm
Bullet diameter: 8.3mm
Overall length of cartridge: 80.7mm

Bullets

The ball bullet is boat-tailed and lead-cored, and weighs 208 grains (13.48



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8mm Breda: 1, ball cartridge; 2, ball bullet; 3, sectioned tracer cartridge.

Individual Cartridge Profiles

grams). At various times, tracer, armour-piercing tracer, armour-piercing and spotter bullets have been manufactured in this calibre.

Muzzle velocity
2,600fps (793mps).

Outline history

This Italian cartridge was intended for medium machine-guns, in ground use. It was used in the Breda machine-gun, from 1935, and after the war was retained in Italian service for some time. It is unique to Italy, and has been made nowhere else.

8mm Swedish MG

Metric designation: 8mm × 63.

Other designation: 8mm (Model 1935)
(Model 1932) Swedish.

The case is rimless and bottle-necked, of brass and Berdan primed.

Measurements

Case length:	63.0mm
Head diameter:	12.4mm
Rim diameter:	12.2mm
Bullet diameter:	8.2mm
Overall length of cartridge:	85.0mm



8mm Swedish ball cartridge.

Bullets

The ball bullet is boat-tailed and weighs 218 grains (14.13 grams). Other loadings in this calibre are tracer, armour-piercing and incendiary.

Muzzle velocity
2,500fps (762mps).

Outline history

This cartridge was introduced into Swedish service in 1932 as a ground service, medium machine-gun cartridge, in a Browning machine-gun. It was also used in a limited way with the Mauser rifle. It remained in service for a limited period after 1945. It was made only in Sweden.

.50in Spotter

Metric designation: 12.7mm Spotter.

Other designation: .50in Spotter

Tracer.

U.S. designations: .50in Spotter Tracer
M.48.A.1. and M.48.A.2.

The case is rimless and bottle-necked. The U.S.-designed M.48.A.1. has an internal flash tube running up the inside of the case from the primer, but simplified ignition has been incorporated in some of the corresponding case types manufactured in Europe, where the cases sometimes have Berdan primers. Cases are of brass.

Measurements

Case length:	75.8mm
Head diameter:	20.2mm
Rim diameter:	20.35mm
Bullet diameter:	13.0mm
Overall length of cartridge:	114.7mm

Bullets

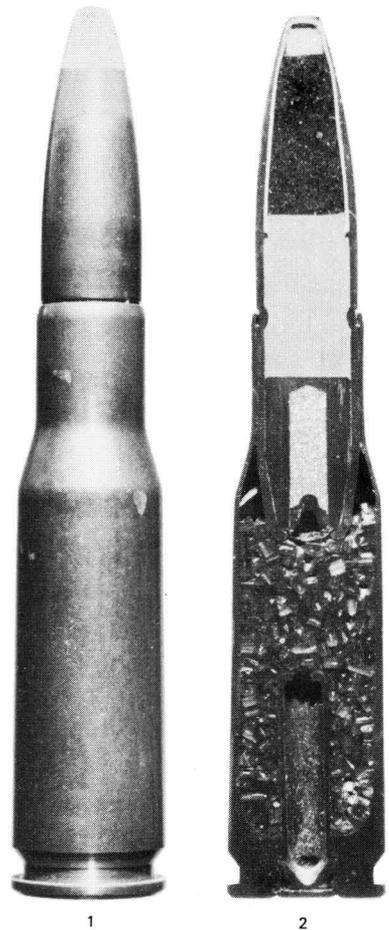
The U.S. bullet M.48.A.1. represents the basic form of bullet used, and this bullet is described in detail under 'United States' in Chapter 5. Total bullet weight for the U.S. design is 816 grains (52.89 grams). This U.S. bullet has been copied in Europe, but in addition to these copies, original bullet forms have also been developed elsewhere. The British commercially sponsored design of the 1970s, for example, has a tungsten carbide core and generally resembles in layout the AP/1/T .50in Browning bullet.

Muzzle velocity

M.48.A.1: 1,745fps (532mps).

Outline history

This cartridge was developed in the



.50in Spotter: 1, M.48.A.1. cartridge; 2, sectioned M.48.A.1. cartridge.

United States, the first round issued there being the M.48 which, unlike the M.48.A.1., had no internal flash tube to the case. Originating in the 1950s, the cartridge was intended for use in the M.8 spotting rifle mounted on the M.40 recoilless rifle of 106mm calibre. Similar weapons were also used or developed in Europe, using similar spotting rifles for ranging purposes.

Manufacturers

Belgium, France, Netherlands, Spain, Switzerland, United Kingdom, U.S.A.

.50in Browning

Metric designation: 12.7mm × 99.
 Other designation: 12.7mm Browning.
 The case is rimless and bottle-necked, usually of brass, and may be Berdan or Boxer primed.

Measurements

Case length: 99.0mm
 Head diameter: 20.3mm
 Rim diameter: 20.3mm
 Bullet diameter: 13.0mm
 Overall length of cartridge: 138.0mm

Bullets

A wide variety of bullet forms exists in this calibre. The standard U.S. armour-piercing bullet, the M.2 is widely used and has a hard steel core within a boat-tailed bullet. Weight is 708 grains (45.88 grams). Other loadings include AP/I, tracer, AP/I/T, incendiary and ball, ball often being regarded as a training rather than as a service loading.

Muzzle velocity

M.2 armour-piercing: 2,900fps (884mps).

Outline history

This cartridge was developed in the United States in 1918, mainly for air service. The first rounds were rimmed, a change to rimless being made later in 1918. In its final form it was used for ground, aircraft and anti-aircraft work, and its use spread to many parts of the world especially during and after the Second World War.

Manufacturers since 1945

Argentina, Austria, Belgium, Brazil, Canada, China (Taiwan), Dominica, Egypt, France, Germany (West), Greece, Indonesia, Iran, Israel, Japan, Korea (South), Morocco, Netherlands, Norway, Portugal, Saudi Arabia, Singapore, Spain, Sweden, Switzerland, Turkey, United Kingdom, U.S.A., Yugoslavia.

12.7mm U.S.S.R./12.7mm × 108

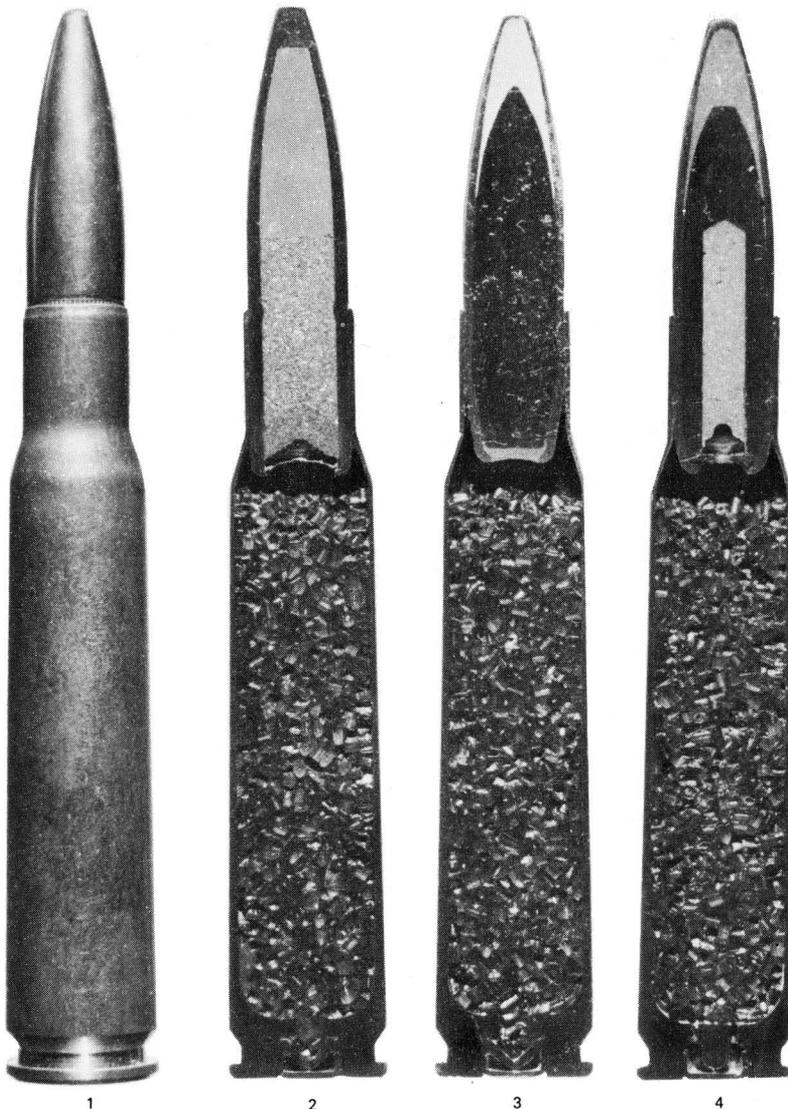
Other designations: 12.7mm Degtyarev; 12.7mm, Type 54 Chinese. The case is rimless and bottle-necked. Most cases have Berdan primers, but some Chinese production has their 'ball and triangle' method of priming. Cases are of brass or steel.

Measurements

Case length: 107.5mm
 Head diameter: 21.7mm
 Rim diameter: 21.6mm
 Bullet diameter: 13.0mm
 Overall length of cartridge: 146.5mm

Bullets

The two principal bullet forms still in use with this calibre are the Soviet Type B.32 armour-piercing incendiary, and the Type BZT 44 armour-piercing incendiary tracer. The weight of the BZT 44 is 680 grains (44.06 grams), and of the B.32 AP/I, 726 grains-



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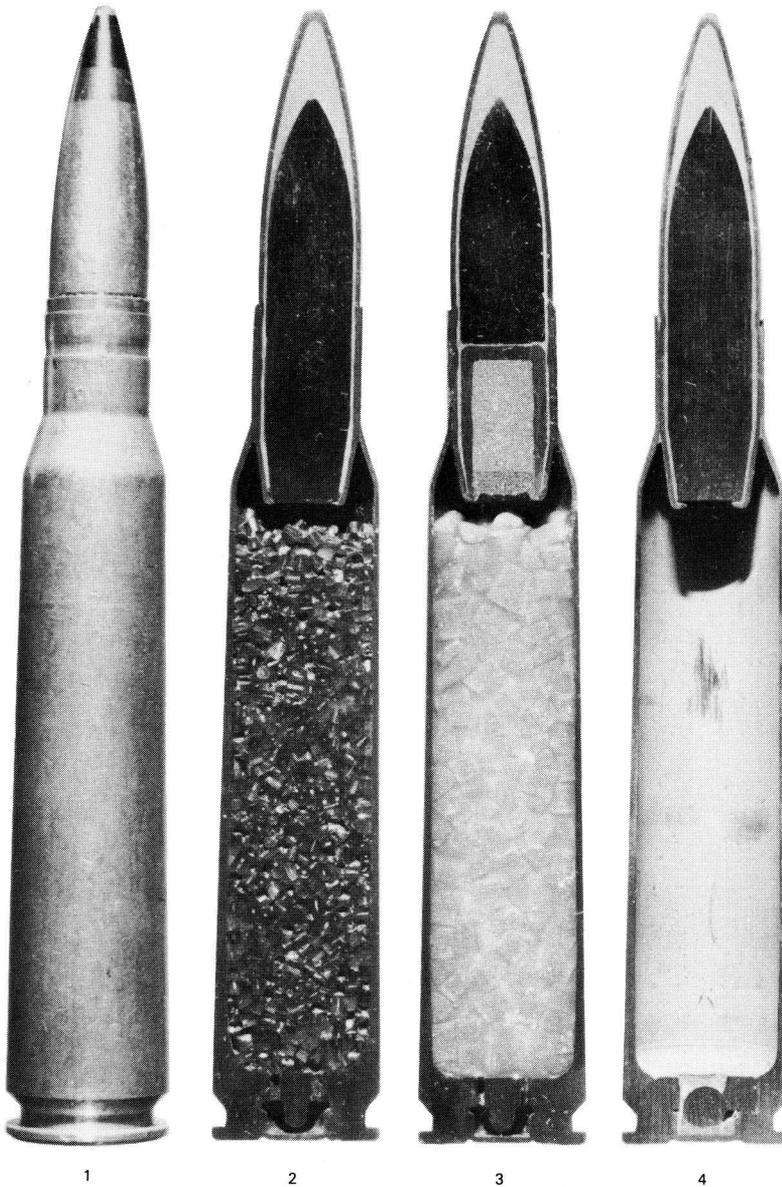
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.50in Browning: 1, ball cartridge; 2, American tracer cartridge; 3, American AP/I cartridge; 4, British L.11.A.2. MG observing.

Individual Cartridge Profiles



12.7mm U.S.S.R.: 1, AP/1 cartridge; 2, sectioned AP/1 cartridge; 3, sectioned AP/1/T cartridge; 4, sectioned Chinese AP/1 showing ball anvil.

(47.07 grams).

Muzzle velocity

B.32: 2,750fps (840mps).

Outline history

The 12.7mm cartridge first appeared in Russian service in the early 1930s as a heavy machine-gun cartridge, and still performs that rôle today. The existing rimless version also had, for a short while, a rimmed equivalent which, however, stayed in production for a very short while only.

Manufacturers since 1945

China (Communist), Czechoslovakia, Egypt, India, U.S.S.R., Yugoslavia.

14.5mm U.S.S.R.

Metric designation: 14.5mm 114.

Other designations: 14.5mm KPV;

14.5mm, Type 56 Chinese.

The case is rimless and bottle-necked, of brass or steel, and Berdan primed.

Measurements

Case length: 113.5mm

Head diameter: 26.8mm

Rim diameter: 26.8mm

Bullet diameter: 14.7mm

Overall length of cartridge: 155.5mm

Bullets

A wide variety of Soviet bullet types exists for this cartridge, including armour-piercing incendiary, armour-piercing incendiary tracer, high-explosive incendiary and incendiary ranging. The incendiary ranging, Type MDZ weighs 921 grains (59.75 grams).

Muzzle velocity

c. 3,200fps (975mps).

Outline history

This cartridge originated for use in the Soviet PTRD and PTRS anti-tank rifles. Subsequently, the cartridge was found to be ideal as a heavy machine-gun round, and as the anti-tank rifle fell into disuse, the sole rôle for the 14.5mm cartridge now is the heavy machine-gun.

Manufacturers since 1945

China (Communist), Egypt, Korea (North), Romania, U.S.S.R.



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14.5mm U.S.S.R.: 1, AP/1 cartridge; 2, AP/1 cartridge; 3, AP/1 cartridge with tungsten carbide core.

OBSOLETE AMMUNITION

7.5mm Swiss Revolver

Other designations: 7.5mm Swiss Nagant Revolver; 7.5mm Swiss Ordnance Revolver (Model 1882). The case is rimmed and is straight-sided, but with a slight taper, of brass and Berdan primed.

Measurements

Case length:	22.3mm
Head diameter:	9.0mm
Rim diameter:	10.3mm
Bullet diameter:	8.0mm
Overall length of cartridge:	33.4mm

Bullets

The original Swiss bullet was of solid lead alloy; some were paper patched and others were not. In its final form, the bullet was fully-jacketed, round-nosed and with a lead alloy core. Bullet weight for the jacketed version was 105 grains (6.8 grams).

Muzzle velocity

700fps (213mps).

Outline history

This cartridge was introduced for the Swiss Model 1882 revolver, and in its original form used black-powder propellant. The revolver was of the Nagant type. The cartridge was produced at Thun at least as late as 1960, although the revolver itself had long been out of regular service. The Swiss 7.5mm revolver cartridge is, so far as the case is concerned, virtually identical with and interchangeable with the Swedish and Norwegian 7.5mm revolver cartridges.

Manufacturers since 1945

Sweden (but actually intended for the Swedish revolver), Switzerland.



7.5mm Swiss revolver ball cartridge.

Individual Cartridge Profiles

8mm Nambu SL Pistol

Other designation: 8mm Japanese SL Pistol.

The case is rimless and bottle-necked, of brass, and Berdan primed.

Measurements

Case length: 21.3mm
 Head diameter: 10.3mm
 Rim diameter: 10.5mm
 Bullet diameter: 8.1mm
 Overall length of cartridge: 31.8mm



8mm Nambu SL pistol ball cartridge

Bullets

The bullet is full metal jacketed, with lead alloy core. Considerable variation in bullet weight exists, with a range between 92-102 grains (5.96-6.61 grams).

Muzzle velocity
 1,000fps (305mps).

Outline history

This cartridge was introduced in 1914 for use by Japan in their new Model 1914 SL pistol designed by Colonel Nambu. It became the standard Japanese pistol calibre cartridge and was also used in submachine-guns. Some considerable while after the Second World War, production of the cartridge was recommenced in Japan, still for use in the M.1914 pistol. So far as is known, only Japan has ever made the cartridge on a full commercial scale since the war, but there has been limited production in the United States on what amounts to a 'custom-made' basis.

8mm Lebel Revolver

Other designation: 8mm French

Ordnance Revolver (Model 1892).

The case is rimmed and straight-sided, of brass, and Berdan primed.

Measurements

Case length: 27.5mm

Head diameter: 9.0mm
 Rim diameter: 10.4mm
 Bullet diameter: 9.1mm
 Overall length of cartridge: 36.4mm

Bullet

The bullet is fully-jacketed and has a lead alloy core. Weight is 120 grains (7.78 grams).

Muzzle velocity
 720fps (220mps).

Outline history

This cartridge first appeared in France in the mid 1880s and became well known as the round for the later Modèle 1892 French ordnance revolver, which remained in service until after the Second World War. Although this 8mm cartridge has in the past been made in several European countries, so far as is known, only France has made it since 1945.



8mm Lebel revolver: 1, ball cartridge; 2, blank cartridge.

10.4mm Italian Revolver

Other designations: 10.4mm Italian Ordnance Revolver (Model 1889), 10.35mm Bodego.

The case is rimmed and has a straight taper, but some cases with slight bottle-necks also exist. Cases are brass with Berdan primers.

Measurements

Case length: 20.2mm
 Head diameter: 11.7mm
 Rim diameter: 13.1mm
 Bullet diameter: 11.2mm
 Overall length of cartridge: 30.3mm

Bullet

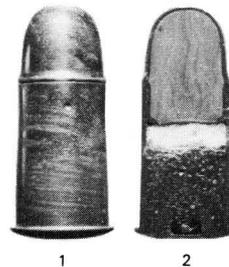
The normal Italian service bullet has a brass envelope and a lead alloy core. The bullet is round-nosed and flat-based with a raised ridge just above the point where the envelope enters the

case mouth. Weight is 174 grains (11.27 grams).

Muzzle velocity
 830fps (253mps).

Outline history

This cartridge was first developed in the 1870s in Italy, and was used mainly



10.4mm Italian revolver: 1, ball cartridge; 2, sectioned ball cartridge.

in the Model 1889 Glisenti revolver. It was still used extensively during the Second World War, but then vanished from service. The ammunition was still made after 1945 in Italy, but not, it is believed, against military contracts.

9.4mm Dutch Revolver

Other designations: 9.4mm

Netherlands (Model 1873); 9.4mm Scherpe Patroon Nr. 5; 9.4mm Dutch East Indies.

This cartridge is found with two distinct case lengths, and one of these (the shorter) comes in different case forms. The standard Dutch home service revolver cartridge is rimmed. This case is found with a straight taper, and with a slight bottle-neck. The Dutch East Indies version of this cartridge has a case longer than the home service round and is straight-sided. Both types have brass cases with Berdan primers.

Measurements (Home Service)

Case length: 20.7mm
 Head diameter: 10.9mm
 Rim diameter: 12.6mm
 Bullet diameter: 9.8mm
 Overall length of cartridge: 29.2mm

Measurements (East Indies)

Case length: 27.2mm
 Head diameter: 11.0mm
 Rim diameter: 12.2mm
 Bullet diameter: 10.0mm
 Overall length of cartridge: 32.9mm

Bullets

The home service bullet is of solid lead alloy, slightly pointed and flat-based,

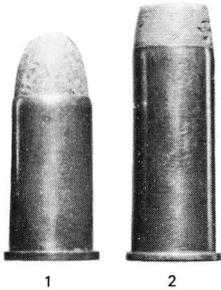
weighing 188 grains (12.2 grams). The East Indies bullet is of solid lead alloy, with flattened nose, and weighing 174.4 grains (11.3 grams).

Muzzle velocity

Home service bullet: 600fps (183mps).

Outline history

The cartridge for home service first appeared in 1873 for the Dutch Chamelot Delvigne revolver. It remained in service, as did the East Indies model, until the Second World War. Prior to the war, the home service cartridge was manufactured in Britain and in Holland, and probably elsewhere, but it is believed that no post-war manufacture has taken place.



9.4mm Dutch revolver: 1, ball cartridge (home service); 2, ball cartridge (East Indies).

6.5mm Mannlicher Carcano

Other designation: 6.5mm (Model 1891) Italian.

The case is rimless and bottle-necked, Berdan primed. Post-war production included steel cases.

Measurements

Case length: 52.4mm
 Head diameter: 11.3mm
 Rim diameter: 11.35mm
 Bullet diameter: 6.7mm
 Overall length of cartridge: 75.1mm

Bullets

The standard ball bullet is fully-jacketed, with rounded nose, the core being of lead alloy. Bullet weight is 162 grains (10.5 grams). A wide variety of other bullets were originally produced in this calibre, including multi-ball, frangible, gallery practice, armour-piercing, tracer, AP/I and spotter.

Muzzle velocity

Ball round: 2,296fps (700mps).

Outline history

This cartridge was adopted in the

Italian Model 1891 Mannlicher Carcano rifle and carbine. This combination, with minor modifications, remained the basic Italian rifle armament until the end of the Second World War, although a cartridge replacement in the



6.5mm Mannlicher Carcano ball cartridge (frangible).

form of the 7.35mm calibre round had begun to be phased-in when the war started. After 1945, the cartridge was manufactured in limited quantities, but by then, other calibres had been taken into Italian service. Italy was the sole post-1945 manufacturer.

6.5mm Arisaka

Other designations: 6.5mm, Type 38 Japanese.

The case is semi-rimless and bottle-necked, of brass and Berdan primed.

Measurements

Case length: 50.8mm
 Head diameter: 11.4mm
 Rim diameter: 12.1mm
 Bullet diameter: 6.6mm
 Overall length of cartridge: 76.5mm

Bullet

The ball is pointed, with lead alloy core, weighing 138 grains (8.94 grams).

Muzzle velocity

2,500fps (346mps).

Outline history

This cartridge was adopted in 1905 for the Type 38 rifle, known as the Arisaka, which was a Mauser-type weapon. The cartridge was also used in a variety of machine-guns. It remained standard during the Second World War, but was to some extent replaced or augmented by the 7.7mm cartridge. Prior to the war, it was manufactured not only in Japan, but also in Britain and possibly other Western countries. Since the war, the cartridge has been made in Japan in limited quantities (including an export order for the Burmese Police) and in Chinese Communist arsenals inherited from the Japanese.



6.5mm Arisaka ball cartridge.

6.5mm Mannlicher

Other designations: 6.5mm (Model 1893) Romanian; 6.5mm (Model 1895) Netherlands.

The case is rimmed and bottle-necked, of brass or steel, and Berdan primed.

Measurements

Case length: 53.6mm
 Head diameter: 11.4mm
 Rim diameter: 13.3mm
 Bullet diameter: 6.7mm
 Overall length of cartridge: 77.5mm

Individual Cartridge Profiles

Bullet

The bullet is fully-jacketed, round-nosed and has a lead alloy core. Weight is 160 grains (10.37 grams).

Muzzle velocity
2,400fps (732mps).



6.5mm Mannlicher ball cartridge.

Outline history

The cartridges for Romanian and Netherlands service were virtually identical. During the war, limited production was carried out under German auspices at the Hirtenberger factory, but any post-war production has generally been for commercial or sporting sale.

7.35mm Mannlicher Carcano

Other designation: 7.35mm (Model 1938) Italian.

The case is rimless and bottle-necked, of brass, and Berdan primed.

Measurements

Case length:	51.15mm
Head diameter:	11.3mm
Rim diameter:	11.4mm
Bullet diameter:	7.5mm
Overall length of cartridge:	73.3mm

Bullet

The bullet is fully-jacketed, with a rounded point, and lead alloy core.

Weight is 128 grains (8.3 grams).

Muzzle velocity
2,490fps (759mps).

Outline history

Recognizing the relative inefficiency of their 6.5mm cartridge, the Italian Army sought to upgrade their Mannlicher Carcano rifles by introducing the more powerful 7.35mm cartridge for use in it. Its adoption in 1938, was only a short while before Italy entered the war, and in consequence Italy found itself with



7.35mm Mannlicher Carcano ball cartridge.

yet another cartridge to supply, in an already overcrowded Italian cartridge scene. Few 7.35mm rifles were ever issued, therefore, and reliance continued to be placed upon the 6.5mm cartridge for infantry use. Italy was the sole producer and no post-war production took place.

7.7mm Japanese Semi-Rimless

Other designations: 7.7mm, Type 92 Japanese.

The case is semi-rimless and bottle-necked, of brass, and Berdan primed.

Measurements

Case length:	57.5mm
Head diameter:	12.0mm
Rim diameter:	12.6mm
Bullet diameter:	7.9mm
Overall length of cartridge:	79.7mm

Bullets

The ball bullet is boat-tailed, weighing 203 grains (13.15 grams). In addition, armour-piercing, tracer, incendiary and explosive bullets exist. Japanese-made ammunition in this calibre is unhead-stamped, and bullet type is indicated by coloured rings around the case mouth/bullet, as follows: Ball: pink band; AP: black band; Tracer: green band; Incendiary: magenta band; HE: purple band.

Muzzle velocity
2,200fps (671mps).

Outline history

This cartridge was used in the Hotchkiss-designed Type 92 machine-gun, and in other machine-guns. It was an effective machine-gun cartridge, far better than the original Japanese 6.5mm. It is easily confused with the 7.7mm Japanese rimless cartridge, which see.

Manufacturers since 1945
China (Communist).



7.7mm Japanese semi-rimless ball cartridge.

7.7mm Japanese Rimless

Other designations: 7.7mm, Type 99. The case is rimless and bottle-necked,

of steel and of brass, and Berdan primed.

Measurements

Case length: 57.3mm
 Head diameter: 12.0mm
 Rim diameter: 12.0mm
 Bullet diameter: 7.9mm
 Overall length of cartridge: 79.5mm



7.7mm Japanese rimless ball cartridge.

Bullets

Two main types of ball exist, one flat-based and the other boat-tailed. The flat-based bullet weighs 181 grains (11.73 grams) and the boat-tailed 203 grains (13.15 grams). In addition, tracer and armour-piercing bullets were made. Identification of bullet was by a coloured band at the case mouth/bullet, as follows: Ball: pink band; AP: black band; Tracer: green band.

Muzzle velocity

2,300fps (701mps).

Outline history

This cartridge, easily confused with the 7.7mm Japanese semi-rimless cartridge, but not interchangeable, was intended for use in the Type 99 rifle and in a number of different machine-guns. It is believed that after 1945, the cartridge was manufactured in Chinese Communist plants.

7.92mm Schwarzlose

Metric designation: 7.92mm × 57.R.

Other designations: 7.92mm (Model 1908) Netherlands; 7.92mm Scherpe Patroon Nr. 23.

The case is rimmed and bottle-necked, of brass, and Berdan primed.

Measurements

Case length: 56.7mm
 Head diameter: 11.9mm
 Rim diameter: 13.3mm
 Bullet diameter: 8.1mm
 Overall length of cartridge: 78mm

Bullet

The ball bullet is streamlined and weighs 195 grains (12.63 grams).

Muzzle velocity

Not known.

Outline history

This little-encountered cartridge was adopted by the Dutch in 1908 for use with the Schwarzlose machine-gun, and was also chambered in a limited number of Mannlicher rifles. It stayed in Dutch service until the Second World War.



7.92mm Schwarzlose ball cartridge.

7.92mm Norwegian Long

Metric designation: 7.92mm × 61.

Other designation: 7.92mm Colt.

The case is rimless and bottle-necked, of brass, and Berdan primed.

Measurements

Case length: 60.7mm
 Head diameter: 12.3mm
 Rim diameter: 11.9mm
 Bullet diameter: 8.1mm
 Overall length of cartridge: 84mm

Bullets

Ball and tracer loadings exist in this calibre. The ball bullet is streamlined and weighs 220 grains (14.25 grams).



7.92mm Norwegian long ball cartridge.

Muzzle velocity

Not known.

Outline history

This cartridge was unique to Norway. It was used in the Model 1917 Browning machine-gun and seems to have been adopted for that weapon in about 1938. The Model 1917 MG was otherwise chambered for the 7.92mm × 57 cartridge.

8mm Danish Krag

Other designations: 8mm (Model 1889) Danish; 8mm (Model 1908) Danish.

The case is rimmed and bottle-necked, of brass, and Berdan primed.

Individual Cartridge Profiles

Measurements

Case length: 57.7mm
 Head diameter: 12.7mm
 Rim diameter: 14.5mm
 Bullet diameter: 8.2mm
 Overall length of cartridge: 76.0mm

Bullet

The ball bullet is pointed and weighs 196 grains (12.7 grams).

Muzzle velocity

2,350fps (716mps).

Outline history

This cartridge was first introduced with the Danish Model 1889 Krag Jorgensen magazine rifle, and in its original form had a round-nosed bullet. The Model 1908 cartridge had a spitzer bullet, and the cartridge remained in service until the Second World War.



8mm Danish Krag ball cartridge.

11.35mm Madsen

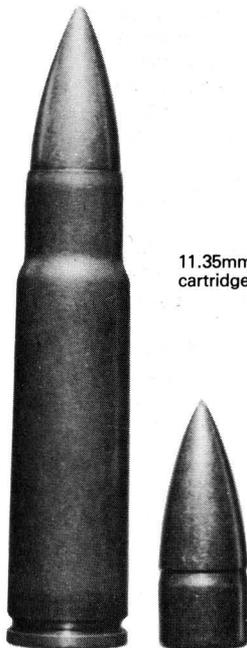
The case is rimless and bottle-necked, of brass, and Berdan primed.

Measurements

Case length: 61.5mm
 Head diameter: 16.0mm
 Rim diameter: 15.9mm
 Bullet diameter: 11.8mm
 Overall length of cartridge: 83.3mm

Bullets

The ball bullet is flat-based and lead



11.35mm Madsen: 1, ball cartridge; 2, ball bullet.

alloy cored, weighing 305 grains (19.76 grams). Tracer, armour-piercing and incendiary bullets of similar weight were also made.

Muzzle velocity

2,785fps (850mps).

Outline history

This intermediate power machine-gun cartridge for use in Madsen guns was first manufactured in the early 1930s, and continued to be produced up to the immediate post-war period. The only known manufacturers were the United Kingdom and Argentina.

.5in Vickers

British designation (Ball round):

Cartridge SA Ball .5in Mk 1.z.
 The case is rimless and bottle-necked, of brass, and Berdan primed.

Measurements

Case length: 80.9mm
 Head diameter: 18.3mm
 Rim diameter: 18.2mm
 Bullet diameter: 13.0mm
 Overall length of cartridge: 110.7mm

Bullets

The Mk 2 ball bullet was the one taken into service, and this was a flat-based design with an aluminium front core and lead rear core. Bullet weight 580 grains (37.58 grams). The armour-piercing bullet (W.Mk 1) had similar



.5in Vickers tracer cartridge.

weight and had a hard steel core. The third type of ammunition issued was semi-armour-piercing tracer.

Muzzle velocity

2,470fps (753mps).

Outline history

This cartridge was developed at the close of the First World War and was first approved for British service in 1924. Originally, it had been intended for air service, but later it was extended

to other services, with the Royal Air Force actually showing little interest in the end. Main uses were for tank-mounted Vickers heavy machine-guns and naval multiple machine-gun anti-aircraft armament.

12.7mm Breda (Italian)/12.7mm Japanese

Metric designation: 12.7mm × 81.
The case is semi-rimless and bottle-necked, of brass, and Berdan primed.

Measurements

Case length:	81.0mm
Head diameter:	18.3mm
Rim diameter:	19.5mm
Bullet diameter:	13.0mm
Overall length of cartridge:	107.2mm



12.7mm Breda incendiary cartridge (Italian).

in this calibre, both Italian and Japanese. As examples, Italian 12.7mm ammunition included ball, tracer, armour-piercing, explosive, incendiary, incendiary tracer, and AP/I/T. The ball weight was 565 grains (36.6 grams).

Muzzle velocity

Italian ball bullet: 2,430fps (741mps).

Outline history

This cartridge bears a very close resemblance to the British .5in Vickers machine-gun cartridge, and was manufactured in Britain for export from the mid 1920s. It was also manufactured in Japan and Italy, and used in air service machine-guns (Breda machine-gun in Italy and the HO.103 machine-gun in Japan).

15mm BESA

British designation (Ball round):

Cartridge SA Ball 15mm Mk I.z.

The case is rimless and bottle-necked, of brass, and Berdan primed.

Measurements

Case length:	103.8mm
Head diameter:	24.8mm
Rim diameter:	24.8mm
Bullet diameter:	15mm or 16.2mm over the driving bands
Overall length of cartridge:	148mm

Bullets

Ball, tracer, armour-piercing and armour-piercing tracer bullets exist in this calibre. The ball bullet, which, like all the rest, has two sets of driving band, has a steel core and weighs 1,160 grains (75 grams).

Muzzle velocity

2,680fps (817mps).

Outline history

This cartridge, basically Czechoslovakian in concept, was adopted by Britain in October 1939, and was for a heavy tank machine-gun. It was not a successful weapon and was phased out of service before the end of the Second World War.



15mm BESA AP cartridge.

Bullets

A wide assortment of projectiles exists

5. Geographical Register of Ammunition Producers and Users

The majority of industrially developed nations, and a growing number of the less developed, possess some potential for producing small arms ammunition. The degree to which it is used depends upon the political aspirations of the nation concerned, the size and importance of its armed forces, its geographical situation, its wealth and, to some extent, its technical ability to operate a plant successfully. Generally, the less developed the nation, the smaller the size and scope of its ammunition production.

A particular feature of some industrially weak nations who operate ammunition plants is their need — stemming from technical inability — to import some or all of the elements required. Thus, the importation of caps, propellant and even bullets is quite common. Similarly, a country which has, for example, case drawing machinery, may well import the sheet metal from which the blanks and cups are derived, or import the blanks and cups themselves.

Where complete cartridges are concerned, a considerable export/import trade has always existed, and much of the ammunition so traded will be headstamped in accordance with the wishes of the buyer. A nation may choose to import its entire ammunition requirement, possibly marked with the headstamps of its choice, or alternatively, may import a proportion of its requirements, marked in exactly the same way as its domestic production. All this goes to show that a headstamp can identify the producer, but may only identify the buyer/user and leave the true origin hidden. In this chapter, the latter factor has been ignored, and it is necessary to assume that the headstamped ammunition shown relates to the factories of the country concerned.

Countries known in recent years to have exported ammunition with the headstamps of the buying country include: Austria, Belgium, France, Greece, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom, West Germany and Yugoslavia. Countries known in recent years to have imported ammunition marked with headstamps identical with those already used by the buyer, or which are peculiar to the buyer include: Cameroon, Denmark, France, Iran, Lebanon, Malaysia, Morocco, Nigeria, Saudi Arabia, Sudan, Syria and Venezuela.

This chapter covers, by country, military ammunition and pistol ammunition with military characteristics, and makes no attempt to deal with sporting ammunition or experimental military ammunition. The calibres covered are those below 20mm, but for the sake of completeness, passing reference is often made to larger calibre cannon ammunition known to be made in the country concerned.

Types of ammunition produced only prior to 1945 have been excluded, and obsolete patterns that were made after 1945 for a limited period only are shown separately, as is ammunition made specifically for export.

Common titles are used in the summary sheet for each country, but where possible the military designation is also shown in subsequent paragraphs, where details of the ammunition itself are given.

The weights and measurements shown are mean measurements, often taken from samples of the ammunition,

and variations between these and manufacturing specification figures can occur. The term 'muzzle velocity' is used throughout for convenience and, in fact, the velocity figures usually relate to mean or instrumental velocity measured at a set distance from the muzzle.

The headstamps illustrated have been taken invariably from samples of the ammunition and as far as possible are spread in a way designed to illustrate different manufacturers' codes and changes in style between different producers or even differences with the same producer.

Finally, the individual cartridge information given in this chapter is the main data pertaining to the principle cartridges made or used by each country. Some cartridges are used by a number of countries and, especially with such types as 7.62mm × 39 (M.43) and 7.62mm × 51 (NATO), the basic data is not repeated separately for all the countries using them. Chapter 4 (profiles) gives fuller details of the measurements and outline history of each cartridge type made since 1945, together with a list of the countries known to be manufacturing the round.

Argentina

Post-1945 small arms ammunition plants

Cartucheria Orbea Argentina (privately owned)

Fabrica Militar Fray Luis Beltran (Rosario) (Government owned)

Fabrica Militar San Francisco (Cordoba) (Government owned)

Industria Metalurgica y Plastica Argentina (now out of production)

Fray Luis Beltran has previously also operated under the names of Fabrica Argentina Militar Armas Portatiles, Fabrica Militar Armas Portatiles Borghi, Fabrica Argentina Militar de Municion de Armas Portatiles Puerto Borghi, Fabrica Militar de Cartuchos San Lorenzo.

Manufacturers' headstamp codes (post-1945)

ORBEA Cartucheria Orbea

FLB, FMC-SL, FMFLB,

FMMAP-B, FMSL Fabrica Militar Fray Luis Beltran

FMSF, FMMAP-SF Fabrica Militar San Francisco

IMPA Industria Metalurgica y Plastica

Principal cartridges in service with the armed forces

9mm Parabellum; 7.62mm × 51 NATO; 12.7mm (.50in)

Browning.

Other cartridges manufactured, now either obsolete or intended for commercial sale

7.63mm Mannlicher Auto Pistol; 6.35mm Auto (.25in ACP);

7.65mm Auto (.32in ACP); 9mm Corto (.380in ACP); .38in

Special Revolver; .45in ACP; 7.65mm Mauser Rifle; .30in-06

U.S.; 11.35mm Madsen MG cartridge; 20mm × 110

Oerlikon.

Original colour code system

Smoke tracer: yellow bullet tip

Light tracer: blue bullet tip

Armour-piercing tracer: green bullet tip

Spotter: black bullet tip

Geographical Register of Ammunition Producers and Users

Armour-piercing: red bullet tip

Incendiary: white bullet tip

In addition, a black primer annulus indicated a light ball bullet, and a green annulus indicated heavy ball.

Current colour codes (effective 1978)

Tracer: red bullet tip

Incendiary: blue bullet tip

Armour-piercing: black bullet tip

Observation: yellow bullet tip

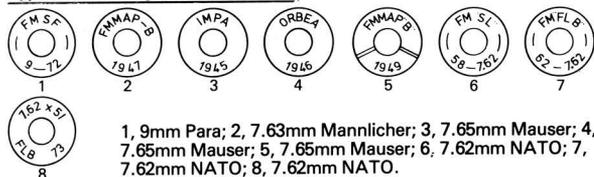
Armour-piercing tracer: red over black tip

Armour-piercing incendiary: silver bullet tip

Armour-piercing incendiary tracer: silver over red tip

Match ammunition: brown bullet tip

Typical cartridge headstamps



1, 9mm Para; 2, 7.63mm Mannlicher; 3, 7.65mm Mauser; 4, 7.65mm Mauser; 5, 7.65mm Mauser; 6, 7.62mm NATO; 7, 7.62mm NATO; 8, 7.62mm NATO.

In-service ammunition

7.62mm × 51 NATO

Ball: Cartucho con bala Normal N Cal: 7.62mm Corto

Tracer: Cartucho con bala Trazante Luminosa 'TL' Cal: 7.62mm Corto

Grenade cartridge: Cartucho de Fogueo 'F' Cal: 7.62mm Corto

Argentinian 7.62mm NATO-type ammunition is known locally as '7.62mm Corto' in contrast to the earlier .30in-06 type ammunition known as '7.62mm Largo'. The earliest Argentinian 7.62mm NATO cases were made from reworked 7.65mm Mauser cases and retain the original headstamps which incorporate the calibre '7.65'. The bullets in these cases may be found with 'FAL 60' stamped into the envelope. Argentinian cases are 50.8mm long, of brass with Berdan primers, and are bottle-necked and rimless.

.50in Browning

Ball: Cartucho con bala Normal 'N' Cal: 12.7mm

Armour-piercing: Cartucho con bala Perforante 'P' Cal: 12.7mm

Tracer: Cartucho con bala Trazante Luminosa 'TL' Cal: 12.7mm

Armour-piercing tracer: Cartucho con bala Luminosa Perforante 'LP' Cal: 12.7mm

It is believed that Argentinian 12.7mm Browning ammunition has projectile designs based upon corresponding U.S. designs. Cases would be of brass and, up to 1978 at least, the colour tip codes would not have corresponded to those in the United States.

9mm Parabellum

Ball: Cartucho con bala Normal 'N' Cal: 9mm

Tracer: Cartucho con bala Trazante Luminosa 'TL' Cal: 9mm

Obsolete Argentinian ammunition

Three obsolete Argentinian cartridges are worthy of further

mention, all of which were still in manufacture after 1945. The 7.65mm Mauser cartridge was the general-purpose infantry cartridge for a great many years until replaced by the 7.62mm NATO cartridge, and was used in the Argentinian Mauser bolt-action rifle. The 7.63mm Mannlicher Auto Pistol cartridge for the M 1900 pistol was used in the Navy and was virtually unique to Argentina, as was the 11.35mm Madsen aircraft machine-gun cartridge, made locally and also imported from the United Kingdom.

7.65mm × 54 Mauser

Ball: Cartucho con bala Normal 'N' Cal: 7.65mm

Ball (SS Heavy): Cartucho con bala Especial 'E' Cal:

7.65mm

Light tracer: Cartucho con bala Trazante Luminosa 'TL' Cal: 7.65mm

Smoke tracer: Cartucho con bala Trazante Humosa 'TH' Cal: 7.65mm

Armour-piercing: Cartucho con bala Perforante 'P' Cal: 7.65mm

Armour-piercing tracer: Cartucho con bala Luminosa Perforante 'LP' Cal: 7.65mm

Spotter: Cartucho con bala Reglaje 'R' Cal: 7.65mm

Incendiary: Cartucho con bala Quimica Incendiaria 'QI' Cal: 7.65mm

The case for this round was of brass, with Berdan primer, and was rimless and bottle-necked, 53.5mm long. With the light bullet weighing 154 grains (9.98 grams), muzzle velocity was 2,780fps (857mps).

7.63mm Mannlicher Auto Pistol

Ball: Cartucho con bala Normal 'N' Cal: 7.63mm

The case for this round was straight-sided and rimless, with Berdan primer, and 21mm long. The round-nosed jacketed bullet weighed 85 grains (5.51 grams) and had a muzzle velocity of 1,020fps (311mps)

11.35mm Madsen machine-gun cartridge

Ball: Cartucho con bala Normal 'N' Cal: 11.35mm

(also made with a variety of special bullet loadings)

The case for this round is of brass, and is rimless and bottle-necked with Berdan primer. Case length is 61.5mm. The ball, armour-piercing and flame tracer bullets all weighed 305 grains (19.76 grams) and muzzle velocity was 2,785fps (850mps).

Australia

Post-1945 small arms ammunition plants

Small Arms Ammunition Factory, Footscray (Government owned)

Manufacturers' headstamp codes

MF Factory No. 1, Footscray

MG Factory No. 2, Footscray

After the war, only Factory No. 2 was kept in commission, using the stamp MG until about 1949, when MF was re-instated.

Headstamps of manufacturers out of production by the end of 1945 on ammunition still in service after 1945

MH, MJ, MQ, MW, MS.

Belgium

Post-1945 small arms ammunition plants

Fabrique Nationale Herstal SA (privately owned)

Manufacturers' headstamp codes

FN

Other headstamp codes

SURP (Suppression, appears on high-pressure proof cartridges)

Principal cartridges in current service with the armed forces

9mm Parabellum; 7.62mm × 51 NATO; 12.7mm (.50in)

Browning.

Other calibres now obsolete or obsolescent, but in service after 1945

11.43mm (.45in ACP, Model 1911); .303in British; .30in-06 U.S.; .30in Carbine (U.S.).

Other cartridges manufactured and largely for export

Rifle or larger calibres:

5.56mm × 45; 7mm Medium; 7mm Mauser; 7.5mm French MAS; 7.62mm × 39 (U.S.S.R. Model 43); 7.65mm Mauser; 7.92mm × 57 Mauser; 12.7mm (.50in) Spotter; 20mm Oerlikon (AA Mk 4); 20mm Vulcan Type; 20mm Hispano Type 404-804; 30mm Aden; 30mm DEFA; 20mm X110 USN (Mk 100).

