

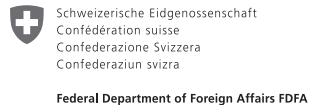
Following the Headstamp Trail

An Assessment of Small-calibre Ammunition Documented in Syria

by N.R. Jenzen-Jones



A Working Paper of the Small Arms Survey/Security Assessment in North Africa project, with support from the Ministry of Foreign Affairs of the Netherlands, the Royal Norwegian Ministry of Foreign Affairs, the Swiss Federal Department of Foreign Affairs, and the Danish Ministry of Foreign Affairs.



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About the Security Assessment in North Africa

The Security Assessment in North Africa is a multi-year project of the Small Arms Survey to support those engaged in building a more secure environment in North Africa and the Sahel-Sahara region. The project produces timely, evidence-based research and analysis on the availability and circulation of small arms, the dynamics of emerging armed groups, and related insecurity. The research stresses the effects of the recent uprisings and armed conflicts in the region on community safety.

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Abbreviations and acronyms

ACP	Automatic Colt Pistol
AK	Avtomat Kalashnikova ('Kalashnikov automatic rifle')
AKM	Avtomat Kalashnikova Modernizirovanny (‘Kalashnikov automatic rifle, modernized’)
AK-74	Avtomat Kalashnikova Obraztsa 1974 (‘Kalashnikov automatic rifle, model 1974’)
AK-74M	Avtomat Kalashnikova Obraztsa 1974 Modernizirovanny (‘Kalashnikov automatic rifle, model 1974, modernized’)
API	Armour-Piercing Incendiary
API-T	Armour-Piercing Incendiary Tracer
B-32	Broneboyno zazhigatelnyy ('armour-piercing incendiary')
BCS	Brass-Clad Steel
BMG	Browning machine gun
BMZ	Bishkekskiy Mashinostroitelnyy Zavod (‘Bishkek Machine-Building Plant’)
BZT	Broneboyno Zazhigatelno Trassiruyushchiy (‘armour-piercing incendiary tracer’)
CCS	Copper-Clad Steel (often incorrectly referred to as ‘copper washed steel’)
CNCS	Cupronickel-Clad Steel
DShKM	Degtyareva-Shpagina Krupnokalibernyy (‘Degtyareva-Shpagina large calibre’)
EID	Établissement Industriel de la Défense (‘Industrial Establishment of Defense’)
FAL	Fusil Automatique Léger ('Light automatic rifle')
FMJ	Full Metal Jacket
FN	Fabrique Nationale d’Herstal ('National Factory of Herstal')

GMCS	Gilding Metal-Clad Steel
HEI	High-Explosive Incendiary
KPV	Krupnokalibernyy Pulemet Vladimirova (‘Vladimirova large calibre machine gun’)
KPVT	Krupnokalibernyy Pulemet Vladimirova Tankovyy (‘Vladimirova large calibre tank machine gun’)
MAG	Mitrailleuse d’Appui Général (‘General-purpose machine gun’)
MDZ	Mnogovennogo Deystviya Zazhigatelnyy (‘instantaneous incendiary’; HEI)
MANPADS	Man Portable Air Defence System
NSV	Nikitina-Sokolova-Volkova (designers’ names)
OSV-96	Obshchetakticheskaya Snayperskaya Vintovka (‘General tactical sniper rifle’)
PAK	Pistole Automatische Knall (‘Automatic pistol blank’)
PK	Pulemet Kalashnikova (‘Kalashnikov machine gun’)
PKM	Pulemet Kalashnikova Modernizirovannyy (‘Modernized Kalashnikov machine gun’)
PKT	Pulemet Kalashnikova Tankovyy (‘Kalashnikov tank machine gun’; vehicle mounted, solenoid-fired variant of the PK machine gun)
PSL	Puşcă Semiautomată cu Lunetă (‘Semi-automatic sniper rifle’)
RPD	Ruchnoy Pulemyot Degtyaryova (‘Degtyarev light machine gun’)
SKS	Samozaryadnyy Karabin Simonova (‘Simonov self-loading carbine’)
SSG 69	Scharfschützengewehr 69 (‘Sniper rifle 69’)
SVD	Snayperskaya Vintovka Dragunova (‘Dragunov sniper rifle’)
TCW	Tula Cartridge Works
VEB	Volkseigener Betrieb (‘Nationally owned enterprise’)

About the author

N.R. Jenzen-Jones is a military arms and munitions specialist and security analyst focusing on current and recent conflicts. He is the director of Armament Research Services (ARES), a specialist consultancy providing technical expertise and analysis to a range of government and non-governmental entities. He has produced extensive research and analysis on a range of small arms and small arms ammunition issues, and has also provided technical assessments of incendiary weapons, cluster munitions, and arms proliferation. His other research fields include counter-piracy, counter-narcotics, and the exploitation of technical intelligence. He is a certified armourer and an ammunition collector.

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Introduction

The ongoing conflict in Syria has brought to light some of the wide variety of small-calibre ammunition (defined as less than 20mm) being used by both government and rebel forces. It has exposed some of the varied supply routes, and highlighted both the shortages and surfeits of certain calibres in different regions of the country. Although the focus is most often on the larger systems in use, ‘gun shots’ are the proximate cause of a significant number of fatalities, accounting for 36 per cent of conflict-related deaths between March 2011 and June 2013 (Syria Tracker, 2013).¹

This report examines the headstamps of 70 different types of small-calibre ammunition and analyses images of cartridge types, packaging, and contextual information such as weapons systems and combatants. Sources include information submitted to the author by various journalists, experts, and organizations, as well as open-source materials, primarily in the form of photographs.² Most of the photographs analysed were taken in the Idlib and Aleppo governorates, with images from Aleppo, ad-Dana, al-Bab, Ibleen, Bab al-Hawa, Kafr Nabl, Atimah, Jabal al-Zawiya, Deir Sonbul, Idlib, and Taftanaz. They were mostly taken between March 2012 and May 2013.