Pistol calibres:

6.35mm Browning Auto; 7.65mm Browning Auto; 9mm Short Auto; .380in Revolver (S & W); .38in Special.

Current colour codes

Tracer: red bullet tip

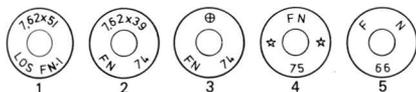
Armour-piercing: black bullet tip

Armour-piercing incendiary: silver tip

Incendiary: blue tip

Armour-piercing incendiary tracer: silver over red tip

Typical cartridge headstamps



1, 7.62mm NATO; 2, 7.62mm × 39; 3, 9mm Para; 4, 5.56mm; 5, 5.56mm.

In-service ammunition

9mm Parabellum

The Belgian case in this calibre is of brass with Berdan primer. It is straight-sided and rimless, and 19.1mm long. When loaded for normal service use the bullet (lead core) weighs 123.4 grains (8 grams) and achieves a muzzle velocity of 1,148fps (350mps). In Belgium this cartridge is used with the Browning self-loading pistol and the Vigneron submachine-gun. Belgium also produces other loadings in 9mm Parabellum calibre. A 115-grain (7.45-gram) ball bullet exists, achieving a muzzle velocity of 1,230fps (375mps) and a super penetrating bullet of similar weight and velocity to the standard service ball, and a tracer bullet.

7.62mm × 51 NATO

Ball: Cartouche Cal: 7.62mm OTAN à Balle Ordinaire, SS.77
Tracer: Cartouche Cal: 7.62mm OTAN à Balle Traceuse, L.78
Armour-piercing: Cartouche Cal: 7.62mm OTAN à Balle Perforante, P.80

Armour-piercing incendiary: Cartouche Cal: 7.62mm OTAN à Balle Perforante Incendiaire, Pi.86

Belgian 7.62mm cases are usually of brass, but steel cases have also been produced. They are Berdan primed, rimless and bottle-necked, 50.8mm long. Principal weapons chambered for this cartridge in Belgian service are the FAL self-loading rifle and the MAG machine-gun. Bullet details: Ball: SS.77 bullet, boat-tailed and lead-cored, weight 144 grains (9.33 grams), muzzle velocity 2,789fps (850mps).

Tracer: L.78 bullet, flat base, weight 137 grains (8.88 grams), muzzle velocity 2,723fps (830mps).

A.P.: P.80 bullet, boat-tailed with steel core, weight 150 grains (9.75 grams), muzzle velocity 2,789fps (850mps).

A.P./I: Pi.86 bullet, flat-based, 138 grains (9 grams), muzzle velocity 2,789fps (850mps).

12.7mm (.50in) Browning

Ball: Cartouche Cal: 12.7mm à Balle Ordinaire

Tracer: Cartouche Cal: 12.7mm à Balle Traceuse

Armour-piercing: Cartouche Cal: 12.7mm à Balle Perforante

Armour-piercing incendiary: Cartouche Cal: 12.7mm à Balle Perforante Incendiaire

Armour-piercing incendiary tracer: Cartouche Cal: 12.7mm à Balle Perforante Incendiaire — Traceuse

Belgian ammunition in this calibre usually employs brass cases, with Boxer primers. They are rimless and bottle-necked, 99mm long. The bullets are similar to their U.S. counterparts, and Belgian ammunition is loaded to the velocities shown below.

Ball: Similar to U.S. M.33. Weight 649 grains (42.06 grams), boat-tailed with lead core, muzzle velocity 3,034fps (925mps).

Tracer: Similar to U.S. M.17. Weight 634 grains (41.12 grams), velocity as for ball round.

A.P: Similar to U.S. M.2. Weight 706 grains (45.78 grams), velocity as for ball round.

A.P./I: Similar to U.S. M.8. Weight 650 grains (42.15 grams), velocity as for ball round.

A.P./I/T: Similar to U.S. M.20. Weight 612 grains (39.69 grams), velocity as for ball round.

Details of other ammunition currently manufactured largely for export or development

Fabrique Nationale manufacture a wide selection of ammunition, much of which is intended for export to a large number of countries, many of which have little or no military ammunition capacity of their own. Many of the types thus exported have no special interest and some are obsolete or obsolescent. Three calibres are worthy of further note:

7mm Medium

This cartridge has its origins in the 1952 NATO trials which ultimately led to the adoption by NATO of the 7.62mm × 51 cartridge. The 7mm cartridge referred to, of Belgian design, was also made in the United Kingdom as the 7mm Second Optimum cartridge. After the trials, in the mid 1950s, Belgium made limited exports of the 7mm round to Latin America. The case for the 7mm Medium is 49.15mm long and is of brass, rimless and bottle-necked, with Berdan

Geographical Register of Ammunition Producers and Users

primer. The original Belgian ball bullet was the lead-cored S.12 weighing 140 grains (9.07 grams) with a velocity of 2,750fps (830mps).

7.62mm × 39 (U.S.S.R. Model 1943)

Belgium has made this cartridge for a number of years, usually marked with the FN headstamp, but also with the head left plain. Steel cases have been produced (copper washed) but usually the case material is brass, Berdan primed, rimless and bottle-necked, and 38.6mm long. The ball bullet is lead-cored and flat-based, weighing 123 grains (7.97 grams).

5.56mm × 45

Belgium has made the 5.56mm (.223in) cartridge for a number of years, mainly for export. More recently Belgium has developed a special line of loadings for this cartridge and has entered it in the current NATO small arms calibre trials. Belgian 5.56mm ammunition is normally brass-cased with Berdan primers, rimless and bottle-necked, and 44.5mm long. A variety of different bullet forms has been produced. Equivalent to U.S. standard specifications (suitable for 12in twist barrel)

Ball: S.92 equivalent to U.S. M.193 ball. Lead-cored boat-tail bullet, weighing 55 grains (3.55 grams), muzzle velocity 3,300fps (1,005mps).

Tracer: L.95 equivalent to U.S. M.196 tracer, weight 53 grains (3.43 grams).

Belgian development for the NATO trials (suitable for 9in twist barrel)

Ball: S.109 bullet. Boat-tailed bullet 23mm long with steel nose insert and lead rear core. Weight 61.7 grains (4 grams), muzzle velocity 3,000fps (906mps).

Tracer: L.110 bullet. Flat-based, 29.5mm long, weight 64 grains (4.15 grams).

Armour-piercing: P.112 bullet. Length 24mm, weight 62 grains (4.15 grams).

Brazil

Post-1945 small arms ammunition plants

Fabrica Realengo, Rio de Janeiro (Government owned)
Companhia Brasileira de Cartuchos, Sao Paulo (privately owned)

Manufacturers' headstamp codes

FNCM, FR, CBC.

Other headstamp codes

MG Ministro da Guerra

MM Ministro da Marin

DAM Diretoria da Marinha

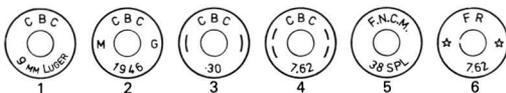
Principal cartridges in service with the armed forces or police, and manufactured in Brazil

9mm Parabellum; .38in Special; .45in ACP; 7.62mm × 51 NATO; 5.56mm × 45; 12.7mm (.50in) Browning.

Other cartridges made in Brazil and now obsolete or made for commercial sale

7.65mm Parabellum; 7.63mm Mauser Pistol; 9mm Corto (.380in ACP); .45in Revolver; .30in US Carbine; .30in-06; 7mm Mauser.

Typical cartridge headstamps



1, 9mm Para; 2, 7mm Mauser; 3, .30in-06; 4, 7.62mm NATO; 5, .38in Special; 6, 7.62mm NATO.

Bulgaria

Post-1945 small arms ammunition plant

Factory No. 10

Manufacturer's headstamp codes

Factory No. 10 currently employs the numeral '10' in the headstamp. Earlier, the Cyrillic letters 'B Φ' (VF) were used on Bulgarian headstamps, both pre- and post-1945.

Other headstamp codes

On ammunition with factory code '10', additional marks used include a triangle, a star, or a dash.

Principal cartridges in service with the armed forces and manufactured in Bulgaria

7.62mm × 39 (U.S.S.R. Model 43).

Other cartridges manufactured for export, not domestic use
9mm Parabellum; 7.62mm × 51 NATO; 7.92mm × 57 Mauser; 7.62mm Tokarev.

Characteristics of Bulgarian ammunition

Initial Bulgarian production after the war was limited in scope, and brass cases were used. Bulgarian ammunition now has steel cases, both copper washed and lacquered, with Berdan primers.

Bulgarian 7.62mm × 39 Model 43 ammunition is, in the main, identical with that manufactured in the U.S.S.R. However, in addition to the normal Type PS ball, Bulgaria also produced a ball cartridge in M.43 calibre with a sintered iron bullet. For other calibres, it is believed that imports are made from other Warsaw Pact countries.

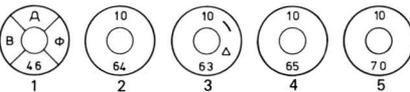
Current colour codes

Tracer: green bullet tip

Armour-piercing incendiary: black over red tip

Incendiary ranging: red bullet tip

Typical cartridge headstamps



1, 9mm Para; 2, 9mm Para; 3, 7.92mm Mauser; 4, 7.62mm x 39; 5, 7.62mm NATO.

Burma

Post-1945 small arms ammunition plant

One modern plant, built by the Fritz Werner organization, exists. There may be other older equipment in use also.

Manufacturer's headstamp codes

Burmese headstamps use the local alphabet, and while being thus quite distinctive, the headstamps appear to lack common identifying marks.

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Principal cartridges in service with the armed forces and manufactured in Burma

9mm Parabellum; .303in British; 7.62mm × 51 NATO.

Typical cartridge headstamps



9mm Para.

Cambodia

(Prior to take-over by Khmer Rouge)

Ammunition plant

At Stung Chral

Manufacturer's headstamp codes

No manufacturer's headstamp code was employed. Headstamps included the calibre and sometimes the year of production.

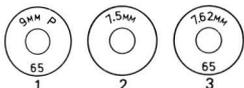
Principal cartridges manufactured

9mm Parabellum; .30in-06 U.S.; 7.5mm × 54 MAS.

Note on Cambodian ammunition

The plant at Stung Chral had a short life, starting production in 1969 and ending late in 1970. The factory was built under the supervision of Sellier and Bellot (from Czechoslovakia) and the primers and propellants were supplied direct from Czechoslovakia. All Cambodian ammunition from this plant was brass-cased, and Berdan primed, and the only loadings produced were ball, with lead cores.

Typical cartridge headstamps



1, 9mm Para; 2, 7.5mm MAS; 3, .30in-06.

Cameroun

Post-1945 small arms ammunition plant

Manufacture Camerounaise de Munition (Government owned)

Manufacturer's headstamp code

'Manucam'

Principal cartridges in service with the armed forces (manufactured for or by Manucam)

7.62mm × 51 NATO.

Typical cartridge headstamps



7.62mm NATO.

Canada

Post-1945 small arms ammunition plants

Dominion Arsenals Division of Canadian Arsenals Ltd. (Now closed)

Defence Industries Ltd. (Now closed)

Industrie Valcartier

Manufacturers' headstamp codes

DA, DAC, DAQ, DC, IVI.

Principal cartridges in service with the armed forces, and manufactured in Canada

.380in Revolver; 9mm Parabellum; 7.62mm × 51 NATO; .50in Browning.

Other cartridges, now obsolete, in use after 1945

.303in; .30in-06.

Special headstamp codes

To some extent, Canada retained some of the old British headstamp code letters, indicating the type of loading. The following letters appear, therefore, on some Canadian cartridges of this period:

'G' tracer

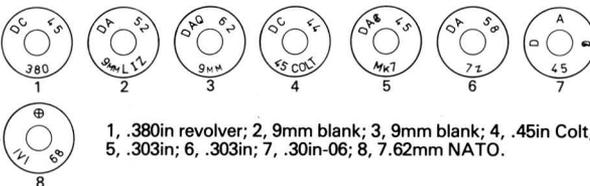
'L' blank

'Z' nitro-cellulose propellant

Colour codes

Canadian ammunition now bears the standard NATO coloured bullet tip code.

Typical cartridge headstamps



1, .380in revolver; 2, 9mm blank; 3, 9mm blank; 4, .45in Colt; 5, .303in; 6, .303in; 7, .30in-06; 8, 7.62mm NATO.

Chile

Post-1945 small arms ammunition plant

Fabrica de Material de Guerra de Ejercito, Santiago

Manufacturer's headstamp codes

F, FAMAE, FMG, FMEP, FME.

Principal cartridges in service with the armed forces and manufactured in Chile

9mm Steyr Auto; 9mm Parabellum; 7.62mm × 51 NATO.

Other calibres made in Chile after 1945, and now obsolete

7.65mm Browning SL Pistol; 7mm Mauser.

Characteristics of Chilean ammunition

Chilean ammunition is brass-cased, and has Berdan ignition.

Typical cartridge headstamps



1, 9mm Steyr; 2, 9mm Para; 3, 7mm Mauser; 4, 7mm Mauser; 5, 7.62mm NATO.

China, Republic of (pre-1950)

Small arms ammunition plants, 1945-49

Factory No. 10 (reported to have been in Chungking)

Factory No. 11

Factory No. 20

Factory No. 25

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Factory No. 40
 Factory No. 90 (reported to have been in Shansi Province)
Manufacturers' headstamp codes



Principal cartridges in service with the armed forces and manufactured in China
 7.63mm Mauser SL Pistol; .45in ACP; 7.92mm × 57 Mauser.
Typical cartridge headstamps
 Republic of China headstamp dates are reckoned from 1912 in the Western calendar, the year of the revolution.



China, Republic of (Taiwan)

The Chinese Nationalist Government based itself in Taiwan after leaving mainland China in December 1949.

Post-1949 small arms ammunition plant

Plant No. 60.A

Manufacturer's headstamp code



60.A

Principal cartridges in service with the armed forces
 9mm Parabellum; .45in ACP; .30in U.S. Carbine; .30in-06; 7.62mm NATO; 5.56mm × 45; .50in Browning.

Current colour codes

Tracer: red bullet tip

Typical cartridge headstamps

Headstamp dates are reckoned from 1912, the year of the revolution which first installed the régime in China.



China, People's Republic of

(established 21 September 1949)

Post-1949 small arms ammunition plants

Nationalist ammunition plants were usually kept in operation after being overrun by Chinese Communist forces. Nationalist factory numbers and symbols were, it is believed, kept in use for a period of time thereafter. Currently the following plants are in operation:

Factory No. 11 (believed to be at Nanking)

Factory No. 31 (believed to be at Peking)

Factory No. 41

Factory No. 51

Factory No. 61

Factory No. 71

Factory No. 81

Factory No. 121 (may no longer be in operation)

Factory No. 361

Factory No. 501

Factory No. 661

In addition, Chinese Communist ammunition with the following numbers included in the headstamp has been produced, and presumably relate to the Factory number. These date from the early 1950s:

D.22, D.53, 321, 671, 791, 21215.

Manufacturers' headstamp codes

All the above factories and presumed factories are represented by the appropriate number included in the headstamp. In addition, some symbols were in use during the early years of the Communist régime that had been inherited from the Nationalists. Which *see*.

Principal cartridges in service with the armed forces

7.62mm Tokarev; 7.65mm × 17 (Rimless) Pistol; 9mm Makarov; 7.62mm × 39 (U.S.S.R. Model 43); 7.62mm × 54 (U.S.S.R.-type); 12.7mm × 108 (U.S.S.R.-type); 14.5mm × 114 (U.S.S.R.-type).

Other calibres now obsolete, but manufactured in China and used by the Communist forces

6.5mm Japanese Arisaka; 7.7mm Japanese semi-rimless; 7.92mm × 57 Mauser.

Current colour codes

Tracer: green bullet tip

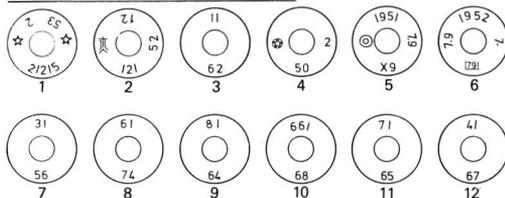
Armour-piercing incendiary: black bullet tip (prior to 1967 the API code was black over red tip)

Incendiary ranging: red bullet tip

Armour-piercing incendiary tracer: violet tip (prior to 1967 the APIT code was violet over red tip)

Ball (steel core): plain tip now, but prior to 1967 had a silver or white bullet tip.

Typical cartridge headstamps



1, 7.62mm Tokarev; 2, 7.62mm Tokarev; 3, 7.62mm Tokarev; 4, 7.92mm Mauser; 5, 7.92mm Mauser; 6, 7.92mm Mauser; 7, 7.62mm × 39; 8, 7.62mm × 39; 9, 7.62mm × 39; 10, 7.62mm × 39; 11, 7.62mm × 54; 12, 12.7mm.

In-service ammunition

7.65mm × 17 rimless, pistol

7.65mm × 17 Type 64

This cartridge is unique, being solely for use in the Chinese

Type 64 silenced pistol. The case is very close in design to the 7.65mm × 17 semi-rimless Browning cartridge, but is rimless and not interchangeable. Bullet weight is 74 grains (4.8 grams).

7.62mm Tokarev (7.62mm × 25)

7.62mm Type 50

Chinese ammunition in this calibre is normally brass-cased. Cases have Berdan primers and are rimless and bottle-necked, 24.85mm long. It is used in a number of weapons including the Type 50 submachine-gun and the Chinese copy of the U.S.S.R. Tokarev SL Pistol.

The Type 50 cartridge is similar to the Russian Type P, and has an 85-grain (5.5-gram) bullet, with lead core and gilding metal jacket. Muzzle velocity is 1,500fps (457mps).

9mm Makarov

9mm Type Type 59

Chinese ammunition in this calibre is normally brass-cased. Cases have Berdan primers, and are rimless, straight-sided and 17.8mm long. It conforms to the original U.S.S.R. cartridge.

7.62mm × 39 (U.S.S.R. M.43)

Ball: Cartridge 7.62mm Ball Type 56.

A.P./I: Cartridge 7.62mm armour-piercing incendiary Type 56.

Tracer: Cartridge 7.62mm tracer Type 56.

Incendiary ranging: Cartridge 7.62mm incendiary tracer Type 56.

Chinese 7.62mm × 39 ammunition conforms closely to the original U.S.S.R. specifications. The case is rimless and bottle-necked, with Berdan primer, and 38.6mm long. Chinese cases are of steel, which may be copper washed and occasionally brass washed. In addition, lacquered steel cases are increasingly coming into use, the lacquers being green, or brown. Primers are sometimes coloured green or red, or alternatively a coloured or black primer annulus is used. The bullet forms of the four Type 56 cartridges listed above are similar to the bullet forms of the corresponding U.S.S.R. cartridges, and the ballistics are also similar. In China the 7.62mm Type 56 cartridge is chambered in the Type 56 carbine and Type 56 Rifle and the Type 68 Rifle. It is also chambered in the Type 56 light machine-gun.

7.62mm × 54 (U.S.S.R.)

Ball (lead core): Cartridge 7.62mm ball Type 53.

Ball (steel core): Cartridge 7.62mm ball Type 53.

A.P./I: Cartridge 7.62mm armour-piercing incendiary Type 53.

Chinese 7.62mm × 54 ammunition conforms closely to that manufactured in the U.S.S.R. The case is rimmed and bottle-necked, with Berdan primer, 53.6mm long. Chinese cases are usually of steel and copper washed. The steel-cored ball bullet is similar to the Soviet LPS type with a trajectory matching that of A.P./I. The 7.62mm Type 53 is chambered in the Type 53, Type 57 and Type 67 machine-guns, and in the old Type 50 Carbine now in reserve.

12.7mm × 108

A.P./I: Cartridge 12.7mm armour-piercing incendiary Type 54.

A.P./I/T: Cartridge 12.7mm armour-piercing incendiary tracer Type 54.

Chinese 12.7mm Type 54 ammunition conforms closely to that manufactured in the U.S.S.R. The case is lacquered steel or brass washed steel, and is rimless, bottle-necked, 108mm long. Some production at least employs the novel Chinese form of Berdan primer in which a ball-bearing, acting as an anvil, is pressed half-way into a triangular hole in the floor of the cap chamber, which, in effect, leaves three fire holes at the corners of the triangle. This ammunition is used in the Type 54 heavy machine-gun.

14.5mm × 114

A.P./I: Cartridge 14.5mm armour-piercing incendiary Type 56.

Incendiary tracer: Cartridge 14.5mm incendiary tracer Type 56.

A.P./I/T: Cartridge 14.5mm armour-piercing incendiary tracer Type 56.

Chinese 14.5mm Type 56 ammunition conforms closely to that manufactured in the U.S.S.R. The case is rimless and bottle-necked, 114mm long and is of lacquered steel.

Colombia

Post-1945 small arms ammunition plant

Industria Militar, Bogota

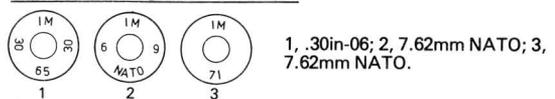
Manufacturer's headstamp codes

INDUMIL, IM.

Principal cartridges manufactured in Colombia

9mm Parabellum; 7.62mm × 51 NATO; .30in-06.

Typical cartridge headstamps



Czechoslovakia

Post-1945 small arms ammunition plants

Vsetin plant (large calibres, 20mm or larger)

Povazska Bystrica plant

Vlasim plant (pre-war site of Sellier & Bellot plant)

Post-1945 manufacturers' headstamp codes

Z, ZV, aym, bxn, CZO, dtp, PS.

Other headstamp codes (in use up to 1952)

A six-pointed star indicates a brass cartridge case, a cross indicates a steel case, and only a dash indicates that the Berdan primer has one fire hole only. Other symbol codes for this period are:



Principal cartridges in service with the armed forces, and manufactured in Czechoslovakia

7.62mm × 25 (Tokarev); 7.65mm Browning; 7.62mm × 39 (U.S.S.R. Model 43); 7.62mm × 54 (U.S.S.R.); 12.7mm ×

Geographical Register of Ammunition Producers and Users

108 (U.S.S.R.); 23mm × 115 aircraft (U.S.S.R.); 30mm × 155 aircraft (U.S.S.R.); 30mm × 220 anti-aircraft.

Other cartridges now obsolete, but manufactured and issued after 1945

9mm Parabellum; 7.62mm × 45 (M.52); 7.92mm × 57 Mauser.

Other calibres manufactured, but largely for export
.303in British; 7.62mm × 51 NATO.

Colour codes for 7.92mm x 57 ammunition

Ball: black annulus for light bullet, green annulus for heavy bullet and blue annulus for bullet with mild steel core

Tracer: red primer annulus

AP/I: white primer annulus

Current colour codes

Steel-cored ball: silver bullet tip (7.62mm × 54 only)

Heavy ball: yellow bullet tip (7.62mm × 54 only)

Short-range practice ball: white bullet tip

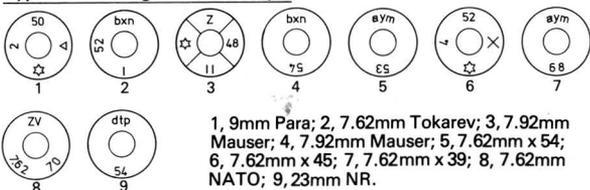
Tracer: green bullet tip

Practice tracer: green over white tip

Incendiary ranging: red bullet tip

A.P/I: black over red tip

Typical cartridge headstamps



In-service ammunition

7.62mm × 25 (Tokarev)

This cartridge is manufactured with steel and brass cartridge cases and is Berdan primed. The case is rimless and bottle-necked and 24.85mm long. This is the standard U.S.S.R. submachine-gun round and replaced the 9mm Parabellum round in Czech service in the 1950s. It is chambered in the M.52 self-loading pistol and in a number of obsolete or obsolescent submachine-guns. Bullet details are:

Ball: round-nosed lead-cored bullet with clad steel envelope. Weight 85 grains (5.51 grams), muzzle velocity is 1,500fps (457mps).

Tracer: round-nosed flat-based bullet, weight 85 grains (5.51 grams).

7.65mm Browning (.32in ACP)

This cartridge has been adopted by Czechoslovakia for use in pistols and in the SMG rôle. The cartridge case is straight-sided and semi-rimless, and 17mm long. Weapons chambered for this cartridge are the M.50 self-loading pistol and the M.61 'Skorpion' machine pistol. The bullet is lead-cored and weighs about 77.2 grains (5 grams) and has a muzzle velocity of about 990fps (302mps).

7.62mm × 39 (M.43 U.S.S.R.)

Ball: Ostry Naboj 7.62mm Vz.43

Tracer: Ostry Svitici Naboj 7.62mm Sv.43

A.P/I: Ostry Prubojny Zapalny 7.62mm PZ.43

Incendiary ranging: Ostry Zastrelny 7.62mm Z.43

Practice tracer (ranging): Ostry Zamerovaci 7.62mm Zm.43

Practice ball: Ostry Naboj Redukovany 7.62mm Rd.43

The Czech cartridge case in this calibre is of steel with Berdan primer. The case is rimless and bottle-necked, and 38.6mm long. Principal weapons chambered for this cartridge are the Vz.52/57 and the Vz.58 self-loading rifles and the Vz.52/57 light machine-gun. Bullet details are:

Ball: Vz.43. Boat-tailed bullet with mild steel core. Weight 123 grains (7.97 grams), muzzle velocity 2,349fps (716mps).

Tracer: Sv.43. Flat-based bullet, weighing 115 grains (7.4 grams).

7.62mm x 54 (U.S.S.R.)

Ball (steel core): Ostry Naboj 7.62mm Vz.59

Ball (heavy): Ostry Naboj Tezkou 7.62mm Tz

Tracer: Ostry Svitici Naboj 7.62mm TzSv

AP/I: Ostry Prubojny Zapalny 7.62mm PZ

Incendiary ranging: Ostry Zastrelny 7.62mm ZaZ

The Czech cartridge case in this calibre is of steel with Berdan primer. The case is rimmed and bottle-necked, and 53.6mm long. This cartridge is chambered in the Vz.59 machine-gun. Two heavy bullets have been manufactured in this calibre by the Czechs. The first corresponds to the U.S.S.R. 'D' bullet and is boat-tailed with lead core, weighing 182 grains (11.79 grams), and this is marked with a yellow bullet tip. The second weighs the same, but is longer and has a mild steel core. Specimens seen had no tip colour. The Czech tracer bullet in this calibre is unlike its Soviet counterpart in having a boat-tailed rear, and a different form of tracer cannister.

Obsolete Czech ammunition

7.62mm × 45 (M.52)

This cartridge, of native Czech design, was developed and produced after 1945 and was chambered in the M.52 self-loading rifle and the M.52 light machine-gun. In the interests of standardization within the Warsaw Pact, this calibre was dropped in favour of the 7.62mm × 39 cartridge. The cartridge case in this calibre was made with both brass and steel cases, steel predominating. The case is rimless and bottle-necked and 44.8mm long. Details are:

Ball: Ostry Naboj 7.62mm Kr Vz.52

Tracer: Ostry Svitici Naboj 7.62mm Kr-Sv. 52

The ball bullet is boat-tailed with a steel core, weighing 130 grains (8.43 grams) and achieves a muzzle velocity of 2,440fps (744mps).

7.92mm × 57 Mauser

This was the pre-war standard Czech infantry cartridge, and in 1945 Czechoslovakia again took it into service as the standard round. The original pre-war ball round was the Vz.23 having a light 154-grain (9.98-gram) bullet, and a number of other loadings also existed then. The post-1945 7.92mm cartridge employed a brass case with Berdan primer, the case being rimless and bottle-necked, and 56.8mm long. Post-war bullet types were:

Ball: Vz.47. Cupro-nickel clad steel envelope with mild steel core, boat-tailed. Bullet weight 178 grains (11.54 grams).

Geographical Register of Ammunition Producers and Users

Tracer: Weight 158 grains (10.24 grams).

Armour piercing: AP bullet, weight 154 grains (9.98 grams).
CNCS envelope.

9mm Parabellum

Ostry Naboj 9mm Vz.48

Most Czech 9mm cases are of brass, although some steel cases have been made also. Cases are rimless and straight-sided, 19.1mm long, and with Berdan primers having one or two fire holes. The Czech ball bullet has a cupro-nickel clad steel envelope and a mild steel core. Bullet weight is 100 grains (6.48 grams).

Denmark

Post-1945 small arms ammunition plants

Ammunitionsarsenalet (Government owned)
(known as the Haerens Ammunitionsarsenalet prior to October 1953.)

Manufacturer's headstamp codes

HA, AA, AMA.

Other headstamp marks

Danish ammunition often bears a crown in the headstamp
Principal cartridges in service with the armed forces, and manufactured in Denmark

9mm Parabellum. Mod 41; 7.62mm × 51 (NATO) Mod 62.

Other cartridges manufactured and now obsolete

6.5mm × 55 (Model 1946); .30in-06 (7.62mm Model 1948).

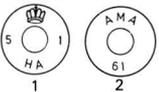
Characteristics of Danish ammunition

Danish ammunition is brass-cased, and employs Berdan primers. Some Danish marked ammunition has, in fact, been imported. For certain classes of training ammunition, the Danes have reloaded foreign cases or, for drill or dummy ammunition, used foreign cases.

Current colour codes

Tracer: red bullet tip

Typical cartridge headstamps



1, 9mm Para; 2, 9mm Para.

Dominican Republic

Post-1945 small arms ammunition plants

Armeria F.A. San Cristobal (believed to be Government owned)

Manufacturer's headstamp codes

RD, AC.

Principal cartridges in service with the armed forces

9mm Parabellum; .30in U.S. Carbine; 7.62mm × 51 NATO; .50in Browning. (.45in ACP ammunition may also be made in San Cristobal).

Other calibres manufactured and now obsolete

7mm Mauser; .30in-06.

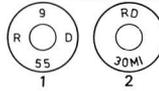
Characteristics of Dominican ammunition

Dominican ammunition is made to U.S. specifications (with the exception of 9mm Parabellum) and is unremarkable.

Current colour codes

Ammunition is marked in accordance with U.S. colour codes.

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm NATO (from reworked .30in-06 cases).

Egypt

Post-1945 small arms ammunition plants

Factory No. 10 near Alexandria (Government owned).

Factory No. 27 near Cairo (Government owned).

Post-1945 manufacturers' headstamp codes



Principal cartridges in service with the armed forces and manufactured in Egypt or made with Egyptian markings

9mm Corto (.380in ACP); 9mm Parabellum; 7.62mm × 39 (U.S.S.R. Model 43); 7.62mm × 54 (U.S.S.R.); 12.7mm (.50in) Browning; 12.7mm × 108 (U.S.S.R.); 14.5mm × 114 (U.S.S.R.); 20mm × 110 HS; 23mm × 152 ZSU 23 (U.S.S.R.); 30mm × 170 HSS 831.

Other calibres now obsolete or obsolescent, but in service use after 1945 and manufactured locally

.303in British; 7.92mm × 57 Mauser

Current colour codes

Tracer: green bullet tip (green tips are also found on incendiary bullets in 7.62mm x 54 calibre)

A.P/I: black over red bullet tip

A.P/I/T: purple over red tip (12.7 × 108 calibre)

Incendiary ranging: red bullet tip

Steel core ball: silver bullet tip

Colour codes on obsolete ammunition

7.92mm × 57 ammunition and probably .303in ammunition used codes different from those shown above. The following applied to 7.92mm calibre:

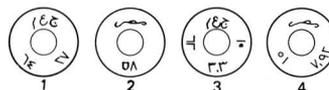
Tracer: red bullet tip

A.P: black bullet tip

Characteristics of Egyptian ammunition

Egyptian-made ammunition employs both steel and brass cases, the steel cases usually occurring with ammunition of U.S.S.R. design. While in general the four Russian calibres made in Egypt are to U.S.S.R. specifications and conform ballistically, there are differences. The Egyptian 7.62mm × 39 ball differs from the Soviet Type PS in having a flat base and a lead core. Weight 123 grains (7.97 grams).

Typical cartridge headstamps



1, 7.62mm x 39; 2, 7.62mm x 39; 3, .303in; 4, 7.92mm Mauser.

Geographical Register of Ammunition Producers and Users

Ethiopia

Post-1945 small arms ammunition plant

The positive existence of an Ethiopian ammunition plant cannot be confirmed. Small arms ammunition with Ethiopian headstamps exist, in a number of calibres, but some or all of these could be custom made elsewhere and imported.

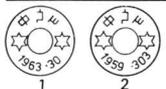
Ethiopian headstamp codes

Ethiopian headstamps appear to lack common identifying marks. Most headstamps include dates in Western characters, with other characters of a local alphabet included. The headstamp, which tends to be rather over-crowded, often includes one of more stars and the calibre description in Western characters.

Principal cartridges found with Ethiopian headstamps

.303in British; .30in-06.

Typical cartridge headstamps



1, .30in-06; 2, .303in.

Finland

Post-1945 small arms ammunition plants

Lapuan Patruunatehdas (privately owned)

Oy Sako AB (privately owned)

Post-1945 manufacturers' headstamp codes

L, Lapua

VPT

SO

SAKO

Lapuan Patruunatehdas

Lapuan Patruunatehdas for
ammunition for Finnish Defence
Ministry

Oy Sako

Oy Sako

Principal cartridges in service with the armed forces

9mm Parabellum; 7.62mm × 39 (U.S.S.R. Model 43 type);

7.62mm × 54 (U.S.S.R. type); 23mm ZSU 23 (U.S.S.R.).

Other calibres manufactured largely for export

pistol calibres:

6.35mm Browning Auto; 7.65mm Browning Auto; 7.65mm Parabellum; 9mm short (.380in ACP); .38in Revolver (S & W); .38in Special.

rifle calibres:

5.56mm × 45; 7mm Mauser; 6.5mm Swedish Mauser;

7.62mm × 51 NATO; .30in-06.

Current colour codes

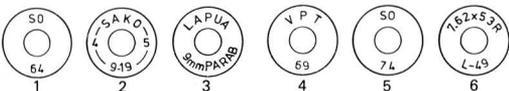
Tracer: white bullet tip

Armour-piercing: blue bullet tip

Armour-piercing Incendiary: black/red tip

Observation: red bullet tip

Typical cartridge headstamps



1, 9mm Para; 2, 9mm Para; 3, 9mm Para; 4, 7.62mm x 39; 5, 7.62mm x 39; 6, 7.62mm x 54.

In-service ammunition

9mm Parabellum

9mm Pistolpatruuna

The Finnish case in this calibre is of brass with Berdan primer, rimless and straight-sided, and 19.1mm long. The bullet weighs 115 grains (7.45 grams). Muzzle velocity is 1,263fps (385mps).

7.62mm × 39 (U.S.S.R. Model 1943 type)

Ball: 7.62mm RKIV Patruuna S.309

Tracer: 7.62mm Valojuovo Patruuna VJ.313

The Finnish cartridge case in this calibre is externally identical with that of the U.S.S.R. It is of brass, with Berdan primer, and the bottle-necked rimless case is 38.6mm long. This cartridge is chambered in the M.62 self-loading rifle and the M.62 light machine-gun. Bullet details are:

Ball: The S.309 bullet has a flat base and is lead-cored, with gilding metal envelope. Bullet weight is 123 grains (7.97 grams), muzzle velocity is 2,379fps (725mps)

Tracer: The VJ.313 bullet weighs 123 grains (7.97 grams) and has a lead core behind which is the trace composition. Gilding metal envelope.

7.62mm x 54 (U.S.S.R.-type)

Known in Finland as 7.62mm × 53R

Ball: 7.62mm × 53R RKIV Patruuna D.166

Tracer: 7.62mm × 53R Valojuovo Patruuna D.278

Armour-piercing: 7.62mm × 53R Panssari Patruuna D.277

Incendiary: 7.62mm × 53R Sytytin Patruuna S.276

The Finnish cartridge in this calibre is externally identical with that of the U.S.S.R. It is of brass, with Berdan primer, and the bottle-necked case is rimmed and measures 53.5mm. In Finland the designation of this round is '7.62mm × 53.R' and not the more customary '7.62mm × 54'. Bullet details are:

Ball: The D.166 bullet weighs 200 grains (12.96 grams), muzzle velocity 2,329fps (710mps).

France

Post-1945 small arms ammunition plants

Cartoucherie du Mans

Cartoucherie de Toulouse

Cartoucherie de Valence

Atelier de Construction de Tarbes

Luchoire SA

Ste Méridionale d'industrie

Manufacture de Machines du Haut-Rhin

Etablissements Rey à Nimes

Société Française des Munitions

(The first four plants on this list are government owned. The rest are in private ownership but supply ammunition to the French Government. Rey à Nimes no longer make military ammunition, and Ste Méridionale now make no ammunition at all.)

Post-1945 manufacturers' headstamp codes

LM Cartoucherie du Mans

ATE and TE Cartoucherie de Toulouse

A-VE and VE Cartoucherie de Valence

Geographical Register of Ammunition Producers and Users

ATS and TS Atelier de Construction de Tarbes
 LU Luchaire SA
 MI Ste Méridionale d'industrie
 MR Manurhin (Manufacture du Haut Rhin)
 RY Etablissements Rey à Nimes
 SF Société Française des Munitions (also Gevelot)
 GT Société Française des Munitions (export)

Other headstamp codes

French military headstamps often include code letters identifying the source of the metal delivered to the plant making the cartridge case. These code letters include: B, BD, BO, C, CCM, CM, D, F, FY, HMB, HX, I, N, P, PC, PY, R, S, SF, SI, V, VA, VD.

Principal cartridges in service with the armed forces

9mm Parabellum; 5.56mm × 45; 7.5mm (Modèle 1929); 7.62mm × 51 NATO (Modèle 1961); 12.7mm (.50in) Browning (Modèle 1947); 12.7mm (.50in) Spotter — Tracer; 20mm × 82 (MG 151); 20mm × 102 (M.621); 20mm × 139 (HS 804); 30mm (HS 831); 30mm DEFA.

Other calibres now obsolete, but in service use after 1945

7.65mm Auto pistol/SMG; 8mm Revolver; .380in Revolver (S and W); 8mm Rifle (Modèle 1886 type); 7.7mm × 56 (.303in British); 7.62mm Model 1949 (.30in-06 type); 7.92mm × 57 Mauser; 7.62mm K (Modèle 1950) (.30in Carbine).

Other calibres currently manufactured, but for export or commercial sale

9mm Makarov pistol (U.S.S.R.); 9mm Court (Corto) pistol; 7.62mm × 39 (U.S.S.R. Model 43); 7.62mm × 54 (U.S.S.R.).

Current colour codes

French colour codes are somewhat more complicated than those of other Western powers, partly because the French have two rifle calibres in service, the 7.62mm NATO cartridge (using NATO colour codes) and the 7.5mm cartridge (using a French code).

7.5mm Mle 1929

Tracer (Mle 1949 and 1949.a): 10mm red bullet tip and red primer annulus
 Tracer (Mle 1950.a): 8mm green bullet tip
 Tracer (Mle 1958.a): 8mm purple bullet tip and purple primer annulus
 Tracer (Mle G.59): 7mm red bullet tip and purple primer annulus
 Armour-piercing (Mle 1949 & 1949.a): 8mm black bullet tip
 Armour-piercing Tracer (Mle 1949): black over white bullet tip
 Armour-piercing Tracer (Mle 1949.a): from 1958, black over red tip
 Short-range, sub-calibre (Mle 1954): yellow bullet tip
 Short-range, sub-calibre, tracered: yellow over red tip
7.62mm × 51 NATO
 Tracer (all models): red bullet tip
 Armour-piercing: black bullet tip
 Armour-piercing incendiary: silver bullet tip
 Incendiary: blue bullet tip

Sub-calibre, observation: yellow bullet tip

12.7mm (.50in) Browning

Armour-piercing: black bullet tip

Tracer: red bullet tip

Armour-piercing tracer: black over red tip

Incendiary: blue bullet tip

An earlier and now obsolete French Air Force code for 12.7mm ammunition identified ball ammunition with a grey tip, tracer with a white tip and A.P/T with a black over white tip. The Air Force code is now standardized with the general code shown above.

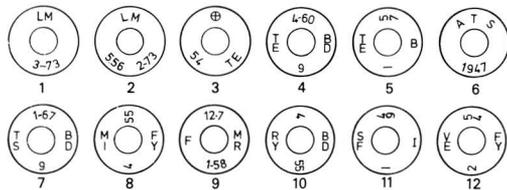
9mm Parabellum

Tracer: red bullet tip. Previously, 9mm tracer was identified by a white bullet tip.

5.56mm × 45

Tracer: red bullet tip

Typical cartridge headstamps



1, 5.56mm; 2, 5.56mm; 3, 7.62mm NATO; 4, 9mm Para; 5, 9mm Para; 6, 9mm Para; 7, 9mm Para; 8, 9mm Para; 9, .50in Browning; 10, 9mm Para; 11, 9mm Para; 12, 7.62mm NATO.

In-service ammunition

9mm Parabellum

Ball: Cartouche de 9mm, Balle 'O'

Tracer: Cartouche de 9mm, Balle 'T'

French cartridge cases in this calibre are of steel or brass, with Berdan primers. The case is straight-sided and rimless, 19.1mm long. The 9mm cartridge is for use in both submachine-guns and self-loading pistols. Bullet details are: Ball: Round-nosed flat-based bullet with lead core. Weight 124 grains (8.04 grams). Muzzle velocity 1,300fps (396mps). Tracer: Round-nosed flat-based bullet with lead front core behind which is loaded the trace composition. Weight 124 grains (8.04 grams). Muzzle velocity 1,300fps (396mps). Match ball: A special truncated ogived bullet, the T.14, also exists in 9mm calibre.

5.56mm × 45

Ball: Cartouche de 5.56mm, Balle 'O'.

Tracer: Cartouche de 5.56mm, Balle 'T'.

French cartridge cases in this calibre are of brass or steel, with Boxer primers, although some may use the new French 'bridge' variant of the Berdan primer. Cases are rimless and bottle-necked, 44.5mm long. This cartridge is for use with the MAS 5.56mm assault rifle.

Ball: Boat-tailed bullet with cupro-nickel clad steel envelope and lead core. Bullet weight 55 grains (3.56 grams). Ball powder propellant. Muzzle velocity 3,300fps (1,005mps). Tracer: Apart from the envelope material, of Stannic steel, the French tracer resembles the U.S. M.196 tracer bullet.

Geographical Register of Ammunition Producers and Users

7.5mm MAS Modèle 1929

Ball: Cartouche de 7.5mm Mle 1929 à Balle Ordinaire ('O')

Tracer: Cartouche de 7.5mm à Balle Traçante Ordinaire Mle 1949 (and 1949.a) ('TO')

Tracer: Cartouche de 7.5mm à Balle Traçante Ordinaire Mle 1950.a ('TO')

Tracer: Cartouche de 7.5mm à Balle Traçante Ordinaire Mle 1958.a ('TO')

Tracer: Cartouche de 7.5mm à Balle Traçante Ordinaire Mle G.59 ('TO')

Armour-piercing: Cartouche de 7.5mm à Balle Perforante Mle 1949 (and 1949.a) ('P')

Armour-piercing tracer: Cartouche de 7.5mm à Balle Traçante Perforante Mle 1949 (and 1949.a) ('TP')

Short-range, sub-calibre: Cartouche de 7.5mm de Tir Réduit, Mle 1954

Short-range, sub-calibre, tracered: Cartouche de 7.5mm de Tir Réduit à Balle Traçante, Mle 1954

Cartridge cases are usually of steel or brass, but for some training ammunition aluminium cases are also sometimes used. The case is rimless and bottle-necked with Berdan primer, 53.5mm long. This cartridge is used principally in the MAS 49/56 self-loading rifle, the FR-F.1 sniper's rifle and the AAT 52 machine-gun. Bullet details are:

Ball: Flat-based lead-cored bullet with a clad steel envelope. Weight 140 grains (9 grams). Muzzle velocity 2,600fps (793mps).

Tracer: The Mle 1949 and 1949.a weigh 145 grains (9.4 grams) and have a mild steel core, behind which is a cannister containing the trace composition.

Tracer: The Mle 1950.a, now out of production, had a lead core with a trace cannister behind. The Mle 1958.a is basically similar to the Mle 1950.a and weighs 140 grains (9.05 grams).

The Mle G.59 is similar to the Mle 1958.a, but has a longer trace cannister and a different composition which gives a paler trace. It is used mainly with the Mle 1931.e tank machine-gun.

AP: The Mle 1949 and 1949.a have hardened steel cores, and weigh 144 grains (9.33 grams).