The ammunition assessed in this report was recovered from both rebel and government sources, as well as from battlefields where the source of cartridges and cartridge cases remains unknown. It is important to note that battlefield capture of government materiel has served as an essential source of small-arms ammunition for rebel forces, making it particularly difficult to attribute cartridges to one side or the other, regardless of where or with whom they were found. Nonetheless, the original producers of the ammunition are identifiable, and several supply patterns can be identified. It is likely that much of the ammunition documented—though certainly not all of it—was originally supplied to Syrian government forces.

Tracing small-calibre ammunition can be a difficult task. First, the ammunition is likely to have entered Syria through a variety of routes. The bulk of the cartridges identified in this report probably entered the country as a result of authorized state-to-state transfers. Other possibilities present

themselves as well, including authorized re-export from a third country, illicit transfer from a third country, or cross-border smuggling by arms traders and/or combatants. As a result, it must be stressed that the producing countries identified in this report are not necessarily responsible for transferring the ammunition directly to those involved in the Syrian conflict. It is also important to note that ammunition can have a very long shelf life and a cartridge's date of production is not a strong indicator of when it was supplied. For example, ammunition produced in the 1980s or 1990s could have been stored for decades before being exported to Syria more recently, or it may have been dispatched to Syria almost immediately after production.

Quantifying ammunition, particularly small arms ammunition, is very difficult in the context of an ongoing conflict. Some of the packaging analysed in this report refers to 'millions' of cartridges, while other photographs represent the ammunition carried by individual combatants. The difficulty in finding reliable information—of whatever type—compounds this problem.

The limitations described above notwithstanding, the report presents the following findings:

- The identified cartridges were manufactured primarily in factories located in China, Iran, Syria, and former Eastern Bloc countries.
- Ammunition produced in Syria and Iran accounts for a significant portion of the headstamps assessed, suggesting that much of the ammunition used in the conflict is sourced locally.
- At least seven of the identified cartridge headstamps (from cartridges produced in China, Iran, Romania, and Sudan) indicate a date of production of 2011 or later. This constitutes further evidence of ongoing supply from outside Syria during the hostilities.
- Chinese-produced ammunition has been documented from six consecutive decades since the 1960s, including examples from 2008 and 2011.
- Cartridges in Eastern Bloc calibres appear to be more common and widely available than those in NATO calibres. In particular, supply of some NATO calibre cartridges is erratic or unreliable.

This report is divided into two sections. The first examines the general availability of the main types of ammunition discussed, based on headstamp data, black market prices, and other relevant information. The second section provides technical background and photographic illustrations of the

ammunition observed. Finally, Annexe 1 provides a table summarizing the 70 identified headstamps, including headstamp diagrams or photos where available.

Building on the Small Arms Survey's Working Paper 16, *The Headstamp Trail: An Assessment of Small-calibre Ammunition Found in Libya* (also by the present author), this report adds another baseline assessment to the body of work on small-arms ammunition in conflict zones.

General availability and pricing

The availability of ammunition has fluctuated greatly over the course of the conflict in Syria. While government forces (and some rebel elements) typically receive their small-arms ammunition from central stores, this is not uniformly the case. Indeed, elements of the rebel forces have occasionally needed to supplement their organized supply with personal or group purchases on the black market.³ The conflict in Syria has also impacted on the pricing and availability of small arms ammunition elsewhere in the region. Prices in Lebanon and Turkey, where arms and ammunition for rebel forces are often sourced, indicate intense demand in mid-2012 (Chivers, 2012c; Florquin, 2013, p. 272).

The use of weapons systems in combat is always closely tied to the availability of ammunition of the correct calibre and type. It is not uncommon for small arms to be set aside due to a lack of compatible ammunition. One battalion commander fighting with rebel forces near Aleppo described a critical shortage of 5.56 × 45 mm calibre cartridges preventing the use of the M16-type rifles which many of his fighters carried in combat. Similarly, SVD type rifles have been popular with rebel combatants because of the far more reliable supplies of 7.62 × 54R mm ammunition (also used with PK and PKM type machine guns) (Chivers, 2012c). Discussions with sources in the conflict zones of Syria suggest that 5.56 × 45 mm calibre cartridges are scarce in the areas they visited, making the collection of photographic evidence challenging. As a result, this report does not feature any headstamps of 5.56 × 45 mm calibre cartridges, despite the widespread appearance of weapons chambered for this round since the beginning of the conflict (Jenzen-Jones, 2013).

The variety of Chinese-produced ammunition is noteworthy. Ammunition produced from the 1960s until the present day (both 2008 and 2011) has been documented in several common Eastern Bloc calibres: 7.62 × 39 mm, 7.62 × 54R mm, 12.7 × 108 mm, and 14.5 × 114 mm. The presence of this ammunition in Syria offers no definitive indication of anything beyond its country of origin. It may be that this ammunition was included in materiel allegedly purchased by Qatar from Sudan. Equally, it could suggest ongoing supplies

of Chinese small-arms ammunition to Syria—either in the years prior to the outbreak of the conflict or early in the conflict—in line with the continuing supply of small arms and light weapons chambered in these and other calibres (Jenzen-Jones, 2013).

Ammunition pricing has also fluctuated during the conflict. Some rebel groups in the Aleppo region have paid up to USD 4.00 for a single rifle or machine gun cartridge on the black market.⁴ The norm may be significantly less; among nearly a dozen rebel commanders who shared price data with *The New York Times*, the average price cited was closer to USD 2.00 for each 7.62 × 39 mm cartridge (Chivers, 2012c). Pricing data gathered in Jabal al-Zawiya in September 2012 indicates that 7.62 × 51 mm cartridges are found at significantly higher prices, and are harder to obtain, than the more common 7.62 × 39 mm cartridge. FAL rifles were sold with only 100 cartridges, and additional cartridges cost USD 3.00 each (Spleeters, 2012).

Technical characteristics of the identified ammunition

7.62 × 39 mm ammunition

Ammunition manufactured in Iran and Syria

As can be expected in a modern conflict in the Middle East region, 7.62 × 39 mm cartridges are the most commonly observed calibre of small-arms ammunition, representing the bulk of the cartridges documented in this report. A mixture of brass alloy, coated (lacquered) steel cases, and copper-clad steel (CCS) cases were identified. Jackets of gilding metal-clad steel (GMCS) were the norm among the projectiles observed. Sources noted that the 7.62 × 39 mm cartridge was in use with a wide range of AK-type rifles, SKS rifles, and RPD (and similar Chinese Type 56) light machine guns (Jenzen-Jones, 2013).⁵

Of the 47 different 7.62 × 39 headstamps documented in this report, 22 were produced in either Iran or Syria. This is unsurprising in light of Syria's long-standing domestic production capabilities and Iran's historical/ongoing support of the Assad government (Charbonneau, 2013). The presence of Hezbollah fighters and Iranian troops in Syria (Fisk, 2013) may also account for an increase of Iranian-produced ammunition in the country.

Although Syrian and Iranian cartridges can often be difficult to distinguish from one another (see below), sources provided evidence of confirmed production markings associated with both countries. Syrian ammunition, produced by the *Établissement Industriel de la Défense* (Industrial Establishment of Defense; EID) in Damascus and featuring Arabic headstamp information (Photo 1), was documented with headstamp dates of 1982 and 1984. Later-style cartridge headstamps (Photo 2) were documented from 1996, 1997, and 1998.

Likewise, Iranian ammunition was positively identified with production dates including 1970, 1999, 2001, and 2011.⁶ The most recent Iranian headstamp identified, from 2011, was of the significantly less common 'three-entry type' (see Photo 4), with a lot or batch number of '7' also included in the



Photo 1 Syrian 7.62×39 mm cartridge case produced in 1984 by the Industrial Establishment of Defense (EID) in Damascus, showing earlier-style production characteristics.

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Photo 2 Syrian 7.62×39 mm cartridge case produced in 1998, bearing hallmarks of later-style production.

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Photo 3 Iranian 7.62×39 mm cartridge case produced in 2001 by the Defense Industries Organization's Ammunition & Metallurgy Industries Group.

© Damien Spleeters



Photo 4 Iranian 7.62×39 mm cartridge produced in 2011 by the Defense Industries Organization's Ammunition & Metallurgy Industries Group. Note three-entry type headstamp.

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headstamp. It features a brass alloy case with translucent green sealant at the primer annulus. One older-style Iranian cartridge, produced circa 1991–92, was also identified, and is allegedly connected to reports of booby-trapped ammunition (see below for further details).⁷ This cartridge is marked in Farsi with 'Sazman Sanaye Defa', or 'Defense Industries Organization'. Iran's Defense Industries Organization's Ammunition & Metallurgy Industries Group is responsible for producing small-arms ammunition in Iran and is believed to operate at multiple subsidiary factories. It is unknown which specific headstamps are produced at which factories.

Iranian and Syrian ammunition packaging for 7.62×39 mm cartridges was also observed in Syria. A single Iranian wooden crate with reasonably clear markings (Photo 5) read:

1,000 Kalashnikov military cartridges No: 7.62

Weight: 23,5kg Volume: 21 cubic decimetres Year: 1371⁸

The crate contained 1,000 7.62×39 mm cartridges, primarily for use with AK (Kalashnikov) pattern rifles. Syrian packaging observed included cardboard inner packaging marked in English, common to more recent Syrian production. This packaging contained 50 lead-core 7.62×39 mm cartridges produced in 1998 (Photo 6/7).

There are several complicating factors that make it hard to distinguish between Iranian and Syrian ammunition (see below). Headstamps featuring '6 6' and '7 7' configurations are most difficult to identify conclusively and expert opinions on the matter vary. According to some small arms ammunition specialists, such cartridges may be either distinctly Iranian *or* distinctly

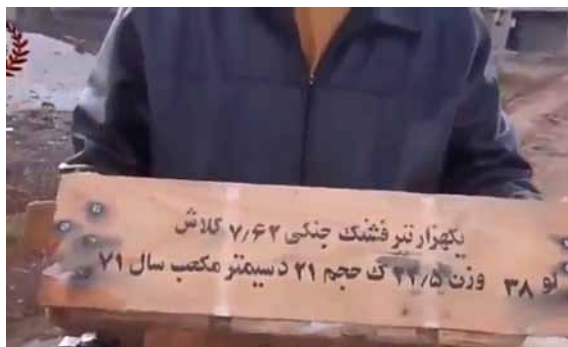


Photo 5 Wooden outer packaging of Iranian origin, containing 1,000 7.62×39 mm cartridges produced in 1992

[Confidential source]



Photo 6/7 Cardboard inner packaging of Syrian origin, originally containing 50 7.62×39 mm cartridges produced in 1998.

[Confidential source]

Box 1 Differential Identification of Iranian and Syrian Ammunition

It is often difficult to distinguish between cartridges manufactured in Iran and Syria. At the outset, it is important to remember that there is only limited information about production methods and capability in both countries. While there are a number of cartridges of confirmed provenance from either country, given the paucity of information and the small sample assessed by experts, it is difficult to know the extent of variation in production we have documented. Cartridges with previously unrecorded headstamps or other differing identification characteristics have been frequently observed in Syria.