AP/tracer: The Mle 1949 and 1949.a is similar to the tracer 'TO' Mle 1949 except that they have hardened steel cores instead of mild steel. Bullet weight is 145 grains (9.4 grams).

Short-range sub-calibre: Short pointed biogival bullet with a lead core within a clad steel envelope. Overall cartridge length is 74mm only. This cartridge is used with the 7.5cm recoilless gun.

Short-range sub-calibre tracered: This has a similar bullet to the ordinary type above with tracer composition added.

Rifle-grenade cartridges: 'Cartouches de Lancement'.

(1) Brass case with white coloured wood bullet, for the Mle 1948 grenade.

(2) Brass case with mauve-coloured wood bullet, for the Mle 1948 grenade.

and unbulleted (sans Balle):-

(3) Brass case closed with cork wad and crimped, for the Mle 1948 grenade.

(4) Brass case with six flutes beneath the rose crimp which is painted black, for rifle grenades with 22mm tail-piece.

A further grenade cartridge, the Mle 69.b exists having a white plastic body to the cartridge case and mock bullet. This is intended for the discharge of tear-gas grenades for riot control.

7.62mm × 51 NATO

Ball: Cartouche à Balle Ordinaire de 7.62mm N. Mle 1951 ('O')

Ball: Cartouche à Balle Ordinaire de 7.62mm N. Mle 1954 ('O')

Ball: Cartouche à Balle Ordinaire de 7.62mm N. Mle 1961 ('O')

Tracer: Cartouche à Balle Traçeuse de 7.62mm N. Mle 1951 ('T')

Tracer: Cartouche à Balle Traçeuse de 7.62mm N. Mle 1954 ('T')

Tracer: Cartouche à Balle Traçeuse de 7.62mm N. Mle 1960 ('T')

Armour-piercing: Cartouche à Balle Perforante de 7.62mm N. Mle 1950 ('P')

Armour-piercing incendiary: Cartouche à Balle Perforante Incendiaire de 7.62mm N. Mle 1960 ('PI')

Incendiary: Cartouche à Balle Incendiaire de 7.62mm N. Mle 1960 ('I')

Observation: Cartouche de Réglage de 7.62mm N

Grenade cartridge: Cartouche de Lancement (sans Balle)

French cartridge cases in this calibre are of brass or steel, but for some training ammunition aluminium cases or plastic cases are sometimes used. The case is rimless and bottle-necked with Berdan or Boxer primers, Boxer now predominating. Case length is 50.8mm. The 7.62mm cartridge is used mainly by French forces serving in West Germany, and chambers in the MAS 49/56 self-loading rifle, the FR-F.I. sniper's rifle and the AAT 52 machine-gun. Bullet details are:

Ball: Mle 1961 Bullet weight 148 grains (9.52 grams), lead core, boat-tailed, 29mm long, diameter 7.81mm. Ball powder charge. Muzzle velocity 2,680fps (817mps).

Tracer: Mle 1960 Bullet weight 131 grains (8.49 grams). 22mm long. Ball powder charge.

12.7mm (.50in) Browning

Ball: Cartouche de 12.7mm à Balle Ordinaire Mle 1947 ('O')

Armour-piercing: Cartouche de 12.7mm à Balle Perforante Mle 1947 ('P')

Tracer: Cartouche de 12.7mm à Balle Traçeuse Mle 1947 ('T')

Armour-piercing tracer: Cartouche de 12.7mm à Balle Traçeuse Perforante Mle 1947 ('TP')

Incendiary: Cartouche de 12.7mm à Balle Incendiaire Mle 1947 ('I')

French cartridge cases in this calibre are of brass or steel, rimless and bottle-necked and 99mm long. This cartridge is used in Browning heavy machine-guns. Bullet details are:

Ball: Bullet weight 686 grains (44.5 grams), boat-tailed with mild steel core. Jacket of gilding metal. Bullet length about 58mm.

Armour-piercing: Weight of bullet 686 grains (44.5 grams),

boat-tailed with hardened steel core. Jacket of gilding metal. Bullet length about 58mm.

Tracer: Bullet weight 701 grains (45.4 grams). Gilding metal jacket. Bullet length 60mm.

AP/Tracer: Bullet weight 701 grains (45.4 grams). Gilding metal jacket. Bullet length 60mm.

Incendiary: Bullet weight 632 grains (41 grams). Gilding metal jacket.

12.7mm (.50in) Spotter

Cartouche de 12.7mm pour L'arme de Réglage du Canon sans recul de 106mm M.48. A.I.

It is believed that the French cartridge is identical with or similar to the U.S. M.48.A.I. .50in calibre Spotter cartridge.

Obsolete French ammunition

Nine other cartridges which have been in French service since 1945, are now obsolete and out of service. Three of these were never in widespread service and are covered in principle in Chapter 4. These are the .380in Revolver (S and W), the 7.92mm × 57 Mauser which were pressed into limited service after 1945, and the 7.7mm (.303in British) which was in limited air service in France from 1914-18 and which was still in use after the Second World War.

Three other cartridges, the .30in-06 type 7.62mm, the .45in ACP and the .30in Carbine were inherited from the United States during the Second World War and remained in general service with many units of the French Army for a considerable period thereafter. Another three cartridges were French in origin, two dating so far as case design is concerned from before 1900, and the other from between the wars, all three being in service to some extent after 1945. These were the 8mm Revolver, the 8mm Rifle and the 7.65mm Auto Pistol/SMG cartridges.

.30in-06 Ball cartridge (.30in M.2)

Cartouche de 7.62mm à Balle Ordinaire, Mle 1949 (details as for the U.S. .30in M.2 cartridge).

.45in ACP

Cartouche de 11.43mm à Balle Ordinaire, pour Pistolets (details as for the U.S. Model 1911 .45in ACP cartridge).

.30in Carbine

Cartouche de 7.62mmK. à Balle Ordinaire Mle 1950, pour Carabine (details as for the .30in M.I. cartridge (U.S.)).

8mm Revolver cartridge

Cartouche de 8mm à Balle Ordinaire Mle 1892.

Brass case, straight-sided and rimmed, 27.5mm long. Bullet weight 120 grains (7.78 grams). Muzzle velocity 720fps (220mps).

8mm Rifle cartridge ('Lebel')

Cartouche de 8mm à Balle Ordinaire Mle 1886 'N'

Brass case, rimmed and bottle-necked, 50.2mm long. (Limited numbers with steel cases were manufactured during the Second World War. The 'N' bullet is lead core, boat-tailed, weight 199 grains (12.9 grams).

7.65mm Auto Pistol/SMG

Cartouche de 7.62mm.K. à Balle Ordinaire Mle 1950, pour pistolets et pistolets mitrailleurs.

Brass or steel cases, rimless and straight-sided, 19.7mm

long. 89.5-grain bullet (5.8 grams) developing muzzle velocity of 984fps (300mps).

Germany, Democratic Republic of

Post-1945 small arms ammunition plants

Factory No. 04 (believed to be at Magdeburg)

Factory No. 05

The pre-war Sellier & Bellot factory at Schönebeck, Berlin, still exists and produces commercial ammunition head-stamped 'SB'. It is possible that, apart from this activity, it produces military ammunition, possibly at Factory No. 05.

Manufacturers' headstamp codes

The codes '04' and '05' appear in the headstamp for the respective factories.

Principal cartridges in service with the armed forces and manufactured in East Germany

9mm Makarov; 7.62mm × 39 (U.S.S.R. Model 43).

Other calibres manufactured either for use by militia or for export

7.65mm Browning Auto; 9mm Parabellum; 7.92mm × 33 Kurz; 7.92mm × 57 Mauser.

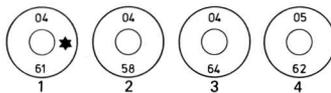
Current colour codes

Tracer: green bullet tip

Armour-piercing incendiary: black over red tip

Incendiary ranging: red bullet tip

Typical cartridge headstamps



1, 9mm Para; 2, 7.92mm Kurz; 3, 9mm Makarov; 4, 7.62mm x 39.

In-service ammunition

9mm Makarov

East German ammunition in this calibre usually has lacquered steel cases, with Berdan primers. In general, the ammunition conforms to the original U.S.S.R. specification.

7.62mm × 39 (U.S.S.R. Model 1943)

East German ammunition in this calibre usually has lacquered steel cases, but limited quantities with brass cases have been made. The case is rimless and bottle-necked, 38.6mm long and with Berdan primers. East German service ammunition in 7.62mm calibre conforms generally to U.S.S.R. specifications, but, in addition, a special practice, short-range ball is issued, the Übungspatrone M.43, which is round-nosed and has a plastic core, the bullet envelope being blackened. A short-range tracer round also exists, the blackened bullet having a green tip. Principal weapons chambered for this cartridge are the MPiK and MPiKM rifles and the LMG-K light machine-gun.

7.92mm × 33 (Kurz)

This cartridge, developed in Germany during the Second World War for use in the MP43 'Sturmgewehr', was put back into production in East Germany after the war, when the Sturmgewehr was issued to the Factory Militia. Subsequently, East Germany supplied both the weapon and the

Geographical Register of Ammunition Producers and Users

ammunition to dissident groups in Africa.

The East German cartridge is a close counterpart to the original wartime round, and has a lacquered steel case with Berdan primer. The case is rimless and bottle-necked, 32.8mm long. The boat-tailed bullet has a steel core and weighs 125 grains (8.1 grams). Original muzzle velocity was 2,296fps (700mps).

Germany, Federal Republic of

Post-1945 small arms ammunition plants

West German ammunition is produced by four major groups and one independent company. These are:

The I.W.K.A. group (which includes Mauser at Oberndorf)

The Diehl group

The Dynamit AG group (including part of Eurometaal, Holland)

The Rheinmetall group (including part of NWM in Holland)

Maschinenfabrik Elisenhütte Nassau

Manufacturers' headstamp codes

IWK and DWM	I.W.K.A. group
DN	Diehl group
MS	Manusaar (port of the Diehl group)
DAG, DNG, GECO, RWS, GD	Dynamit Ag group
Rh	Rheinmetall
EN, ME, MEN, MN	Maschinenfabrik Elisenhütte Nassau
Hk	Appears on drill and blank cartridges made by H. Huck, and has also appeared on ammunition made for Heckler and Koch
OI	Used on a limited scale by RWS
IAC	Unknown factory

Principal cartridges in service with the armed forces and manufactured in Germany

9mm Parabellum; 7.62mm × 51 NATO; 12.7mm (.50in) Browning; 20mm × 139 HS 820; 27mm Mauser; 30mm × 170 HSS 831; 30mm DEFA.

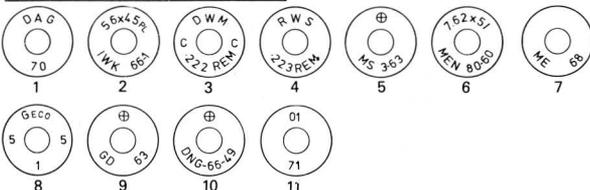
Other cartridges in use and made after 1945 and obsolete, or manufactured for development or export

7.65mm Browning Auto; 7.92mm × 57 Mauser; 5.56mm × 45; 7.62mm × 39 (U.S.S.R. Model 43); .30in-06 (for export only).

Current colour code

Tracer: red or orange bullet tip

Typical cartridge headstamps



1, 5.56mm; 2, 5.56mm; 3, 5.56mm; 4, 5.56mm; 5, 7.62mm NATO; 6, 7.62mm NATO; 7, 7.62mm NATO; 8, 9mm Para; 9, 9mm Para; 10, 9mm Para; 11, 7.62mm x 39.

In-service ammunition

9mm Parabellum

Ball: Patrone 9mm × 19 Weichkern DM.11

The West German case is of brass, with Berdan primer, and is straight-sided, rimless, and 19.1mm long. The bullet is lead-cored and weighs 124 grains (8.03 grams). The muzzle velocity is 1,200fps (366mps). Principal weapons chambered for this cartridge are the Walther SL pistol (PP/PPK) and the UZI submachine-gun.

7.62mm × 51 NATO

Ball (hard core): Patrone 7.62mm × 51 DM.1 Eisenkern

Ball (lead core): Patrone 7.62mm × 51 DM.41 Weichkern

Tracer: Patrone 7.62mm × 51 DM.21 Leuchtspur

Grenade: Treibpatrone 7.62mm × 51 DM.31

German 7.62mm ammunition is brass-cased with Berdan primers. The case is rimless and bottle-necked, 50.8mm long. Principal weapons chambered for this cartridge are the G.3 self-loading rifle and the MG.3 machine-gun.

Bullet details are:

Ball: DM.1. This bullet has a mild steel core, and is based upon the U.S. M.59 ball.

Ball: DM.41. This is the standard NATO lead-cored bullet, weighing 144 grains (9.33 grams).

Tracer: DM.21. The DM.21, identified by a red tip, has dim ignition to 20 metres and then traces red to 800 metres.

DM.21.AI has an orange tip, and has dim ignition to about 75 metres and then traces orange to 1,000 metres.

A further training ball cartridge (Kurzbahn patrone) exists, having a brass projectile body with white plastic tip. Bullet weight is 89 grains (5.77 grams) and muzzle velocity is 2,526fps (770mps).

Greece

Post-1945 small arms ammunition plant

Greek Powder and Cartridge Co. at Hymettus (privately owned)

Post-1945 manufacturer's headstamp codes

HXP, EΣ, EMK

Principal cartridges in service with the armed forces

11.43mm (.45in ACP); 7.62mm × 51 NATO; 7.62mm × 63 (.30in-06); 12.7mm (.50in) Browning; 20mm Vulcan type.

Other calibres manufactured but largely for export

9mm Parabellum; .303in British; 7.92mm × 57; 20mm × 110 Oerlikon.

Current colour codes

Ammunition used by the Greek armed forces bears standard NATO colour codes.

In-service ammunition

11.43mm (.45in ACP)

Greek cases in this calibre are of brass, and the rimless and straight-sided case is 22.7mm long. The bullet weighs 231 grains (14.96 grams) and has a muzzle velocity of 820fps (250mps).

7.62mm × 51 NATO

Greek cartridge cases in this calibre are of brass, with

Geographical Register of Ammunition Producers and Users

Berdan primers, rimless and bottle-necked, 50.8mm long. The only service variants in this calibre made in Greece are ball and tracer. The ball bullet has the standard NATO weight of 144 grains (9.33 grams) and the muzzle velocity is 2,725fps (831mps).

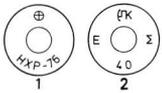
7.62mm × 63 (.30in-06 type)

Greek cases in this calibre are of brass, rimless and bottle-necked, and 63.1mm long. The Greeks have only two service loadings in this calibre, ball and tracer. The ball is based upon the American M.2 ball and has a 150-grain (9.75-gram) lead core bullet with flat base. Muzzle velocity is 2,740fps (835mps).

12.7mm (.50in) Browning

There are three Greek loadings in this calibre: ball (M.33 type), tracer and armour-piercing incendiary tracer (M.20 type).

Typical cartridge headstamps



1, 7.62mm NATO; 2, 9mm Para.

Hungary

Post-1945 small arms ammunition plants

Factory No. 23

Factory No. 21 (existence reported, but not confirmed)

The main Hungarian small arms plant prior to 1945 was at Csepel, about 60 miles S.W. of Budapest. It is not known if Factory No. 23 is situated at the same location.

Manufacturers' headstamp codes

Factory No. 23 ammunition has '23' in the headstamp.

Principal cartridges in service with the armed forces and manufactured in Hungary

7.62mm x 39 (U.S.S.R. Model 43); 7.62mm x 54 (U.S.S.R.)

Other cartridges manufactured since 1945, now obsolete

8mm × 56 Mannlicher.

Characteristics of Hungarian ammunition

After the war, Hungarian ammunition production was limited in scope, and brass cartridge cases were used. Hungarian ammunition is now steel-cased, with Berdan primers. Hungarian 7.62mm × 39 Model 43 ammunition is virtually identical with that produced in the U.S.S.R. It is believed that most other calibres required for the Hungarian armed forces are imported from other Warsaw Pact countries.

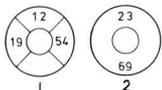
Current colour codes

Tracer: green bullet tip

Armour-piercing incendiary: black over red tip

Incendiary ranging: red bullet tip

Typical cartridge headstamps



1, 8mm Mannlicher M.35; 2, 7.62mm x 39.

India (post-partition)

Post-1947 small arms ammunition plants

Kirkee Factory, Poona (Government owned)

Khamaria Factory, Jubbulpore (Government owned)

Verangoan Factory, Bhusawal (Government owned)

Manufacturers' headstamp codes

↑KF Kirkee, early

KF Kirkee

OK Khamaria

OFV Verangoan

Other headstamp codes

Early Indian production after Independence in 1947 often used the codes applicable to British ammunition and ammunition made in India prior to 1947. The following headstamp codes therefore appear on some post-1947 production:

Nitro-cellulose propellant: code letter 'Z'

Tracer: code letter 'G'

Armour-piercing: code letter 'W'

Grenade cartridge: code letter 'H'

On production of 7.62mm × 51 NATO ball, lead-cored, the letter 'A' often appears after the calibre stamp.

Principal cartridges in service with the armed forces and manufactured in India

9mm Parabellum; .380in Revolver (S & W); 7.62mm × 51 NATO; .303in; .50in Browning; 12.7mm × 108 (U.S.S.R.-type); 23mm N.R. (U.S.S.R.-type); 30mm Aden.

Other cartridges now obsolete, but in service after 1947

.455in Revolver; .30in-06; 8mm Austrian Mannlicher (but not for service use).

Primer annulus colour code

Ball: purple

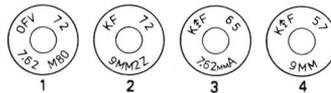
Tracer: red

Armour-piercing: green (.303in only)

Bullet tip colour code

Ball: red

Typical cartridge headstamps



1, 7.62mm NATO; 2, 9mm Para; 3, 7.62mm NATO; 4, 9mm Para.

Characteristics of Indian ammunition

Indian small arms ammunition uses brass cases only and, for the most part, Berdan primers are employed. However, for 7.62mm × 51 NATO calibre ammunition made in the Ordnance Factory at Verangoan, whose plant is of American design, Boxer cases are used. India inherited a variety of British calibres, the ammunition being made largely to British specifications and having British nomenclature. After partition in 1947, the British tradition persisted, and to this day most Indian ammunition has a very British appearance.

Geographical Register of Ammunition Producers and Users

Indonesia

Post-1945 small arms ammunition plants

Bandung Plant (Government owned)

Turen Plant (Government owned)

Post-1945 manufacturers' headstamp codes

LPB unconfirmed, mark on immediate post-independence ammunition.

PSM Paprik Sendjasta Mesin, Bandung (original name of present Bandung plant).

AD Augkatan Darat (ammunition made for the Army). Current markings

AL Augkatan Laut (ammunition made for the Navy). Current markings

AU Augkatan Udara (ammunition made for the Air Force). Current markings

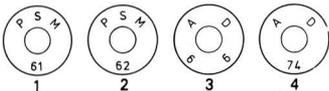
Principal cartridges in service

9mm Parabellum; .38in Special; 5.56mm × 45; 7.62mm × 39; .30in-06 (to be phased out in 1980); 12.7mm (.50in) Browning.

Other calibres now obsolete, but in service after 1945 and manufactured locally

.303in British.

Typical cartridge headstamps



1, .30in-06; 2, 9mm Para; 3, 9mm Para; 4, 5.56mm.

Iran

Post-1945 small arms ammunition plants

A State-owned small arms ammunition factory exists in Tehran. It is possible that other factories exist also.

Manufacturers' headstamp codes

Iranian ammunition normally bears a stylized crown in the headstamp, either in the 12 o'clock or 3 o'clock position. Other characters included are in Arabic script.

Principal cartridges in service with the armed forces and manufactured in Iran

9mm Parabellum; .30in-06; 7.62mm × 51 NATO; .50in Browning.

Other calibres manufactured in Iran and now obsolete
7.92mm × 57 Mauser.

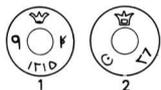
Characteristics of Iranian ammunition

Iranian small arms ammunition is brass-cased, and Berdan ignition is employed. Apart from locally produced ammunition, it is known that Iran imports some of her small calibre ammunition, complete with Iranian headstamps.

Current colour codes

It is believed that Iran employs the current U.S.A./NATO system of bullet tip colours.

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm NATO.

Iraq

Post-1945 small arms ammunition plants

Al Yarmouk State Establishments, Baghdad

Manufacturers' headstamp codes

Iraqi ammunition normally includes a triangle, with or without a cypher therein. This is in addition to Arabic script.

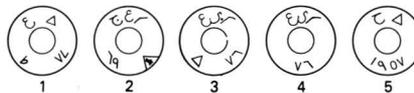
Calibres known to have been manufactured in Iraq

9mm Parabellum; .303in; 7.62mm × 39 (U.S.S.R. Model 43).

Characteristics of Iraqi ammunition

Iraqi ammunition is brass-cased and has Berdan primers. 7.62mm × 39 ammunition made in Iraq has, for the ball loading, a flat-based lead-cored bullet similar to that made in Egypt. The Iraqi armed forces also use a number of other Russian-designed and made- weapons in other calibres. It is possible, but not confirmed, that these are made in Iraq.

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm x 39; 3, 7.62mm x 39; 4, 7.62mm x 39; 5, .303in.

Israel

Post-1945 small arms ammunition plant

Israeli Military Industries, Tel Aviv plant.

Manufacturer's headstamp codes

ז ת (Hebrew for 'TZ') AE

TZ ז ת (Hebrew for 'MIN')

TA ת א (Hebrew for 'MI')

IMI י מ י (Hebrew for 'MIT')

E

Principal cartridges in service with the armed forces

9mm Parabellum; 5.56mm × 45; 7.62mm × 39 (M.43 U.S.S.R.) Pilot; 7.62mm × 51 NATO; .50in Browning; 20mm × 110 HS; 30mm DEFA.

Other calibres now obsolete or obsolescent, but in service use after 1947 and manufactured locally

.303in British; 7.92mm × 57 Mauser.

Colour codes for 7.92mm x 57

Ball: purple primer annulus, no bullet tip colour

Tracer: green primer annulus, red bullet tip

AP: green primer annulus, black bullet tip

AP/I: red primer annulus, black bullet tip

Incendiary: green primer annulus, blue bullet tip

Other current colour codes

Tracer: red bullet tip

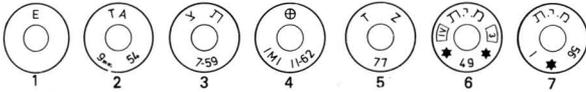
AP: black bullet tip

AP/I: black/blue bullet tip (.50in Browning only)

AP/I/T: black/red/blue bullet tip (.50in Browning only)

Reduced-charge: silver tip (9mm Parabellum only)

Typical cartridge headstamps



1, 9mm Para; 2, 9mm Para; 3, 9mm Para; 4, 7.62mm NATO; 5, 7.62mm NATO; 6, .303in; 7, 7.92mm Mauser.

In-service ammunition

9mm Parabellum

The Israeli cartridge case in this calibre is of brass, and current production is Boxer primed. The case is rimless, straight-sided and 19.1mm long. This cartridge is mainly used in the Beretta self-loading pistol and the UZI submachine-gun. The following loadings have been issued: Ball: The weight of the standard Israeli bullet is 115 grains (7.45 grams). Standard muzzle velocity is 1,378fps (420mps).

Reduced-charge ball: This cartridge, identified by a silver tip, is loaded to a velocity of 1,247fps (380mps).

Tracer: The trace bullet is loaded to give ballistics matching those of the ball.

Triplex load: Limited quantities of triplex-loaded 9mm have been issued, some with American components and some in Israeli marked cases. The three bullets are contained within a translucent white plastic shroud.

Grenade blank: Extended neck blanks, the crimps of which are wax sealed, have been issued for firing grenades from the UZI submachine-gun.

7.62mm x 51 NATO

The Israeli cartridge case in this calibre is brass with Boxer primer. The cases are rimless and bottle-necked, and 50.8mm long. This cartridge is chambered in the FAL self-loading rifle and the MAG machine-gun. Bullet details are: Ball: The Israeli ball bullet is lead-cored and boat-tailed, weighing 144 grains (9.33 grams). The bullet envelope is gilding metal. Muzzle velocity 2,850fps (899mps).

Tracer: The bullet weight is 138.5 grains (8.97 grams) with a gilding metal clad steel bullet envelope.

7.62mm x 39 (U.S.S.R. M.43)

The Israelis have used a substantial amount of captured arms chambered for the Russian 7.62mm cartridge, but although Israeli ammunition capacity in this calibre exists, the ammunition issued with these weapons has been largely or all from captured stocks.

Societa Metallurgica Italiana (In private ownership, but supply ammunition to the Italian Government)
Martignoni Cartucce Munizioni (privately owned, no longer in operation)

Post-1945 manufacturers' headstamp codes

C, PEC, PECA, PC	Pirotecnico Esercito di Capua
BPD, AOC	Bombirini Parodi Delfino
GFL	Giulio Fiocchi
LB, LBC	Leon Beaux
SMI, SYI	Societa Metallurgica Italiana
MCM	Martignoni Cartucce Munizioni

Other headstamp codes

Capua-made cartridges often include in the headstamp the initials of the Ammunition Inspector as follows: AS, BP, DCE, PB, PV, SA, SG.

Principal cartridges in service with the armed forces, and manufactured in Italy

9mm (M.34) Auto Pistol; 9mm Parabellum (M.38); 7.62mm x 51 NATO; 12.7mm (.50in) Browning; 20mm x 102 Vulcan; 20mm x 110 Oerlikon; 20mm x 139 HS 820; 27mm Mauser.

Other cartridges now obsolete, but made in Italy and in service after 1945

6.5mm Mannlicher Carcano, Model 1891; 7.7mm (.303in British); 8mm Machine-gun, Model 1935; 7.62mm (.30in-06); 7.62mm (.30in Carbine); 20mm x 110 Oerlikon; 20mm x 110 Hispano.

Other calibres manufactured after 1945, but for export or commercial sale

9mm Steyr Auto Pistol; 11.43mm (.45in ACP); 5.56mm x 45; 20mm x 138 Solothurn AA.

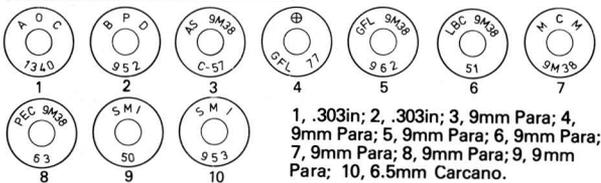
Current colour codes

Tracer: red bullet tip

Armour-piercing incendiary: silver bullet tip

Armour-piercing incendiary tracer: red over silver bullet tip

Typical cartridge headstamps



1, .303in; 2, .303in; 3, 9mm Para; 4, 9mm Para; 5, 9mm Para; 6, 9mm Para; 7, 9mm Para; 8, 9mm Para; 9, 9mm Para; 10, 6.5mm Carcano.

Italy

Post-1945 small arms ammunition plants

- Pirotecnico Esercito di Capua (Government owned)
- Bombirini Parodi Delfino (In private ownership, but supply ammunition to the Italian Government)
- Giulio Fiocchi (Lecco) (In private ownership, but supply ammunition to the Italian Government)
- Leon Beaux & C. (In private ownership, but supply ammunition to the Italian Government)

In-service ammunition

9mm Corto Model 1934 (.380in ACP)

Cartuccia Cal: 9mm a Pallottola Ordinaria M.34

Cartridge case of brass, with Berdan primer. The case is straight-sided, rimless and 17.3mm long. The bullet is lead core with full jacket and weighs 93 grains (6 grams). Muzzle velocity is 935fps (285mps). For use in Beretta pistol.

9mm Parabellum Model 1938

Cartuccia Cal: 9mm a Pallottola Ordinaria M.38

Brass cartridge case with Berdan primer. The case is straight-sided and rimless and 19mm in length. The bullet is full-jacketed with lead core and weighs 115 grains (7.45

Geographical Register of Ammunition Producers and Users

grams). Muzzle velocity is 1,450fps (462mps). This cartridge is used in the M.1951 self-loading pistol and a number of different submachine-guns.

7.62mm × 51 NATO

Ball: Cartuccia Cal: 7.62mm NATO a Pallottola Ordinaria

Tracer: Cartuccia Cal: 7.62mm NATO a Tracciante

Italian ammunition in this calibre is normally of brass, with Boxer primer. The case is rimless and bottle-necked and 50.9mm long. The principal weapons chambered for this cartridge are the BM 59 self-loading rifle and the MG 42/59.

12.7mm (.50in) Browning

Ball: Cartuccia Cal: 12.7mm a Pallottola Ordinaria

Armour-piercing incendiary: Cartuccia Cal: 12.7mm a Perforante Incendiaria.

Armour-piercing incendiary tracer: Cartuccia cal: 12.7mm a Perforante Incendiaria Tracciante.

Italian cases in this calibre are normally of brass, with Boxer or Berdan primers. The case is rimless and bottle-necked and 99mm long. The 12.7mm cartridge is used in the Browning heavy machine-gun. Bullet details are:

Ball: Based on the U.S. M.33 bullet, the bullet is boat-tailed and has a mild steel core with lead tip filler. Weight c. 662 grains (42.9 grams). Muzzle velocity 2,900fps (875mps).

AP/I: Based on the U.S. M.8 bullet, the bullet is boat-tailed with a steel core and in front of the core is placed the incendiary composition. Weight c. 649 grains (42 grams). Muzzle velocity 2,900fps (875mps).

AP/I/T: Based on the U.S. M.20 bullet, the bullet is boat-tailed with a steel core, similar to the AP/I, but with the base of the core recessed to receive a separate tracer cannister. Weight c. 612 grains (39.66 grams). Muzzle velocity 2,900fps (875mps).

Obsolete Italian ammunition

After the Second World War, Italy took into service two American cartridges which were manufactured in Italy and which are no longer in first-line service. These were the .30in-06 (M.2 ball) and the .30in M.I. carbine cartridges.

After the war, the Italians retained in service for a while three other cartridges which had been in service before and during the war. These were the 6.5mm cartridge for the Model 1891 Mannlicher Carcano rifle, the 7.7mm (.303in British) originally for the Breda Safat aircraft machine-gun, but used after the war in the British No. 4 rifle, and the 8mm Breda machine-gun cartridge Model 1935. The latter two remained in service post-war for a considerable time.

6.5mm Rifle cartridge, Model 1891

Cartuccia a Pallottola Cal: 6.5mm Mod 91

This was made after the war with brass and steel cases, and is Berdan primed. The case is rimless and bottle-necked and 52.4mm long. The bullet is lead-cored with cupro-nickel or gilding metal envelope with rounded nose. Bullet weight 162 grains (10.5 grams). Muzzle velocity 2,296fps (700mps).

7.7mm (.303in British)

Ball: Cartuccia Cal: 7.7mm a Pallottola Ordinaria

Tracer: Cartuccia Cal: 7.7mm a Tracciante

This cartridge is brass-cased with Berdan primer, the case

being rimmed and bottle-necked and 56.2mm long. For some contracts for supply to the Middle East, Italian .303in ammunition was made with chemically darkened cases and with the headstamp 'AOC'. Italian 7.7mm or .303in ammunition is interchangeable with British .303in.

8mm Breda, Model 1935

Ball: Cartuccia Cal: 8mm a Pallottola Ordinaria, Mod. 35

Tracer: Cartuccia Cal: 8mm a Pallottola Tracciante Mod. 56 This cartridge is brass-cased with Berdan primer. The case is rimless and bottle-necked and 58.9mm long. The ball bullet weighs 208 grains (13.48 grams) and achieves a muzzle velocity of 2,600fps (793mps).

Japan

Post-1945 small arms ammunition plants

Asahi-Seiki Manufacturing Co. Ltd. (privately owned)

Toyo Seiki Co. Ltd. (privately owned, and no longer in being or else absorbed into Asahi-Seiki)

Asahi Okuma Co. Ltd. (privately owned, and no longer in being or else absorbed into Asahi-Seiki)

Chuo Kayaku Co. (privately owned, and no longer in being or else absorbed into Asahi-Seiki)

Showa Kayaku Co. (privately owned, and no longer in being or else absorbed into Asahi-Seiki)

Manufacturers' headstamp codes

AO, AOA, J-AO,

J-AOA Asahi Okuma or Asahi Seiki

J-CH Chuo Kayaku

J-ST Showa Kayaku

J-TE and TOYO Toyo Seiki (sometimes 'TE' alone is used)

P and PA Asahi Okuma or Asahi Seiki

Other headstamp codes

The letter 'W' appears on some headstamps before a two-digit number, indicating the year of manufacture in the Western calendar.

Principal cartridges in service with the armed forces

.45in ACP; 9mm Parabellum; .30in Carbine (U.S.); .30in-06;

7.62mm × 51 NATO; 5.56mm × 45; .50in Browning.

Other calibres manufactured either for export, for non-military use, or now obsolete

8mm Nambu SL Pistol; .38in Special; 6.5mm × 55 Swedish Mauser; 7.5mm MAS (French).

Current colour codes

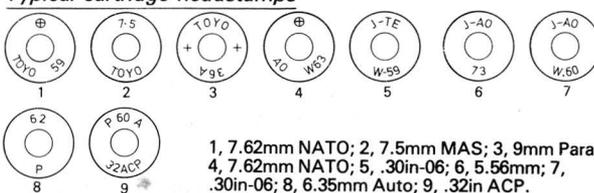
Tracer: red bullet tip

Armour-piercing: black bullet tip

Armour-piercing incendiary: silver bullet tip

Low-recoil (reduced-charge) ball: violet bullet tip

Typical cartridge headstamps



1, 7.62mm NATO; 2, 7.5mm MAS; 3, 9mm Para; 4, 7.62mm NATO; 5, .30in-06; 6, 5.56mm; 7, .30in-06; 8, 6.35mm Auto; 9, .32in ACP.

Geographical Register of Ammunition Producers and Users

Korea, North

Post-1945 small arms ammunition plant

Factory No. 93

Manufacturer's headstamp codes

'93' appears on some production from the mid 1970s, but most production has had, as the manufacturer's code, a triangle with its apex either up or down. Occasionally, in place of the triangle, a small dot is placed.

Principal cartridges in service with the armed forces, and manufactured in North Korea

7.65mm Browning SL Pistol; 7.62mm × 39 (U.S.S.R. Model 43); 14.5mm × 114 (Type 63).

Current colour codes

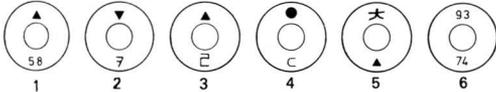
Tracer: green bullet tip

Armour-piercing incendiary: black over red tip

Incendiary ranging: red bullet tip

Typical cartridge headstamps

On most N. Korean ammunition the date is signified by a letter code in the Hankul alphabet.



1, 7.62mm x 39; 2, 7.62mm x 39; 3, 7.62mm x 39; 4, 7.62mm x 39; 5, 14.5mm; 6, 7.62mm x 39.

Korea, South

Post-1945 small arms ammunition plants

Poongsan Metal Manufacturing Co. (privately owned)

Pusan Plant (Government owned)

Post-1945 manufacturers' headstamp codes

PS Poongsan plant

KA Pusan plant

Principal cartridges in service with the armed forces

.45in ACP; .30in M1 Carbine; 5.56mm × 45; 7.62mm × 51;

.30in-06; .50in Browning; 20mm Vulcan.

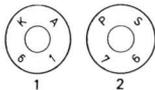
Current colour codes

Tracer: red bullet tip

Armour-piercing: black bullet tip

Armour-piercing incendiary: silver bullet tip

Typical cartridge headstamps



1, .30in-06; 2, 5.56mm.

Lebanon

Post-1945 small arms ammunition plants

The existence of a Lebanese ammunition plant is in doubt. All, or virtually all ammunition with Lebanese markings is believed to have been imported from a number of countries.

Lebanese headstamp codes

Lebanese headstamps include a stylized Lebanese cedar tree.

Principal cartridges found with Lebanese headstamps

9mm Parabellum; 7.5mm MAS.

Typical cartridge headstamp



9mm Para.

Malaysia

Post-1945 small arms ammunition plant

Syarikat Malaysia Explosives Ltd. (Batu Arang) (Government owned)

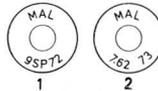
Manufacturer's headstamp code

MAL.

Principal cartridges in service with the armed forces, and manufactured in Malaysia

9mm Parabellum; 5.56mm × 45; 7.62mm × 51 NATO.

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm NATO.

Mexico

Post-1945 small arms ammunition plants

Fabrica Nacional de Municiones

Cartuchos Deportivos de Mexico

Manufacturers' headstamp codes

CDM, FM, F de M, FNM, Aquila.

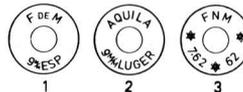
Principal cartridges in service with the armed forces, and manufactured in Mexico

.45in ACP; .30in Carbine; .30in-06; 7.62mm × 51.

Other calibres manufactured either for export, or now obsolete

9mm Parabellum; 7mm Mauser.

Typical cartridge headstamps



1, 9mm Para; 2, 9mm Para; 3, 7.62mm NATO.

Morocco

Post-1945 small arms ammunition plant

Manufacture Nationale D'armes et de Munitions

Some, at least, of the ammunition marked with the code of this organization is imported.

Manufacturer's headstamp code

MNAM.

Other headstamp codes

DGSN (Direction Générale de la Sûreté Nationale).

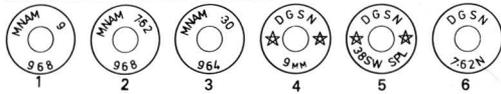
Principal cartridges in service with the armed forces or police, and bearing Moroccan headstamps

.38in Special; 9mm Parabellum; 7.62mm × 51; .30in-06;

.50in Browning.

Geographical Register of Ammunition Producers and Users

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm NATO; 3, .30in-06; 4, 9mm Para; 5, .38in Special; 6, 7.62mm NATO.

Nepal

Post-1945 small arms ammunition plant

Munitionfabrik Sundarjal

Manufacturer's headstamp code

MFS.

Principal cartridges in service with the armed forces and manufactured in Nepal

9mm Parabellum; 7.62mm × 51 NATO.

Typical cartridge headstamp



7.62mm NATO.

Netherlands

Post-1945 small arms ammunition plants

Eurometaal NV (previously Artillerie — Inrichtingen) (70% Government owned)

Nederland Wapen & Munitiefabriek. NV. (De Kruihoorn) (privately owned)

Post-1945 manufacturers' headstamp codes

AI, EMZ Eurometaal

NWM Nederland Wapen & Munitiefabriek

Other headstamp codes

'T' on some calibres indicates a proof (high-pressure) cartridge.

Letters 'A', 'B', 'GA', etc. represent different manufacturing lots.

Principal cartridges in service with the armed forces

9mm Parabellum (production currently ceased in Holland); 7.62mm × 51 NATO (production currently ceased in Holland); 12.7mm (.50in) Browning; 12.7mm (.50in) Spotter; 20mm × 139 HS 820; 25mm × 137 Oerlikon.

Other calibres now obsolete, but in manufacture and in service after 1945

.303in British; .30in-06 U.S.A.; .30in Carbine.

Other calibres manufactured, but largely for export or for development

5.56mm × 45; 7.62mm × 39 (U.S.S.R. Model 43); 20mm × 102 Vulcan; 30mm DEFA.

Current colour codes

Tracer: red bullet tip

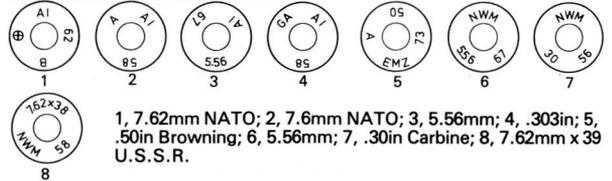
Armour-piercing: black bullet tip

Armour-piercing incendiary: silver bullet tip

Armour-piercing incendiary tracer: silver over red tip

Proof cartridges (high-pressure): purple bullet tip

Typical cartridge headstamps



1, 7.62mm NATO; 2, 7.6mm NATO; 3, 5.56mm; 4, .303in; 5, .50in Browning; 6, 5.56mm; 7, .30in Carbine; 8, 7.62mm x 39 U.S.S.R.

In-service ammunition

9mm Parabellum

Patroon Scherpe 9mm

The Dutch cartridge case in this calibre is brass, and has a Boxer primer. The case is rimless and straight-sided, and 19.1mm long. It is used in the Browning self-loading pistol and the UZI submachine-gun. The NWM loading for this cartridge is a 115-grain (7.45-gram) bullet at a muzzle velocity of 1,001fps (305mps).

7.62mm × 51 NATO

Ball: Patroon Scherpe 7.62mm NATO

Tracer: Patroon Lichtspoor 7.62mm NATO

Armour-piercing: Patroon Pantser 7.62mm NATO

Grenade blank: Patroon Afvuur 7.62mm NATO

Dutch cases in this calibre are of brass with Berdan primers. The case is rimless and bottle-necked and 50.8mm long. Principal weapons chambered for this cartridge are the FAL self-loading rifle and the MAG machine-gun. Ballistics for Dutch 7.62mm ammunition are standard for this class of ammunition.

12.7mm (.50in) Browning

Ball: Patroon Scherpe .50in

Armour-piercing incendiary: Patroon Pantserbrand .50in

Armour-piercing incendiary tracer: Patroon Pantserbrand-lichtspoor .50in

Tracer: Patroon Lichtspoor .50in

Dutch cases in this calibre are of brass with Berdan primers. Cases are rimless and bottle-necked and 99mm long. Bullet details are:

Ball: Similar to U.S. M.33 type. Boat-tailed bullet with mild steel core, weight 648 grains (42 grams).

AP/I: Similar to U.S. M.8 type. Boat-tailed bullet with hard core and incendiary composition in front of core, weight 648 grains (42 grams).

AP/I/T: Similar to U.S. M.20 type. Boat-tailed bullet similar to the AP/I, but with the hard steel core recessed to take tracer composition. The bullet has dark ignition for 100 metres and bright red for 1,600 metres. Bullet weight 617 grains (40 grams).

Tracer: Similar to U.S. M.17 type. Boat-tailed bullet with mild steel core recessed to take tracer composition. The composition burns dim from 40 to 150 metres and bright red to 2,000 metres. Bullet weight is 648 grains (42 grams).

AP Hard Core: (Purely Dutch design). Boat-tailed bullet with tungsten carbide core, with lead tip filler and aluminium core sleeve above base pad. Core weight 378 grains (24.5 grams); total weight 679 grains (44 grams). An AP/I

Geographical Register of Ammunition Producers and Users

version of this bullet exists in which the lead tip filler is replaced with composition.

.50in Spotter

Patroon Markeer-Lichtspoor .50in M.48

The Dutch cartridge is similar to the U.S. M.49.A.I. cartridge, which *see*.

Obsolete Dutch ammunition

Four further types of ammunition that originated either in the United States or in the United Kingdom were in service in the Netherlands after 1945. The U.S. .30in Carbine ammunition is now obsolete, as are the .303in British and the .380in Enfield revolver cartridges, but the .30in-06 cartridge is probably still in limited service with .30in Browning machine-guns. Most of the ammunition falling within this section was actually manufactured in Holland. The Dutch description of these cartridges is as follows:

.30in Carbine M1

Ball: Patroon Scherpe Karabijn .30in

Tracer: Patroon Lichtspoor Karabijn .30in M.27

Grenade blank: Patroon Afvuur Karabijn .30in

All above loaded to U.S. specifications (brass cases).

.30in-06 type

Ball: Patroon Scherpe .30in M.2

Tracer: Patroon Lichtspoor .30in M.25

Armour-piercing: Patroon Pantser .30in M.2

Armour-piercing incendiary: Patroon Pantserbrand .30in M.14

Grenade blank: Patroon Afvuur .30in

All above loaded to U.S. specifications (brass cases).

.303in British

Ball: Patroon Scherpe .303in

Ball: Patroon Scherpe .303in Mark 8.z

Tracer: Patroon Lichtspoor .303in

Grenade blank: Patroon Afvuur .303in

All above generally similar to British .303in ammunition. The tracer appears, by virtue of its weight and shape to be similar to the British G.Mk 2.

.380in Enfield

Patroon Scherpe .380in Revolver.

New Zealand

Post-1945 small arms ammunition plant

C.A.C. Industries Ltd (privately owned)

C.A.C. no longer manufacture military ammunition, and domestic military requirements are met by imports from Australia, the U.S.A. the U.K. and elsewhere. Last military production by C.A.C. is believed to have been in 1966.

Manufacturer's headstamp codes

CAC.

Other headstamp codes

'N' has appeared on some C.A.C.-made ammunition in 7.62mm × 51 calibre. It is assumed that this stood for 'NATO'. Some C.A.C. ammunition in the same calibre was made with the NATO mark of a cross within a circle although New Zealand was not a NATO member.

Cartridges in service and manufactured in New Zealand

7.62mm × 51 NATO.

Other cartridges made in New Zealand that are now obsolete

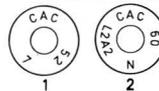
.303in

Other calibres used by N.Z. Forces such as .380in Revolver or 9mm Parabellum were not made in New Zealand.

Characteristics of New Zealand ammunition

New Zealand-made ammunition in the only two calibres in use after 1945 was to the specification of the corresponding British calibre. 7.62mm ammunition was ball L.2.A.2 and the .303in ammunition was Ball Mk 7. Cases were of brass, with Berdan primers, and the headstamps included the cartridge designation.

Typical cartridge headstamps



1, .303in; 2, 7.62mm NATO.

Nigeria

Post-1945 small arms ammunition plant

Nigerian Ordnance Factory (Government owned)

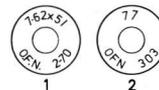
Manufacturer's headstamp code

OFN.

Principal cartridges in service with the armed forces and manufactured in Nigeria

9mm Parabellum; 7.62mm × 51 NATO; .303in.

Typical cartridge headstamps



1, 7.62mm NATO; 2, .303in.

Norway

Post-1945 small arms ammunition plants

Raufoss Ammunisjonsfabrikker

Norma Projektilfabrik, Oslo

Bakelittfabrikken, Oslo

Manufacturers' headstamp codes

RA and AYR Raufoss

NP Norma (cases made elsewhere)

Principal cartridges in service with the armed forces

9mm Parabellum; 7.62mm × 51 NATO; 12.7mm (.50in)

Browning; 20mm × 139 HS 820.

Other calibres manufactured, either now obsolete or now manufactured for development or export

11.25mm Colt (.45in ACP); 6.5mm Mauser; 7.92mm × 57 Mauser; .30in U.S. Carbine (7.62mm × 33); .30in-06 U.S. (7.62mm × 63); 5.56mm × 45; 10.15mm Jarmann (not for military use).

Characteristics of Norwegian ammunition

Apart from blank ammunition (and some grenade cartridges) made by Bakelittfabrikken which has plastic cases, Norwegian ammunition is brass-cased, and mostly Berdan primers have been used, although recently Boxer primers

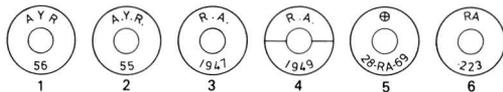
Geographical Register of Ammunition Producers and Users

have also been noted. Norwegian 7.62mm × 51 (NATO) ammunition is normally loaded to standard NATO specifications, but in addition to the standard ball, a heavy ball version also exists for Match shooting, having a heavier bullet weighing 183 grains (11.86 grams). This has a muzzle velocity of 2,450fps (747mps).

Current colour codes

Tracer: red bullet tip

Typical cartridge headstamps



1, .50in Browning; 2, .30in-06; 3, 7.92mm Mauser; 4, 7.92mm Mauser; 5, 7.62mm NATO; 6, 5.56mm.

Pakistan

Post-1947 small arms ammunition plant

Pakistan Ordnance Factory, Rawalpindi (Government owned)

Manufacturer's headstamp code

POF.

Principal cartridges in service with the armed forces or the security forces, and manufactured in Pakistan

9mm Parabellum; .303in; 7.62mm × 51 NATO; .410in Musket.

Characteristics of Pakistan ammunition

Pakistan ammunition is brass-cased, and uses Berdan primers. In the main, designs of ammunition used are inherited either from Britain or from pre-partition India.

Pakistan, at least until recently, has used British-style codes on headstamps, to indicate Mark and type of loading. Thus the .303in cartridge manufactured locally was the Ball Mk 7, the 7.62mm NATO ball round was the L.2.A.2, and the 9mm ball round was the Mk 2.z cartridge.

The .410in Musket cartridge is peculiar to the Indian sub-continent, and was issued to both police and army for internal security work. It consists of a brass case, rimmed and straight-sided, with the mouth coned over a lead ball. Case length is 55.5mm.

Previous ammunition codes

On .303in ammunition, Pakistan used the old British headstamp code, and this consisted of a letter code as follows:

Tracer: code letter 'G' (coupled with a red primer annulus)

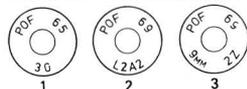
Proof: code letter 'Q'

Nitro-cellulose propellant: code letter 'Z'

Current colour codes

Tracer: red bullet tip

Typical cartridge headstamps



1, 7.62mm NATO; 2, 7.62mm NATO; 3, 9mm Para.

Peru

Post-1945 small arms ammunition plant

Fabrica de Municiones del Ejercito, Lima (Government owned)

Manufacturer's headstamp code

FAME.

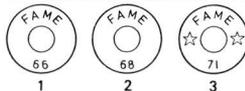
Principal cartridges in service with the armed forces and manufactured in Peru

9mm Corto; 9mm Parabellum; 7.62mm × 51 NATO.

Other calibres manufactured, now obsolete

7.65mm Mauser rifle.

Typical cartridge headstamps



1, 7.62mm NATO; 2, 9mm Para; 3, 7.62mm NATO.

Philippines

Post-1945 small arms ammunition plants

Republic of the Philippines Arsenal (Government owned)
Squires Bingham Co. (privately owned)

Manufacturers' headstamp codes

RPA Republic of Philippines Arsenal

SB and SBMC Squires Bingham Co.

Principal cartridges in service with the armed forces, and manufactured in the Philippines

.38in Special; .45in ACP; .30in M.I Carbine; .30in-06; 7.62mm × 51 (NATO); 5.56mm × 45.

Current colour codes

Tracer: red bullet tip

Typical cartridge headstamps



.30in-06.

Poland

Post-1945 small arms ammunition plants

Factory No. 21

Factory No. 343

Three pre-1945 small arms ammunition factories existed in Poland, at Praga, Warsaw, at Kielce (100 miles south of Warsaw) and at Skarzynsko Kamienna (75 miles south of Warsaw). It is not known which of these sites remain as ammunition factories.

Manufacturers' headstamp codes

The factory number '21' or '343' appears in the headstamp. These codes were sometimes contained within a circle. Early post-war steel-cased Polish ammunition sometimes had the code 'St' included in the headstamp.

Principal cartridges in service with the armed forces and manufactured in Poland

9mm Makarov; 7.62mm × 39 (U.S.S.R. Model 43); 7.62mm × 54 (U.S.S.R.).

Other cartridges manufactured, now obsolete
7.62mm Tokarev.

Characteristics of Polish ammunition

Pistol calibre ammunition is sometimes found with brass cases, but generally Polish ammunition is steel-cased, lacquered. Berdan primers are used. The 7.62mm × 39 ammunition is similar to that manufactured in the U.S.S.R.

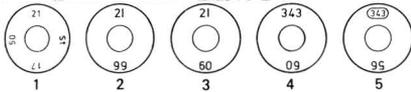
Current colour codes

Tracer: green bullet tip

Armour-piercing incendiary: black over red tip

Incendiary ranging: red bullet tip

Typical cartridge headstamps



1, 7.62mm x 54; 2, 9mm Makarov; 3, 7.62mm x 39; 4, 7.62mm x 39; 5, 7.62mm Tokarev.

Portugal

Post-1945 small arms ammunition plants

Fabrica Nacional de Municoes de Armas Ligeiras, Chelas (Government owned)

Fabrica Cartuchos e Polvoras Quimicas (now closed)

Post-1945 manufacturers' headstamp codes

ASC, FNM, FCPQ.

Principal cartridges in service with the armed forces

9mm Parabellum (Model 1947); 7.62mm × 51 NATO (Model 1963); 12.7mm (.50in) Browning.

Other calibres manufactured, but largely for export

7.63mm Mauser Auto Pistol; 7.65 Parabellum; 5.56mm × 45; 7.92mm × 57; .303in British; .30in U.S. Carbine.

Other calibres now obsolete, but presumed to be still in service use after 1945

6.5mm × 58 Mauser (Model 1904).

Current colour codes

Ammunition used by the Portuguese armed forces bears standard NATO colour codes.

In-service ammunition

9mm Parabellum

Cartucho 9mm con Bala normal, M.947

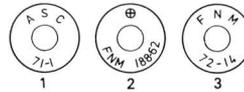
Portuguese 9mm ammunition has brass cases with Berdan primers. Standard bullet weight is 123.4 grains (8 grams) and muzzle velocity is 1,230fps (375mps).

7.62mm × 51 NATO

Cartucho 7.62mm con bala normal, M.963

Portuguese 7.62mm ammunition is brass-cased with Berdan primers. Standard bullet weight is 144 grains (9.33 grams) and muzzle velocity 2,746fps (837mps). The Portuguese tracer bullet has a velocity of 2,736fps (834mps) and the AP bullet has a velocity of 2,772fps (845mps). Principal weapons chambered for the 7.62mm round are the G.3 rifle and the HK.21 machine-gun.

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm NATO; 3, 5.56mm

Romania

Post-1945 small arms ammunition plants

Factory No. 21 (existence not confirmed)

Factory No. 22

The pre-1945 main Romanian ammunition plant was at Cugir (170 miles north-west of Bucharest). It is not known if this factory is still operative.

Manufacturers' headstamp codes

'22' sometimes used in conjunction with the letters 'RPR'.

Principal cartridges in service with the armed forces, and manufactured in Romania

7.62mm × 39 (U.S.S.R. Model 43); 14.5mm × 114.

Current colour codes

Tracer: green bullet tip

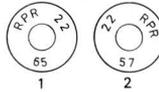
Armour-piercing incendiary: black over red tip

Incendiary ranging: red bullet tip

Characteristics of Romanian ammunition

Romanian post-1945 ammunition is made to the same general specifications as their U.S.S.R. counterparts. While some 7.62mm × 39 ammunition has been made with steel cases, Romania is unusual among Warsaw Pact countries in making this calibre also with brass cases. Brass cases are also used in 14.5mm calibre. It is thought that other calibres required by the Romanian armed forces are imported from other Warsaw Pact countries.

Typical cartridge headstamps



1, 7.62mm x 39; 2, 14.5mm.

Saudi Arabia

Post-1945 small arms ammunition plant

Ar-Riyad, Riyadh

Manufacturer's headstamp codes

Saudi headstamps include a palm tree and crossed sabres. Other information in the headstamp is in Arabic script. Some Saudi marked ammunition is known to be imported from Europe.

Principal cartridges in service with the armed forces and bearing Saudi headstamps

7.62mm × 51 NATO; .30in-06; 7.92mm × 57 Mauser; 12.7mm (.50in) Browning.

Current colour codes

Armour-piercing: purple bullet tip

Armour-piercing tracer: green bullet tip

Incendiary: orange bullet tip

Geographical Register of Ammunition Producers and Users

Typical cartridge headstamps



7.62mm NATO.

Singapore

Post-1945 small arms ammunition plant

Chartered Industries Singapore

Manufacturer's headstamp codes

SGA, CIS, B.

Other headstamp codes

Chartered Industries use a simple letter code in place of a two-digit date stamp. The numerals are replaced by letters running in sequence, 'A', 'B', etc. Thus 'FG' stands for '67' or '1967'.

Principal cartridges in service with the armed forces and manufactured in Singapore

5.56mm × 45; 7.62mm × 51 NATO; .50in Browning.

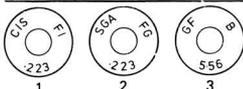
Other calibres manufactured in Singapore, for export

.380in S and W Revolver.

Current colour codes

Tracer: red bullet tip

Typical cartridge headstamps



1, 5.56mm; 2, 5.56mm; 3, 5.56mm.

South Africa

Post-1945 small arms ammunition plants

South African Mint (no longer connected with ammunition)

Pretoria Metal Pressings Ltd., Pretoria (privately owned)

Musgrave & Sons, Bloemfontein

Manufacturers' headstamp codes

U (sometimes followed

by a small diamond)

SAM

PMP

A (usually followed by two digits of the date)

M and MUS

Musgraves, components imported

Principal cartridges in service with the armed forces or police, and manufactured in South Africa

.380in S & W Revolver (called locally 9.65mm Revolver);

9mm Parabellum; 7.62mm × 51 NATO.

Other cartridges manufactured, including calibres made obsolete after 1945

.25in ACP; .32in Auto; .380in ACP; .38in Special; .30in-06;

.303in; 5.56mm × 45.

Special headstamp codes

South Africa inherited the original British headstamp codes used to identify the type of loading, and to some extent these codes are still in use today. The following British letter

codes are valid for South Africa, and where appropriate, form part of the headstamp:

'G' tracer

'H' grenade cartridge

'L' blank

'Q' proof

'Z' nitro-cellulose propellant

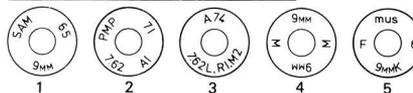
In addition, the letters 'HP' appear on some proof cartridges.

In recent years, South Africa has adopted a system of codes based in principle upon the British 'L' and 'A' system, and these appear on the headstamps of much current ammunition. The code letters 'R' and 'M' take the place of 'L' and 'A', and this system is used in conjunction with the original British-type code letters 'G', 'H', 'L', etc. The numeral after the 'R' changes if there is a change in performance, and the numeral after the 'M' changes if there is a change in the material or layout of the cartridge.

Current colour codes

Tracer: red bullet tip, red primer annulus

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm NATO; 3, 7.62mm NATO; 4, 9mm Para; 5, 9mm Corto.

In-service ammunition

9mm Parabellum

Ball: Cartridge Ball 9mm R.I.M.2

Tracer: Cartridge Tracer 9mm G. R.I.M.I. (earlier production was marked 'G. A1')

South African ammunition is brass-cased and Berdan primed.

.380in S & W Revolver

Cartridge Ball 9.65mm R.I.M.I.

This cartridge is a close copy of the British .380in Enfield revolver cartridge Mk 2z. The metrication of this calibre to 9.65mm is clumsy and slightly misleading.

7.62mm × 51 NATO

Ball: Cartridge Ball 7.62mm R.I.M.I. (earlier production was marked 'A.I')

Tracer: Cartridge Tracer 7.62mm G.R.I.M.I.

South African 7.62mm ammunition is brass-cased with Berdan primer, rimless and bottle-necked and 50.8mm long. One unusual South African cartridge in this calibre is the short-range Ball 'A.I'. This employs a short-pointed orange plastic bullet, and appears to be of French design, in that it closely resembles its French counterpart.

.303in (7.7mm) British

Ball: Cartridge Ball 7.7mm R.I.M.I.

Ball: Cartridge Ball 7.7mm R.I.M.2z.

Ball: Cartridge Ball 7.7mm R.I.M.3z.

South African .303in ammunition, now described there as 7.7mm, is brass-cased, and has Berdan primers. The Ball M.1 is cordite loaded, and the M.2 and M.3 are nitro-cellulose loaded. The M.1 and M.2 have large primers,

whereas the M.3 has the smaller size also found with the 7.62mm NATO cartridge.

Spain

Post-1945 small arms ammunition plants

Fabrica Nacional de Palencia; Fabrica Nacional de Toledo (both in current production and jointly operated as part of 'Empresa Nacional Santa Barbara')

Pirotecnia Militar de Sevilla (no longer operative)

Post-1945 manufacturers' headstamp codes

P and FNP	Palencia plant
T, FNT, SBT, SBLT	Toledo plant
S and PS	Sevilla plant
SB	currently in common use in Santa Barbara plants

Other headstamp codes

CIM Consorcio de Industrias Militares (in conjunction with Sevilla headstamp)

MMM Manufacturas Metalicas Madrilenas (now usually found in conjunction with Santa Barbara (SB) headstamp)

Principal cartridges in service with the armed forces or para-military forces

Pistol or SMG:

6.35mm Browning; 7.65mm Browning; 9mm Corto; 9mm Parabellum; 9mm Largo; .38in Special.

Rifle calibre and larger:

7.92mm x 57 Mauser (obsolescent); 7.62mm x 51 NATO; .30in-06; 12.7mm (.50in) Browning; 7.62mm x 33 Sub-calibre; 12.7mm (.50in) Spotter-tracer; 20mm x 110 Hispano; 20mm x 128 Oerlikon.

Other calibres now obsolete, but in service use after 1945

Pistol or SMG:

.32in S & W; .38in S & W; 7.63mm Mauser.

Rifle calibre and larger:

7mm x 57 Mauser (Model 42); 7.7mm (.303in British) (Model 36); 7.62mm x 54 Russian; 20mm x 80 Oerlikon.

Other calibres currently manufactured, but not in service

5.56mm x 45 'Armalite'.

Current colour codes

Tracer: red bullet tip

Armour-piercing: black bullet tip

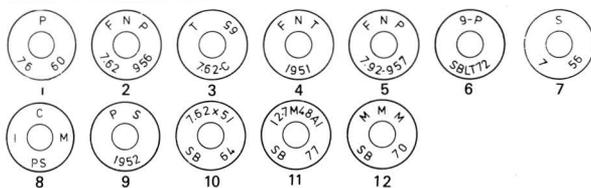
Spotter tracer: yellow over red bullet tip

Proof: black ring at nose

Armour-piercing incendiary: black over grey bullet tip

Armour-piercing incendiary tracer: red over grey bullet tip

Typical cartridge headstamps



1, 7.62mm NATO; 2, 7.62mm NATO; 3, 7.62mm NATO; 4, 9mm Para; 5, 7.92mm Mauser; 6, 9mm Para; 7, 7mm Mauser; 8, 7mm Mauser; 9, 9mm Para; 10, 7.62mm NATO; 11, .50in Spotter; 12, .50in Browning.

In-service ammunition

6.36mm Browning Auto: Pistola (.25in ACP)

Cartucho cal: 6.35mm de pistola

Spanish cartridge cases in this calibre are of brass, with Berdan primers. The case is straight-sided, 15.5mm long, and semi-rimless. The round-nosed, flat-based bullet is jacketed with a lead core and is 12mm long. Bullet weight 50 grains (3.25 grams), muzzle velocity 869fps (265mps).

7.65mm Browning Auto: Pistola (.32in ACP)

Cartucho cal: 7.65mm de pistola

Spanish cartridge cases in this calibre are of brass, with Berdan primers. The case is straight-sided, 17mm long and semi-rimless. The round-nosed, flat-based bullet is jacketed with a lead core and is 11.5mm long. Bullet weight 67 grains (4.35 grams), muzzle velocity 1,066fps (325mps).

9mm Corto (.380in ACP)

Cartucho cal: 9mm Corto

Spanish cartridge cases in this calibre are of brass, with Berdan primers. The case is straight-sided, 17.1mm long and rimless. The round-nosed, flat-based bullet is jacketed with a lead core and is 11.4mm long. Bullet weight 88.7 grains (5.75 grams), muzzle velocity 869fps (265mps).

9mm Parabellum

Cartucho cal: 9mm especial Parabellum

Spanish cartridge cases in this calibre are of brass, with Berdan primers. The case is straight-sided, 19.1mm long and rimless. The round-nosed, flat-based bullet is jacketed with a lead core and is 16mm long. Bullet weight is 126.5 grains (8.2 grams). The 9mm Parabellum is used in both pistols and submachine-guns.

9mm Largo

Cartucho cal: 9mm Largo

Brass cartridge case with Berdan primer. The case is straight-sided, 23mm long and rimless. The round-nosed, flat-based bullet is jacketed with a lead core and is 16.1mm long. Bullet weight 126.5 grains (8.2 grams), muzzle velocity 1,198fps (365mps). The 9mm Largo is used in both pistols and submachine-guns.

.38in S and W Special (Revolver)

Cartucho cal: .38in Largo

Spanish cartridge cases in this calibre are of brass, with Berdan primers. The case is straight-sided, rimmed (with groove) and 29.3mm long. Two bullets are in Spanish service. A round-nosed lead bullet weighing 154 grains (10 grams), giving an overall cartridge length of 39.6mm achieves a velocity of 1,033fps (315mps). The second type is a wadcutter totally enclosed in the case, bullet weight (all lead) being 139 grains (9 grams). Muzzle velocity of this type is 820fps (250mps).

7.92mm x 57 Mauser

Ball: Cartucho cal: 7.92mm de guerra (M.1936)

Tracer: Cartucho cal: 7.92mm de guerra, trazador (M.1938.a)

Armour-piercing: Cartucho cal: 7.92mm de guerra, perforante (M.1938.a)

Armour-piercing incendiary: Cartucho cal: 7.92mm de guerra, perforante incendiario (M.1938.a)

Spanish cartridge cases in this calibre are of brass, with

Geographical Register of Ammunition Producers and Users

Berdan primers. The case is rimless and bottle-necked with a length of 56.8mm. This cartridge is now obsolescent and not in use with regular units. Bullet details are:

Ball: (M.1936) Weight 196 grains (12.7 grams), boat-tailed with lead core, 35mm long, muzzle velocity 2,428fps (740mps)

Tracer: (M.1938.a) Weight 168 grains (10.9 grams), boat-tailed with lead core hollowed to receive 15 grains (1 gram) of trace composition. Trace commences at 15 metres and burns to 850 metres. Muzzle velocity 2,559fps (780mps).

AP: (M.1938.a) Steel-cored bullet with slight boat-tail, 37mm long. Ballistics unknown.

AP/I: (M.1938.a) Weight 154 grains (10 grams), bullet length 37mm. Core design is similar to the German 7.92mm P.m.K. bullet.

7.62mm × 51 NATO

Ball: Cartucho de 7.62mm × 51 NATO Español con Bala de 90/10 (M.1964)

Tracer: Cartucho de 7.62mm × 51 NATO Español Trazador Grenade cartridge: Cartucho de 7.62mm × 51 NATO Espanol Lanzagranades

Spanish cartridge cases in this calibre are of brass, with Berdan primers. The case is rimless and bottle-necked with a length of 50.8mm. Apart from making ammunition in 7.62mm NATO calibre for domestic use, Spain has also supplied ammunition to NATO specification to NATO members. The principal weapons in Spain chambered for the 7.62mm cartridge are the Model 1958 CETME self-loading rifle, the Model 59 FAO and the MG 1A3 machine-guns. Bullet details are:

Ball: (M.1964) Weight 146 grains (9.45 grams), boat-tailed with lead core, 29mm long, muzzle velocity 2,723fps (830mps).

Tracer: This cartridge dates from 1970. Weight of bullet is 138 grains (8.92 grams). Front lead core to bullet with 15 grains (1 gram) of trace composition loaded directly behind core, without a cannister. Bullet length 33.5mm.

Grenade cartridge: This dates from 1962, and consists of a short crimped cartridge case, with an overall length of 50.8mm.

.30in-06 (U.S.A.)

Ball: Cartucho de 7.62mm × 63 de guerra (M.1968)

Spanish cartridge cases in this calibre are of brass, with Berdan primers. The case is rimless and bottle-necked, with a length of 63mm. The Spanish ball cartridge has a bullet weighing 154 grains (10 grams) which is flat-based and lead-cored. Muzzle velocity 2,802fps (854mps).

12.7mm (.50in) Browning

Ball: Cartucho cal: 12.7mm de guerra, Americano M.2

Armour-piercing incendiary: Cartucho cal: 12.7mm perforante incendiario, Americano M.8

Armour-piercing incendiary tracer: Cartucho cal: 12.7mm perforante incendiario trazador, Americano M.20

Spanish cartridge cases in this calibre are of brass, with Boxer primers. The case is rimless and bottle-necked, with a length of 99mm. Bullet details are:

Ball: Weight 711.5 grains (46.11 grams) of which the mild

steel core is 386 grains (25 grams). The bullet is boat-tailed and 58.6mm long. Muzzle velocity 2,936fps (895mps).

AP/I: Weight 649 grains (42.18 grams) of which the steel core is 376 grains (24.37 grams). Muzzle velocity 2,936fps (895mps).

AP/I/T: Weight 618 grains (40.6 grams) of which the steel core is 356 grains (23.07 grams). Bullet is 58.67mm long.

12.7mm (.50in) Spotter Tracer

Cartucho cal: 12.7mm, localizador trazador, Americano M.48.A.1

This cartridge is for use in a special self-loading spotting rifle mounted coaxially with a large calibre anti-tank weapon. The Spanish cartridge case is of brass and is Boxer primed. The case is rimless and bottle-necked, and is 75.95mm long. The bullet is modelled on the United States M.48.A.1. bullet (which see) and is flat-tipped and boat-tailed, 69mm long. Bullet weight 987.7 grains (64.15 grams), muzzle velocity 1,542fps (470mps).

7.62mm × 33 Sub-calibre Tracer

Cartucho de 7.62mm × 33 sub-calibre trazador 69-3

Although not employed in a small arms rôle, this is essentially a small arms cartridge and is indistinguishable from other assault rifle cartridges in general. The cartridge has an overall length of 50mm and the brass cartridge case is rimless and bottle-necked, Berdan primed, and 33mm long. The bullet is 33.5mm long with a lead core, behind which is loaded 15 grains (1 gram) of trace composition. Bullet weight is 137.8 grains (8.93 grams). The muzzle velocity is far less than true rifle cartridges at 722fps (220mps). (An earlier ball version (M.68) and tracer versions (M.68, 69-1 and 69-2) also existed.)

Obsolete Spanish ammunition

A number of other cartridges which were in Spanish service use after 1945 have now vanished from the scene. Descriptions of three of these, all pistol rounds (.32in S and W, .38in S and W and 7.63mm Mauser pistol cartridges) are given in Chapter 4. Brief descriptions are given below of three other cartridges in rifle calibre which also fall into this general category:

7mm × 57 Mauser

Ball: Cartucho cal: 7mm de guerra, con bala PP (M.1942).

Boat-tailed, lead-cored bullet.

Tracer: Cartucho cal: 7mm trazador.

Armour-piercing: Cartucho cal: 7mm perforante.

Armour-piercing tracer: Cartucho cal: 7mm perforante trazador.

Explosive: Cartucho cal: 7mm de reglaje.

(The 7mm Mauser was originally the Spanish general-purpose cartridge, adopted in 1893.)

7.7mm × 56 (.303in British)

Ball: Cartucho de 7.7mm de guerra (M.1936).

Tracer: Cartucho de 7.7mm trazador (M.1949).

Tracer: Cartucho de 7.7mm trazador (M.1959).

Tracer: Cartucho de 7.7mm trazador (M.PS 63).

Armour-piercing incendiary: Cartucho de 7.7mm perforante incendiario (M.1945).

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Armour-piercing incendiary: Cartucho de 7.7mm perforante incendiaria (M.1949).

The 7.7mm cartridge, identical, so far as the case is concerned, with the .303in British, was first introduced into Spanish service in 1936 with the Breda Safat aircraft machine-gun from Italy.

7.62mm × 54 Russian

Cartucho cal: 7.62mm Ruso, de guerra

This cartridge was probably introduced into Spain at the time of the Spanish Civil War, and remained in limited use thereafter. Details of the bullet types employed in this calibre are not known.

Sudan

Post-1945 small arms ammunition plant

Sudanese Government Plant, Khartoum

Manufacturer's headstamp code

Sudanese headstamps are in Arabic script

Principal cartridges in service with the armed forces and bearing Sudanese markings

.303in British; 7.62mm × 51 NATO; 7.62mm × 39

(U.S.S.R. Model 43) (not confirmed).

Typical cartridge headstamps



7.62mm NATO.

Sweden

Post-1945 small arms ammunition plants

Factory coded as No. 24 (Norma operated)

Factory coded as No. 25 (Karlsborg operated)

Factory coded as No. 26 (Svenska operated)

Factory coded as No. 27 (Norma operated)

Factory coded as No. 31

Factory coded as No. 32

Factory coded as No. 35

Factory coded as No. 70 (Karlsborg operated)

(Factories coded No. 28, 29, and 30 are believed to have existed also.)

A.B.Svenska Metallverken, Vasteras (privately owned)

Norma Projektilfabrik, Amotfors (privately owned)

Karlsborg Ammunition Factory (Government owned)

Marieberg Ammunition Factory (Government owned)

Some of these code numbered factories may have closed by 1945 and so may the Marieberg factory. Three code numbered factories only are still operating in Sweden, Nos. 27, 35, and 70.

Manufacturers' headstamp codes

'24' for Factory using code No. 24

'25' for Factory using code No. 25

'026' and '26' for Factory using code No. 26

'027' and '27' for Factory using code No. 27

'31' for Factory using code No. 31

'32' for Factory using code No. 32

'035' and '35'

'070'

'586'

NP

SM

K

M

for Factory using code No. 35

for Factory using code No. 70

attributed to ammunition imported from

Hirtenberger, Austria

Norma Projektilfabrik

Svenska Metallverken

Karlsborg

Marieberg

Other headstamp codes

'E' indicates that the case is made of coated steel.

'Amf' indicates Swedish Army Board of Ordnance.

Principal cartridges in service with the armed forces

.38in Special; 9mm Parabellum; 7.62mm × 51 NATO;

12.7mm (.50in) Browning.

Other calibres manufactured and now obsolete or

obsolescent or manufactured for export

9mm Browning long; 5.56mm × 45; 6.5mm × 55 Mauser;

7.92mm × 57 Mauser; 8mm × 63 Machine-gun.

Current colour codes

Armour-piercing: black bullet tip

Tracer: white bullet tip

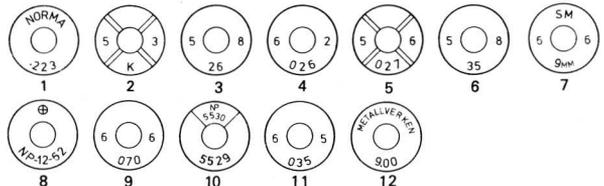
Incendiary: orange bullet tip

Armour-piercing incendiary (12.7mm calibre only): yellow bullet tip

Reduced-charge training ammunition has the case head

blackened for half its surface

Typical cartridge headstamps



1, 5.56mm; 2, 9mm Para; 3, 9mm Para; 4, 9mm Para; 5, 9mm Para; 6, 9mm Para; 7, 9mm Para; 8, 7.62mm NATO; 9, 7.62mm NATO; 10, .50in Browning; 11, 9mm Para; 12, 9mm Browning long.

In-service ammunition

.38in Special (Revolver)

Ball: 9mm Sk Ptr M/58

Ball: 9mm Sk Ptr M/72

The Swedish-made case for the .38in Special is of brass, and is rimmed, straight-sided and 29.2mm long. The ballistics of the M/58 ball are not known. The bullet is jacketed and round-nosed. The M/72 ball is believed to differ from the M/58 only with regard to the propellant weight. The M/72 has a muzzle velocity of 787fps (240mps). This ammunition is intended for use in the M/58 Smith and Wesson Revolver.

9mm Parabellum
Ball: 9mm Sk Ptr M/39.B
Ball (short-range practice): 9mm KPtr M/39
Tracer (reduced charge): 9mm Sk Ptr M/67 SIPrj
Tracer (reduced charge): 9mm Sk Ptr M/68 SIPrj
Post-1945 Swedish cases are of brass, with Berdan primers.

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The case is rimless and straight-sided, 19.1mm long. The M/39.B ball bullet weighs 115 grains (7.45 grams) and has a muzzle velocity of 1,345fps (410mps). The M/39 short-range ball bullet is made of black plastic with a steel ball embedded in the nose. This bullet weighs 22 grains (1.43 grams) and has a muzzle velocity of 1,148fps (350mps). Both the M/67 and the M/68 reduced-charge tracer bullets have white tips, and half the case head is blackened. The M/67 has a white neck seal and the M/68 has a yellow neck seal.

7.62mm × 51 NATO

Ball: 7.62mm Sk Ptr 10 Prj

Tracer (reduced charge): 9mm Sk Ptr M/67 SIPrj

Ball (short-range practice): 7.62mm KPtr 10

The Swedish case for this calibre is of brass and Berdan primed. The case is rimless, bottle-necked and 50.8mm long. Principal weapons chambered for this cartridge are the AK.4 rifle and the KSP.58.B. machine-gun. Bullet details are: Ball: Boat-tailed bullet with clad steel envelope and lead core. Bullet weight 144 grains (9.34 grams), muzzle velocity 2,631fps (830mps).

Tracer: Muzzle velocity is 2,626fps (815mps).

Obsolete or Obsolescent Swedish ammunition

9mm Browning long

9mm Sk Ptr M/07

This cartridge is intended for use in the Model 1907 SL pistol. It employs a brass cartridge case, straight-sided and semi-rimless, 20mm long. The bullet is cupro-nickel or gilding metal jacketed, with lead core, weighing 110 grains (7.2 grams). Muzzle velocity c. 1,000fps (305mps).

6.5mm × 55 Mauser

This cartridge was first introduced in Sweden as the Model 1894 cartridge, and was used mainly in the M/96 rifle at the beginning of its service, and finally in the M/42 rifle and the Ksp 58 machine-gun. The Swedish cartridge case is of brass with Berdan primer, and the case is rimless and bottle-necked, 54.8mm long. The M/41 ball bullet weighs 140 grains (9.07 grams). Muzzle velocity is 2,600fps (793mps). The following cartridge loadings have been in service recently:

Ball: 6.5mm Sk Ptr M/94 Prj M/41

Tracer: 6.5mm Sk Ptr M/94 SI Prj M/41

AP: 6.5mm Sk Ptr M/94 PPrj M/41

Gallery Practice: 6.5mm KPtr M/12

Training ball (short-range): 6.5mm Sk Ptr M/94 Övn Prj M/44

8mm × 63 MG

This cartridge, known as the 8mm M.32 was introduced for use in Mauser rifles and Browning machine-guns. The cartridge case is rimless and bottle-necked, with Berdan primer, 63mm long. The M/32 ball bullet is boat-tailed and weighs 218 grains (14.13 grams). Muzzle velocity is 2,500fps (762mps). The following loadings were in service:

Ball: 8mm Sk Ptr M/32 Prj M/32

Tracer: 8mm Sk Ptr M/32 SI Prj M/39

Incendiary: 8mm Sk Ptr M/32 Brand Prj M/41

AP: 8mm Sk Ptr M/32 PPrj M/39

Switzerland

Post-1945 small arms ammunition plants

Eidgenössische Munitionsfabrik, Altdorf (Government owned)

Eidgenössische Munitionsfabrik, Thun (Government owned) Werkzeugmaschinenfabrik Oerlikon-Bührle AG. (who, from 1971, also incorporate the firm of Hispano Suiza) (privately owned, makes 20mm and larger calibres only)

Post-1945 manufacturers' headstamp codes

A Altdorf

T (appears in the 3 o'clock position on the headstamp)

Oe, PS Thun

Oerlikon
Other headstamps codes (denoting the source of the metal from which the case is made and appearing at 9 o'clock on the headstamp)

brass:

D Dornach

T Selve & Co, Thun

aluminium:

M Menzikon

steel:

BT Borsig (Germany), steel processed at Selve

FD Fagersta (Sweden), steel processed at Dornach

FT Fagersta (Sweden), steel processed at Selve

GD Gerlafingen (Swiss), steel processed at Dornach

HT Hellefors (Sweden), steel processed at Selve

OT SRO Stahl (Swiss), steel processed at Selve

ST Schwedenstahl, steel processed at Selve

UD Uddeholm (Sweden), steel processed at Dornach

UT Uddeholm (Sweden), steel processed at Selve

Brass cases made from old fired cases had the letter 'B' at 10 o'clock on the headstamp, and cases made from scrap virgin brass had 'A' at 8 o'clock on the headstamp. 'BG' at 12 o'clock on 7.65mm Parabellum cases indicated use with Bergmann submachine-gun.

Principal cartridges in service with the armed forces or security organizations or manufactured for export (some 20mm or larger)

6.36mm Browning Auto; 7.65mm Browning Auto; 7.65mm Parabellum; 9mm Parabellum; 7.5mm Model 1911 rifle and MG; 7.5mm Sub-calibre; 12.7mm (.50in) Spotter; 12.7mm (.50in) Browning; 20mm × 128; 25mm × 137; 30mm Aden, aircraft; 30mm × 170 HSS 831; 30mm × 173 aircraft.

Other calibres manufactured since 1945, but not for service
7.5mm Revolver; 7.92mm × 57 Mauser.

Current colour codes

Tracer: red bullet tip

Armour-piercing incendiary: silver bullet tip (12.7mm Browning)

Armour-piercing incendiary tracer: red over silver bullet tip (12.7mm Browning)

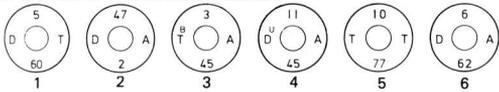
Spotter: plain tip, with white over red bands below the point (12.7mm Browning)

Spotter: white over red bullet tip (12.7mm short spotter case)

An earlier code for rifle calibre ammunition consisted of

lacquering the base of the cartridge with the appropriate colour. A red base indicated tracer, a purple base indicated armour-piercing (AP is no longer made or in service).

Typical cartridge headstamps



1, 7.5mm Revolver; 2, 7.92mm Mauser; 3, 7.5mm Model 1911; 4, 7.5mm Model 1911; 5, 9mm Para; 6, 7.5mm sub-calibre.

In-service ammunition

7.65mm Parabellum

Scharfe Pistolen-Patrone Cal: 7.65mm

Although aluminium-cased 7.65mm ammunition was made at the end of the war, since then Swiss ammunition in this calibre has been brass-cased with Berdan primers. The case is rimless and bottle-necked and 21.5mm long. The 7.65mm cartridge is no longer in service as a submachine-gun round, but is still used with the Model 1929 Parabellum pistols, which are now being phased out of service. Bullet weight is 93 grains (6.03 grams) and muzzle velocity 1,300fps (396mps).

9mm Parabellum

Scharfe Pistolen-Patrone Cal: 9mm, M.41

Although aluminium-cased 9mm ammunition was made at the end of the war, since then Swiss ammunition in this calibre has been brass-cased, with Berdan primers. The case is rimless and bottle-necked and 19.1mm long. It is for use in Pistole 49 and Pistole 75 (both by S.I.G.) and in the Model 43/44 submachine-gun. Bullet weight is 125 grains (8.1 grams) and the Swiss bullet is unusual in having a very rounded ogive.

7.5mm Model 1911

Ball: Scharfe Gewehrpatrone Cal: 7.5mm M.1911 (GP.11)

Tracer: Leuchtspurpatrone Cal: 7.5mm M.1911

Grenade: Treibpatrone Cal: 7.5mm M.44

Steel-cased and limited quantities of aluminium-cased M.1911 cartridges were manufactured after 1945, but now only brass-cased ammunition in ball or tracer loadings is manufactured. Plastic or cadmium cases are used in some training ammunition and grenade cartridges. Principal weapons chambered for the 7.5mm cartridge are the Sturmgewehr Model 1957 and the Model 1951 machine-gun. The cartridge case is bottle-necked and rimless, and 55.4mm long, with Berdan primers.

Bullet details are:

Ball: Weight 175 grains (11.34 grams), lead-cored and boat-tailed with cupro-nickel clad envelope. Muzzle velocity 2,600fps (793mps).

Tracer: Weight 156 grains (10.11 grams), flat-based.

7.5mm Sub-calibre

This is a rimmed version of the 7.5mm Model 1911. It has a 55.4mm case length, and has a tracer bullet. Two versions exist, the M.50 and the M.57 which vary only with regard to velocity and trajectory. The sub-calibre device is a carbine barrel fitted to the 9cm PAK 50 (anti-tank weapon).

12.7mm (.50in) Browning

Armour-piercing incendiary: Cal: 12.7mm Panzer-Brandpatrone M.64

Armour-piercing incendiary tracer: Cal: 12.7mm Panzer-Brandpatrone M.65 mit L'spur

These cartridges have the standard .50in Browning case, and it is believed that the projectiles are based upon the corresponding U.S. M.8 and M.20. They are fired from the M.64 heavy machine-gun.

12.7mm (.50in) Browning, Sub-calibre, Spotter

Cal: 12.7mm Rauchpatrone M.57 mit L'spur

This cartridge is also based upon the .50in Browning case, and is fired with a barrel mounted on the 9cm PAK (anti-tank gun).

12.7mm (.50in) Spotter

Cal: 12.7mm Rauchpatrone M.58 mit L'spur

This cartridge is based upon the American M.48.A.I. .50in Spotter round, and is used in a special barrel fitted to the 10.6cm PAK. M.58.

Obsolete Swiss ammunition

Although not issued to first-line units of the army since 1945, one purely Swiss cartridge has been manufactured during this period, with Swiss military markings, for use by clubs, etc. This is the Swiss Ordnance Revolver cartridge, Model 1882.

Scharfe Revolverpatrone Cal: 7.5mm M.1882

The case for this cartridge is rimmed, straight-sided, 22.5mm long. The bullet, of post-war manufacture, is full-jacketed, earlier production having lead bullets. Overall cartridge length is 35mm.

Syria

Post-1945 small arms ammunition plants

Defence Industries Factory No. 823 (Government owned)

Defence Industries Factory No. 837 (Government owned)

Post-1945 manufacturers' headstamp codes

Much current Syrian ammunition bears no manufacturers' headstamp codes and apart from showing calibre and date of manufacture, the only distinguishing mark is two small stars.

'MMD' in Arabic script appears on some Syrian headstamps as a factory code.

Principal cartridges in service with the armed forces

9mm Parabellum; 7.62mm × 39 (U.S.S.R. Model 43);

7.62mm × 54 (U.S.S.R.); 7.62mm × 51 NATO.

Other calibres now obsolete, but in service after 1945 and manufactured locally

7.5mm MAS; .30in-06.

Current colour codes

Tracer: green bullet tip

AP/I: black over red tip

Incendiary ranging: red bullet tip

Characteristics of Syrian ammunition

Syrian-made ammunition is brass-cased with Berdan primers. Considerable quantities of Soviet-made

Geographical Register of Ammunition Producers and Users

ammunition, particularly in heavy machine-gun calibres, are in use. For the ball cartridge in 7.62mm × 39 calibre the Syrians use the flat-based, lead-cored bullet rather than the Soviet-type PS bullet which has a steel core. The Syrian ball bullet weighs 123 grains (7.97 grams).

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm x 39; 3, 7.62mm x 54.

Thailand

Post-1945 small arms ammunition plant

Royal Thai Arsenal, Bangkok (Government owned).

Manufacturer's headstamp codes

Originally Thai-made ammunition bore Thai alphabet letters on the headstamp. Now the letters 'RTA' appear in Western characters.

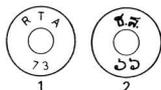
Principal cartridges in service with the armed forces and manufactured in Thailand, or made with Thai marks

.38in Special; 5.56mm × 45; 7.62mm × 51.

Other calibres now obsolete, but manufactured locally after 1945

8mm Siamese rifle, Type 66; .30in-06.

Typical cartridge headstamps



1, 5.56mm; 2, 8mm Rifle.

Turkey

Post-1945 small arms ammunition plant

Makina Ve Kimya Endustrisi Kurumu, Ankara

Manufacturer's headstamp code

MKE.

Other headstamp codes

TC, AF, FS.

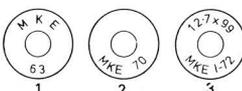
Principal cartridges in service with the armed forces and manufactured in Turkey

9mm Parabellum; .380in S & W Revolver; .38in Special; .30in-06; 7.62mm × 51 NATO; 12.7mm (.50in) Browning.

Other cartridges, now obsolete, manufactured after 1945

9mm Corto (.380in ACP); 7.65mm Browning Auto; 7.63mm Mauser Auto; 7.92mm × 57 Mauser.

Typical cartridge headstamps



1, 7.62mm NATO; 2, 7.62mm NATO; 3, .50in Browning.

United Kingdom

Post-1945 small arms ammunition plants

Royal Ordnance Factory, Radway Green (currently in production)

IMI (Kynoch) Ltd. (currently in production)

British Manufacturing and Research Co. Ltd. (currently in production)

Royal Laboratory, Woolwich (ceased production after 1945)

Royal Ordnance Factory, Thorp Arch (ceased production after 1945)

Greenwood and Batley Ltd. (ceased production after 1945)

Post-1945 manufacturers' headstamp codes

RG	Radway Green
K and ICI	Kynoch
BMARCO	British Mfg and Research Co.
R ↑ L	Royal Laboratory
TH	Thorp Arch
GB	Greenwood and Batley

Headstamps of manufacturers out of production by the end of 1945 on ammunition still in service after 1945

BE and B ↑ E	Royal Ordnance Factory, Blackpole
H ↑ N	Royal Ordnance Factory, Hirwaun
SR	Royal Ordnance Factory, Spennymore
ST	Royal Ordnance Factory, Steaton and Thorp Arch

CP Crompton Parkinson Ltd.