Common characteristics in the marking of the ammunition produced by Iran and Syria, understandable given their close links, make it hard to reach a definitive identification of the provenance of ammunition. Although there are various possible explanations for the communality of markings (manufacture for export, identical production equipment, or even sharing of components in the manufacturing process are but a few), there is no certain way to conclusively identify a significant portion of the ammunition presumed to originate from one or the other of those two countries.

In light of this, several of the cartridges discussed in this report are listed as 'presumed' to be of Syrian or Iranian origin, and some are listed as 'Iran or Syria' (where the cartridge can be attributed to one of these two countries, though which one is unknown). Thus, cartridges identified as being of Syrian or Iranian origin are so identified as the author's 'best guess' based on available knowledge at the time of writing, including the opinions of six independent ammunition specialists the author consulted in the course of researching this report.

The following non-exhaustive list of visual identification characteristics represent 'typical' Iranian and Syrian cartridges, and should be referred to only as a guide:¹²

Primer crimp

Iran: Typically three-square 'stake' crimp

Syria: Early cartridges feature three-stake crimp, while later cartridges feature no primer crimp

Style of the letter 'X'

Iran: Typically full size (upper case)

Syria: Often small size (lower case) but sometimes full-size (upper case)

Decimal separator spacing

Iran: Typically featuring wide spacing between digits and decimal separator, i.e. 7 . 62

Syria: Typically featuring narrow spacing between digits and decimal separator, i.e. 7.62

Case head surface

Iran: Typically rougher than Syrian cartridges

Syria: Typically less rough than Iranian cartridges

Style of numeral '7'

Iran: Typically sharply angled

Syria: Typically more rounded/curved than Iranian headstamps

Projectile (bullet) shape¹³

Iran: Features more rounded ogive shape than Syrian projectiles, and blunted tip

Syria: Older ammunition has a sharper ogive shape than Iranian projectiles.

Syrian.⁹ Nevertheless, some of these headstamps appear to have features consistent with Iranian manufacture, while others have features consistent with Syrian manufacture. The remainder are a mix of the two.

There are various possible reasons why these cartridges may not be readily identifiable as the products of either country. For instance, similarities in headstamps and physical identification characteristics may be the result of contract manufacture in one country *for* the other. In such a case, the strongest likelihood is Iranian manufacture for sale to Syria. This possibility has given rise to speculation that the upper case 'I' seen in some headstamps denotes production in Iran.¹⁰ Another possibility is that the '6 6' and '7 7' headstamps may be of Syrian origin, produced on machinery received from Iran. This scenario may account for the consistent physical characteristics between the two countries' production, while also explaining differences in font style, spacing, etc. There remains the possibility that both Syria and Iran use similar headstamps. This seems less likely, however, given Iran's public presentation of ammunition at trade shows, as well as the documented ammunition of Iranian origin that has surfaced in other countries (Conflict Armament Research, 2012).

Chinese-manufactured ammunition

Ten different 7.62 × 39 mm headstamps of Chinese provenance are identified in this report, with years of production ranging from 1964 to 2011. Headstamps were recorded for every decade from the 1960s until the present, with the exception of the 1970s. These cartridges all featured CCS cases and, where observed, GMCS jacketed projectiles. Several featured translucent red sealant at the primer annulus. The 2008 example from 'Factory 811' does not have any sealant at the primer annulus, while the 2011 example from the same factory does.¹¹ The sealant on the latter appears somewhat more opaque than is the norm for Chinese ammunition.

Sudanese-manufactured ammunition

Sources provided documentation of several different headstamps from 7.62 × 39 mm cartridges manufactured in Sudan. These cartridges, which were probably produced at the Alshagara Industrial Complex under the auspices of the Military Industry Corporation, feature CCS cases with a red sealant at the primer annulus. The headstamps are of the three-entry variety typical of more recent Sudanese production: calibre identifier (in this case, '39'

for '7.62×39'), a two- or three-digit code for the year of manufacture, and a single digit believed to represent the batch number or production line. The exact meaning of the final, single digit remains unknown. Interestingly, the two headstamps documented from 2012 were differently marked: one was marked '12' and the other '012'.¹⁴ Moreover, the 2009 example cited lacks the third headstamp entry.¹⁵ It is unclear whether this was deliberate, or caused by an error with the bunter during manufacturing.¹⁶

The Sudanese ammunition may have been smuggled through Turkey to rebel forces, with Qatari support (Chivers and Schmitt, 2013), a possibility confirmed by a confidential source in Syria. Qatar is also believed to have provided Sudanese-sourced arms and munitions to rebel forces in Syria, including FN-6 MANPADS, HJ-8 ATGWs, and M99 anti-materiel rifles, and mortar projectiles and other munitions.¹⁷



Photo 8 Chinese 7.62×39 mm cartridge produced in 1997 by State Factory 71.

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Photo 9 Chinese 7.62×39 mm cartridge produced in 2011 by State Factory 811.

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Photo 10 Sudanese 7.62×39 mm cartridge produced in 2012 by the Military Industry Corporation.

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Photo 11 Sudanese 7.62×39 mm cartridge produced in 2009 by the Military Industry Corporation. Note the lack of a third entry in the headstamp.