GBF Greenwood and Batley, filled at Farnham

Other headstamp codes

Original code:

B	Incendiary
G	Tracer
H	Grenade propelling
L	Blank
Q	Proof (high-pressure)
W	Armour-piercing
FG	Semi-armour-piercing tracer
WG	Armour-piercing tracer
Z	Nitro-cellulose propellant

Only codes G, H, L, W, Z and Q appear on post-1945 ammunition.

Present code:

'L' prefix letter and 'A' suffix letter, each with its appropriate numeral, now indicate the type of cartridge.

Primer annulus colour codes

Proof: yellow annulus

Ball: purple annulus.

Tracer: red annulus.

Incendiary: blue annulus (no longer used)

Armour-piercing: green primer annulus (no longer used)

MG observing: red annulus

Bullet tip colour codes (in current use)

Tracer: red

MG observing: yellow over red

Spotter tracer: yellow over red

Armour-piercing incendiary: silver

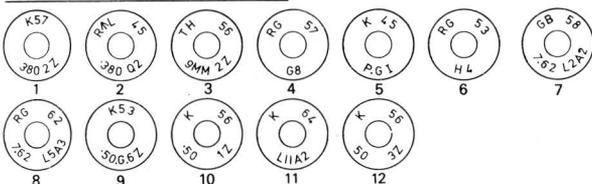
Principal cartridges in service

9mm Parabellum; .380in Revolver (obsolescent); 7.62mm × 51 NATO; .30in Browning; 6.5mm Sub-calibre (for 84mm Carl Gustav); .50in MG Observing/ .50in Browning; .50in Spotter; 30mm Raden; 30mm Aden.

Other calibres now obsolete, but manufactured and in service after 1945

.30in U.S. Carbine; .303in; 7.92mm BESA (7.92mm × 57); 20mm Oerlikon; 20mm Hispano Suiza.

Typical cartridge headstamps



1, .380in revolver ball; 2, .380in revolver proof; 3, 9mm Ball; 4, .303in tracer G Mk 8; 5, .303in practice tracer PG Mk 1; 6, .303in grenade H Mk 4; 7, 7.62mm x 51 ball; 8, 7.62mm x 51 tracer; 9, .50in Browning tracer G Mk 6z.; 10, .50in Browning A.P/1 Mark 1.z; 11, .50in MG Observing; 12, .50in Browning ball Mk 3.z.

In-service ammunition

9mm Parabellum

Round 9mm Ball Mark 2.z

Brass case, rimless and straight-sided, 19.1mm long. Berdan primer. The bullet is round-nosed and lead-cored, weighing 115 grains (7.45 grams). Muzzle velocity is c. 1,300fps (397mps). Principal weapons chambered for this cartridge are the Browning SL pistol and the L.2.A.3 submachine-gun.

.380in Revolver (S & W)

Round .380in Ball Mark 2.z

Brass case, straight-sided and rimmed, 19.3mm long. Berdan primer. The bullet is jacketed with two cannelures, and round-nosed, lead-cored. Bullet weight is 178 grains (11.53 grams). The Mk 2.z cartridge has nitro-cellulose propellant, but the Mk 2 is cordite loaded. Muzzle velocity is 600fps (183mps). This cartridge is chambered in the Enfield No. 2 Revolver.

7.62mm × 51 NATO

Ball: Round 7.62mm Ball L.2.A.2

Ball: Round 7.62mm Ball L.2.A.4

Tracer: Round 7.62mm Tracer L.5.A.3

Tracer: Round 7.62mm Tracer L.5.A.4

Grenade: Cartridge 7.62mm Rifle Grenade L.1.A.2

Short-range: Round 7.62mm Training, short-range, L.14.A.1 British cartridge cases in this calibre are of brass with Berdan primers. The case is rimless and bottle-necked and 50.8mm long. The 7.62mm cartridge is chambered principally in the L.1.A.1. SL rifle and the L.39.A.1. sniper's rifle, and a number of machine-guns (L.7, L.8, L.20, and L.37 series, and the L.4 Bren conversions).

Bullet details are:

Ball L.2.A.2: The bullet is boat-tailed with gilding metal envelope and lead core. Weight 144 grains (9.33 grams), muzzle velocity 2,700fps (823mps). The L.2.A.2 has nitro-

cellulose propellant.

Ball L.2.A.4: This has been in limited production only, and differs from the L.2.A.2 only in having ball powder as the propellant.

Tracer L.5.A.3: This bullet has a gilding metal clad steel envelope, and behind the lead front core is inserted a copper tracer cannister. The bullet weight is 135 grains (8.75 grams), muzzle velocity 2,620fps (799mps). The L.5.A.3. had dark ignition to 60 metres and bright to 1,000 metres.

Tracer L.5.A.4: Only limited quantities of this type have been made. It differs from the L.5.A.3 in having ball powder propellant instead of standard nitro-cellulose and in having a modified trace composition giving longer trace.

Grenade cartridge L.1.A.2: This consists of a normal case with a short rose crimp, giving a case length of 51.5mm. The lower part of the case is blackened.

.30in Browning

Ball: Round .30in Ball Mk 4.z

Tracer: Round .30in Tracer Mk 1.z

This ammunition uses the basic case design of the old U.S. .30in-06, but British cases have Berdan primers. Cases are of brass, bottle-necked and rimless and 63.1mm long. This cartridge has largely been phased out of service and is used in Browning machine-guns mounted in armoured vehicles. Details are:

Ball Mk 4.z: Flat-based bullet with lead core, weighing 150 grains (9.72 grams), muzzle velocity 2,800fps (855mps).

Tracer Mk 1.z: 150-grain (9.72-gram) bullet, with gilding metal clad steel envelope. Behind front core of lead is a copper trace cannister. This bullet has dark ignition to 80 metres and bright ignition to 1,000 metres.

6.5mm Sub-calibre

Round 6.5mm/84mm Infantry sub-calibre, short range,

L.10.A.1 (Outdoor)

This cartridge, although a training round, has all the external characteristics of a service round. It is based upon the standard Swedish 6.5mm Mauser case, and this ammunition is manufactured for Britain in Sweden. The case is rimless and bottle-necked with Berdan primer, and is 55mm long. The tracer bullet may bear the normal Swedish colour code for tracer, which is a white tip, and is in fact the Model 1941 Swedish tracer. Later production had red tips. Bullet weight is 120 grains (7.78 grams). The base of the case is half-blackened, which is the standard Swedish code for a reduced-charge cartridge, and the propellant charge is 10 grains (.65 grams) of nitro-cellulose. An indoor 6.5mm training round, the L.11.A.1, with a short flat-nosed bullet also exists.

.50in Spotter

Round .5in Spotter Tracer M.48.A.1

This is the U.S. Spotter cartridge M.48.A.1. purchased from the United States. Its full description is shown elsewhere in this chapter. It is chambered in a special self-loading rifle mounted in parallel with the main barrel of the 106mm and 120mm RCL anti-tank weapons, and is used for ranging the main weapon on to the target.

Geographical Register of Ammunition Producers and Users

.50in MG Observing / .50in Browning

Ball: Round .50in Ball Mark 3.z

Tracer: Round .50in Tracer Mark 6.z

AP/I: Round .50in Armour-piercing Incendiary Mark 1.z

MG Obs: Round .50in Machine-gun Observing L.11.A.2

MG Obs: Round .50in Machine-gun Observing L.13.A.1

This series uses the standard .50in Browning case, in brass, with Berdan primers. The case measures 99mm, and is rimless and bottle-necked. Details are:

Ball Mark 3.z: The bullet is boat-tailed with a gilding metal envelope and lead core tip. The main core is of mild steel. Bullet weight is 710 grains (46 grams). Muzzle velocity is 2,700fps (823mps).

Tracer Mark 6.z: The bullet is flat-based with a gilding metal envelope. The core is of mild steel recessed to take the trace composition. Weight is 685 grains (44.39 grams). This bullet has dark ignition to 80 metres and bright to 2,000 metres.

AP/I Mark 1.z: The bullet is boat-tailed with a hard steel core. The nose space, normally filled with a lead tip filler, is instead filled with incendiary composition. Bullet weight is 660 grains (42.77 grams). Muzzle velocity is 2,850fps (869mps).

MG Observing L.11.A.2: The bullet has a gilding metal envelope and a steel core, recessed to hold tracer composition. The bullet is boat-tailed and weighs 626 grains (40.56 grams). Muzzle velocity is 2,965fps (904mps).

MG Observing L.13.A.1: In layout this bullet is similar to the L.11.A.2, except that it is heavier, having a tungsten carbide core.

Obsolete British ammunition

Three cartridges which were in British service after 1945 are now obsolete. The .30in U.S. Carbine ammunition, used principally in the Far East, was basically to U.S. specifications and is covered, therefore, elsewhere. The 7.92mm BESA cartridge was based upon the German 7.92mm × 57 Mauser case and interchangeable with German ammunition. The third cartridge was the .303in cartridge described here in limited detail. After 1945 it was used principally with the No. 4 Rifle, the No. 5 Carbine, the Bren light machine-gun and the Vickers medium machine-gun. Nomenclature shown below relates to ammunition last held in store.

.303in

Ball: Round .303in Ball Mk 7. and 7.z

Ball: Round .303in Ball Mk 8.z

Tracer: Round .303in Tracer Mk 8

Cases are brass with Berdan primers, and are rimmed and bottle-necked. Case length is 56mm. The Ball Mk 7 bullet is flat-based with lead rear core and aluminium nose filler and weighs 174 grains (11.27 grams). Muzzle velocity 2,440fps (744mps). The Ball Mk 8.z is for use in Vickers MMGs and has a lead-cored boat-tailed bullet of the same weight as the Mk 7. Muzzle velocity is 2,550fps (777mps). The Mk 8 tracer round has a blunter ogive than the ball, and weighs 169 grains (10.95 grams) with a muzzle velocity of 2,370fps (722mps).

U.S.A.

Post-1945 small arms ammunition plants

Frankford Arsenal (now closed) (Government owned)

Lake City Ordnance Plant (Government owned)

Twin Cities Ordnance Plant (Government owned)

Federal Cartridge Co. (privately owned)

Remington Arms Co. (privately owned)

Olin Mathieson Chemical Corporation (Winchester Western Division) (privately owned)

Waterbury Ferris Co. (privately owned)

The Winchester Repeating Arms Co. and the Western Cartridge Co. were originally separate companies before merging as part of the Olin Mathieson Chemical Corporation.

Manufacturers' headstamp codes (small calibres)

FA Frankford Arsenal

LC Lake City

TW Twin Cities

FC Federal Cartridge Co.

RA Remington Arms Co.

REM-UMC Remington Arms Co.

WCC Olin Mathieson Corporation

WRA Olin Mathieson Corporation

WF Waterbury Ferris Co.

Manufacturers' codes (20mm calibre and over)

ACN Amron Corporation

AJD Aerojet Ordnance & Manufacturing Co.

BWD Brunswick Corporation

CMC Clymer Machine Co.

CSY AVCO Corporation

HA Harvey Aluminium (also appears on small calibre)

KO Olin Mathieson Chemical Corporation

MHR Honeywell Incorporated

RNO Amron Corporation

USE Piper Industries

VAT Vatronics Incorporation

Manufacturers' headstamp codes for plants out of production by the end of 1945, on ammunition still in service after 1945

DEN, DM, EC, ECS, EW, LM, M, PC, PCC, SL, U, UT; W, WC (early versions of Western Cartridge Co.)

Other headstamp codes

AN, BN, CN Special 'disguise' code used on clandestine ammunition in the 1950s from un-named U.S. ordnance plant.

HP High-pressure (proof) cartridge

Current colour codes

Armour-piercing: black bullet tip

Armour-piercing incendiary: silver bullet tip

Incendiary: blue bullet tip

Tracer: orange, maroon or red bullet tip

Armour-piercing incendiary tracer: red/silver bullet tip

Spotter tracer: yellow/red bullet tip

Frangible ball: green/white tip

Principal cartridges in service with the armed forces

.38in Special; .45in ACP; 5.56mm × 45; 7.62mm × 51

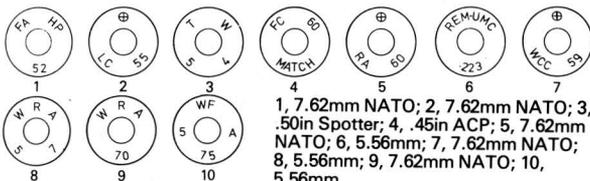
NATO; .50in Spotter; .50in Browning; .22in Hornet (for

survival weapons); 20mm × 102 Vulcan; 20mm × 110 Mk 100; 25mm × 137; 30mm × 170 HSS 831; 30mm × 173 aircraft.

Other cartridges manufactured, now obsolete or manufactured for military aid programmes overseas

.30in M.1 carbine; .30in (.30in-06 type); 7.62mm × 39 (U.S.S.R. Model 43).

Typical cartridge headstamps



1, 7.62mm NATO; 2, 7.62mm NATO; 3, .50in Spotter; 4, .45in ACP; 5, 7.62mm NATO; 6, 5.56mm; 7, 7.62mm NATO; 8, 5.56mm; 9, 7.62mm NATO; 10, 5.56mm.

velocity 2,750fps (839mps).

5.56mm × 45

Ball: Cartridge Ball, Cal: 5.56mm, M.193

Tracer: Cartridge Tracer, Cal: 5.56mm, M.196

Grenade cartridge: Cartridge grenade, Cal: 5.56mm, M.195

American cases in this calibre may be of brass or steel (and, largely on an experimental basis, of aluminium). The case is rimless and bottle-necked, 44.5mm long, with Boxer primer. Principal weapon chambered for this round is the M.16.A.I rifle. Bullet details are:

Ball: boat-tailed bullet with lead core. Weight 55 grains (3.56 grams), muzzle velocity 3,170fps (966mps).

Tracer: chamfered flat-based bullet, lead tip filler, weight 53 grains (3.43 grams).

7.62mm × 51 NATO

Ball: Cartridge 7.62mm NATO ball, M.59

Armour-piercing: Cartridge 7.62mm NATO armour-piercing, M.61

Tracer: Cartridge 7.62mm NATO tracer, M.62

Grenade: Cartridge 7.62mm NATO rifle grenade, M.64

Ball: Cartridge 7.62mm NATO ball, M.80

American cases in this calibre may be of steel or brass, brass predominating. The case is rimless and bottle-necked, 50.8mm long, with Boxer primers. Principal weapons chambered for this weapon are the M.14 rifle and the M.60 machine-gun. Bullet details are:

Ball M.59: boat-tailed bullet with gilding metal envelope and mild steel core. Bullet weight is 147 grains (9.53 grams), muzzle velocity 2,750fps (839mps).

Ball M.80: boat-tailed bullet with gilding metal envelope and lead core. Bullet weight is 149 grains (9.66 grams), muzzle velocity as for the M.59.

Armour-piercing M.61: boat-tailed bullet with gilding metal envelope and hard steel core. Bullet weight 147 grains (9.53 grams), muzzle velocity as for the M.59 ball.

Tracer M.62: flat-based bullet with clad steel envelope and lead tip filler. Weight 141 grains (9.14 grams), muzzle velocity as for M.59 ball.

Grenade cartridge M.63: cartridge case closed with a rose crimp. Propels grenade at mean velocity of 170fps (52mps).

.50in Spotter

Cartridge Spotter Tracer, Cal: .50in M.48.A.1

The cartridge case for this cartridge is of brass, with an ignition tube 26mm long fitted in conjunction with a Boxer primer. The case is rimless and bottle-necked, 75.8mm long. This cartridge is used in a special Springfield-designed self-loading spotting rifle mounted parallel to the main barrel of the 106mm RCL M.40.A.1. weapon.

The bullet is boat-tailed with gilding metal jacket, and 68.5mm long. In the shrouded nose is a detonator, behind which is a container of aluminium, holding the main incendiary charge. The centre of the bullet is occupied by a lead core, and the rear of the bullet holds a steel plug recessed to take the tracer composition. Total bullet weight is 816 grains (52.89 grams), muzzle velocity 1,745fps (532mps). This bullet traces to 1,500 metres and is intended to give a flash and puff of smoke upon impact from ranges

In-service ammunition

.38 Special (Revolver)

Cartridge Cal: .38in Special. M.41

The case for this cartridge is of brass, with straight sides and rimmed. Boxer primer. The case length is 29.2mm. The bullet has a gilding metal envelope and a lead core, and weighs 132 grains (8.56 grams). Muzzle velocity is 950fps (290mps). At least two other ball cartridges in .38in Special calibre have been issued. One, the XM 142, has a 158-grain (10.24-gram) bullet and the same velocity as the M.41, and was for use by the Counter-intelligence Corps. The other, to a commercial design, had a wadcutter bullet and was issued for target practice only. The .38in Special cartridge is used in a number of revolvers, including the lightweight M.12 aircrew revolver.

.45in ACP

Ball: Cartridge Ball, Cal: .45in M.1911

Tracer: Cartridge Tracer, Cal: .45in M.26

This calibre has been produced with both steel and brass cases, brass now predominating. The case has straight sides and is rimless, 22.6mm long with Boxer primer. The principal weapons chambered for this cartridge are the Colt M.1911. A.I. Auto Pistol and the M.3 submachine-gun. Bullet details are:

Ball: the bullet is round-nosed and flat-based with gilding metal envelope and lead core. Bullet weight is 234 grains (15.16 grams), muzzle velocity 820fps (250mps).

Tracer: the bullet is round-nosed and flat-based, with a clad steel envelope and lead core. Bullet weight is 208 grains (13.48 grams), muzzle velocity 850fps (259mps). Trace is to 150 metres.

.22in Hornet

Cartridge Ball Hornet, Cal: .22in M.65

The M.65 replaced the earlier Hornet cartridge M.39, which had a soft-point bullet, as the standard cartridge for the M.4 and M.6 survival weapons. The cartridge case for the Hornet cartridge is of brass and is rimmed with a tapered bottle-neck. The case is 35.4mm long and has Boxer ignition. The bullet is fully-jacketed with a gilding metal envelope and lead core. Bullet weight is 35 grains (2.27 grams), muzzle

Geographical Register of Ammunition Producers and Users

in excess of 175 metres. An M.48.A.2 cartridge that is structurally the same as the M.48.A.1 but which has superior tracer characteristics is now in service.

.50in Browning

Armour-piercing: Cartridge armour-piercing Cal: .50in M.2

Armour-piercing incendiary: Cartridge armour-piercing incendiary, Cal: .50in M.8

Incendiary: Cartridge Incendiary Cal: .50in M.23

Armour-piercing incendiary tracer: Cartridge armour-piercing incendiary tracer, Cal: .50in M.20

Tracer: Cartridge tracer, Cal: .50in M.10

Tracer: Cartridge tracer, Cal: .50in M.17

Tracer: Cartridge tracer, Cal: .50in M.21

Although steel-cased .50in cartridges have been made in the past, brass cases are now used. The case is rimless and bottle-necked, 99mm long, with Boxer primers. This cartridge has been chambered in various Browning heavy machine-guns. Bullet details are:

AP bullet M.2: boat-tailed bullet with gilding metal envelope and manganese molybdenum steel core. Lead tip filler.

Bullet weight 708 grains (45.88 grams), muzzle velocity 2,900fps (884mps).

AP/I bullet M.8: boat-tailed bullet with gilding metal envelope and manganese molybdenum steel core.

Incendiary composition in nose of envelope. Bullet weight 649 grains (41.99 grams), muzzle velocity 2,910fps (887mps).

Incendiary, M.23: flat-based bullet with gilding metal envelope. Base lead plug. The incendiary composition is contained in a steel container above the lead base plug. Bullet weight 512 grains (33.21 grams), muzzle velocity 3,400fps (1,036mps).

AP/I/T bullet, M.20: boat-tailed bullet with gilding metal envelope with manganese molybdenum steel core recessed at rear to take tracer composition. Space in nose of envelope filled with incendiary composition. Bullet weight 612 grains (39.66 grams), muzzle velocity 2,910fps (887mps).

Tracer bullet, M.10: flat-based bullet with clad steel envelope, lead front core. Bullet weight 643 grains (41.67 grams), orange bullet tip. Muzzle velocity 2,860fps (872mps).

Tracer bullet, M.17: flat-based bullet, similar in construction to M.10. Bullet weight 643 grains (41.67 grams), brown bullet tip. Muzzle velocity 2,860fps (872mps).

Tracer bullet, M.21: flat-based bullet, similar in construction to M.10. Bullet weight 666 grains (43.22 grams), red bullet tip. Muzzle velocity 2,840fps (866mps).

Obsolete U.S. ammunition

Two U.S. cartridges now obsolete were in service not only in the U.S. forces, but also in the armies of many other countries after 1945. These are the .30in carbine and the .30in rifle cartridges.

.30in Carbine

Ball: Cartridge ball, carbine, Cal: .30in M.1

Tracer: Cartridge tracer, carbine, Cal: .30in M.16

Grenade: Cartridge grenade, carbine, Cal: .30in M.6

The case for this cartridge is straight-sided and rimless, 32.6mm long, with Boxer primer. The ball bullet weighs 112 grains (7.25 grams), muzzle velocity 1,900fps (579mps).
.30in (.30in-06 type)

Ball: Cartridge ball, Cal: .30in M.2

Armour-piercing: Cartridge armour piercing, Cal: .30in M.2

Armour-piercing incendiary: Cartridge armour-piercing incendiary, Cal: .30in M.14

Incendiary: Cartridge incendiary, Cal: .30in M.1

Tracer: Cartridge tracer, Cal: .30in M.1

Tracer: Cartridge tracer, Cal: .30in M.23

Grenade: Cartridge rifle grenade, Cal: .30in M.3

The case for this cartridge is rimless and bottle-necked, 63.2mm long, with Boxer primer. The ball bullet M.2 weighs 150 grains (9.72 grams), and the muzzle velocity is 2,740fps (836mps).

U.S.S.R.

Post-1945 small arms ammunition plants

Factory No. 3

Factory No. 10 (now closed)

Factory No. 17

Factory No. 30 (now closed)

Factory No. 38

Factory No. 46 (now closed)

Factory No. 60 (no production noted since the early 1960s)

Factory No. 184

Factory No. 188

Factory No. 270

Factory No. 304

Factory No. 513

Factory No. 529 (now closed)

Factory No. 539

Factory No. 541 (now closed)

Factory No. 543 (now closed)

Factory No. 545 (now closed)

Factory No. 606

Factory No. 710 (no production noted since 1950)

Factory No. 711

In addition, evidence suggests that a further six factories existed up to 1945, numbered 50, 58, 179, 540, 547, and 611.

Manufacturers' headstamp codes

Factories numbered as above include the full factory number in the headstamp. In addition one or more stars or triangles may appear. The factory code letter 'T' appears instead of a numeral on ammunition made at the factory at Tula. On older ammunition, the factory code letters '3B' appear. This is the Cyrillic for 'ZV' and indicated a factory that is believed to have ceased production completely during the Second World War.

Other headstamp codes

For some factories, and for some years only, the U.S.S.R. used a Cyrillic letter code in place of the usual two-digit date code. The following letters were used:

Geographical Register of Ammunition Producers and Users

Г А Е И К
1952 1953 1954 1955 1956

For 7.62mm × 54 ammunition intended for use in the ShKas machine-gun, the headstamp included the Cyrillic letter Ш (sh).

Principal cartridges in service with the armed forces

9mm Makarov; 7.62mm × 39 (Model 1943); 7.62mm × 54; 12.7mm × 108 heavy MG; 14.5mm × 114 heavy MG; 20mm × 99 ShVAK aircraft (obsolete); 23mm × 115 aircraft; 23mm × 152 ZSU anti-aircraft; 25mm × 205 anti-aircraft (obsolete); 25mm × 218 naval anti-aircraft; 30mm × 155 aircraft; 30mm × 210 anti-aircraft.

Other cartridges manufactured, now either obsolete, intended for export, or used in match shooting

7.62mm × 25 Tokarev; 7.62mm Revolver; 5.6mm × 39; 6.5mm × 54.

Current colour codes

Ball: yellow bullet tip for 7.62mm × 54 Type D heavy ball.

Yellow tip is also found on some 7.62mm × 25 Tokarev steel-cored ball Type PST

Ball: silver bullet tip (Type LPS steel-cored ball in 7.62mm × 54 calibre only)

AP/I: black over red bullet tip

AP/I/T: purple over red bullet tip

Tracer: green bullet tip

Incendiary ranging: red bullet tip

HE/I: red projectile (14.5mm only)

In addition Soviet ammunition charts show the existence of a reduced velocity round in 7.62mm × 39 calibre having a black/green tip. Specimens have not been seen in the west.

Obsolete colour codes

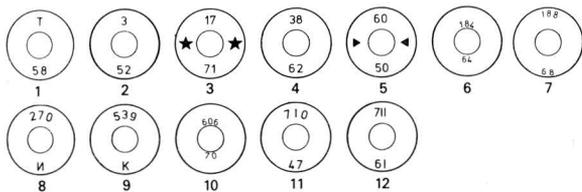
AP: black bullet tip

AP/I: black over yellow bullet tip (special category, for 12.7mm only)

AP/I (with tungsten carbide core): red projectile, black tip

AP/T: purple bullet tip

Typical cartridge headstamps



1, 5.6mm × 39; 2, 7.62mm × 39; 3, 14.5mm; 4, 9mm Makarov; 5, 7.62mm × 39; 6, 23mm ZU; 7, 7.62mm × 54; 8, 7.62mm × 39; 9, 7.62mm × 39; 10, 23mm; 11, 7.62mm Tokarev; 12, 5.6mm × 39.

In-service ammunition

9mm × 18 (Makarov)

Cartridge 9mm PM

This cartridge, of Soviet design, was introduced after the Second World War and is now the standard pistol cartridge

of the U.S.S.R. and Warsaw Pact armies. Soviet-made ammunition usually has steel cartridge cases with Berdan primers, the cases being copper washed or lacquered. The case is straight-sided and rimless, 17.8mm long.

Two forms of ball bullet exist, one with a lead core and the other with a steel inner core, the latter design being the newer. The bullet is jacketed with a rounded nose. The bullet weight is 93 grains (6.03 grams), muzzle velocity is 1,043fps (318mps). This cartridge is chambered in the Makarov SL pistol and the less frequently encountered Stechkin SL pistol.

5.45mm × 39 (for AKS 74)

Ball: full designation unknown

Tracer: full designation unknown

This, the new Soviet infantry rifle calibre cartridge, is now coming into general service with the AKS 74 assault rifle. The cartridge case is of conventional design, of lacquered steel, and is rimless, bottle-necked, and 39.5mm long. The ball bullet is boat-tailed and weighs 53 grains (3.45 grams). A tracer variant is known to exist.

7.62mm × 39 (Model 1943)

Ball: Cartridge 7.62mm Model 43 Type PS

Tracer: Cartridge 7.62mm Model 43 Type T.45

AP/I: Cartridge 7.62mm Model 43 Type BZ

Incendiary ranging: Cartridge 7.62mm Model 43 Type Z

The 7.62mm × 39 cartridge was designed in the U.S.S.R. and first produced there. The case is rimless and bottle-necked, 38.6mm long. Russian cases are of steel, with Berdan primers. Originally most cases were copper washed, with some instances of brass washing, but more recently increasing use of lacquer as a coating for the steel case has been noted.

The principal weapons chambered for this cartridge are the obsolescent Simonov SKS carbine, the AK47 and the AKM assault rifles, the obsolescent RPD and RPK light machine-guns. Bullet details are:

Ball, Type PS: the bullet is boat-tailed, with mild steel core.

The bullet weight is 123 grains (7.97 grams), muzzle velocity is 2,330fps (710mps).

Tracer, Type T.45: flat-based bullet with front core of lead, the rear portion of the bullet holding a tracer cannister.

Weight 115 grains (7.65 grams).

AP/I Type BZ: boat-tailed bullet with steel core behind which is located the incendiary composition. Weight 120 grains (7.77 grams).

Incendiary ranging, Type Z: bullet with centre steel core. In front of the core is contained the incendiary composition, and the rear of the bullet contains a tracer cannister.

Weight 102 grains (6.6 grams).

7.62mm × 54

Ball (Light): Cartridge 7.62mm Model 1908, Type L

Ball (Heavy): Cartridge 7.62mm Model 1930, Type D

Ball (steel core): Cartridge 7.62mm Type LPS

Tracer: Cartridge 7.62mm Type T.46

AP/I: Cartridge 7.62mm Type B.32

Incendiary ranging: Cartridge 7.62mm Type ZP

This cartridge has a rimmed, bottle-necked case, 53.6mm

Geographical Register of Ammunition Producers and Users

long. Russian cases are usually of steel, copper washed, but some brass-cased ammunition also exists. Berdan primers. Principal weapons chambered for this cartridge are the Dragunov (SVD) sniper's rifle and the PK (and variations on the PK) machine-gun. Bullet details are:

Ball, Type 'L': (Obsolete), flat-based bullet with lead core, weighing 150 grains (9.7 grams).

Ball, Type 'D': boat-tailed bullet with lead core. Weight 182 grains (11.8 grams), muzzle velocity 2,680fps (818mps).

Ball, Type 'LPS': boat-tailed bullet with mild steel core. Weight 150 grains (9.7 grams), muzzle velocity 2,850fps (870mps).

Tracer, Type T.46: flat-based bullet, front lead core behind which is situated a tracer cannister. Bullet weight 149 grains (9.66 grams).

AP/I Type B.32: boat-tailed bullet with steel core. Weight 155 grains (10.05 grams), muzzle velocity 2,850fps (870mps).

Incendiary ranging, Type ZP: boat-tailed bullet with internal striker.

Weight 160 grains (10.37 grams).

12.7mm × 108

AP/I: Cartridge 12.7mm Type B.32

AP/I/T: Cartridge 12.7mm Type BZT.44

This cartridge has a rimless, bottle-necked case, 107.5mm long, with Berdan primer. Most Russian-made ammunition has brass cases. Principal weapons chambered for this cartridge are the Degtyarev series of heavy machine-guns. Bullet details are:

AP/I Type B.32: boat-tailed bullet with hard steel core.

Weight 762 grains (49.4 grams). The nose cavity between the core tip and the envelope is filled with incendiary composition. Muzzle velocity 2,750fps (840mps).

AP/I/T, Type BZT.44: boat-tailed bullet, with short steel core, with incendiary composition situated between the core tip and the envelope. Behind the core is situated a separate tracer cannister. Weight 680 grains (44.06 grams).

14.5mm × 114

AP/I: Cartridge 14.5mm Type B.32

AP/I: Cartridge 14.5mm Type BS.41 (obsolete)

AP/I/T: Cartridge 14.5mm Type BZT

AP/I/T: Cartridge 14.5mm Type BST

Incendiary ranging: Cartridge 14.5mm Type ZP

HE/I: Cartridge 14.5mm Type BDZ

This cartridge has a rimless bottle-necked case, 113.5mm long with Berdan primer -Both brass and steel cases are used, the steel cases being lacquered. Principal weapon for this cartridge is the KPV heavy machine-gun. The muzzle velocity for 14.5mm ammunition is, depending upon the loading, c. 3,200fps (975mps). Bullet details are:

AP/I, Type B.32: weight 990 grains (64.2 grams).

Construction similar to 12.7mm AP/I.

AP/I/T, Type BZT: weight 919 grains (59.6 grams).

Construction similar to 12.7mm AP/I/T.

Incendiary ranging Type ZP: weight 921 grains (59.75 grams).

HE/I, Type MDZ: weight 903 grains (58.5 grams).

Obsolete Russian ammunition

Two other Soviet cartridges were in service after 1945, the 7.62mm × 25 cartridge used in the Tokarev SL pistol and in various submachine-guns, and the 7.62mm Revolver cartridge used in the Nagant revolver. The Tokarev cartridge is no longer in service in the U.S.S.R., but is widely used in various other parts of the world in weapons supplied by Russia. The 7.62mm Revolver cartridge, while not in military service, is used in the U.S.S.R. for Match shooting. Details of these cartridges are:

7.62mm × 25 Tokarev

Ball: Pistol cartridge 7.62mm Type P and Type PST

AP/I: Pistol cartridge 7.62mm Type P.41

Tracer: Pistol cartridge 7.62mm Type PT

Soviet cartridge cases in this calibre may be of brass or copper washed steel, with brass predominating. The case is rimless and bottle-necked, 24.85mm long, with Berdan primer. The ball bullet is round-nosed and weighs 85 grains (5.51 grams), muzzle velocity 1,500fps (457mps). The AP/I bullet, with steel core, weighs 74 grains (4.8 grams) and the tracer bullet 85 grains (5.51 grams).

7.62mm Revolver (Nagant)

Revolver cartridge 7.62mm

The cartridge case for this cartridge is rimmed, and straight-sided except that, at the mouth it is coned slightly inwards. The bullet is seated completely within the case. Case length is 38.5mm, and primers are Berdan-type. The bullet is jacketed, with a truncated nose, and lead core, weighing 106 grains (6.87 grams): Muzzle velocity 950fps (290mps).

Upper Volta

Post-1945 small arms ammunition plant

Cartucherie Volcanique (also known as 'Carvolt')

(Government owned)

Manufacturer's headstamp code

CV.

Principal cartridges in service with the armed forces

9mm Parabellum; 7.5mm MAS Rifle; 7.62mm × 51 NATO.

Typical cartridge headstamp



9mm Para.

Venezuela

Post-1945 small arms ammunition plant

Although ammunition exists with Venezuelan markings, the existence of a plant in Venezuela has not yet been confirmed. It is known that some, at least, of the 7.62mm × 51 ammunition bearing Venezuelan markings was made in Belgium.

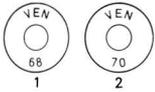
Venezuelan headstamp code

VEN.

Principal cartridges found with Venezuelan markings

9mm Parabellum; 7.62mm × 51 NATO.

Typical cartridge headstamps



1, 9mm Para; 2, 7.62mm NATO.

Vietnam, South

Post-1945 small arms ammunition plant

Quan Cu Cong Xuong 100 (Factory No. 100)

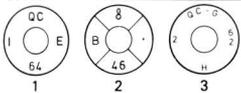
Manufacturer's headstamp codes

QC and QC-G

Principal cartridges manufactured in South Vietnam prior to its absorption by the North

9mm Parabellum; 7.5mm MAS; .30in-06; 8mm Lebel Rifle.

Typical cartridge headstamps



1, .30in-06; 2, 9mm Para; 3, 8mm Lebel.

Yugoslavia

Post-1945 small arms ammunition plants

Igman Plant, Konjice (Government owned).

Privi Partizan Plant, Titovo Uzice (Government owned).

Prior to the Second World War, a plant existed at Kragujevac. This was Voino Tekniki Zavod (BT3). It is not known if this plant resumed production after 1945.

Post-1945 manufacturers' headstamp codes

11, 12 and 14 (11 predominating) between 1947 and the mid-1950s.

IK and WK	Igman
PP, PPU, PP-YU, nny	Privi Partizan
EIGN	Believed to be Igman
nr	believed to be Privi Partizan

Other headstamp codes

Y: (chu) indicates steel or type of steel treatment.

Principal cartridges in service with the armed forces and reserves

7.62mm × 25 Tokarev; 9mm Parabellum; 7.62mm × 39 (U.S.S.R. Model 43); 7.62mm × 54 (U.S.S.R.); 7.92mm × 57 M.49; 12.7mm (.50in) Browning; 12.7mm × 108 (U.S.S.R.); 20mm HSS 804 (M.55); 30mm for M.53/59 AA.

Other calibres manufactured and largely for export

6.35mm Browning Auto; 7.65mm Browning Auto; 9mm Corto (.380in ACP); .38in Special; .45in ACP; 5.56mm × 45; .303in British; .30in-06; 7.5mm x 54 French.

Current colour codes

Exported ammunition is coded in accordance with the wishes of the client country. For domestic use, Yugoslavia uses the colour code system of the U.S.S.R.:

Heavy ball: yellow bullet tip

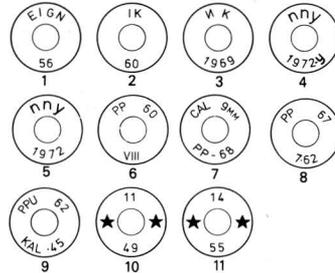
Tracer: green bullet tip

Armour-piercing incendiary: black over red tip

Incendiary ranging: red bullet tip

Armour-piercing incendiary tracer: violet over red tip

Typical cartridge headstamps



1, .50in Browning; 2, .30in-06; 3, 7.62mm x 39; 4, 7.62mm x 39; 5, 7.62mm x 54; 6, .303in; 7, 9mm Para; 8, 7.62mm x 39; 9, .45in ACP; 10, 7.92mm Mauser; 11, 7.62mm Tokarev.

In-service ammunition

7.62mm × 25 (Tokarev)

The Yugoslav-made case in this calibre is brass, with Berdan primer. The case is rimless and bottle-necked, and 24.85mm long. It is chambered in the Yugoslav M.57 self-loading pistol and the M.49/57 and M.56 submachine-guns. The bullet is round-nosed and weighs 85 grains (5.51 grams) and achieves a muzzle velocity of 1,500fps (457mps).

9mm Parabellum

The Yugoslav case for this calibre is brass, with Berdan primer. The case is rimless and straight-sided and 19.1mm long. The bullet is round-nosed, lead-cored and has a gilding metal envelope. Weight is 123 grains (7.97 grams).

7.62mm × 39 (U.S.S.R. Model 43 type)

Yugoslav cartridge cases in this calibre are of brass or of steel, and have Berdan primers. The case is rimless and bottle-necked, and 38.6mm long. This cartridge is chambered in the M.59/66, the M.70 and the M.70A self-loading rifles, and the M.72 light machine-gun. The ball bullet used by the Yugoslavs differs from that used in the Russian equivalent cartridge, in that it is flat-based and lead-cored. It weighs 123 grains (7.97 grams) and has a muzzle velocity of 2,362fps (720mps).

7.62mm × 54 (U.S.S.R.)

Few examples have been seen outside Yugoslavia, and those seen are blanks. It is possible that weapons chambered for this cartridge (originally obtained at the end of the war from the U.S.S.R.) are reserve stocks or used by second-line reserve units only. The blank ammunition seen, bearing military headstamps, has been steel cased.

7.92mm × 57 Model 1949

Yugoslav cases in this calibre normally have brass cases, but some steel-cased production has also taken place. Primers are Berdan and the case is rimless, bottle-necked and 56.8mm long. This cartridge is chambered, apart from any M.1948 Mauser rifles remaining in Yugoslavia, in the M.1953 machine-gun. The Yugoslav M.49 bullet is boat-tailed, with lead core and gilding metal envelope, and weighs 198 grains (12.83 grams).

12.7mm (.50in) Browning

Yugoslav loadings in this calibre examined have had brass cartridge cases with Boxer primers. The case is rimless, bottle-necked and 99mm long. Bullet details are unknown.

6. Colour Identification Codes

Individual cartridges may carry coloured markings, which provide one method of identifying the type of bullet or the type of cartridge. The markings may take the form of a coloured bullet tip, or rings around the bullet, or a coloured primer annulus. In addition, a coloured band may be found at the junction of the case mouth and the bullet. This band is usually only a sealing band to keep out moisture and has no identification value. The colour primer annulus may have no identification value, and is often added as a means of keeping moisture away from the primer. The major colour code systems for ammunition under 20mm are summarized.

China, People's Republic of

Some Chinese 7.62mm × 39 ammunition has had primers entirely coloured green or red, and the significance of this, if any, is not known. The Chinese system of bullet colour codes is based upon the Soviet code. In 1967, however, the Chinese made a significant break in one part of the code in that, never having made armour-piercing, the black tip code was unused. So to simplify the code for AP/I (hitherto black over red), the Chinese dropped the red band, and from that date Chinese AP/I has had just a black bullet tip.

Czechoslovakia

Prior to their adoption of Soviet 7.62mm ammunition and codes, the Czechs used the following primer annulus code.

Black annulus: Light ball bullet
Green annulus: Heavy ball bullet
Blue annulus: Mild steel cored ball bullet
Red annulus: Tracer
White annulus: Armour-piercing

Finland

White bullet tip: Tracer
Blue bullet tip: Armour-piercing
Black/red tip: Armour-piercing incendiary
Red bullet tip: Observation

France

French primer annuli often do have some significance, matching the bullet code in many instances. The following coloured bullet tip codes are for calibres other than 7.62mm NATO.

Red bullet tip: Tracer
Green bullet tip: Tracer
White bullet tip: Tracer
Black bullet tip: Armour-piercing
Black over white tip: Armour-piercing tracer (old code)
Black over red tip: Armour-piercing tracer (newer code)
Purple tip: Tracer
Blue tip: Incendiary

Pre 1939-45 colour codes for French ammunition bear no resemblance to the above listed post-war code.

NATO

NATO members producing ammunition in 7.62mm calibre employ a number of different coloured primer annuli and

neck seal bands. For the most part these have no significance except for certain countries. The NATO coloured bullet tip code is closely modelled upon the old U.S. code.

Black bullet tip: Armour-piercing (but little AP is made or used within NATO)
Silver bullet tip: Armour-piercing incendiary
Red over white or silver tip: Armour-piercing incendiary tracer
Orange bullet tip: Tracer
Brown bullet tip: Tracer
Red bullet tip: Tracer
Yellow bullet tip: Observation
Yellow over red: Observing tracer
Blue tip: Incendiary

Sweden

Black bullet tip: Armour-piercing
White bullet tip: Tracer
Orange bullet tip: Incendiary
Yellow bullet tip: Armour-piercing incendiary

Switzerland

Until recently, Swiss rifle calibre ammunition was identified as to type by having the entire base lacquered with the appropriate colour. This has now given way to a coloured bullet code. The following colours applied:

Base of case	Bullet	Type
Purple	no longer in service	Armour-piercing
Red	Red bullet tip	Tracer
not applicable	Silver bullet tip	AP/I (12.7mm Browning)
not applicable	White band over red band	Spotter (12.7mm Browning)
not applicable	White over red tip	Spotter (12.7mm short)
not applicable	Red over silver tip	AP/I/T (12.7mm Browning)

United Kingdom

The pre-NATO British colour codes consisted of the following combination of annulus and bullet tip colours.

Annulus	Bullet tip	Type
Purple	plain	Ball
Green	plain	Armour-piercing
Black	black	Observation
Blue	blue or plain	Incendiary
Red	plain	Tracer
Red	red	Tracer
Red	grey or white	Tracer
Yellow	plain	Proof or standard

As a member of NATO, Britain now uses the NATO colour tip code, but in addition, British 7.62mm × 51 ammunition still carries a purple annulus for ball, red for tracer and a yellow annulus for proof or standard.

U.S.A.

American primer annuli have no special significance. The following were the original U.S. bullet tip codes.

Black bullet tip:	Armour-piercing	AN	U.S.A. Appeared on ammunition for clandestine use
Silver bullet tip:	Armour-piercing incendiary	AOA	Japan
Blue bullet tip:	Incendiary	AOB	Italy (special code used by Bombrini)
Two tone blue tip:	Incendiary M.23 .50in calibre	AO	Japan
Red over white tip:	Armour-piercing incendiary tracer	ASC	Portugal
Green over white tip:	Frangible	ATE	Toulouse, France
Green bullet tip:	Duplex ball	ATS	Atelier de Construction de Tarbes, France
Orange bullet tip:	Tracer	AVE	Valence, France
Brown bullet tip:	Tracer	AU	Indonesia
Red bullet tip:	Tracer	AYM	Czechoslovakia (capital letters not normally used)
Silver over black tip:	Plate test	AYR	Raufoss, Norway
White tip:	M.2 tracer, .30in calibre	AGUILA	Mexico
U.S.S.R. (now also in general use by Warsaw Pact armies)		B	Chartered Industries, Singapore
Soviet and Warsaw Pact primer annuli and neck seal bands have no special significance. All present codes are bullet codes.		BMARC	British Manufacturing and Research Co., U.K.
Yellow bullet tip:	Found on heavy ball 7.62mm × 54 (Type D) and steel-cored 7.62mm Tokarev	BN	U.S.A. Appeared on ammunition for clandestine use
Black bullet tip:	Obsolete. Was used on 7.62mm × 54 armour-piercing	BPD	Bombrini Parodi Delfino, Italy
Green bullet tip:	Tracer	BWD	Brunswick Corporation (Defence Products Division), U.S.A. (on 25mm)
Red bullet tip:	Incendiary ranging	BXN	Czechoslovakia (capital letters not normally used)
Red bullet (complete):	High-explosive incendiary	BXP	Bombrini Parodi Delfino, Italy
Red bullet with black tip:	Obsolete. Armour-piercing incendiary (with tungsten carbide core)	C	Capua, Italy
Black tip with red band:	Armour-piercing incendiary	CAC	Colonial Ammunition Co., New Zealand
Purple tip with red band:	Armour-piercing incendiary tracer, 7.62mm × 54	CBC	Brazil
Purple bullet tip:	Obsolete. Armour-piercing tracer, 7.62mm × 54	CDM	Mexico
Black tip with yellow band:	Obsolete. Armour-piercing incendiary (special 12.7mm only)	CIM	Spain
Silver or white bullet tip:	Ball, 7.62mm × 54 (Type LPS)	CIS	Chartered Industries, Singapore
Red bullet:	(Fuzed). High-explosive incendiary (14.5mm)	CMC	Romania
		CMO	Clymer Machine Co., U.S.A. (on 30mm)
		CN	U.S.A. Appeared on ammunition for clandestine use
		CSY	Avco Ordnance, U.S.A. (on 25mm and 30mm)
		CV	Volta Republic
		CZO	Czechoslovakia
		DA	Dominion Arsenal, Canada
		DAC	Dominion Arsenal, Canada
		DAG	Dynamit AG, West Germany
		DAM	Brazil (unconfirmed)
		DAQ	Dominion Arsenal, Canada
		DC	Dominion Cartridge Co., Canada
		DI	Defence Industries, Canada
		DGSN	Morocco
		DN	West Germany
		DNG	West Germany
		DTP	Czechoslovakia (capital letters not normally used)
		DWM	Industrie Werke Karlsruhe, West Germany
		E	Israel (early)
		EID	Syria (unconfirmed)
		EIGN	Yugoslavia
		EK	Greek Powder and Cartridge Co.
		EMK	Greek Powder and Cartridge Co.
		EMZ	Eurometaal, Netherlands
		EN	Elisenhütte Nassau, West Germany
MANUFACTURERS' HEADSTAMP CODES, POST-1945 (LETTERED)			
A	Aldorf, Switzerland		
A	Pretoria, Republic of South Africa		
AA	Ammunitionsarsenalet, Denmark		
AC	San Cristobal, Dominican Republic		
ACN	Amron Corporation, U.S.A. (on 30mm)		
AD	Indonesia		
AE	Israel (early)		
AI	Artillerie Inrichtingen, Netherlands		
AJD	Aerojet Ordnance and Manufacturing Co., U.S.A. (on 30mm)		
AL	Indonesia		
AMA	Ammunitionsarsenalet, Denmark		
AmF	Sweden		

Colour Identification Codes

F	Chile	IWK	Industrie Werke Karlsruhe, West Germany
FA	Frankford Arsenal, U.S.A.	J-AO	Japan
FAMAE	Chile	J-AOA	Japan
FAMAP	Argentina	J-CH	Japan
FAME	Peru	J-ST	Japan
FAMMAP	Argentina	J-TE	Japan
FC	Federal Cartridge Corporation, U.S.A.	K	Karlsborg, Sweden
FCPQ	Fabrica Cartuchos e Polvoras Quimicas, Portugal	K	Kynoch (Imperial Chemical Industries/Imperial Metal Industries), United Kingdom
FLB	Argentina	KA	Pusan, South Korea
F de M	Mexico	KF	Kirkee, India (early post-war production had a broad arrow over 'I' between the letters)
FM	Mexico	KO	Olin Mathieson Corporation, U.S.A. (on 30mm)
FMCSL	Argentina	KTW	K.T.W. Incorporated, U.S.A.
FME	Chile	L	Lapua, Finland
FMEP	Chile	LBC	Leon Beaux, Italy
FMFL	Argentina	LBCM	Leon Beaux, Italy
FMFL'B'	Argentina	LC	Lake City Arsenal, U.S.A.
FMG	Chile	LM	Le Mans, France
FMMAP	Argentina	LPB	Indonesia (early)
FMMAP'B'	Argentina	LU	Luchoire SA, France
FMSF	Argentina	M	Musgraves, South Africa
FMSL	Argentina	M	Marieberg, Sweden
FN	Fabrique Nationale, Belgium	MAC	Military Armament Corporation, U.S.A. (believed to be custom-made)
FNCM	Brazil	MAL	Malaysia
FNM	Mexico	MANUCAM	Cameroon Republic
FNM	Portugal	MCM	Martignoni Cartucce Munizioni, Italy
FNP	Palencia, Spain	ME	Maschinenfabrik Eisenhütte, West Germany
FNT	Toledo, Spain	MEN	Maschinenfabrik Eisenhütte, Hessen, West Germany
FR	Brazil	MF	Footscray, Australia
GB	Chartered Industries, Singapore	M + FA	Altdorf, Switzerland
GB	Greenwood and Batley, Leeds, United Kingdom	MG	Footscray, Australia
GD	Dynamit AG, West Germany	MFS	Nepal
GECO	Dynamit AG, West Germany	MHR	Honeywell Incorporated, U.S.A.
GFL	Fiocchi, Italy	MI	Ste Méridionale, France
GPC	Unknown	MKE	Turkey
GS	Unknown	MMM	Spain
GT	S.F.M., France (for export)	MN	West Germany (unconfirmed)
H	Hirtenberger, Austria	MNAM	Morocco
HA	Harvey Aluminium, U.S.A.	MNMA	Unknown
HA	Ammunitionsarsenalet, Denmark	MR	Manurhin
HK	Heckler and Koch, West Germany (but made elsewhere)	MS	Manusaar, West Germany
HK	H. Huck, West Germany (on dummies and blanks)	MUS	Musgraves, South Africa
HP	Hirtenberger, Austria	NK	Yugoslavia ('N' reversed)
HSS	Hispano Suiza, Switzerland	NNY	Yugoslavia
HXP	Greek Powder and Cartridge Co.	NP	Norma, Sweden
IAC	Unknown producer, West Germany	NWM	Nederland Wappen & Munitie, Netherlands
ICI	Imperial Chemical Industries Ltd. (Kynoch), United Kingdom	O	Czechoslovakia
IK	Yugoslavia	OFN	Ordnance Factory, Nigeria
IM	Colombia	OFV	Ordnance Factory, Varangoan, India
IMI	Israeli Military Industries	OJP	Hirtenberger, Austria
IMPA	Argentina	OK	Khamaria, India (unconfirmed)
INDUMIL	Colombia	P	Japan
IVI	Industrie Valcartier, Canada	P	Palencia, Spain
		PA	Japan

PC Capua, Italy
 PEC Capua, Italy
 PE-CA Capua, Italy
 PMP Pretoria Metal Pressings, South Africa
 POF Pakistan Ordnance Factory
 PP Yugoslavia
 PPU Yugoslavia (also PP-YU)
 PS Seville, Spain
 PS Poongsan, South Korea
 PS Czechoslovakia
 PS Oerlikon, Switzerland
 PS/W Oerlikon, Switzerland (Lichtenstein)
 PSM Indonesia
 QC South Vietnam
 QC-G South Vietnam
 R Brazil
 RA Raufoss, Norway
 RA Remington Arms, U.S.A.
 RD Dominican Republic
 RG Royal Ordnance Factory, Radway Green, United Kingdom
 Rh Rheinmetall, West Germany
 REM-UMC Remington Arms, U.S.A.
 R ↑ L Royal Laboratory, United Kingdom
 RNO Amron Corporation, U.S.A.
 RP Remington Arms, U.S.A.
 RPA Philippines
 RPR Romania
 RTA Royal Thai Arsenal, Thailand
 RWS Dynamit Ag, West Germany
 RY Etablissements Rey à Nimes, France
 S Sako, Finland
 S Seville, Spain
 S Israel
 SAKO Sako, Finland
 SAM South African Mint
 SB Santa Barbara, Spain
 SB Squires Bingham, Philippines
 SBMC Squires Bingham, Philippines
 SCAMP Small Calibre Ammunition Modernisation Programme, U.S.A.
 SF Société Française de Munitions, France
 SFM Société Française de Munitions, France
 SGA Singapore
 SM Svenska Metallwerken, Sweden
 SMI Societa Metallurgica Italian, Italy
 SMI Südsteirische Metallindustrie, Austria (headstamp unconfirmed)
 SO Sako, Finland
 SR Royal Ordnance Factory, Spennymore, United Kingdom
 STON Unknown (on 20mm)
 SYI Societa Metallurgica Italiana, Italy
 T Tula, U.S.S.R.
 T Thun, Switzerland
 T Toledo, Spain
 TA Tel Aviv, Israel

TC Turkey
 TE Toulouse, France
 TE Japan
 TH Royal Ordnance Factory, Thorp Arch, United Kingdom
 THP Hirtenberger, Austria
 TS Atelier de Construction de Tarbes, France
 TW Twin Cities, U.S.A.
 TZ Israel
 U South African Mint
 USE Piper Industries, U.S.A. (on 30mm)
 VAT Vatronics Incorporated, U.S.A. (on 30mm)
 VC West Germany (on 30mm)
 VE Valence, France
 VEN Venezuela
 VPT Lapua, Finland
 WCC Winchester Western, U.S.A.
 WF Waterbury Ferris, U.S.A.
 WRA Winchester, U.S.A.
 WW Winchester Western, U.S.A.
 X Czechoslovakia
 Z Czechoslovakia
 ZV Czechoslovakia

MANUFACTURERS' HEADSTAMP CODES, POST-1945 (NUMBERED)

Communist

Few letter codes have been used for Warsaw Pact countries, for the Peoples' Republic of China, or for other Communist states. In these countries a common system exists in which most ammunition factories are allotted a code number. There are a few duplications in the series, but generally the system embraces the whole Communist world. Most ammunition has the factory code number on the headstamp, in the '12 o'clock' position. The following code numbers apply.

0 Czechoslovakia
 3 U.S.S.R.
 04 G.D.R.
 05 G.D.R.
 10 Bulgaria and U.S.S.R. (the U.S.S.R. factory has long been closed)
 11 China and Yugoslavia
 12 Yugoslavia
 14 Yugoslavia
 17 U.S.S.R.
 21 Poland and Romania (Romania unconfirmed)
 22 Romania
 23 Hungary
 30 U.S.S.R.
 31 China
 38 U.S.S.R.
 41 China
 46 U.S.S.R.
 50 U.S.S.R. (unconfirmed)
 51 China
 58 U.S.S.R. (unconfirmed)

Colour Identification Codes

60 U.S.S.R.
61 China
71 China
81 China
93 North Korea
012 U.S.S.R.
121 China
179 U.S.S.R. (unconfirmed)
184 U.S.S.R.
188 U.S.S.R.
270 U.S.S.R.
304 U.S.S.R.
321 China
343 Poland
353 Unknown country
361 China
451 China (unconfirmed)
501 China
513 U.S.S.R.
529 U.S.S.R.
539 U.S.S.R.
540 U.S.S.R. (unconfirmed)
541 U.S.S.R.
543 U.S.S.R.
545 U.S.S.R.
547 U.S.S.R. (unconfirmed)
606 U.S.S.R.
611 U.S.S.R. (unconfirmed)
661 China
671 China
710 U.S.S.R.
711 U.S.S.R.
791 China
964 Unknown country
21215 China

In addition to the regular sequence of Communist numbered codes, early Chinese Communist ammunition bore numbered codes on the headstamp that are believed to be factory codes. These include, D.22, D.25 (unconfirmed) and D.53.

German Federal Republic

01 Dynamit AG/RWS

Syria

823 Shown on package labels, not headstamps

837 Shown on package labels, not headstamps

Sweden

24 Norma operated

25 Karlsborg operated

26 Svenska operated

27 Norma operated

28 Unconfirmed

29 Unconfirmed

30 Unconfirmed

31

32

35 Karlsborg

70

586

MANUFACTURERS' HEADSTAMP CODES, POST-1945 (NUMBERED)

Non-Communist

Nationalist China

10 Mainland China

11 Mainland China

20 Mainland China

25 Mainland China

40 Mainland China

90 Mainland China

60A Taiwan

Egypt

10 Shown on headstamps in Arabic numerals

27 Shown on headstamps in Arabic numerals

7. Packages

GLOSSARY OF PACKAGING TERMS

Small arms ammunition is almost invariably packed in a variety of containers, designed to meet a particular purpose, and the containers are often or usually marked with various stencils or labels, giving a variety of information, some of which is of particular interest to the ammunition researcher.

It is necessary to define some types of pack and some of the means by which loose rounds are united to serve the user and the weapon concerned. These definitions are not based on any commonly accepted military terms, but are offered here to clarify terms which are used in the text.

Bandolier This is a fabric or plastic belt, with integral pockets in which useful quantities of ammunition are packed and stored. After being broken out of the boxes in which they arrive, they are intended for immediate issue to troops, usually to be worn around the body, as a means of carrying ammunition in excess of that normally carried in equipment pouches. Usually the rounds have been loaded into clips or chargers prior to packing in the bandoliers.

Carriers These are made of the same materials as liners, and carry the same contents, but are fitted with handles and are intended to be carried as part of a soldier's load. They are commonly used in conjunction with belt-fed weapons, and can be accommodated alongside the deployed weapon in a vehicle or on the ground, where it is an advantage to have hinged lids with secure, but readily opened, fasteners.

Carton This is a thin cardboard box which is usually re-closable, and contains a set number of cartridges, usually held by internal sub-divisions separately. Whereas a wrapper is worthless once opened, most cartons can continue in useful life even after having been opened. Increasingly, plastic is being used for the internal fittings or trays used within the carton. An unusual variation in carton is that which is entirely of plastic, but which has no lid and which must, therefore, be contained in transit within another container to prevent spillage.

Liner A liner is a box into which loose rounds, bandoliers, belts, wrappers or cartons are packed. Liners might form

part of a still larger package, but they exist in their own right as an entity only when closed. Once open they offer only limited protection to the contents. They may be made of stout card, wood, metal, or plastic, and some are, prior to opening, hermetically sealed. When a handle is fitted, liners are usually reloadable, and they are then defined as carriers.

Outer An outer pack is the smallest size that is of use logistically, and is usually made of small-sized packs to give an overall weight that is man-portable, but not tactically feasible for one man to carry. In this state they offer protection against damage and the weather and, hence, are robust. They are of wood, metal, or plastic and usually securely closed, needing for access, sealed lids to be cut, sealing wires to be broken and nails or screws to be removed. It is common practice to make up an outer from two or more liners or carriers.

Outers, or any other packages, can be united on pallets or banded into large loads for storage and transportation, but in this form can be considered as freight and not as packages peculiar to ammunition.

Wrapper A wrapper is the most rudimentary pack for ammunition and consists of a piece of paper, which may be tied with paper, string or tape, enclosing a quantity of ammunition. It offers little constraint on the contents, and may include a separate dividing paper inside to separate individual rounds.

DEFINITIONS OF LINKING COMPONENTS

Belt A belt is a link system uniting ammunition in a long chain to provide a supply of rounds acceptable to the gun-loading system. They are flexible in at least one plane, some in only one, and the ultimate inflexible type is the now obsolete rigid feed strip. Belts are essential for the effectiveness of an automatic gun. Belts are divided into two types: continuous or strippless belts which remain intact without their complement of cartridges, and stripping or disintegrating belts which fall to pieces once individual rounds are

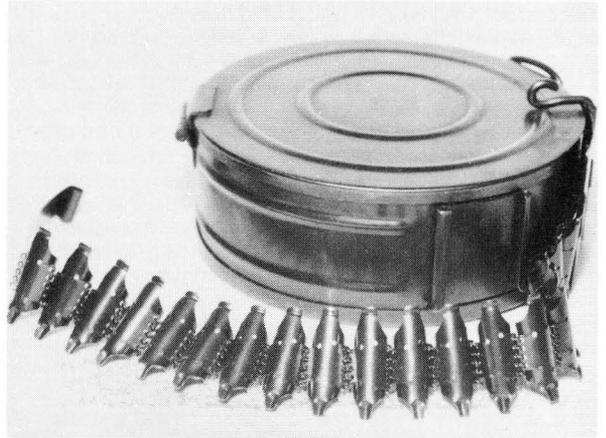


Right: British and American carriers.

Packages



1



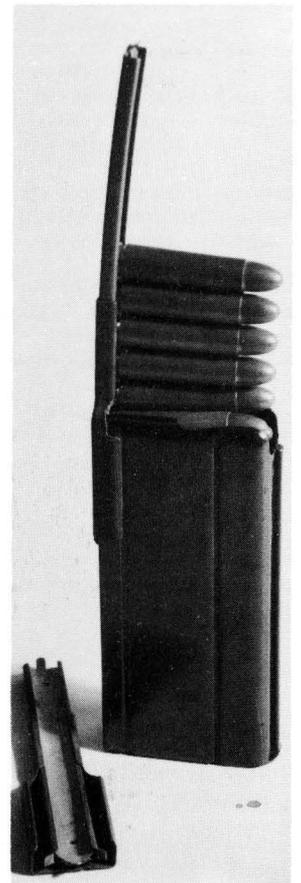
2



3



4



5

removed. Belts can be made of fabric, fabric and metal or, as most now are, only metal links. Depending upon the system, cartridges are either pushed straight out of the belt or are first withdrawn rearwards from the belt and then fed forwards into the chamber.

Other belt types One type which doesn't fall neatly into any usual category is that in which a belt is housed within a magazine. In this type of system it is the belt which is the essential component, but it is conveniently carried in a magazine style of container. The 'magazine' can be detached from the gun, but contains no functional parts to assist feeding and therefore can be replaced by any container or be absent completely.

Charger This is a small metal component which may contain up to a magazine's worth of cartridges, and which may be used to charge a magazine, in position on the gun or separately. Commonly they contain five rounds and serve, as much as anything, to provide a useful single unit from which individual rounds can be stripped to fill a magazine, round by round. Although chargers are refillable they are expendable and are not, unlike a clip, necessary for the functioning of the feed system.

Clip A clip is a small metal component containing a magazine's worth of ammunition, which is loaded as a complete unit and becomes an integral part of the magazine feed system. Weapons in which the ammunition is clip-fed are significantly less effective if the clip is missing.

Magazine A magazine is a container, integral with or attached to a weapon, in which rounds for immediate use are housed. It is invariably refillable; nowadays usually by hand, but in the past some types were helped by a special loading tool and others could only be fully filled with a special tool. Magazines, whether integral or separate, are usually spring-operated, but some large capacity types have a clockwork mechanism.

OTHER DEFINITIONS

Offshore contract An American term understood to mean contracts to manufacture ammunition, outside the continental U.S.A., but to American domestic specifications. This serves two purposes: first, foreign governments can be given the opportunity to utilize capacity and earn foreign exchange and, second, it enables the United States to place contracts with friendly nations in an educational setting, to familiarize foreign plants with the American product and to show the United States that the capability for production exists. A form of insurance against a day when large quantities may be needed rapidly.



Opposite page:

1. A British 50-round plastic, open 'carton'. It is refillable, but in transit must be carried within another container.
2. An ammunition belt and pseudo magazine for 7.62mm x 39 RPD machine-guns and similar designs.
3. German 50-round carton with internal plastic tray.
4. A modern rifle charger. This example is the 10-round 7.62mm x 39 charger for use with SKS carbines or the equivalent.
5. A box magazine for U.S. M.1 Carbine. The magazine has been partially filled from a unique American charger which is fitted to the magazine by a sliding metal component. This system does away with the separate fitting otherwise necessary, unless the magazine is charged while on the weapon.

Top right: A typical cardboard ammunition carton.

Right: The complete pack; this example from Finland comprises a 1,200-round wooden outer pack, and two 600-round waxed cardboard carriers, each containing 20 cartons of thirty rounds capacity.



Packages

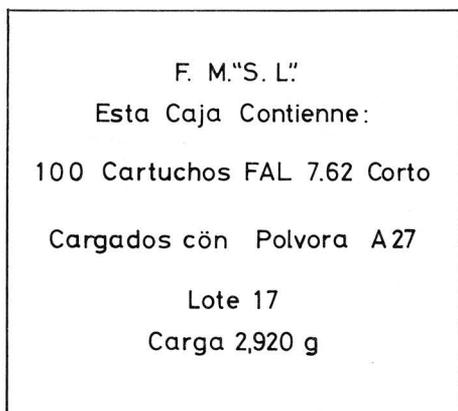
PACKAGING AND MARKINGS BY COUNTRY

Argentina

In addition to indigenous production, Argentina has relied upon contract production since the war, particularly for ammunition larger than rifle calibres.

Cartons are standard for rifle and pistol calibre packaging, both for home production and contract supplies. Unpartitioned cartons hold 15 rounds of rifle ammunition and are marked to give details of calibre, nomenclature, year of manufacture and Lot number. The charge weight is sometimes shown on the carton. A coloured stripe, corresponding to the bullet tip colour code, appears on the lid of Argentinian-made ammunition boxes. A similar stripe is marked on the lid of the wooden outer boxes.

A glossary of ammunition terms can be found in the section covering Spain.



A diagrammatic example of an Argentinian 7.62mm x 51 NATO (Corto) 100-round carton label.

Austria

Packaging

Austrian packages for domestic use follow the common theme of cartons filling larger boxes. Austrian-made ammunition is frequently found for external contracts and is then packed according to the wishes of the customer, but usually follows the accepted standards. Rifle ammunition, 7.62mm x 51 NATO, is packed in 20-round cartons of loose



20 CARTRIDGES
cal 7,62 mm x 51
BALL

HIRTENBERGER PATRONENFABRIK
A-2552 HIRTENBERG, AUSTRIA

A diagrammatic example of a label of Austrian contract for Denmark.

cartridges; with 36 cartons packed into a 720-round outer wood containers.

Marking

Contract ammunition for foreign customers does not follow any particular theme, and commonly shows the manufacturer's name and monogram, which does not appear in full on Austrian domestic ammunition cartons.

Domestic ammunition is strictly military in style of markings, and details are shown in abbreviated form. Cartons are marked with the maker's initials, manufacturing date and Lot number, quantity and cartridge type. Although not always appearing on cartons, the weapon abbreviation is usually

HP	62	LOS Nr 33/
20		
7,62 mm L-Patronen /StG 58		

HP	71	LOS Nr. 4 /
20		
7,62 mm SSch-Patr 70		

ÖJP	1961	/
20		7,62 mm
S Patronen / GM 1		

Diagrammatic examples of Austrian carton labels: *top*, 7.62mm x 51 plastic blank; *centre*, 7.62mm x 51 sniper ball; *bottom*, 7.62mm x 63 ball (Cal. 30/60).

HP	63	LosNr 48/
720		7,62mm
StG S-Patronen		58
1305-0-050-0020	22 Kg 0,022 m	11

HP	63	LosNr 25/
720		7,62mm
StG L-Patronen		58
1305-0-050 0030	21,5 Kg 0,022 m	11

Examples of outer container labels for Austrian ammunition: *top*, 7.62mm x 51 ball; *bottom*, 7.62mm x 51 blank.

marked on labels for outer containers (i.e. StG 58). Outer containers bear a label showing similar details to those on cartons, but have a yellow vertical band for ball ammunition, a yellow band bordered at each edge by a red band for tracer, and, in common with other European nations, a blue vertical band is shown on blank ammunition labels. The stock code number for the ammunition (e.g. 1305-0-050-0020) is shown on the outer container as is the weight and volume data.

Abbreviations and wording is usually in German. A glossary is given in the section covering Germany (West). The significant exception is the use of Knallpatrone for blank, instead of the more common Platzpatrone.

Belgium

The ammunition production of Belgium is complicated by the huge commercial enterprise of FN which has probably supplied more ammunition to more different nations than any other single manufacturer. Obviously the majority of domestic military ammunition is provided by FN, but the products of that one factory are so often seen that Belgium's own system tends to be obscured.

Packaging

7.62mm x 51 NATO and 9mm ammunition are typically packed in cartons and accepted into service in both the full military style packs and in the FN trade or commercial packs, the latter probably being absorbed in training stocks with a relatively fast turnover rate. Hinged steel carriers, similar to those used by the U.K. and U.S.A. are to be found, as are thin steel, galvanized inners fitted into wood outers.

Marking

Belgian domestic military ammunition can be readily

15 Patronen
Kal 7,9 mm S
op houders
FN 1950

50
PATRONEN LO S SE
KARABIJN .30
(CARTS, BLANK, CARBINE, CAL. .30)
FN-55 LOT 2

A diagrammatic example of an FN, but not Belgian, military label.

identified from the labels which detail the contents in both the French and Flemish languages. These labels show quantity, calibre, cartridge type, the weapon for which the contents are intended, maker (invariably FN), powder and complete round Lot numbers and usually a contract or order reference number.

FN ammunition, made on contract, shows the nomenclature and detail required by the customer and frequently has the same information shown in English when the nomenclature follows the unique 'reversed' description used by the U.K. (Carts, Blank, 7.62mm). An example of this is shown below, on a label made for a Dutch contract, with the nomenclature in the 'U.K. equivalent'.

POUDRE	BUSKRUIT
COOPAL LOT 3 1953	
20	
Cartouches	
Patronen	
.45	
POUR MITRAILLETTE	
VOOR MITRAILLEURKARABIJN	
F.N. LOT 3 b / 51	
Cde Best	
S.A.A. Ap34/1/172	

POUDRE	BUSKRUIT
COOPAL LOT 7 1950	
20	
CART. Cal Patr Kal	
.303 C.T.N.	
Pour F M BREN	
Voor M G BREN	
FN 1950	
Lot 4 a / 50	
Cde A1 AP3/50/36 Best	

Two diagrammatic examples of Belgian labels: left, for .45in ACP; right, for .303in ball.

Bulgaria

Now aligned with the Soviet bloc, Bulgarian small arms ammunition matches Soviet ammunition in both calibres and packaging systems. The layout of markings and package style can be seen by reference to the section covering U.S.S.R. Currently, the factory code '10' is the best evidence of Bulgarian origin, and this will be found only on the galvanized steel inners and wooden outer packages. See under U.S.S.R. for marking layout.

Canada

There are two categories of Canadian manufacture, characterized by the period during which Canada used weapons and ammunition similar to those of the U.K., followed by a period when practice follows that used generally by NATO members.

Packaging

For the immediate post-war period, packaging follows that used by the U.K., and cartons or bandoliers were packed into sealed steel inners, individually packed into plywood carriers, two of which pack into a steel outer.

The NATO period is similar to the patterns adopted throughout that alliance, ammunition being packed in cartons in sealed, hinged metal carriers, belted or in chargers

Packages

as necessary. One innovation worthy of note is the use of a plastic 50-round bandolier in which five tear-off compartments are fitted with a plastic carrying strap. These are expendable and cannot be refilled by the user, but have the advantage that the contents are fully protected from moisture until the individual rounds are removed.

Marking

The common practice is followed, with cartons being stamped to show quantity, calibre, cartridge type, maker's initials and the Lot number and year of manufacture. Canadian nomenclature is similar in principle to that of the U.S. system, but numbers are suffixed to the letter 'C' (for Canada) rather than the more common 'L'. Some early types of 7.62mm x 51 NATO ball ammunition was numbered as EX 2.

10 CARTRIDGES

7.62 MM BALL

CDN EX2

IN CLIPS

LOT 127

A diagrammatic example of a Canadian 7.62mm x 51 carton label. Note the use of 'in Clips' on the label. This is an American expression for which we prefer 'charger'.

Chile

Ammunition for use in Chile is produced in domestic factories and has been supplemented by contracts from Europe and North America. Cartons for rifle ammunition hold 15 rounds and are marked to show calibre, nomenclature, manufacturer, Lot number and year of manufacture. If applicable, the labels are marked with a coloured stripe corresponding to the bullet tip colour. In some instances the emblem of the factory is stamped on the carton. Typical examples of labels of pistol and rifle ammunition are shown below.

A glossary of terms related to ammunition can be found in the section covering Spain.

FABRICAS y MAEST del EJERCITO

24 Cartuchos para pistola Steyr
Calibre 9 m/m (Sin cargadores)

Pólvora Rottweil
Fabricacion

Chilean 9mm Steyr Auto Pistol label.

China, People's Republic of

Packaging

Generally speaking, Chinese packaging follows the practice



15
CARTUCHOS
7,62 mm.

NATO

SOBRE
CARGADORES
PARA ARMAS

de Repetición

LOTE N °	FECHA MES AÑO

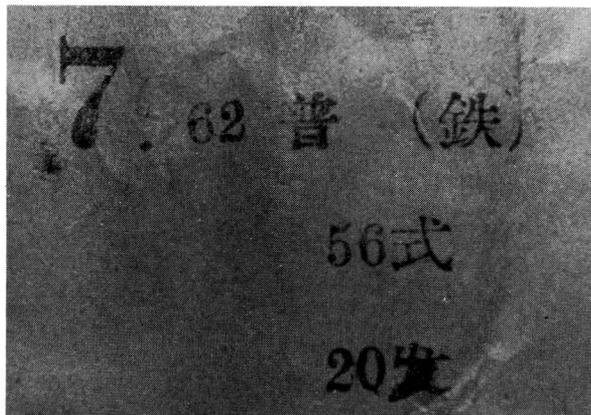
Chilean labels on a package for 7.62mm x 51 proof ammunition.

of U.S.S.R. but, as in so many examples, China is allowed idiosyncratic lapses. The main aspect of difference is the widespread absence of small cardboard cartons, and universal use of paper wrappers for both 7.62mm x 54R and 7.62mm x 39. Each wrapper contains 10 or 20 cartridges separated one from another by a zigzag strip of paper, the whole being sometimes string tied. While this style of packing represents that which will give least protection, it is feasible to achieve the desired measure of protection from the outer pack. Bigger packages in use by China are similar to those used by the Soviet bloc, sealed metal inners with a tear-off lid and the wooden outers normally containing two inners.

Marking

Package markings for large logistic containers are marked in the format common to all nations using ammunition based on Soviet designs. Western (Arabic) numerals are used in place of the Chinese characters which are used for all other information. Wrappers do not always have a stripe corresponding to the bullet tip colour, but both inner and outer packages are normally marked with a coloured band or bands to identify the bullet loading. It is not practicable to give a detailed glossary of Chinese terms used on ammunition packages, but some Chinese numerals are shown on page 127.

Chinese 20-round wrapper.



Wrappers however, the equivalent of cartons, are usually marked to show calibre, cartridge type and model, case material, propellant and manufacturers' details. No common theme has been noted, but the printing on wrappers is in black or red on brown paper.

7.62 普 (鉄) 7.62 金罎 (金罎)
 56 式 53 式
 20 発 30 発

7.62mm x 39 wrapper. Translation: 7.62mm x 54 wrapper. Translation:
 7.62 Ball (Steel) Type 56; 20 Quantity. 7.62 (Brass) Type 53; 30 Quantity.

56 式 7.62 鋼 (鋼) 720
 0103-68-61 鋼 45

7.62mm x 39 outer. Translation: Type 56 7.62 Ball (Steel/iron); 720
 0103-68-61; Propellant data; Lot, Factory, Year.

7.62 鋼 (鋼) 15-31
 880 鋼 X-54

7.62mm x 54 wood outer. Translation: 7.62 Light (Brass); 15-31; Lot
 and Factory; X-54; Month and Year.

Type	Rounds	How held	Bulk packing	Total
7.62mm x 25	70 per carton	18 cartons in metal inner	2 inners in wood outer	2,520
7.62mm x 54R	10 per paper wrapper	44 wrappers in sealed metal inner	2 inners in wood outer	880
7.62mm x 39	20 per paper wrapper	36 wrappers in sealed metal inner	2 inners in wood outer	1,440
—	2 x 10 in charger per wrapper	—	55 wrappers in wood outer	170
12.7mm x 108	loose rounds in metal	—	2 inners in wood outer	170
14.5mm x 114	42/47 loose rounds in metal inner	—	2 inners in wood outer	84/94

Czechoslovakia

Chronologically, Czech ammunition calibres have been based on German, Czech and Russian designs and the influence shows in both packages and marking.

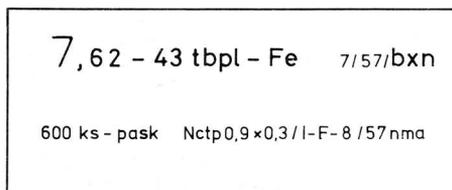
Packaging

The 'German era' (7.92 and 9mm) covers the period from the end of the Second World War to the time in about 1947 when Czech designs made an appearance. Rifle calibre cartons are typically German in size, shape and the number of

contents, whereas the cartons for 9mm are uniquely Czech, being related to the 40-round magazine capacity of the submachine-guns.

In the early 1950s, the Czechs introduced their own 7.62mm x 45 cartridge, packed in the typically German 15-round carton. 7.62mm x 54 ammunition made during this period is packed in flat 20-round cartons, each carton usually fitted with a card internal divider or zigzag paper strip to separate each cartridge. Throughout both periods, the 7.62mm x 25 (Tokarev) cartridge was in use for sub-machine-guns and pistols, again packed in a 40-round carton matching the capacity of the 9mm pack.

Finally and currently, the 'Soviet' era finds Czech ammunition following Soviet practice in packaging and in marking. 7.62mm x 39 M.43 ammunition, however, has been packed in flat 20-round packs, each carton containing two 10-round chargers for use with the modified Vz 52/57 carbine, or for export and suitable for use with SKS carbines. Current packaging for this ammunition is based on the Soviet-pattern 20-round carton, cartons packed into steel, sealed inners, two inners to a wooden outer.



A diagrammatic layout of Czech markings on a 600-round sealed box.

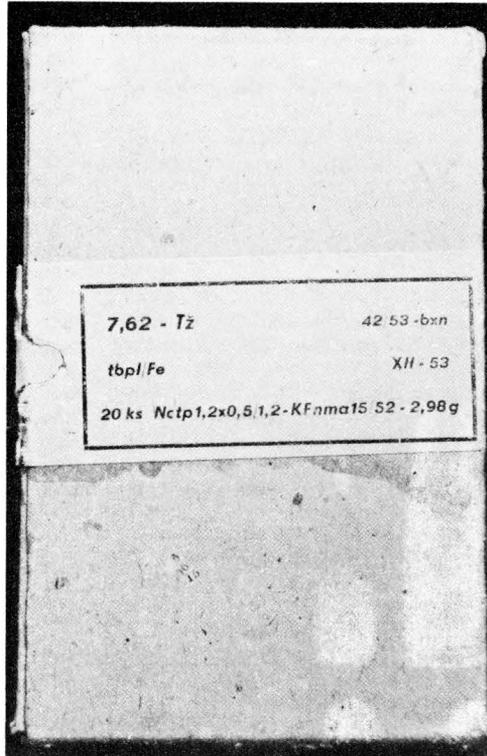
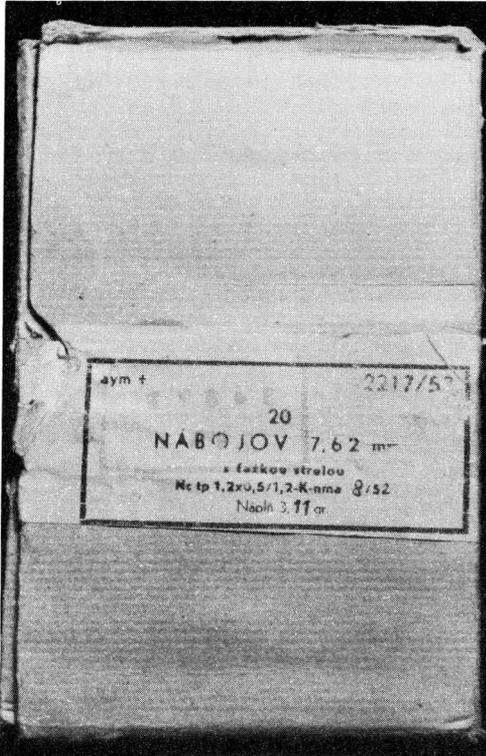
Marking

The early post-war period probably followed wartime styles, but changed in layout within a year or so. Typical markings show quantity, calibre, type, manufacturer's details, propellant detail, including abbreviation for propellant type, grain dimensions and charge weight per round (following German practice exactly).

At this stage, it is of interest to note that two languages, quite similar in appearance, are in use in Czechoslovakia; the official Czechoslovakian and Slovak. The use of the second language is largely confined to the geographic area of Slovakia wherein exists a spirit of 'being different', no doubt aided by the widespread use of another tongue. Many words are so similar that, without any real understanding of either language, they can be recognized as being related (e.g. naboju and nabojuv). On the labels that appear in the 1950s, those from the factory using the code 'aym' are always in Slovak and those from the factory 'bxn' are always in the official Czech. This difference is, in all probability, accounted for by the two factories being located in the two parts of modern Czechoslovakia.

During the period when their own designs were pre-dominant, two types of label were used, those in abbreviated form and those in complete words. The same format is

Packages



Typical Czech labels from 20-round boxes. *Left*, 7.62mm Tokarev; *right*, 7.62mm x 45 M.52.

Opposite page: Czech carton in pale green paper. There are no markings except for an inspector's stamp and a green diagonal bar to signify tracer contents.

followed for 7.62mm × 54 labels and for 7.62mm × 45, even to the extent of using green printing on tracer labels (to match the bullet tip colour). Ball ammunition labels are printed in black, but those for heavy ball do not use yellow printing, which might follow if the system were universally employed. Labels of this period show calibre, type, Lot and year of production, bullet envelope and case material, charge weight, type, grain dimensions, propellant maker's code with the batch number and year. On 'bxn' labels, type and model tend to be in abbreviated form (7.62 — Tz) and on 'aym' labels in a more complete form (7.62mm s tazkou strelou).

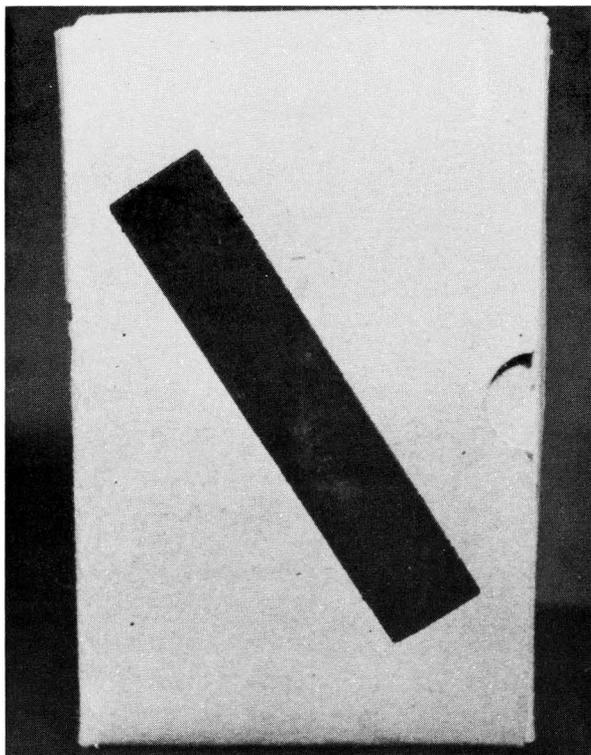
From the 1960s, there appears to be a continuing tendency to reduce the amount of information on labels. Cartons in a peculiar green cardboard are not usually marked at all and may be for export only. These are used for both 7.62mm × 39 and for 7.62mm × 54, and if containing tracer a diagonal band is added. Otherwise the only other marks noted are an inspector's number or inspection mark, but these are not invariably found. Markings on the outer packages follow the Soviet pattern, but with different codes and, of course, using the Roman instead of the Cyrillic alphabet.

Some surplus Czech ammunition has been sold on the open market in the West, and labels have been seen with an

overstamp 'Prebeleno I'. This has been interpreted by some as meaning armour-piercing; in fact it indicates nothing more interesting than 'Repacked'. A glossary of Czech terms is given below, but no attempt has been made to list all the alternative word differences, and endings which change when adjectives are used to qualify nouns of different genders. In most cases the words are so similar in any form that they can be interpreted from the information given (e.g. těžkou and tazkou both mean heavy).

Glossary of terms and abbreviations used on Czechoslovakian ammunition containers and labels

	Cervene	red
Cv	cvicný	blank
Fe	ocel	steel
	ocelovym	steel
	jadro, jadrom	core
Kr	Karabinã	carbine
ks	kus	piece, each
		(quantity contained)
nab	nãboj, nãboj	cartridge
	niklovane	nickel-plated
ostr	õstrý	live
Pi	pistolový	pistol



pask	paskovaných pancer	in chargers armour
nepask	nepaskovanych poniklovena, ponklovany	not in chargers nickel-plated
Rd	reducovany	reduced (practice)
s		with
S, Sv	svitici	tracer
Tbpl	strela, strelou	bullet
Tz	těžkou, tazkou	tombak plated (GMCS)
TzSv	těžkou svitici	heavy
Vz	Vzor	heavy tracer
Za	Zastrelny	model, pattern
Zn	Zanérovací	ranging (cartridge)
Z	zapaľny	ranging (registering)
Zb	Zbrojnice	incendiary
		arsenal

Denmark

Packaging

Rifle ammunition tends to be in rather larger capacity cartons than are used elsewhere, and 50 rounds is common for pistol as well as rifle calibre ammunition. Ammunition of both 7.62mm x 51 NATO and .30in-06 is similarly packed in the large 50-round cartons and then into sealed metal inners and

wooden outers, with belted ammunition in metal carriers.

Marking

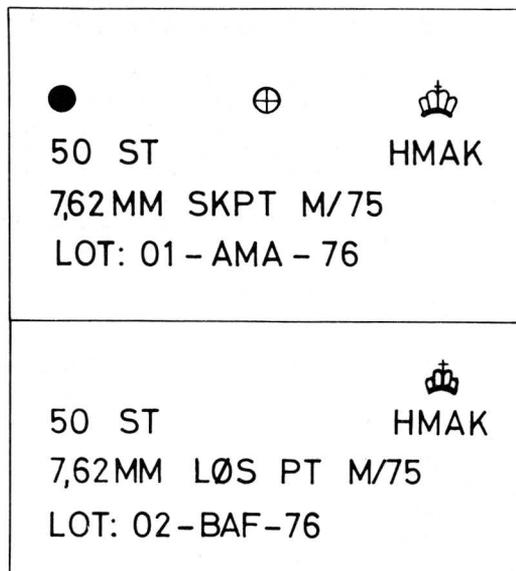
Carton labels are immediately recognizable by the presence of a Crown which appears either as a true replica or, as on current cartons, in diagrammatic form. Beneath the crown the words HAERENS MATERIALKOMMANDO are shown. On the modern label, this is abbreviated to HMAK.

Labels show quantity, cartridge type and model, ammunition Lot number with date detail, propellant Lot number including manufacturing data and propellant grain size. Loading or filling dates are sometimes followed by the word 'AMMUNITIONSARSENALLET'.

Plastic blank ammunition from Norway is marked with a typically Danish label, but will have the bottom marked with 'FREMSTILLET I NORGE' in place of 'Ammunitions-arsenallet'.

Current cartons are marked to conform with NATO practice and are much less elaborate than previous markings. The label on the 50-round NATO carton shows quantity, calibre, cartridge type and model, Lot number and the Danish crown emblem above 'HMAK'. All are in abbreviated form, and labels also show the standard NATO symbols as applicable.

Examples show the early elaborate type of label and the current counterparts. A blank label for 7.62mm x 51 made on contract for Italy has the Lot number details enclosed in boxes, and the quantity in the carton has been reduced from the normal 50 to 44, but which in other respects is similar to the Danish Blank label below.



Diagrammatic examples of current Danish ammunition labels: *top*, 7.62 x 51 NATO ball; *below*, 7.62 x 51 NATO blank.

Packages

An elaborate Danish label, from a carton of fifty 7.62mm x 63 (.30in-06) drill rounds.



Glossary of terms and abbreviations used on Danish ammunition containers

brand	brand eksercerpatron gevaer	incendiary drill or dummy round rifle
HMAK	Haerens Materialkommando hylster karabin krud løs patron lysspor projektil maskin gevaer messing	Army Material Command cartridge case carbine powder, propellant blank cartridge tracer bullet machine-gun brass
M/	Model panserbrydende patron patron bånd holder hylster laderamme	model or pattern AP round or cartridge ammunition belt charger or clip cartridge case
	parti pistole projektil	lot pistol bullet
SK	skarp	live, ball
SKPT	skarp patron	ball round
	stål	steel
ST	stuck	pieces (quantity)

Egypt

Packaging

Prior to alignment with the U.S.S.R., Egypt was equipped from a range of sources, and ammunition was procured both from abroad and from Egyptian-run plants. A typical pack from Egyptian factories is a fifty-round carton which, in the past, was used for .303in and is retained for use with 7.62mm × 54 cartridges.