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Warsaw Pact/Eastern Bloc-manufactured ammunition

Sources provided evidence of Warsaw Pact-produced 7.62 × 39mm cartridges. From the former USSR and the Russian Federation there was documentary evidence of ammunition from three manufacturers: Tula Cartridge Works (TCW) (produced in 1985), Barnaul Machine Tool Plant JSC (produced in 1998), and ammunition produced under license from (US-owned) WOLF Performance Ammunition, probably manufactured at either Ulyanovsk Machinery Plant SPA or TCW (undated, but produced in 2009 or earlier).¹⁸ Although WOLF ammunition is intended primarily for the civilian market, it was purchased and distributed in large quantities in Afghanistan (Chivers, 2009). Headstamps have also been recorded from ammunition made by Volkseigener Betrieb (VEB) Mechanische Werkstätten Königswartha in East



Photo 12 **WOLF brand 7.62 × 39 cartridge likely manufactured at either Ulyanovsk Machinery Plant or Tula Cartridge Works, both located in the Russian Federation, prior to 2009.**

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Photo 13 **Kyrgyz 7.62 × 39 cartridge case produced in 2000 by the Bishkek Machine-Building Plant.**

© Damien Spleeters



Photo 14 **Romanian 7.62 × 39 armour-piercing incendiary (API) cartridges produced in 1996 by Uzina Mecanică Sadu S.A.**

© C.J. Chivers/The New York Times



Photo 15 **Unidentified 7.62 × 39 cartridge of possible Romanian origin, produced in 2012.**

© C.J. Chivers/The New York Times

Germany (produced in 1982), from Mátravidéki Féművek in Hungary (produced in 1984), and from Bishkek Machine-Building Plant (BMZ) in Kyrgyzstan (produced in 2000).¹⁹ Each of these manufacturers produced variations of lacquered steel cases and red sealants at the primer annulus.

Romanian armour-piercing incendiary (API) cartridges, produced at Uzina Mecanică Sadu S.A. in 1992 and 1996, were documented by sources in Aleppo.²⁰ These had lacquered steel cases, projectiles of two-piece construction (with a brass tip and GMCS lower jacket), and translucent red sealant at both the case mouth and covering the entire exposed portion of the primer and primer annulus. They featured the black-over-red tip markings common to most Eastern Bloc API cartridges. An unmarked 7.62×39 mm cartridge, bearing features consistent with Romanian (Sadu) manufacture, was also documented.²¹ The cartridge was produced in 2012 and appeared to be of Romanian origin, or produced on Romanian-made machinery. This



Photo 16 Sheet metal inner packaging containing 7.62×39 mm cartridges produced at Lugansk Cartridge Works in Lugansk, Ukraine. Note production date (2010).

© C.J. Chivers/The New York Times



Photo 17 Wooden outer packaging containing 7.62×39 mm cartridges produced at Lugansk Cartridge Works in Lugansk, Ukraine. Note contract date (17 February 2010) and consignee (Royal Saudi Arabian Land Forces).

© BBC



Photo 18 Ukrainian 7.62×39 mm cartridge case produced in 2010 by Lugansk Cartridge Works.

© Damien Spleeters

cartridge had a lacquered steel case and a green sealant covering both the primer and primer annulus.

Sources also provided evidence of the packaging for 7.62 × 39 mm cartridges that were apparently originally ordered by the Royal Saudi Arabian Land Forces. The packaging was observed at a Syrian rebel base in Aleppo, in late 2012 (Jenzen-Jones, 2012). The crate in question was initially reported to contain ‘weapons’ shipped from Luhansk (in Eastern Ukraine) and intended for Saudi Arabia (BBC News, 2012). A close analysis of the markings indicated it contained ammunition produced at Lugansk Cartridge Works in Ukraine.²² The crate was labelled as number 990 out of 1429 and is likely to have contained 1,400 cartridges, meaning the original contract was probably for over two million cartridges. The label on the crate also indicated that the sale was brokered through Dastan Engineering, apparently a Kyrgyz firm with offices in Ukraine. Although it is not known how many of these crates were provided to Syrian rebels, the Saudi government has acknowledged supplying arms and ammunition to the rebel forces (Worth, 2012).

Both the crate’s metal inner packaging (a so-called ‘spam can’ or ‘sardine tin’) and the cartridges it contained were marked to indicate production in 2010, consistent with the contract date of ‘17 February 2010’, found on the original outer packaging. The cartridges featured lacquered steel cases and GMCS projectiles. They contained Sunar 7.62 1/10K powder, manufactured at KGKPZ, the Russian state-owned gunpowder factory in Kazan. The cartridges had a translucent red sealant at both the primer annulus and case mouth. Ammunition from this shipment has surfaced in Aleppo, al-Dana (near the Bab al-Hawa border crossing), and Deir Sonbul (Chivers, 2012a; Jenzen-Jones, 2012).

Booby-trapped ammunition

Finally, there is documented evidence of booby-trapped or so-called ‘hot’ 7.62 × 39 mm cartridges in Syria. Doctored ammunition was described in two YouTube videos published by rebel forces, and documented by sources in Deir Sonbul (Chivers, 2012b) and Western Damascus (see Photos 19–21).²³ A granular high-explosive compound had replaced the propellant in such cartridges; the intention appears to have been to damage beyond operation the weapons firing this ‘hot’ ammunition, as well as potentially injuring the person firing the weapon. The programme has been characterized as ‘extensive’, with various ammunition supply lines apparently salted with these ‘hot’ cartridges.²⁴

All of the doctored cartridges documented in Deir Sonbul featured a ‘6 6’ headstamp (see Box 1), while the Western Damascus example is an



Photo 19 Booby-trapped ammunition observed in Deir Sonbul. The original cartridge was likely manufactured by either Iran or Syria.

© C.J. Chivers/The New York Times



Photo 20 Booby-trapped ammunition observed in Deir Sonbul. Note the granular white and rust-coloured substances in place of propellant.

© C.J. Chivers/The New York Times



Photo 21 Alleged booby-trapped ammunition observed in Western Damascus. The original cartridge was produced by the Iranian Defense Industries Organization's Ammunition & Metallurgy Industries Group in 1991–1992.