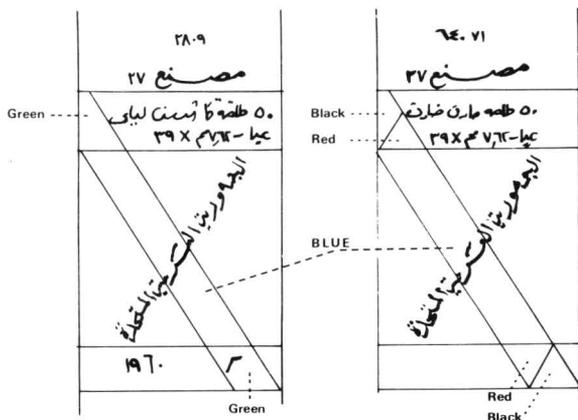
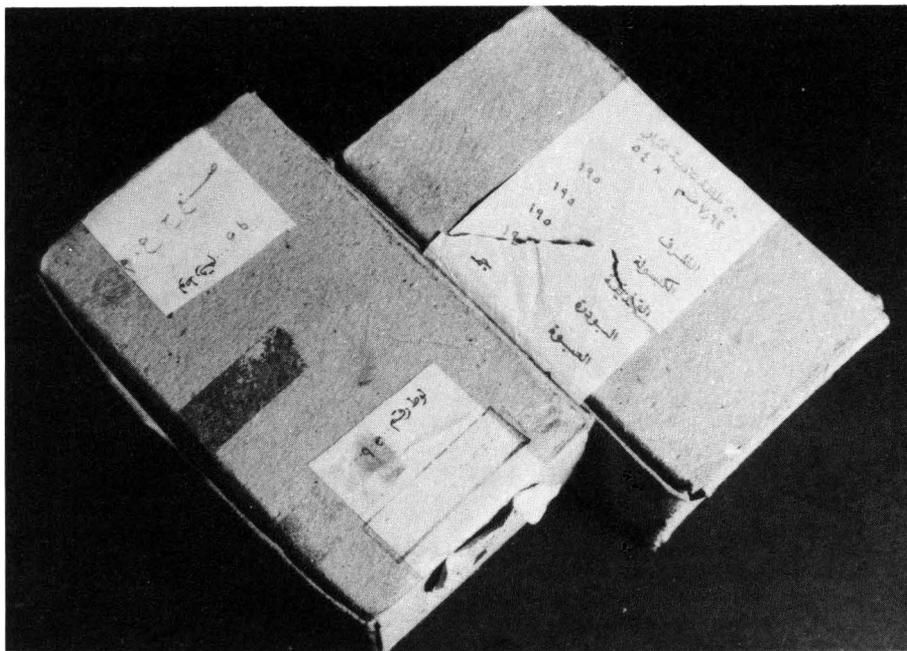
Unlike most countries which use Soviet-designed ammunition, Egypt does not follow Russian packaging or marking practice, and the 50-round capacity carton is also used for 7.62mm × 39 ammunition.

Cartons in all calibres are packed in sealed metal inners which are fitted into a hinged wooden outer container. Again, contrary to Soviet style, both 12.7mm × 108 and 14.5mm × 114 are packed into unique containers, the metal inners for which are labelled.

Some examples of Egyptian packaging are:

Type	Rounds	How held	Bulk packing	Total
7.62mm x 54	50 per carton	24 cartons in sealed metal inner	1 inner in hinged wood outer	1,200
7.62mm x 39	50 per carton	40 cartons in sealed metal inner	1 inner in hinged wooden outer	2,000
12.7mm x 108	100 per sealed metal inner	—	2 inners in wooden outer	200
14.5mm x 114	56 per sealed metal inner	—	3 inners in wooden outer	168
9mm x 19	36 per carton	—	—	—

Identical sized boxes: *left*, used and labelled for .303in; *right*, labelled for 7.62mm x 54.



Examples of markings used on cartons for 7.62mm x 39: *left*, 50 rounds 7.62mm x 39 tracer; *right*, 50 rounds 7.62mm x 39 API. (The Arabic alphabet and numerals which are used on Middle Eastern ammunition packaging are shown elsewhere.)

Marking

Egyptian cartons are sealed with labels which contain information concerning the contents and are marked with a distinctive diagonal bar of colour from which the contents may be identified. All words and numerals are in Arabic characters, and labels show quantity, cartridge type, and

factory number. Lot details of propellant, bullet, case and primer are sometimes shown on 7.62mm x 54 labels, but do not feature on modern 7.62mm x 39 cartons.

Labels are marked with a distinctive bar of colour which corresponds to the calibre:

- | | |
|--------------|------------------------------|
| 7.62mm x 54 | diagonal beige stripe |
| 7.62mm x 39 | diagonal blue stripe |
| 12.7mm x 108 | diagonal yellow stripe |
| 14.5mm x 114 | diagonal yellow stripe |
| 9mm x 19 | two horizontal beige stripes |

Each end of the diagonal bar, at the edges of the label, is formed into a triangle which is coloured to match the bullet tip colour or left plain in the case of ball ammunition. These triangles are themselves divided into two if necessary: for API or APIT ammunition, for example, when the colour code is Black/Red and Violet/Red respectively.

The Arabic alphabet and numerals used on Middle Eastern ammunition packaging are shown on page 127.

Finland

Packaging

Current Finnish ammunition is for both domestic military use and for export. Military ammunition is typically packed in cartons. 7.62mm x 39 comes in 30-round cartons which are themselves carried in stout cardboard, tape-handled carriers, heavily waxed for waterproofing. Two carriers are packed into a wooden outer which, incidentally, offers little protection against moisture.

Packages

Some earlier carton-packed 7.62mm × 39 ammunition was to be found in 50-round cartons, a box style that can be used for both domestic and foreign requirements, although the 30-round carton is more strictly the standard and, of course, the more logical size, being compatible with one rifle magazine.

Marking

Finnish military ammunition cartons and boxes are comprehensively labelled and marked. They show in abbreviated form the quantity, complete round data, maker's data for the charge including weight and details of all components. Labels are usually on neutral paper, but those for blank ammunition are on pale blue paper.

The layout is similar for all domestic military labels and frequently is headed by a code number for the ammunition. It is also usual to describe certain loadings by the code for the bullet (e.g. S 309 for the 7.62mm × 39 Ball round). A list of these bullet codes, which are used in Finnish nomenclature, and are sometimes found on box labels and other markings, is given below together with a glossary of terms and abbreviations.

D 166: Ball for the 7.62mm × 53 R.

L 301: Short-range hollow-nose ball for 7.62mm × 53 R.

D 278: Tracer for the 7.62mm × 53 R.

D 277: Armour-piercing for the 7.62mm × 53 R.

S 276: Incendiary for the 7.62mm × 53 R.

S 309: Ball for the 7.62mm × 39.

Vj 313: Tracer for the 7.62mm × 39.

Glossary of terms and abbreviations used on Finnish ammunition containers and labels

	alikantamapatruuna	short-range cartridge
	hylsy	cartridge case
kpl	kappale	quantity (each, piece)
kiv	kivääri	rifle
	kivaarigranaatin	rifle grenade
kk	konekivääri	self-loading rifle
kp	konepistooli	submachine-gun
	korkeapainepatruuna	high-pressure, proof
	kova, kovia	ball, live, etc. (literally hard)
	laatikko	box
	latausharjoitus patr.	loading practice cartridge
	ladattu, ladata	loading (charge)
	luoditon	without bullet
	luoti	bullet
	messing	brass
	muovinen (paukkupatruuna)	plastic (blank)
	nalli	primer
	paksuus	size, thickness, diameter
	panos	charge weight

ps	panssarinmurto	armour-piercing
p or patr	patruuna	cartridge, round
PAP or papp	paukku (patruuna)	blank (cartridge)
	peruspatruuna	primary cartridge
	pikakivääri	light machine-gun
pist	pistooli	pistol
pl		plastic
PUU	puuluotin (paukkupatr)	wooden bullet (blank)
	ruuti	charge
	ruutipano	charge weight
RKIV or RK	rynnäkökiväärin	assault rifle
s	sytytys (patruuna)	incendiary (cartridge)
vj	valojuuva (patruuna)	tracer (cartridge)
	uudelleen pakattu	repackaged
	uusittu	reconditioned

France

Packaging

Long established French influence, for example in Indo-China and Algeria, resulted in the retention of obsolete or obsolescent weapons for local militia forces and, of course, insured that French-made ammunition was supplied to fill the demand. 8mm Lebel ammunition was supplied in post-war style cartons as well as in pre-war style wrappers.

7.5mm MAS ammunition can be found packed in 15- or 20-round cartons or in bandoliers, either being packed in a sealed metal inner, one or more of which are further packed into a wooden outer.

French-made American calibre ammunition was packed into cartons as shown:

.30in Carbine (7.62mm × 33) in 50-round carton.

.30in-06 (7.62mm × 63) in U.S.-style 20-round flat packs or two 8-round clips (for Garand) in carton.

.45in (11.43mm) in 25-round cartons.

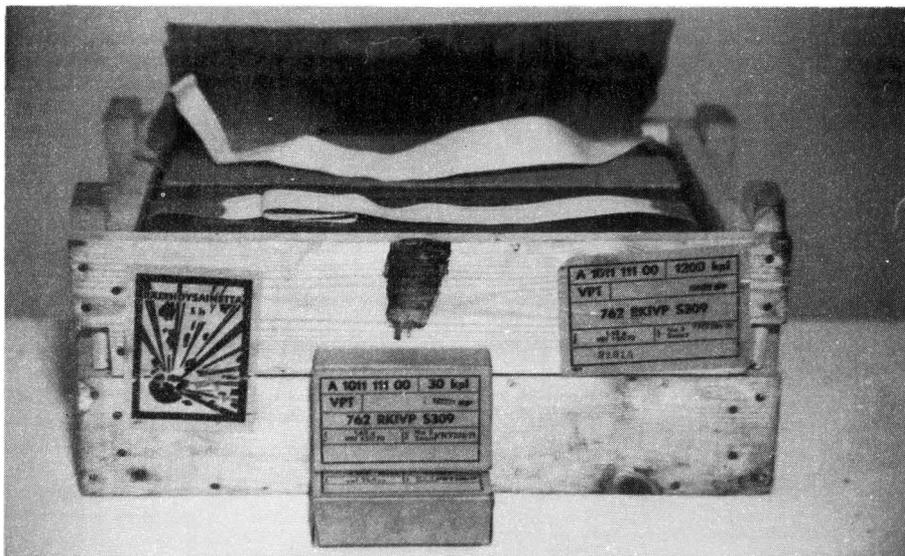
Marking

French package labels are quite detailed and show not only calibre, type and quantity, but maker, date and Lot number for the complete round, the bullet, the case, the primer and the charge for which the individual cartridge load is recorded.

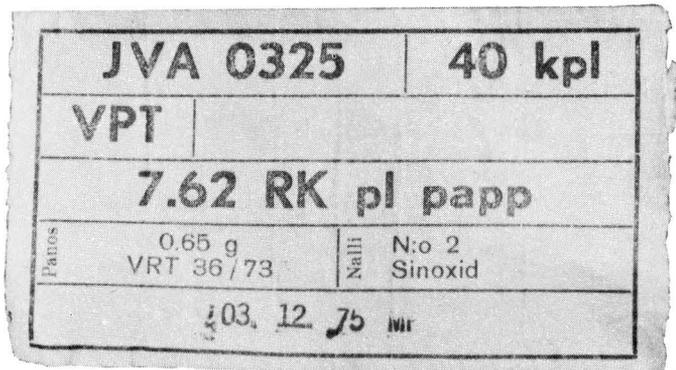
When the bullet tip is colour coded, the equivalent colour or colours are shown on the label as bars of colour. No colour is used for ball, and an all-white label is sometimes used for blank. Some types of bulletted blanks, which have a coloured bullet, have on their label the corresponding colour instead of the white label or band that otherwise mark blank ammunition cartons. Another feature of French labels is the use of symbols to indicate how the contents are packed (i.e. loose rounds, filled chargers or belted).

External markings are not so complete as those on inners and are usually limited to quantity, calibre and type, with only the complete round Lot number. Details of individual

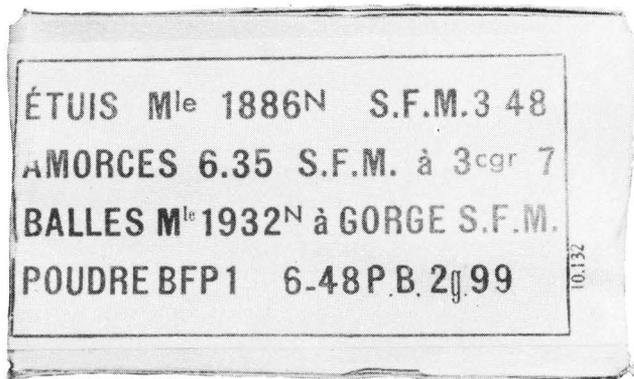
A Finnish 1,200-round container with two carriers in place and two cartons shown in front of the box.



Finnish 7.62mm x 39 label for plastic blank.



Post-war 8mm Lebel ammunition in a carton instead of the old-style wrapper.



Packages

components are not shown, but when applicable, bullet colour codes are marked on the edge of the label. Volumetric and weight measurements are added to the outer package.



A 25-round carton of .45in ACP (11.43mm).

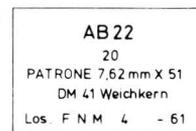
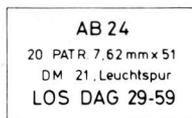


A carton of modern French 7.5mm MAS grenade launching cartridges. In this example, two vertical colour bands at the edges of the label match the colour of the crimp closure.

Glossary of terms and abbreviations used on French ammunition containers and labels

	à blanc	blank
	acier	steel
Am	amorce	primer, cap
Bal	balle	bullet
	bande	belt
	boîte cloisonnée	divided box
Cart	cartouche	cartridge
	charge	(propellant) charge weight
	chargeur	clip
C	courte	short
Et	étui	cartridge case
F	fusil	rifle
FM	fusil mitrailleur	light machine-gun
FR	fusil à répétition	bolt-action rifle
I	incendiaire	incendiary
IT	incendiaire traçante	incendiary tracer
	inerte	inert
L	longue	long
	(sur) lame chargeur	strip chargers
	laiton	brass
	lourde	heavy
M, Mle	modèle	model
M MIT	mitrailleuse	machine-gun
	matière plastique	plastic material
N	NATO	
O	ordinaire	ball
OTAN	Organisation du Traité de l'Atlantique du nord	NATO
P	perforant	AP
PA	pistolet automatique	self-loading pistol
Pdr	poudre	propellant
PI	perforante incendiaire	API

PM	pistolet mitrailleur portée réduite	submachine-gun short-range
R	réglage	observing
RT	réglage traçante	spotter tracer
T	traçante tir réduite	tracer short-range practice



Diagrammatic examples of current West German NATO carton labels: *left*, 7.62mm x 51 NATO tracer DM21 made by DAG; *right*, 7.62mm x 51 NATO ball DM41 made by FNM, Portugal, on contract for Bundeswehr.

Germany, Democratic Republic of

Packaging

Immediately after the Second World War, such ammunition production as was undertaken, was essentially in accordance with the established practice of the war years. 7.9mm x 57 ammunition was packed into cartons of exactly similar pattern to those used by wartime Germany, and for some time surplus cartons and outer packages were utilized.

By the mid 1950s, East Germany had adopted the Soviet system for weapon calibres, packages and package markings. Packs closely copy the Soviet patterns but, of course, have German language markings or abbreviations.

Marking

Cartons are marked with quantity, calibre, cartridge type and a date only, but larger packages show details of manufacturing and propellant data. The layout for the larger packs follows the Soviet pattern. Abbreviations and glossary of all generations of German ammunition are to be found in the section covering Germany (West).

77	20 Stück				
20 Stück	43	M43	M43	M43	M
Platzpatrone					
M-43 - 7,62mm					
	757	757	757	7	
	72	72	72	72	
gebördelt					

Diagrammatic examples of labels on modern East German ammunition: *left*, 20-round 7.62mm x 39 blank; *right*, 20-round 7.62mm x 39 ball.

Germany, Federal Republic of

Immediate ammunition needs after the Second World War were for police use and later for the border guard formations which developed prior to the re-arming and re-establishment of the Bundeswehr. Initially, requirements were met from domestic production largely supported by contracts usually from within Europe. Military production followed the formation of the Bundeswehr, but again with large contract support.

Packaging

Early supplies were mainly of pistol calibres, and these were delivered in commercial packs from domestic producers, military packages tending to be limited to external supply.

During the period in which Germany was a member of NATO, packaging followed the normal pattern, with

ammunition being carton-packed and with sealed metal inners or carriers. When not in belted form, current German rifle ammunition is packed into 20-round cartons, ten of which fill an inner. Plastic blank ammunition is invariably packed in cartons of 50, the number found in cartons of pistol ammunition from military and commercial sources.

Marking

Package labels are a far cry from the comprehensive ones used before 1945, and currently show quantity, calibre and type of cartridge with a DM number, ammunition Lot number and maker's code. A blue vertical band indicates blank ammunition.

Glossary of terms and abbreviations used on German and Swiss ammunition containers and labels

Gesch	Geschoss	bullet
G or Gew	Gewehr	rifle
	kurz	short
L	Laderstreifen	chargers
L'spur	Leuchtspur	tracer
	Los	lot
Manpatr	Manöverpatrone	blank cartridge
MG	Maschinengewehr	machine-gun
MK	Maschinenkannone	machine-cannon (usually over 2cm)
MP or M Pist	Maschinenpistole	submachine-gun
Patr	Patrone	cartridge
	Plastik	plastic
	Platzpatrone	blank cartridge
	Pulver	powder
oL	ohne Laderstreifen	without chargers
	Weichkern	soft core
	Vollgeschoss	full (mantel) bullet
	Zundhutchchen	primer or cap

Hungary

It is probable that Hungary produced domestic calibre ammunition for militia troops, immediately after the war, prior to the wholesale adoption of Soviet weapon and ammunition designs. These early types will have followed pre-war and wartime practice for packaging and labelling.

After the adoption of the Soviet calibres, packaging and marking follows that for the U.S.S.R., except, of course, that the Roman alphabet is used and not the Cyrillic. Broadly speaking, the typical Soviet markings are transposed into Hungarian equivalents, the change including the factory code applicable to Hungary. The Russian quantity (Л/Т)

Packages

appears on Hungarian boxes as the abbreviation DB 'darab'! (from).

Type	Rounds	How held	Bulk packing	Total
7.62mm x 39	20 per carton	33 cartons in sealed metal inner	2 inners in wood outer	1,320

Glossary of terms and abbreviations used on Hungarian ammunition containers and labels

Db	darab	piece, each (quantity)
For	forgopisztoly	revolver
	gyalogsagítóltény	ball round
	karabély	carbine
	löser	ammunition
	löserlada	ammunition box
	nyomjelző lövedék	tracer
	panceltörő	armour-piercing
	pisztoly	pistol
	puska	rifle
	súly	weight
	töltény	cartridge, round
	urmeret	calibre
	vaktöltény	blank cartridge

India

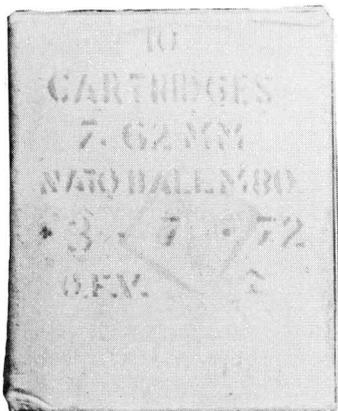
Packaging

Until about 1959, Indian ammunition was packed along the lines of the general practice brought about by India's association with the U.K. Since that date, Indian ammunition has been packed in a style similar to that used by NATO-affiliated countries.

Current ammunition for 7.62mm x 51 rifles is carton packed or belted, as applicable. Cartons contain 10 rounds and are further packed into metal carriers or metal outers.

Marking

Indian containers are usually marked in the English language, and the style is derived from existing practices modified to conform to NATO styles. Cartons show quantity, nomenclature and maker, with filling date in stencilled markings.



Indian 7.62mm x 51 NATO ball carton for M.80.

The example shown below is typical, and it is of interest to note the retention of the old Indian (Dominion status) era mark of the arrow over I ($\frac{\uparrow}{I}$).

Israel

Packaging

Israel produces both domestic military ammunition and 'commercial', which tend to share common cartons and packs. Rifle and pistol calibre ammunition is carton-packed the cartons in turn being packed in metal inners and outers. Examples of Israeli packaging are shown below:

Type	Rounds	How held	Bulk packing	Total
7.62mm x 51 NATO	4 5-round chargers per carton	50 cartons in metal carrier	—	1,000
—	4 5-round chargers	25 cartons in metal carrier	2 carriers in wood outer	500
9mm x 19	25 per carton	20 cartons in metal carrier or 40 cartons in wood outer	—	1,000

Marking

For domestic use, labels are in Hebrew characters except for quantity, calibre and dates for which Western numerals are used. No Hebrew characters are found on export ammunition labels, and nomenclature is in English. Typical labels show quantity, calibre and cartridge type, maker and production Lot numbers and dates, together with a statement of how the cartridges are packed (i.e. in chargers). Domestic labels are printed on beige adhesive paper, their commercial counterparts are on white paper.

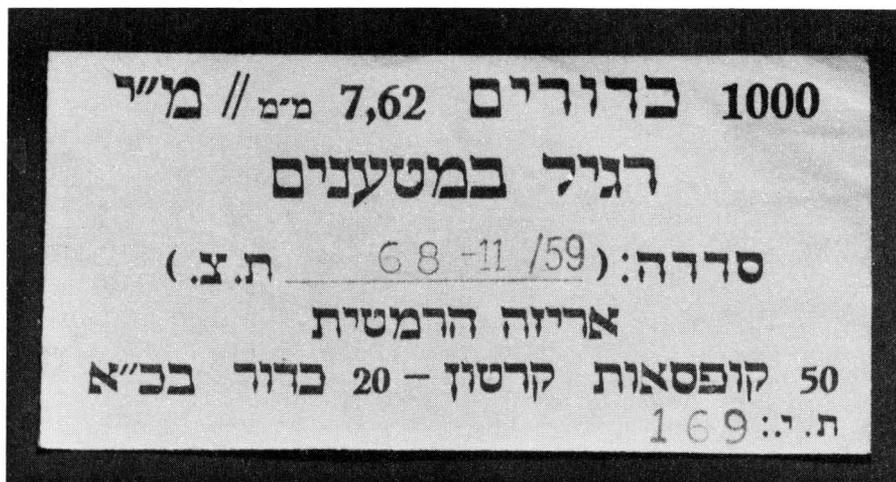


Translation: Made in Israel / / mm 7.62 CARTRIDGES 20 WITH LOADINGS ORDINARY or in chargers NORMAL

(ZT 27-4/59)
CARTRIDGES 5

CHARGER

LOT
IN EACH



Translation:
 Made in Israel // mm 7.62
 CARTRIDGES 1,000
 WITH LOADINGS ORDINARY or
 in chargers NORMAL
 (ZT 68-11/59) LOT
 HERMETIC PACKING
 PACKING IN CARTRIDGE 20 —
 CARTON BOXES 50 CHARGERS
 169 YT



Translation:
 Made in Israel // mm 7.62
 CARTRIDGES 20
 ORDINARY or
 NORMAL
 (ZT 55-68) LOT

Italy

Packaging

Italian cartons have been typically stout cardboard and this material still prevails. Cartons are currently packed into sealed metal liners within a wooden outer.

Rifle calibre ammunition, 7.62mm × 51 and 7.62mm × 63, usually appears in flat 20-round cartons in which the contents are either loose or in 5-round chargers. After the war, however, there was a need to produce 7.62mm × 51 ammunition in 8-round chargers of the Garand type for a

Packages

converted rifle used temporarily by Italy. Some examples of Italian packaging are:

.30in Carbine (7.62mm × 33) in 50-round cartons.

.30in-06 (7.62mm × 63) in 20-round cartons.

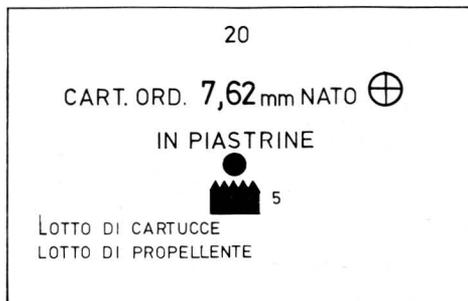
7.62mm × 51 NATO in 20- or 16-round cartons.

9mm × 19 in 20- and 50-round cartons.

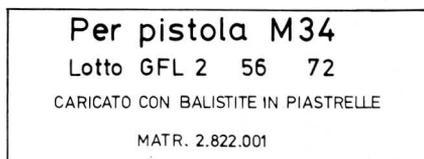
9mm × 17 (9mm Corto) in 7-round cartons.

Marking

Markings are in abbreviated form, and the quantity contained is preceded by 'N°', which is misleading in that it might be thought to refer to a number allocated to a particular cartridge. Markings on all containers show quantity, calibre type, model, complete round and propellant Lot data including maker's monogram and date. NATO symbols are used on Italian labels, where applicable.



A diagrammatic example of an Italian 7.62mm x 51 ball carton.



A diagrammatic example of an Italian 9mm Corto carton.

Glossary of terms and abbreviations used on Italian ammunition containers and labels

	arme	weapon
	automatico	self-loading/automatic
	bossolo	cartridge case
Cal	calibro	calibre
	carabina	carbine (short rifle)
Cart	cartuccia, cartucce	cartridge
	corta gittata	short
Fuc	fucile	rifle
Inc.	incendaria	incendiary
	lotto	lot
M. MOD	modello	model, pattern
Mitr	mitraglia	machine-gun
	moschetto	carbine (machine)
	in nastri	in belt
Ord	ordinaria	ball
Pall	pallottolo, pallottola	bullet

Perf	perforante per in piastri pistola propellente salve sciolte tombacco	AP (piercing) for in chargers pistol propellant blank (cartridge) loose (rounds) tombak (gilding metal)
Tracc	tracciante tipo	tracer tracer type

Japan

After the Second World War, re-armament was primarily represented by a change to U.S. weapons and later to those of U.S. origin in NATO calibre.

Packaging follows the U.S. styles very closely, but whereas the calibre and type or model of cartridge can be easily read from the cartons because of the use of Western designations, the remaining information is difficult to assimilate without a knowledge of written oriental languages. It is further complicated because the elaborate script is difficult to relate to a printed glossary or to compare in stencilled format.



A Japanese 7.62mm x 51 carton.

The above example shows the label on a typical U.S.-pattern flat 20-round carton for the M 80 cartridge. Some characters, particularly those relating to numerals, are widely used and their general make-up can be followed without a knowledge of Japanese or Chinese.

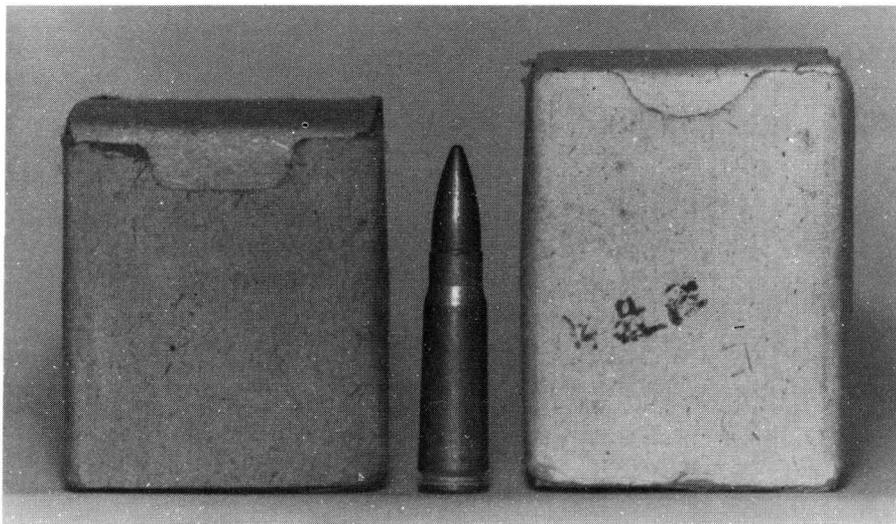
Korea, North

Packaging

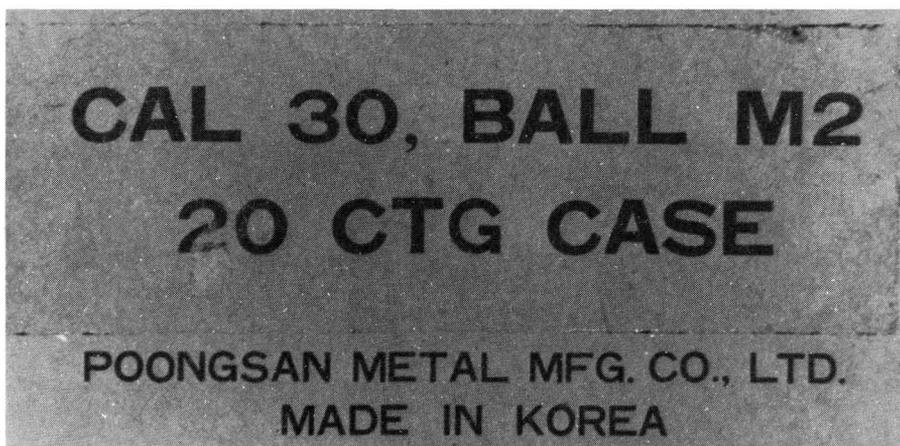
Follows closely the Soviet style including the use of cartons, metal inners, which give protection from moisture, two of which are fitted into a wooden outer.

Marking

The format for North Korean ammunition labels is consistent with others using Soviet-designed weapons. (See under U.S.S.R. for general layout characteristics, page 123.)



Cartons for 7.62mm x 39: *left*, from U.S.S.R.; *right*, from North Korea.



A South Korean label from a 20-round flat carton containing Cal 30 Ball M.2.

Korea, South

Packaging

Most common packs are replicas of those used by American forces throughout the world.

Marking

Again, the markings, nomenclature and identification are usually copies of the American item, and it is only the factory name on labels that differentiates the South Korean products.

NATO/CENTO

The following symbols were devised for marking ammunition containers within NATO, the use of these symbols being extended much later for use in CENTO.

- 

Ammunition which fulfils NATO standardization agreements (now also CENTO).
- 

Ball ammunition.
- 

Blank ammunition.
- 

Inter-operability symbol.
- 

Tracer ammunition.
- 

Armour-piercing ammunition.
- 

Ammunition in links.
- 

Ammunition in clips or chargers. The number of rounds per clip is added on the right.

5

Packages

Netherlands

Packaging

Dutch ammunition, when made by Artillerie Inrichtingen, was generally for domestic use and should not be confused with production from NWM which, although manufacturing for internal use, made a considerable proportion of its output for contracts and utilized commercial packaging.

Dutch rifle and pistol ammunition is carton-packed in a conventional way, cartons or belted ammunition being packed into metal carriers, liners and wooden outers. For a number of years after 1945, the Netherlands used American weapons and ammunition (.30in-06 and .30in Carbine) before widespread adoption of NATO calibres. Some examples of Dutch packaging are:

.30in Carbine (7.62mm × 33) in 30-round cartons.

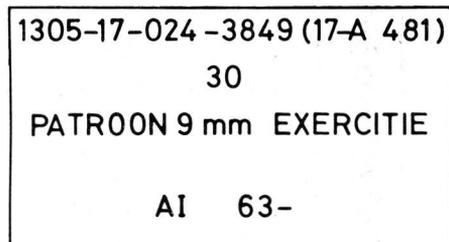
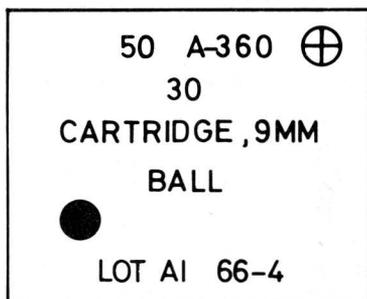
.30in-06 (7.62mm × 63) in 20-round cartons.

7.62mm × 51 NATO in 20-round cartons.

9mm in 30-round cartons.

Marking

Dutch labels are brief and usually in an abbreviated form showing quantity, calibre, cartridge type and model number, Lot number with maker's initials and the last two digits of the year.

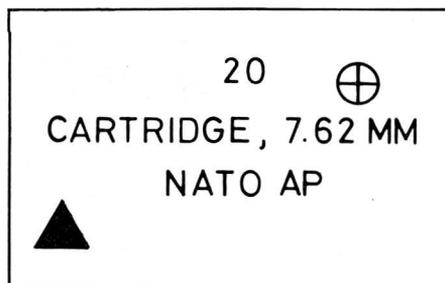


Diagrammatic examples of Dutch labels: *upper*, 30-round carton of 9mm ball; *lower*, 30-round carton of 9mm drill.

Glossary of terms and abbreviations used on Dutch ammunition containers and labels

br	brand	incendiary
kar	karabijn	rifle, carbine
ls	losse	blank (cartridge)

lsp	lichtspoor	tracer
ms	mitrailleur	machine-gun
pbr	messing	brass
ptn	pantserbrand	API
pts	patroon	cartridge
rb	pantser	AP
sch	rookzwak buskrut	smokeless propellant
	scherpe	live, ball
	wapen	weapon, arm
zb	zwart buskrut	black powder



A diagrammatic example of a Dutch label from a 20-round carton of 7.62mm x 51 NATO armour-piercing cartridges.

Norway

Packaging

The immediate post-war period saw the retention of 7.92mm ammunition, followed by use of American calibres, followed, in turn, by use of NATO ammunition types. Typically, 7.92mm ammunition was packed in the classic 15-round carton for rifle use, or in 50-round cartons for training ammunition. Outers contained 1,000, 1,980 or 3,000 rounds, this latter type containing two 1,500-round inners.

Cartons following American style were used for .50in calibre cartridges and held 10 rounds, some of which were made for use outside Norway and were supplied within Europe. .30in-06 (7.62mm × 63) ammunition was packed in cartons of the same capacity (15-rounds) as had been formerly used, and .45in ACP was packed in 14-round cartons, with 42 cartons in an outer box of 588 capacity. Typical NATO-type boxes are currently used holding 20 rounds of 7.62mm, but with a small 16-round box for 9mm.

Marking

Early markings are extensive for 7.62mm calibre and are fully detailed. During the period when American calibres were used, markings followed the U.S. pattern, but with nomenclature being in Norwegian. Some export contracts used American nomenclature fully.

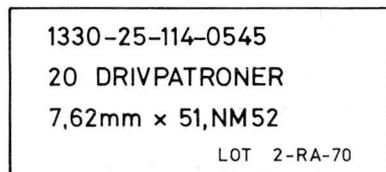
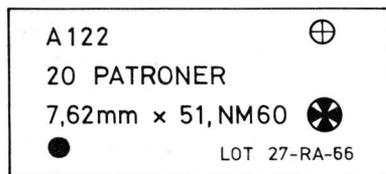
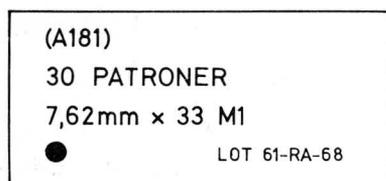
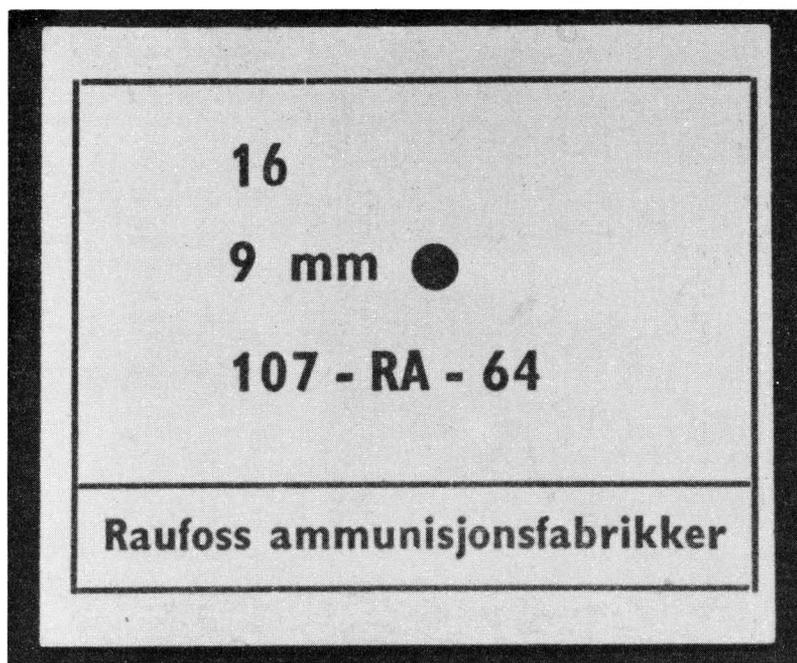
NATO calibre cartons are typically in NATO abbreviated form showing quantity, calibre and cartridge type, makers' initials, lot number and date of filling.

Contract ammunition follows that same style but nomenclature is used applicable to the customer i.e. DM numbers for F.R.G. and NM number for The Netherlands.

Right: Raufoss Browning label, in Norwegian, for Norwegian use (U.S. nomenclature).



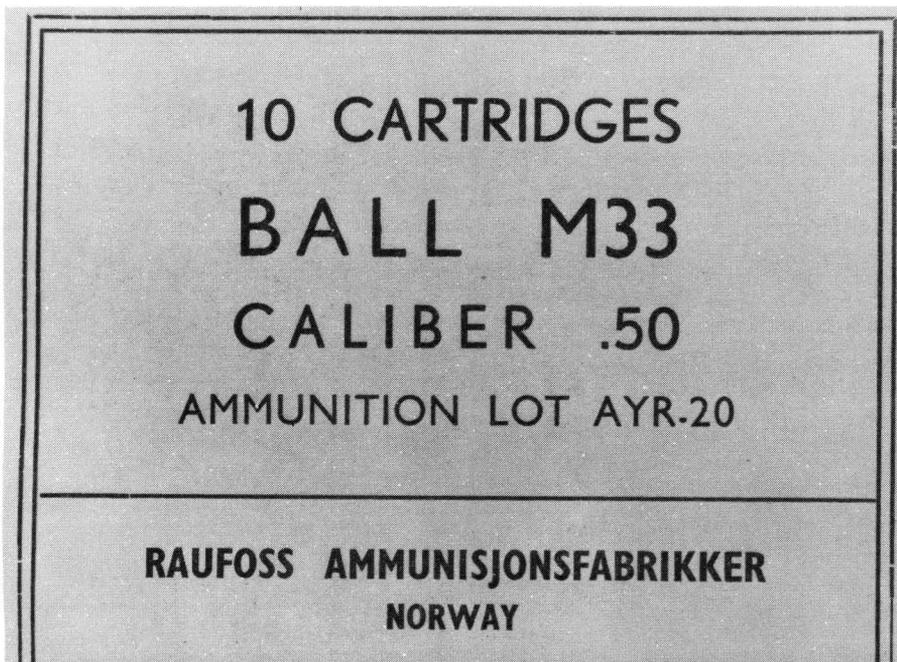
Below: A Norwegian 9mm carton.



Diagrammatic examples of Norwegian labels: *top*, for .30 carbine carton (7.62 x 33); *middle*, for 7.62 NATO ball; *bottom*, for 7.62 NATO grenade propelling cartridges.



Raufoss Browning label, in English with U.S. nomenclature, but with Spanish 'subtitles' for contract.



Raufoss Browning label, in English with full U.S. nomenclature and made as U.S. offshore contract.

Glossary of terms used on Norwegian ammunition containers and labels

ammunisjon	ammunition
brann	incendiary (cartridge)
geraer	rifle
hylse	cartridge case
handrapen	small arms
krutt	propellant
kule	bullet
lette	light (weight)
løs patron	blank cartridge
maskingeraer	automatic rifle, LMG
mitraljøse	machine-gun (heavy)
panserprosjektil	AP bullet
patron	cartridge
pipe	barrel
prosjektil	projectile, bullet
skarpe	live, ball
sporlys	tracer
tung, tunge	heavy (weight)

Poland

Packaging

Although there was probably a period when German ammunition was manufactured and in use, this was short-lived and superseded by Polish alignment with the Soviet Union. Packaging follows the Soviet style exactly, but the terms are in Polish not Russian.

Marking

Polish marking characteristics are the same as those for the Soviet Union and the layout is also the same. Polish labels can be quickly recognized by the use of 'WZ' for model, and the letter 'Ł' which is unique to the Polish language.

Glossary of terms and abbreviations used on Polish ammunition containers and labels

c	ciężki	heavy (weight)
	karabin	carbine/rifle
	karabin maszynowy	machine-gun
	łekki	light (weight)
	łuska	case (cartridge)
łm	łuska mosiężna	brass case
łst	łuska stalowa	steel case
	naboj	cartridge (round)
	naboj cwiczebny	dummy cartridge
	naboj ostry	live (ball) cartridge
	naboj ślępy	blank cartridge
	partia	lot
	pistolet	pistol
	posic, posickow	bullet
	przeciwpancerny	AP
	rdzen	core
st	stal, stali, stalowy,	steel
	strzelba, strzelecka	rifle
	sztuk	pieces (quantity)
wz	wzok	model, pattern

WUFL

zapalajacy	small arms propellant type
zaptonnik	incendiary
zwyklym	primer
	(ordinary) ball

Portugal

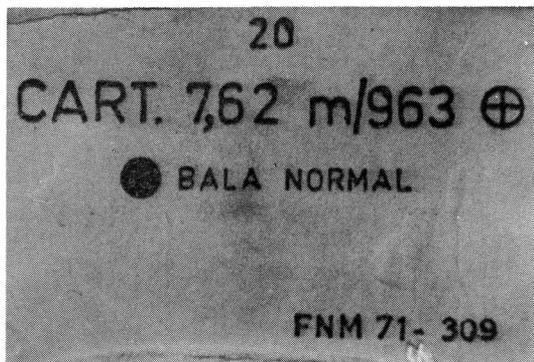
Packaging

The output of Portugal's ammunition production exceeds the internal requirements and contract ammunition is widely distributed throughout the world. Prominent in production are the NATO calibres, 7.62mm, 5.56mm and 9mm, which are typically packed as follows:

Type	Rounds	How held	Bulk packing	Total
5.56mm x 45	20 per carton (with or without charger)	50 cartons in airtight metal inner	1 inner in wood outer	1,000
7.62mm x 51	20 per carton	50 cartons in airtight metal inner	1 inner in wood outer	1,000
Tracer	10 per carton	100 cartons in airtight metal inner	1 inner in wood outer	1,000
9mm x 19	50 per carton	50 cartons in airtight metal inner	1 inner in wood outer	2,500

Marking

The commonly made calibres are typically marked on cartons to show quantity, cartridge type, Model number if applicable, calibre, maker's monogram, Lot and year of production.

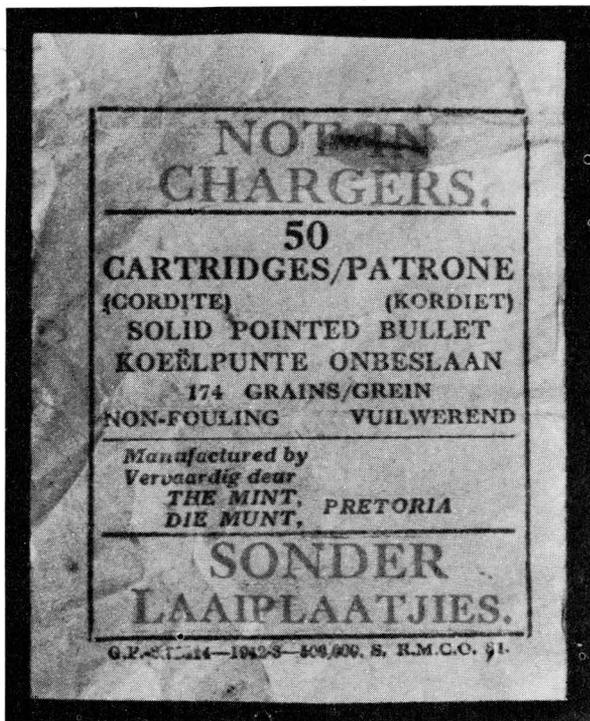


A Portuguese 20-round 7.62mm x 51 carton label.

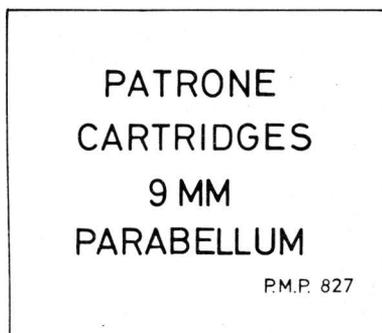
South Africa

Packaging

During the immediate post-war period, South African packaging followed the U.K.'s basic style for .303in ammunition. A later period of non-alignment saw packaging (exclusively for domestic use) which did not invariably follow the previous styles that had been adopted by the NATO



A South African bilingual label from a 50-round .303 package.



A diagrammatic example of the current South African label pattern.

alliance. Currently, rifle and pistol ammunition are packed in cardboard cartons.

Marking

Immediate post-war production was labelled in accordance with U.K. practice for .303in calibre, giving quantity, calibre and cartridge nomenclature together with the monogram or maker's symbol. Filling dates were usually stamped on the wrapper or carton. Domestic production, not following the U.K. style, gave rise to self-translating bilingual labels in

English and Afrikaans, the corresponding language details being alongside or above one another.