Photo provided by Knights of the Year Battalion²⁸

Iranian-produced cartridge from 1991–1992 (which corresponds to 1370 in the Iranian calendar). One of the YouTube videos shows a cartridge with no headstamp information, but with a clearly visible green sealant at the primer annulus and three-square 'stake' type crimp.²⁵ Despite these being the only cartridges identified as doctored to date, there is no reason to believe that other cartridges are not also booby-trapped. The origin of the '6 6' stamped 'hot' cartridges is not conclusively known, although they are almost certainly from either Iran or Syria. It has been suggested that the booby-trapped '6 6' cartridge implies that they come from government stocks, while another specialist suggested the booby-trapped cartridge might point to the Iranian Quds Force.²⁶ The presence of the 1970 Iranian cartridge in Western Damascus may support this theory. The two YouTube videos both offer differing explanations. One claims that 'most of the [booby-trapped] cartridges came as spoils from the Lebanese Hezbollah' and asserts that Hezbollah 'hid these cartridges amongst the spoils'.²⁷ The second video claims that the doctored ammunition was produced by the 'Ministry of Defense in collaboration with the Air Force', and states that RPG projectiles and 12 gauge shotgun shells have also been booby-trapped (SCWN, 2013).²⁹ As of December 2013, the provenance of all doctored ammunition observed in Syria remains unknown.



Photo 22 Chinese 7.62×54R mm cartridge case produced in 2011 by State Factory 945.

© Damien Spleeters

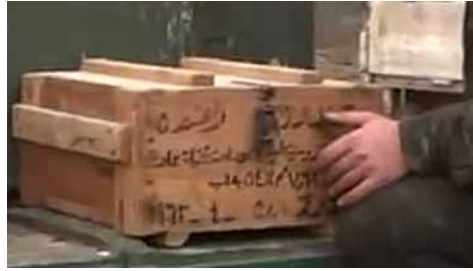


Photo 23 Wooden outer packaging, likely of Syrian origin, containing 7.62×54R mm cartridges produced in 1963.

[Confidential source]



Photo 24 Unmarked 7.62×51 mm cartridges observed in Idlib, in September 2012.

© C.J. Chivers/The New York Times



Photo 25 Wooden outer packaging containing 1,000 7.62×51 mm cartridges, associated with the ammunition seen in Photo 24.

© C.J. Chivers/The New York Times



Photo 26 Czechoslovakian .308 Winchester cartridge case produced in 1986 by Sellier & Bellot.

© Damien Spleeters



Photo 27 Cardboard inner packaging containing .308 Winchester cartridges.

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7.62 × 54R mm ammunition

Seven different 7.62 × 54R mm headstamps were recorded by sources, all from the former USSR or China. This cartridge is primarily used with PSL, SVD, Type 79, and Type 85 rifles, as well as with PK, PKM (along with the similar Chinese Type 80), and PKT-type machine guns (Jenzen-Jones, 2013). The Soviet examples documented were produced at Novosibirsk Low Voltage Equipment Plant (1990), the Barnaul Machine Tool Plant (examples from 1976 and 1983), and the Soviet State Factory in Frunze, now in Kyrgyzstan (1987).^{30,31} The Chinese examples were all of later production date, with cartridges made by State Factory 61 (2006 and 2008) and State Factory 945 (2011)³². All three Chinese examples had CCS cases, and those from Factory 945 featured a red sealant at the primer annulus. The later production dates of the Chinese cartridges is indicative of the Syrian military's shift towards Chinese suppliers, and may be partially related to the Syrian military purchase of Chinese Type 80 machine guns (Jenzen-Jones, 2013).

Two lots of 7.62 × 54R mm packaging were also documented. The first was a wooden crate, likely to have been of Syrian origin, with Arabic writing on the exterior. That crate was marked 'Number 5', which may be a reference to a factory or production facility. The first crate had two further markings of note: a date indicating production in April 1963, and the words '7.62 × 54 WAP' ('WAP' for Warsaw Pact); there was also the notation '58', which appears to be a batch number. The second crate had exterior markings in English, with 'Type: 7.62 × 54 mm' clearly visible. This crate also indicated that the contents were packed with camphor, but an illegible handwritten label covered other important information.

7.62 × 51 mm and .308 Winchester ammunition

Despite the widespread use in Syria of weapons chambered for these cartridges, e.g. FN Hertsal FAL, Steyr Mannlicher SSG 69, and H&K G3-type rifles and FN Herstal MAG machine guns, sources provided evidence of only three 7.62 × 51 mm and .308 Winchester cartridges (Jenzen-Jones, 2013). A single 7.62 × 51 mm headstamp was documented in Idlib, in September 2012, along with its packaging.³³ The cartridge itself was unmarked and appeared to be of brass alloy, with green sealant at the primer annulus and a three square stake primer crimp.³⁴ The packaging indicated that it originally contained 1,000 cartridges, described as '7.62 NATO ball' (Photo 25). While the

cartridges exhibit features consistent with Chinese manufacture, the provenance of these rounds is unknown.

Commercial .308 ammunition, of the type sold for civilian sporting use throughout the world, was also observed in Syria. Ammunition produced (for export) by the then Czechoslovakian manufacturer Sellier & Bellot (in 1986 and 1987) was documented by sources in the Syrian town of Idlib, in 2012.^{35,36} The cartridges had brass cases and red sealant at the primer annulus, and were clearly marked '308 WIN' for .308 Winchester. It should be noted that the use of the .308 Winchester cartridge in firearms chambered for 7.62 × 51 mm might have adverse effects on the firearms themselves, due to the slightly longer headspace present in weapons chambered for 7.62 × 51 mm. The cartridges may also suffer case failures when fired from such weapons, including rupturing of the case walls or separation of the case head. The ammunition observed might come from vendors selling to the civilian market in neighbouring countries, where such sales are legal.

12.7 × 108 mm ammunition

Although 12.7 × 108 mm ammunition is in widespread use in Syria, sources provided only four headstamps³⁷ and limited images of packaging.³⁸ This type of ammunition is used with DShKM, NSV, and W85 heavy machine guns, as well as later-model OSV-96 and Chinese M99 anti-materiel rifles (Jenzen-Jones, 2013). Video documentation of several wooden crates of 12.7 × 108 mm ammunition indicated the presence of B-32 API (armour-piercing incendiary) and BZT API-T (armour-piercing incendiary tracer) cartridges produced



Photo 28 Soviet 12.7 × 108 mm cartridge case produced in 1970 by the Novosibirsk Low Voltage Equipment Plant.

© C.J. Chivers/The New York Times



Photo 29 Wooden outer packaging containing 160 12.7 × 108 mm B-32 armour-piercing incendiary (API) cartridges produced in 1970 by the Novosibirsk Low Voltage Equipment Plant.

© Ugarit News

at the Novosibirsk Low Voltage Equipment Plant in the Soviet Union, in 1970.³⁹ Both types were packaged in typical wooden crates containing 160 cartridges each. A headstamp photograph of one such cartridge, from Aleppo in December 2012, showed a brass alloy case with red sealant at the primer annulus.⁴⁰ Headstamps of identical cartridges from 1971, taken in Ibleen in September 2012, were also provided to the author.⁴¹

Chinese-made API-T cartridges were also documented in Aleppo, in December 2012.⁴² The example photographed, with a brown lacquered steel case and black sealant at the primer annulus, was produced in 1972 at State Factory 631.⁴³ The projectile had a GMCS jacket with black sealant at the case mouth, and a dark purple painted tip, indicating an API-T loading. As is typical with such cartridges, the purple marking colour is very dark, and is often confused with the black tip marking indicating API. Another Chinese 12.7 × 108 mm cartridge headstamp from 2010 was also documented by sources. Although the factory marking was damaged during extraction of the fired case, it appeared to have been produced by State Factory 41.⁴⁴

14.5 × 114 mm ammunition

As with 12.7 × 108 mm cartridges, 14.5 × 114 mm ammunition is seen often and throughout Syria, although only one headstamp was documented in the course of researching this report.⁴⁵ That single example was produced in China (in



Photo 30 Chinese 14.5 × 114 mm cartridge case produced in 1982 by State Factory 9631.

© Damien Spleeters



Photo 31/32 Chinese 14.5 × 114 mm BZT armour-piercing incendiary tracer (API-T) cartridge produced in 1972 by State Factory 631.

© C.J. Chivers/The New York Times



Photo 33 14.5×114mm MDZ high-explosive incendiary (HEI) cartridges of unknown provenance.

© Abkhazian Network News Agency



Photo 34 Iraqi 14.5×114mm armour-piercing incendiary (API) cartridges produced by the Al Yarmouk State Establishment.

© Syrian Truth

1982) and marked with the factory code '9631'.⁴⁶ The cartridge was identified from a fired, olive-green lacquered steel case; the projectile type is unknown.

Sources observed other examples of such ammunition in Syria, although the headstamps were not documented. Sources have documented Iraqi 14.5×114 mm cartridges, with packaging indicating that they were produced at the Al Yarmouk State Establishment. Each cardboard box indicated that it originally contained eight API cartridges. Each box was packaged in black polyethylene bags, with a single bag containing 18 boxes or 144 total cartridges. Other cartridges of B-32 (API), BZT (API-T), and MDZ (high-explosive incendiary; HEI) type (Photo 33) were identified, as well as a B-32 projectile.⁴⁷ The headstamps and provenance of these cartridges is unknown.

Shotshells

Several varieties of shotgun shells (shotshells) were identified within Syria. Sources noted at least two varieties of Sterling brand 12 gauge shotshells. The Sterling brand, owned by Turkish ammunition manufacturer Turaç Dış Ticaret Ltd. Şti., is relatively new, having been produced as hunting ammunition only from 2002. The first example documented was a box of 25 shotshells from Sterling's 'Exclusive' series. Each shell contained 34g of number 5 anti-mony-hardened lead shot.⁴⁸ This loading thus constitutes about 200 pellets of approximately 3.05 mm in diameter (Bussard, 2012, p. 925) and is thus better suited for hunting waterfowl and upland birds than for combat.⁴⁹ The other shotshell packaging observed contained 10 cartridges each (box) of Sterling's



Photo 35 Cardboard packaging originally containing Turkish shotshells produced by Turaç Dış Ticaret Ltd. Şti. under its 'Sterling' brand.

© C.J. Chivers/The New York Times



Photo 36 Turkish .410 bore slug cartridge produced by Yavaşçalar.

© C.J. Chivers/The New York Times

'Big Game Series', loaded with 1oz (28.35g) of double-aught buckshot (9 pellets).⁵⁰ This loading is far more suitable for combat, with similar loadings used worldwide for military, home defence, and large-game hunting purposes.

Two further types of 12 gauge shotshells were observed for sale in Syria, both produced by Yavaşçalar A.Ş. and marketed under its 'YAF' brand.⁵¹ The first type contained 28g of number 8 shot, or roughly 407 pellets of 2.29 mm in diameter (Bussard, 2012, p. 925).⁵² Such a loading would have even less combat utility than the Sterling cartridge described above. The second identified YAF load was of their 'Gold Slug' type, featuring a 30g gilding metal-jacketed lead slug. These were packed ten rounds to each cardboard box, and would constitute an effective combat loading.