Current practice is for a white label with black printing showing the quantity and contents in abbreviated nomenclature, together with the manufacturer and, again, a stamped date of filling to indicate the work date of the ammunition.

Spain

Packaging

Rifle and pistol cartridges are invariably packed in a cardboard carton, the number in contents varying according to calibre. Cartons are packed into black painted, sealed metal inners which are fitted into wooden outer containers. 7.92mm x 57 ammunition has been packed in the German-capacity 15-round carton, but 7.62mm x 51 NATO, for example, is usually packed in 20-round cartons. Pistol calibre ammunition is packed in 25-round cartons.

Marking

Cartons show calibre, quantity, manufacturer, cartridge type and Lot number with the year of production. NATO-calibre ammunition has abbreviated nomenclature on the cartons and larger containers. When a particular round has a coloured bullet tip, a band of the same colour is added to the carton or other containers, near the nomenclature.

(Please note that none of the abbreviations shown here are used on Spanish ammunition, but are applicable to Argentina and some other Latin American countries.)

Glossary of terms used on Spanish ammunition containers and labels

acero	steel
aerodinamica	boat-tailed, streamlined
bala	bullet
calibre	calibre
cartucho	cartridge
cartucho de ejercicio	drill, dummy cartridge
cartucho de guerra	ball cartridge
cartucho de instruccion	instructional cartridge
cartucho de salvas	blank cartridge
cilindrico conica	conical
corto	short
diametro	diameter
dulce	mild (steel)
dura	hard (steel)
ejercicio	practice
envuelta	envelope
E especial	special
EC Especial Concurso	special (heavy) match
ES Especial Sobrecargada	proof, high-pressure cartridge
F (Saluda o) Fogueo	blank
Incendiario	incendiary
iniciador de aguja	pinfire
lanza grenadas	grenade cartridge
laton	brass

	largo	long
	localizador	spotter
LP	Luminosa Perforante modelo	AP tracer model, pattern
N	Normal	ordinary (ball)
NC	Normal Concurso	ordinary match (i.e. not heavy)
	nucleo	core
	Percusion Anular	rimfire
	Percusion Central	centrefire
	Percusion Central (Iniciador interior)	centrefire (inside-primed)
P	Perforante	AP
	peso	
	pestanda	rimmed
	polvoro	powder
QI	Quimica Incendiaria	incendiary (chemical)
	ranura	rimless
	ranura y pestana	semi-rimless
	ranura y pestana corta	rebated rimless
	reforzado	belted
R	Reglaje	observation
	tipo	type
	trazador	tracer
TH	Trazante Humosa	smoke tracer
TL	Trazante Luminosa	tracer (luminous)
	vainas	cartridge case
	velocidad inicial	muzzle velocity

Packaging

Rifle and pistol calibre cartridges are packed in cardboard cartons, loose, in chargers, or in belted form, as appropriate, and these are then packed in metal, polythene or wooden outers, sometimes made up of inners and carriers. Some examples are given below:

Type	Rounds	How held	Bulk packing	Total
6.5mm (obsolescent)	2 x 5-round chargers per carton	108 cartons in wood outer	—	1,080
—	250-round belt in box	7 belt boxes in wood outer	—	1,750
—	250-round belt in box	4 belt boxes in carrier	—	1,000
8mm	250-round belt in box	7 belt boxes in wood outer	—	1,750
7.62mm x 51 NATO	4 x 5-round chargers per carton	—	—	—
9mm x 19	50 per carton	66 cartons in wood outer	—	3,300
—	6 x 6-round in chargers per carton	24 cartons in wood outer	—	864

Marking

Cartons, liners, carriers and outers are labelled with the abbreviated nomenclature of the contents. Outers are additionally marked with nomenclature and quantity details. On grey drab painted carriers and outers, stencilling is in yellow whereas on raw wood outers black is used.

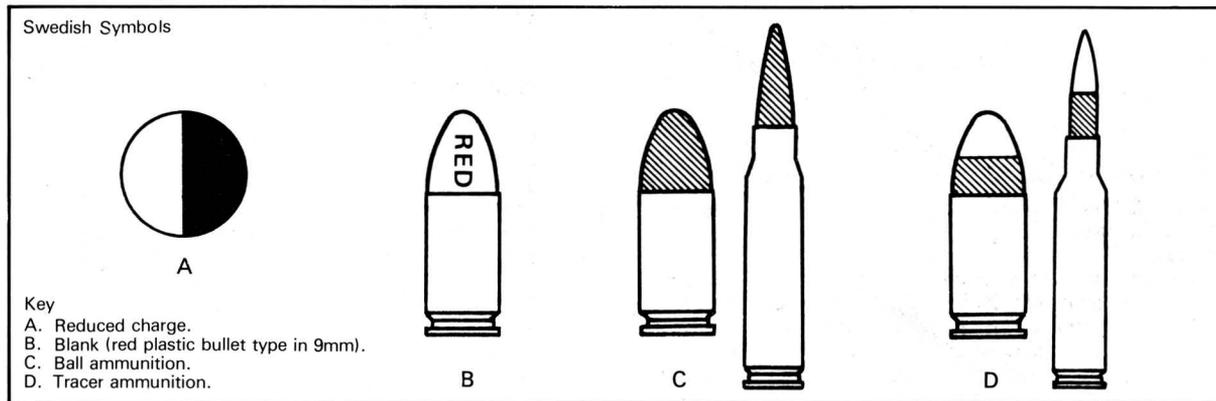
Nomenclature on labels consists of a set of abbreviations which includes calibre, cartridge type and Model number, if applicable. A diagrammatic symbol forms part of the marking, usually depicting the bullet shaded in some way. Examples of Swedish symbols are shown below.

9mm cartons are sometimes completely coloured for further identification: neutral for ball, blue for short-range and red for blank. These cartons contain 36 rounds in chargers and are of a unique shape. Lot number details are stamped on cartons as a series of letters and numbers, e.g. K070 6301 46-3.

Sweden

In addition to producing ammunition for domestic use, Swedish factories also fulfil export contracts, largely in support of small and heavier arms marketed under the name of Carl Gustav.

Exported ammunition generally is packaged according to Swedish practice, but may be differently packed depending on the wishes of the customer. Frequently, a compromise results in Swedish packaging accompanied by the customer's markings.



Packages

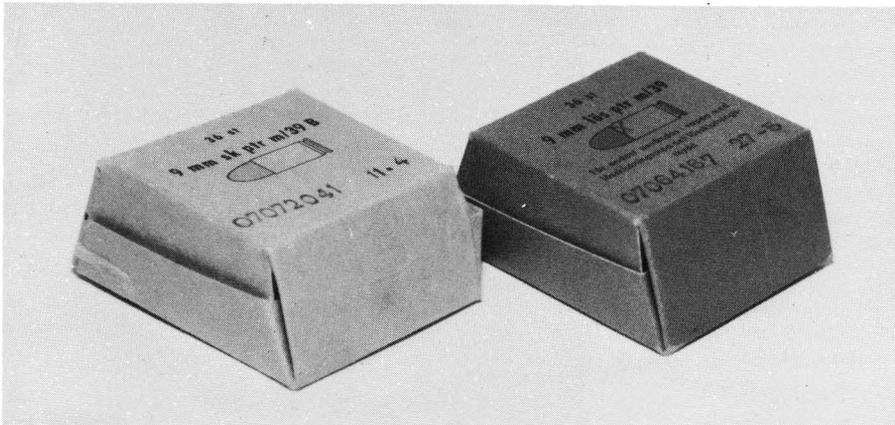
20 st
 9mm sk ptr m/67 slprj
 med
 avfyringspatron m/67

50 st
 9mm sk ptr m/68 slprj

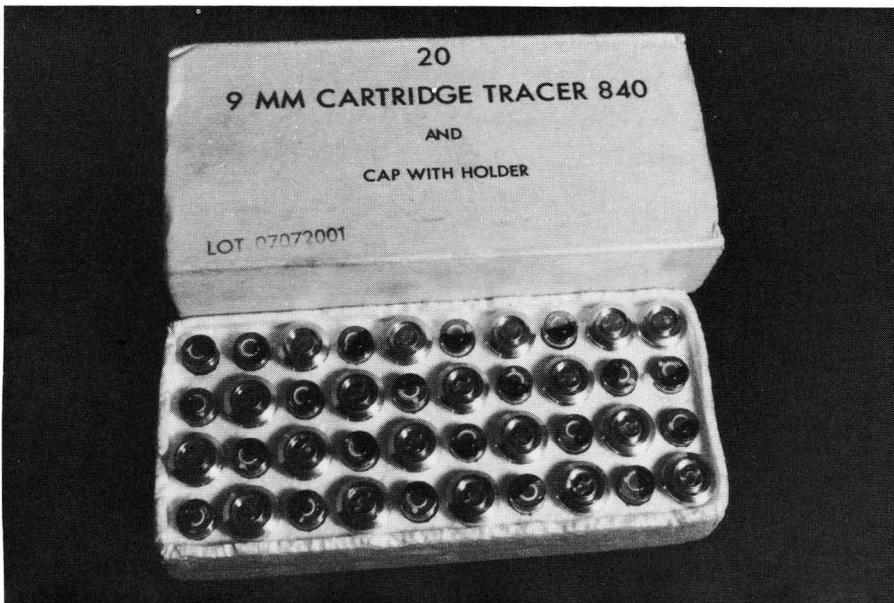


Endast för övningsvapen I
 070 69 202

Diagrammatic examples of 9mm sub-caliber tracer ammunition: *right*, yellow tipped tracer for use with the Miniman system; *left*, white tipped tracer for use with the Carl Gustav system.



The unique shape of Swedish packs for 9mm: *left*, the ball carton; *right*, blank.



A 20-round carton made for 9mm tracer sub-caliber ammunition for use with the 84mm Carl Gustav anti-tank weapon. Compare the label with the two diagrammatic examples shown above for similar cartons.

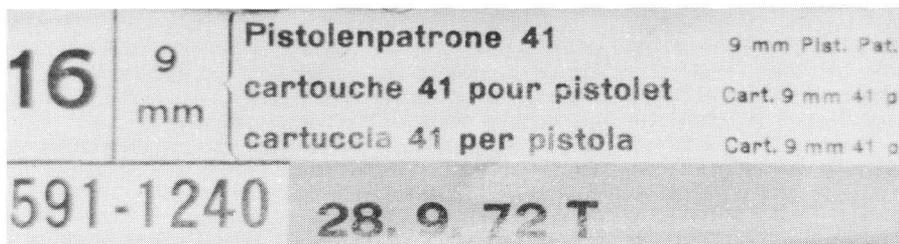
Switzerland

Packaging

Swiss ammunition is well packaged and methodically marked. Rifle, pistol and machine-gun ammunition is packed in cardboard cartons within stout cardboard carriers or wooden outers.

Marking

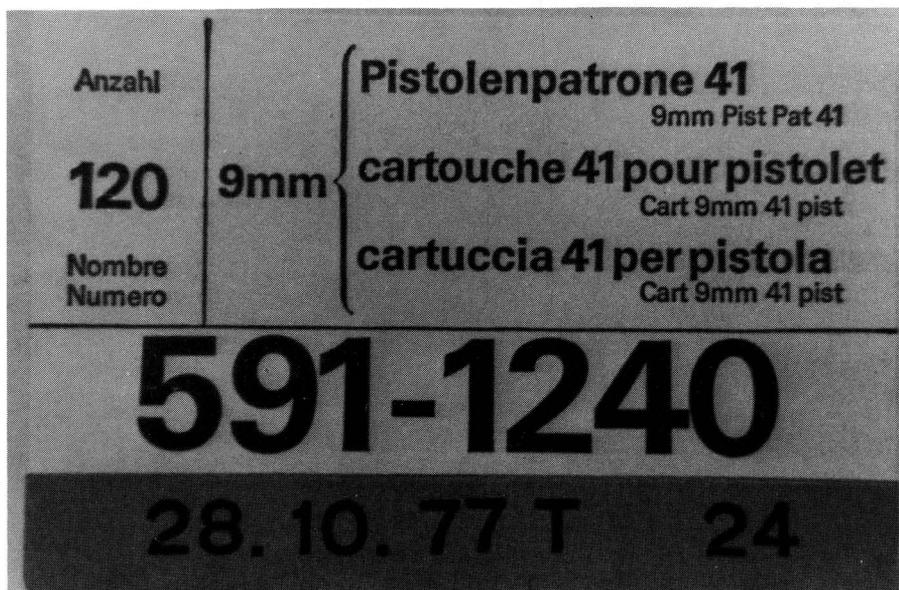
Labels are very similar for all sizes of package, differing only in the quantity contained. Details are often shown in the three national languages, German, French and Italian. The labels show nomenclature in full and in abbreviated form, together with a coded number for the cartridge type.



Trilingual Swiss 9mm carton without the national emblem and with the ammunition code number.



Swiss 9mm carton using only French and German showing also the Swiss national emblem.



An example of a Swiss trilingual label.

Packages

Swiss ammunition part numbers

(Part numbers, which sometimes appear on Swiss box labels, are separate serial numbers allocated to each cartridge type.)

7.5mm Ball cartridge M90/23	591-1092
7.5mm Ball M1911 (standard issue)	591-1100
7.5mm Ball M1911 (special for MG) M51	591-1102
7.5mm AP M1911	591-1104
7.5mm Tracer M1911	591-1108
7.5mm Anti-aircraft training tracer	591-1110
7.5mm Reduced trace anti-tank training	591-5072
7.5mm Tracer M.50, rimmed for training with anti-tank gun	591-5074
7.5mm Tracer M.57, rimmed for training with anti-tank gun	591-5075
7.5mm Cadet, reduced charge	591-5076
7.5mm Blank M.58, green plastic for Stgw 57 only	594-7020
7.5mm Blank, green wood bullet for LMG	594-7032
7.5mm Blank M.1911 and 51, long neck, brass case crimped	594-7036
7.5mm Cadet blank, crimped case	594-7038
7.5mm Drill round	595-8008
7.5mm Grenade-launching M44	591-1172
7.5mm Revolver ball	591-1208
7.5mm Revolver blank	591-7028
7.63mm Mauser	591-1212
7.65mm Browning	591-1220
7.65mm for Bergmann	591-1224
7.65mm Parabellum, for pistols	591-1232
7.65mm Parabellum, drill round	595-8012
9mm Parabellum	591-1240
9mm Parabellum drill	595-8016
5.6mm Ball, Model 1976 (not adopted)	591-0277

Syria

Packaging

Rifle calibre ammunition is packed into cardboard cartons of 50 rounds capacity, cartons are packed into airtight, sealed metal inners which are singly packed into hinged lid wooden outer packs. 7.62mm × 54 is found in 50-round cartons, 24 cartons in the sealed inner, itself packed in the wood outer, giving a total pack of 1,200 rounds.

Marking

Cartons are sealed with white labels and detail is shown in Arabic lettering. Similar details are stencilled in Arabic letters on the front of the wooden outer package.

Not shown in the plate below is the label, which extends to the rear of the carton and which in that example states:

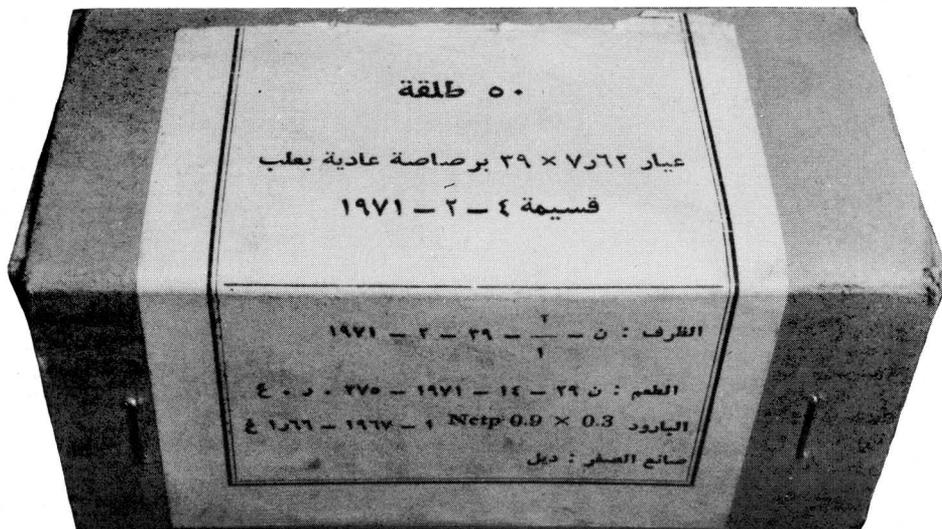
ARAB REPUBLIC OF SYRIA
DEFENCE INDUSTRIES
FACTORY 837

Perhaps the most interesting point to note from the Syrian carton label is the use of propellant nomenclature 'Nctp 0,9 × 0,3' which is the Czech abbreviation for their propellant and the same grain size for their 7.62mm × 39 ball ammunition. This is thought to be a good indication that Czechoslovakia provides at least the propellant for Syrian small arms ammunition.

Below: Syrian 50-round carton for 7.62mm x 39 ball ammunition.
Translation

	Top	50 CARTRIDGES
	Size	7.62 x 39 Ball Lead Core in Box
		4 - 2 - 1971
Front	Box:	N - 2 - 39 - 2 1971
		1
	Load:	N29 - 14 - 1971 - 375.R.G.
	Propellant:	Nctp 0.9 x 0.31 - 1967
	Manufacturer:	Deel (Phonetically)

1.66 gram



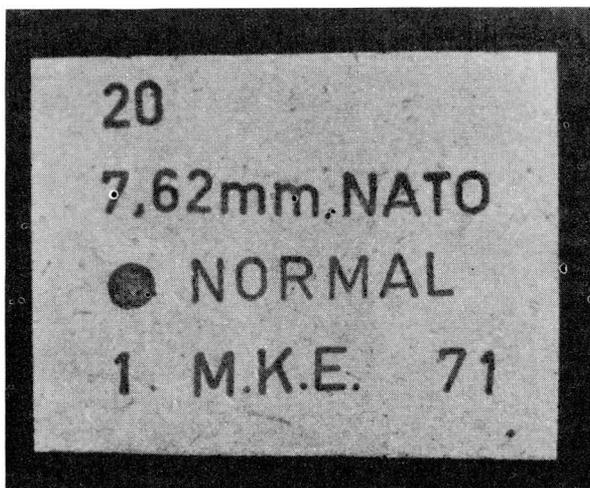
Turkey

Packaging

Turkey's ammunition is closely related to that of the U.S.A. and packaging follows in style. Considerable production from MKE is U.S. 'offshore contract' and has been exported within Europe for NATO use. Boxes are typical U.S. flat cartons containing 20 rounds of either .30in-06 (7.62mm x 63) or 7.62mm x 51 NATO. The 9mm short (.380in ACP) cartridge is packaged in 25-round cartons, obviously not related to any U.S.-style pack.

Marking

Following from the statements above, it is not surprising that markings on Turkish-made cartons are consistent with those of the U.S.A. for American and NATO calibres. Cartons for .30in-06, for example ('offshore contract'), differ from those of U.S. origin by makers' details only. NATO cartons show abbreviated nomenclature and NATO symbols.



Turkish 7.62mm NATO carton.

United Kingdom

Packaging

U.K. packaging styles can be divided into two main periods: that following the Second World War, when the .303in was the most important cartridge, and was widely complied with by other countries having Commonwealth links (for example Australia, Canada, New Zealand, India and South Africa), followed by the period of conformity to NATO patterns.

A high importance has always been placed on the life of small arms ammunition and the packaging is commensurate with that standard. Typically, ammunition is carton- or bandolier-packed and, of course, belted when applicable. Cartons and bandoliers are then packed into a watertight, sealed metal inner fitted with a soldered tear-off lid. These

metal inners fitted into plywood re-closable carriers, two of which were contained in a steel metal outer.

Cartons for rifle calibres (.303in and 7.92mm) held 32-35 rounds, each being fitted into its own separate compartment. Cartons for 9mm ammunition have remained constant and consist of a sliding tray pack.

Variations, to suit the requirements of different Services, consist of the use of the cardboard compartment giving a carton total of 32 rounds to be packed into the tray. These cartons are then fitted into the metal inners described above.

Following membership with NATO, packaging changed to conform to the practices generally in use within the alliance. Mainly the change was to the extensive use of sealed, hinged lid carriers into which carton, bandolier or belted ammunition is packed. These carriers are comparable to those used by the U.S.A. and are a reasonable tactical one-man load or usefully deployable alongside ground- or vehicle-mounted automatic weapons. Three carriers are currently in use:

H84 used for belted 7.62mm x 51 ammunition.

H83 used for carton- or bandolier-packed (comparable to 7.62mm x 51, belted .50in Browning (12.7mm x 99) ammunition. U.S. M2A1)

H82 used for .30in Browning (.30in-06) (comparable to belted ammunition. U.S. M19)

For transportation and storage, two H83 and four of either H82 or H84 can be fitted into a special 'outer' which consists of a top and bottom suitably supported and hinged. Some examples of British packaging are:

Type	Rounds	How held	Bulk packing	Total
7.62mm x 51 NATO	32 per carton	9 cartons in sealed liner in plywood carrier	2 carriers in steel outer	576
—	10 x 5-round chargers in bandolier	7 bandoliers in sealed liner in plywood carriers	2 carriers in steel outer	700
—	50 per carton	8 cartons in carrier (H83)	2 carriers in special outer	800
—	50 per plastic carton	8 cartons in carrier (H83)	—	—
—	200 per belt	1 belt in carrier (H82)	4 carriers in special outer	800
.50in Browning 9mm x 19	140 per belt	1 belt in sealed metal liner	1 inner in wood outer	140
—	50 per carton	25 cartons in sealed metal liner in plywood carrier or 24 cartons in steel carrier (H83)	2 carriers in steel outer	2,400/ 2,500
—	35 per carton	25 cartons in sealed metal liner in plywood carrier	2 carriers in steel outer	1,750

Marking

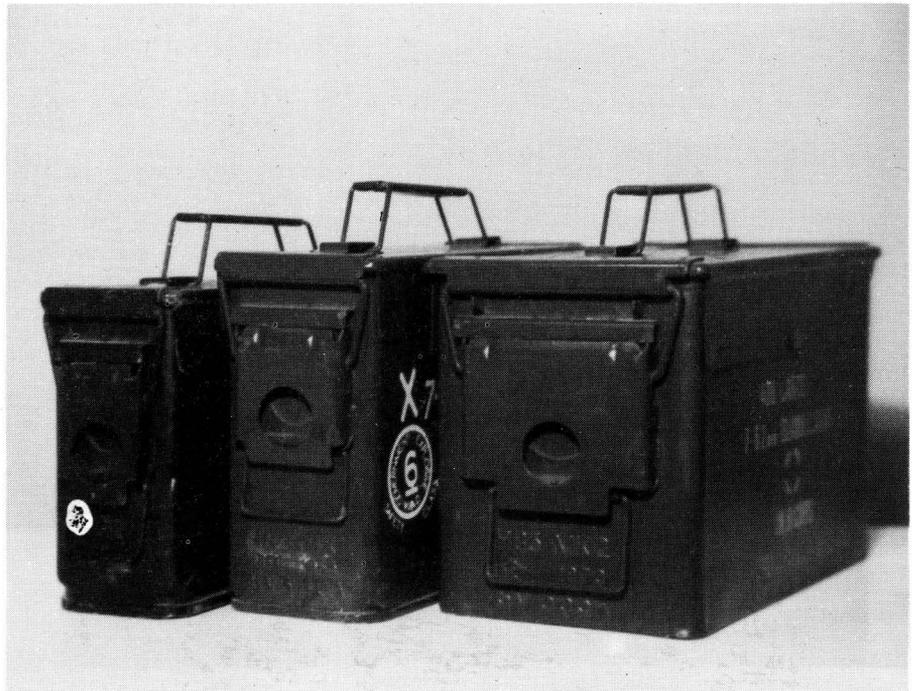
These have been relatively consistent since the end of the Second World War. Cartons show quantity, calibre, type

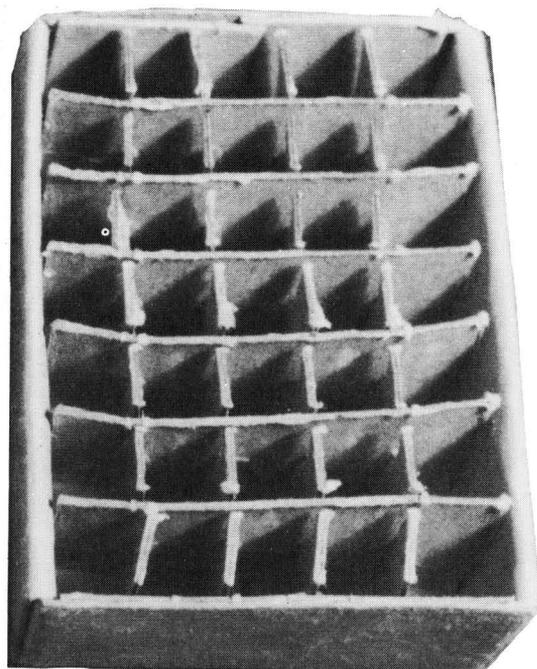
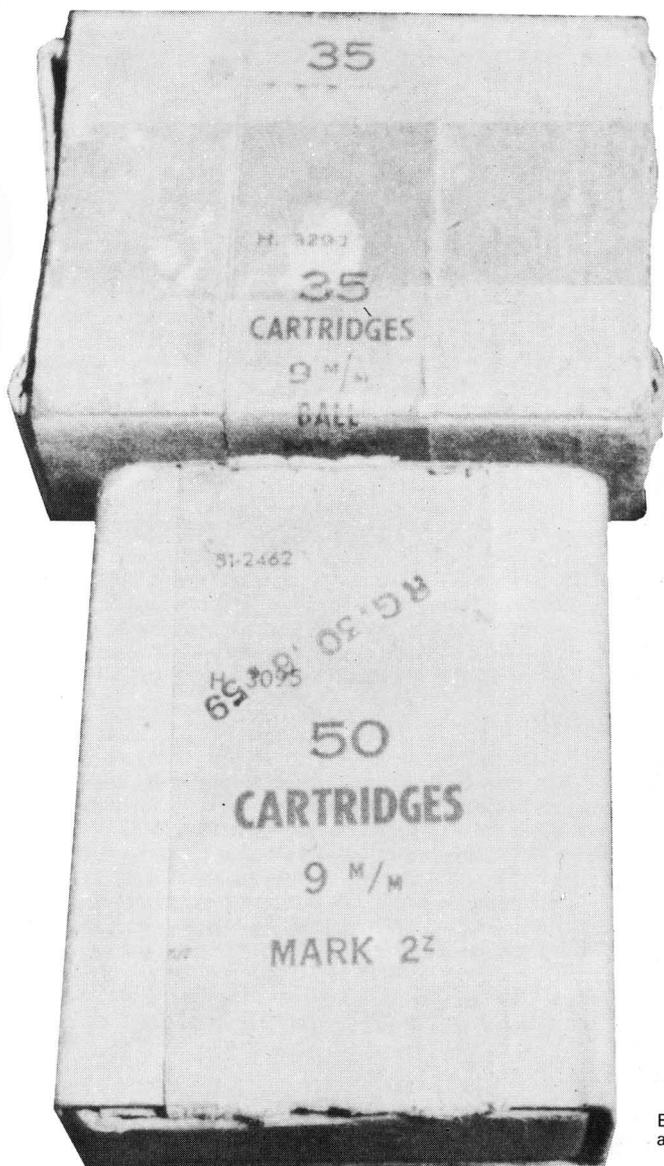
Packages

British ammunition carrier H82 with NATO symbols and national marks.



U.K. carriers, typical of current NATO types. *left to right*: H84, H82, H83.





British 9mm carton, holding 35 rounds with the divider and 50 without.

and Mark number, with stamp added to show filling date and maker's initials. NATO-calibre ammunition labels show standard symbols where applicable. Outer packages are stencilled, not labelled, and show an abbreviated nomenclature, quantity, calibre, type and Mark or Model number, method of packing and manufacturer's details including date. Abbreviations used include: CTN (carton-packed); CHR (charger-packed); BDR (bandolier-packed); MXD LNK (mixed linked (belted)).

U.S.A

Packaging

Since the Second World War, packaging for U.S. small arms ammunition has remained relatively constant and the same style of pack can be traced through the .30in calibre, 7.62mm and 5.56mm eras. Basically, rifle ammunition is charger- or clip-loaded, as necessary, and then packed either in bandoliers ('bandoleers') or in cartons. Both cartons and bandoliers are invariably packed in a metal container of which

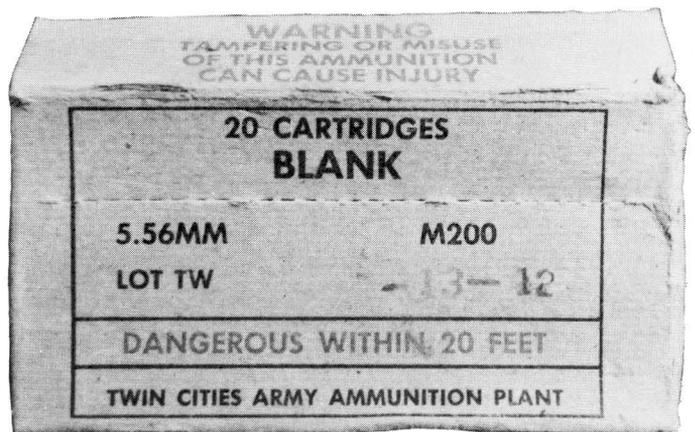
Packages

U.S. 5.56mm carton. This is a white 'commercial' pack of early military issue.



U.S. military 5.56mm carton, the equivalent of the preceding commercial pack.

U.S. military 5.56mm blank carton.



there are many types and styles. The metal containers are packed, two or more, into wooden outers; the principle being to use a stout wooden outer for packaging the thin, tear-open 'metal can' and to use a wire bound plywood box to unite the more robust types of metal carrier. .30in calibre bandoliers take either the 8-round Garand clip or two of the 5-round Springfield type. Cartons are usually made from brown cardboard and for rifle cartridges these cartons are characteristically flat. Pistol and carbine cartons are more balanced in shape and are not so obviously flat. Grenade-launching cartridges are sometimes packed in paper packets lined with metal foil.

Marking

Carton packed ammunition has its identity printed on the carton and this shows quantity, calibre and type or model, the lot number which includes the manufacturer's monogram and the manufacturer in full. Symbols are widely used on all US cartons and packages, some being the adopted NATO symbols and others being exclusively American. The old style of coloured bands on labels to match the bullet tip colour code has been dropped and no recent production has been seen except in cartons with the standard printed label.

On metal cans, carriers, inners and outers the same information is given except that the arsenal is not usually shown in full. All metal containers are olive drab painted and have the markings and symbols added in yellow.

U.S.S.R.

Packaging

Rifle and pistol calibre ammunition of the Soviet Union is usually packed in card cartons which fill a sealed metal inner, two of which are packed into a wooden outer. Inner containers are of galvanized steel, sometimes drab painted, and in either finish are often found separate from the outer. The sealed inners are not usually fitted with handles and bear a resemblance to a large sardine tin, having rounded corners and a tear-off lid. This style of packaging is adopted by nearly all nations which use Russian-designed ammunition, variations being shown under the appropriate country. Some examples of Soviet packaging are:

Type	Rounds	How held	Bulk packing	Total
7.62mm x 25	70 per carton	16 cartons in metal inner	2 inners in wood outer	2,240
7.62mm x 54	20 per carton	22 cartons in metal inner	2 inners in wood outer	880
7.62mm x 39	20 per carton	35 cartons in metal inner	2 inners in wood outer	160/170
12.7mm x 108	80/85 per carton	loose rounds in metal inner	2 inners in wood outer	170
14.5mm x 114	40/42 per carton	loose rounds in metal inner	2 inners in wood outer	80/84
9mm x 18	16 per carton	80 cartons in metal inner	2 inners in wood outer	2,240

The Soviet 70-round pack for 7.62mm x 25 ammunition is one of the largest capacity cartons used and is an example of package design being linked to magazines; this pack being

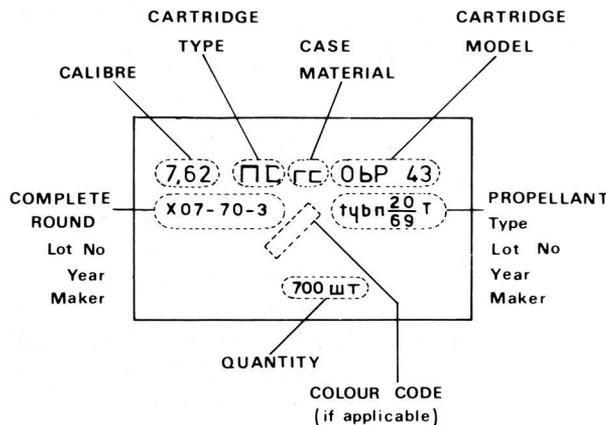
the capacity of the PPSH 41 magazine or two magazines of either the PPSH 42 or 43. The sealed metal inners require a special tool for removing sufficient of the lid to gain access to the contents.

Marking

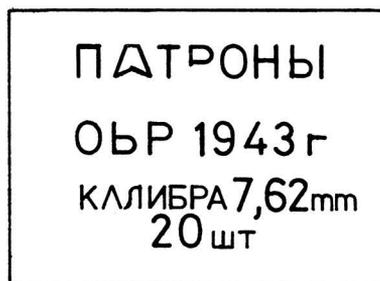
Cartons currently show little information on them, at most an Inspector's number stamp, but during the 1950s cartons for 7.62mm x 39 and 9mm x 18 were marked to indicate calibre, type and quantity.

Metal inners and wooden outers have markings which match exactly except for the larger quantity shown on the outer and the weight in kilograms. Markings show quantity, calibre, case material, bullet type and model, Lot and year of manufacture for the complete round and for the propellant.

Soviet marking follow a standard layout which is generally copied by countries using Russian calibre ammunition; this layout is shown below in diagrammatic form.



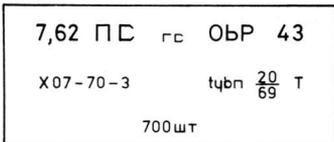
The typical layout of markings found on Soviet metal inner and wooden outer ammunition packages.



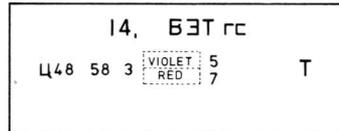
An example of the detail from a 7.62mm x 39 carton whose cartridges are headstamped 270 with a coded date.

Packages

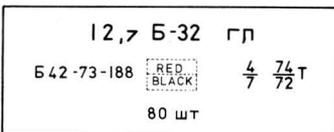
Soviet 70-round carton for 7.62mm x 25 ammunition.



An example of markings on metal inner containing 700 rounds of 7.62mm x 39 ball ammunition.



An example of markings on metal inner containing 14.5mm x 114 armour-piercing incendiary tracer ammunition.



An example of markings on metal inner containing 80 rounds of 12.7mm x 108 B-32 armour-piercing incendiary ammunition.

Russian abbreviations relating to small arms ammunition types

AP	Б
AP, 1930 Type	Б 30
AP, 1932 Type	Б 32
AP, tungsten core	БС

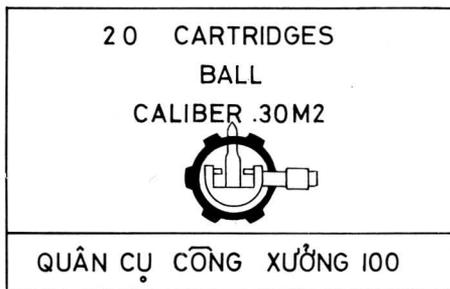
AP, tungsten core, 1940 Type	БС 40
AP, tungsten core, 1941 Type	БС 41
AP, (tungsten core) tracer	БСТ
APT	БТ
API	БЗ
APIT	БЗТ
APIT, 1944 Type	БЗТ 44
heavy ball	Д
brass case	ГЛ
blank	Х
light bullet	Л
light bullet, mild steel core, streamlined	ЛПС
bullet	П
bullet, 1941 Type	П 41
tracer bullet	ПТ
incendiary bullet	ПЗ
for ShKas machine-guns	Ш
tracer, 1945 Type	Т 45
tracer, 1946 Type	Т 46
incendiary	З
incendiary bullet	ЗП

Glossary of terms and abbreviations used on Russian ammunition containers and labels without chargers

AP	БЕЗ ОБОИМ
API	БРОНЕБОЙНО
	- ЗАЖИГАТЕЛЬНОЙ
	БРОН ЗАЖ ТР - ТРАССИРУЮЩИЙ
APIT	БРОНЕБОЙНО
APT	БР ТР
weight	БР
weight	БРУТТО
with chargers	ВЕС
factory	В ОБОИМАХ
incendiary	ЗАВОД
incendiary ranging	ВАЗ , ЗАЖИГ ЗАЖИГАТЕЛЬНЫЙ
lacquer	ПРИСТРЕ ЛОЧНОЙ
charge	ЗАЛАКИРОВАН
calibre	ЗАРЯД
light bullet	КАЛИБР
model, pattern, type	ЛЕТКОЙ ПУЛЕЙ
lot, batch	ОБР
cartridge	ПАРТ
pistol	ПАТРОНЫ
pistol cartridge	ПИСТОЛЕТНЫЙ
bullet	ПАТРОН
revolver	ПУЛЕЙ
with	РЕВОЛЬВЕРНЫЙ
steel	С
tracer bullet	СТАЛЬНОЙ
heavy bullet	ТРАССИРУЮЩЕЙ ПУЛЕЙ
blank cartridge	ТЯЖЕЛОЙ
quantity, piece, items	ХОЛОСТОЙ ПАТРОН
NC propellant (WUFL)	ШТ
brass	ВЧ ПЛ
copper washed steel case type	ГЛ
lacquered steel	ГС

Vietnam, South

In South Vietnam, small arms ammunition was produced by U.S. machinery and calibre and packaging follow U.S. practice. Cartons and outers are typically American, but show the name of the South Vietnamese arsenal. The label is marked in the centre with a symbol representing the cross-section of a rifled barrel, within which is a cartridge between the jaws of a micrometer gauge.



A South Vietnamese carton label (20 rounds, .30in M2 Ball).

Yugoslavia

Packaging

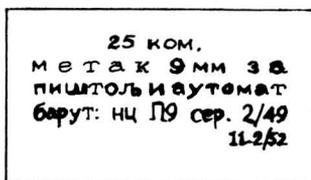
Although Yugoslavia uses Soviet calibres, she retains a degree of autonomy in the precise design of ammunition and in the choice of pack size. Post-war ammunition calibres were basically those used by Germany until 1945 and were packed in similar style, 7.92mm x 57 in 15-round cartons and 9mm x 19 in 25-round cartons.

With the adoption of the Soviet calibres, packs tend to be those which suit Yugoslavia rather than those used throughout the Soviet bloc. Some examples of Yugoslav packaging are:

Type	Rounds	How held	Bulk packing	Total
9mm x 19	25 per carton	—	—	—
7.62mm x 39	20 per carton	48 cartons in metal inner	1 inner in wood outer	960
—	40 per carton	—	—	—

Marking

Yugoslav labels show quantity, calibre and Model or type, propellant Lot and date of production and the complete round Lot and date. Markings are in the Cyrillic or Roman alphabets. The appearance of the word 'KOMADA' or its abbreviation 'KOM' meaning 'quantity' indicate Yugoslav origin.



A diagrammatic example of 9mm x 19 Yugoslav carton label.

Cyrillic alphabet used for Russian and Bulgarian languages

А	а	A	Р	р	R
Б	б	B	С	с	S
В	в	V	Т	т	T
Г	г	G	У	у	U
Д	д	D	Ф	ф	F
Е	е	Ye	Х	х	Kh
Ж	ж	Zh	Ц	ц	Ts
З	з	Z	Ч	ч	Ch
И	и	I	Ш	ш	Sh
Й	й	Y	Щ	щ	Shch
К	к	K	Ъ	ъ	
Л	л	L	Ы	ы	Y
М	м	M	Ь	ь	
Н	н	N	Э	э	E
О	о	O	Ю	ю	Yu
П	п	P	Я	я	Ya

Thai

ก	ข	ค	ด	ต	1
ฃ	ฅ	ฉ	ช	ๅ	2
ๆ	็	่	้	๐	3
๑	๒	๓	๔	๕	4
๖	๗	๘	๙	๐	5
๑	๒	๓	๔	๕	6
๖	๗	๘	๙	๐	7
๑	๒	๓	๔	๕	8
๑	๒	๓	๔	๕	9
๑	๒	๓	๔	๕	0

Chinese Numerals

一	1
二	2
三	3
四	4
五	5
六	6
七	7
八	8
九	9
十	10
百	100
千	1,000
萬	10,000

Burmese

က	ခ	ဂ	ဃ	င	Consonants
စ	ဆ	ဇ	ည	ဋ	
ဍ	ဎ	ဏ	တ	ထ	
ဒ	ဓ	ဣ	ဥ	ဧ	
ဧ	ဩ	ဪ	ါ	ာ	
ိ	ီ	ု	ူ	ေ	
၁	၂	၃	၄	၅	Numerals
၆	၇	၈	၉	၁၀	
၁၀၀	၁၀၀၀	၁၀၀၀၀			100
၁၀၀၀၀					1,000
၁၀၀၀၀၀					10,000
က	ခ	ဂ	ဃ	င	Vowels

Arabic

١	1
٢	2
٣	3
٤	4
٥	5
٦	6
٧	7
٨	8
٩	9
٠	0

Hebrew

א	No phonetic value
ב	v
ג	g
ד	d
ה	h
ו	v
ז	z
ח	ch
ט	t
י	y
כ	ch
ל	i
מ	m
נ	n
ס	s
פ	No phonetic value
צ	f
ק	ts
ר	k
ש	r
ת	s
	or sh

Appendix 2. Conversion Tables

Common inch calibres converted to metric

.25 inch	=	6.35mm
.256 inch	=	6.5mm
.270 inch	=	6.858mm
.280 inch	=	7.11mm
.297 inch	=	7.54mm
.300 inch	=	7.62mm
.301 inch	=	7.645mm
.303 inch	=	7.696mm
.308 inch	=	7.82mm
.311 inch	=	7.899mm
.312 inch	=	7.925mm
.380 inch	=	9.65mm
.400 inch	=	10.16mm
.402 inch	=	10.21mm
.450 inch	=	11.43mm
.455 inch	=	11.557mm
.500 inch	=	12.7mm
.550 inch	=	13.97mm
.577 inch	=	14.65mm
.600 inch	=	15.24mm
.661 inch	=	16.79mm

Weight

1 gram	=	15.432 grains
1 grain	=	0.0648 grams
1 oz	=	28.349 grams

Linear

1 metre	=	1.0936 yards
1 metre	=	3.2808 feet
1 yard	=	0.91438 metres
1 foot	=	0.30479 metres
1 inch	=	25.4mm
$\frac{1}{4}$ inch	=	6.35mm
$\frac{1}{2}$ inch	=	12.7mm
$\frac{3}{4}$ inch	=	19.05mm
$\frac{1}{8}$ inch	=	3.175mm
$\frac{3}{16}$ inch	=	9.525mm
$\frac{5}{16}$ inch	=	15.875mm
$\frac{7}{16}$ inch	=	22.225mm
$\frac{1}{8}$ inch	=	1.5875mm
$\frac{3}{16}$ inch	=	4.7625mm
$\frac{5}{16}$ inch	=	7.9375mm
$\frac{7}{16}$ inch	=	11.1125mm
$\frac{9}{16}$ inch	=	14.2875mm
$\frac{11}{16}$ inch	=	17.4625mm
$\frac{13}{16}$ inch	=	20.6375mm
$\frac{15}{16}$ inch	=	23.8125mm

Pressure

1 Kg per sq cm	=	14.223 lb per sq inch
1 Kg per sq cm	=	0.0063493 tons per sq inch
1 Kg per sq cm	=	0.968 Atmospheres
1 Atmosphere	=	14.7 lb per sq inch
1 Atmosphere	=	0.00656 tons per sq inch
1 ton per sq inch	=	152.0 Atmospheres
1 lb per sq inch	=	0.0680 Atmospheres
1 Atmosphere	=	1.03 Kg per sq cm
1 lb per sq inch	=	0.070309 Kg per sq cm
1 ton per sq inch	=	157.49 Kg per sq cm

Energy

1 m.Kg	=	7.2331 foot lb
1 foot lb	=	0.13825 m.Kg

Velocity

1 metre per second	=	3.2809 feet per second
1 foot per second	=	0.30479 metres per second

Military Small Arms
Ammunition
of the World, 1945-1980 P. Labbett