Turkish Zuber Chamber of Industry .410 bore shotshells were also noted by sources as available for purchase.⁵³ These .410 bore cartridges are marked and marketed by Zuber as '36 gauge', a misleading description used by some producers in parts of Europe (Fiochi, 2001). The shotshells contain 12g of number 4 shot, or approximately 57 pellets of 3.30 mm diameter (Bussard, 2012, p. 925), and were packed 25 cartridges to a box.⁵⁴ They would be almost completely useless in a combat scenario. On the other hand, Yavaşçalar brand .410 bore slug cartridges, observed in Aleppo in December 2012 (see Photo 36), feature a single self-stabilizing lead slug of considerably more weight than each shot pellet in other .410 cartridges, and would thus be of some use in combat.⁵⁵ A third, unidentified, brand of .410 bore shotshells was also documented. Marked simply '36' and either 'SV' or 'KR', the provenance is unknown.⁵⁶



Photo 37 A range of shotshells and blank ammunition for handguns displayed at a fire-arms and sporting goods store in al-Bab. © Damien Spleeters

Finally, sources noted another unidentified shotshell. One example was documented in Ibleen, in September 2012. This shell featured a blue plastic hull with faded white-printed markings, a brass case head, and indications of a petal-crimped closure.

The shotshells documented in Syria may be used with the wide variety of civilian and military-type shotguns seen in the country, including many produced in neighbouring Turkey (Jenzen-Jones, 2013).⁵⁷ Sterling, Chedite, and Zuber-brand shotshells are readily available in Turkey, and may have been sold either legitimately or semi-legitimately to an arms dealer or smuggled across the border by other parties.⁵⁸ It is important to note that shotshells are particularly difficult to identify from headstamps alone, as a range of third-party producers can be involved in supplying cases and, less commonly, their components (hulls and brass heads) to the manufacturers of complete cartridges. Many shotgun cartridges supplied on military contracts also follow commercial marking practices, making them difficult to distinguish from cartridges manufactured and/or used for civilian purposes.



Photo 38 Unidentified 12 gauge shotshell case documented in Ibleen, in 2012.

© Damien Spleeters

8 mm and 9 mm blanks

A range of PAK (*Pistole Automatische Knall*) blank cartridges was also documented in Syria. These cartridges are used in blank-firing handguns (so called 'gas alarm guns') and are primarily of Turkish origin. The ammunition and their associated arms are both produced and widely available (without a firearms license) in Turkey. Both 8 mm and 9 mm blanks, marked with either 'P.A.' or 'P.A.K.', were observed. Although the brands are Turkish, some are manufactured under contract by factories elsewhere. The samples recorded represented a mix of brass alloy and brass-clad steel (BCS) cases, generally with brass or nicked brass primers. The specific cartridges observed by sources are noted below, with the manufacturer and/or distributor listed in parentheses:⁵⁹

- Özkursan 9 mm P.A. (Özkursan)
- Apaci 9 mm P.A.K. (Avrasya)
- V.I.P. 9 mm P.A. (Turan)
- Özkursan 8 mm P.A.K. (Özkursan)
- YAS 'Iron' 8 mm P.A.K. (Yavasçalar)
- King 8 mm P.A.K. (Çıfsan)



Photo 39 Özkursan, YAS 'Iron', and King brand 8 mm blanks (produced by Özkursan, Yavasçalar, and Çıfsan, respectively) displayed at a firearms and sporting goods store in al-Bab.

© Damien Spleeters



Photo 40 Turkish Apaci and V.I.P. brand 9 mm blanks (produced by Avrasya and Turan, respectively) displayed at a firearms and sporting goods store in al-Bab. © Damien Spleeters

Other ammunition

Limited quantities of 7.62 × 45 mm ammunition were observed by a source alongside a Czech vz. 52 rifle in Aleppo, in December 2012.⁶⁰ The cartridges were produced at Považské Strojárne, A.S. in Czechoslovakia, in 1952, and featured brass alloy cases and cupronickel-clad steel (CNCS) jacketed projectiles.⁶¹ They had a three-entry headstamp with a blackened primer.

One 5.45 × 39 mm cartridge was observed in Syria.⁶² Produced by the Russian Barnaul Machine Tool Plant JSC in 1998, it featured a green lacquered steel case, a GMCS projectile, and purple sealant at both the case mouth and primer annulus.⁶³ This cartridge was likely to have been used with an AK-74 or AK-74M rifle, both of which are known to be used in Syria (Jenzen-Jones, 2013).

Two 7.62 × 25 mm pistol-calibre cartridges were documented by sources. Produced by Sellier & Bellot in the Czech Republic, they were seen alongside a Yugoslavian M57 pistol.⁶⁴

A Syrian pistol cartridge, produced in 1984 by EID in Damascus, was also documented.⁶⁵ It was marked '9 × 17' though it is believed that Syrian cartridges marked in such a manner and produced around this period are in fact 9 × 18 mm cartridges with an incorrect case length marked on the headstamp.⁶⁷ The cartridge was observed alongside a Russian PM pistol, which is chambered for the 9 × 18 mm cartridge, supporting this theory. The round featured a brass alloy case with a crudely applied red sealant covering the primer and primer annulus.



Photo 41 Russian 5.45×39 mm FMJ cartridge produced in 1998 by Barnaul Machine Tool Plant JSC. © Damien Spleeters



Photo 42 Czechoslovakian 7.62×45 mm cartridge produced in 1952 by Považské Strojárne, A.S.

© C.J. Chivers/The New York Times



Photo 43 Czech 7.62×25 mm cartridge produced by Sellier & Bellot.

© C.J. Chivers/The New York Times

Likely existence of cartridges not yet observed

Several calibres of ammunition are known to be present and used in Syria, but have not been documented either in this report or by other researchers.⁶⁸ For example, calibres that are frequently visible in news footage and images of the conflict—in particular 5.56×45 mm NATO—have had no headstamps recorded and/or otherwise documented for this report. Bearing in mind the difficulty of gathering information from the conflict zone, the following list of SAA calibres known or strongly suspected to be present in Syria

at the time of publication is offered, with the relevant weapon/s in brackets (Jenzen-Jones, 2013):⁶⁹

- 5.56 × 45 mm (various M16 and AR-15 type weapons; FAMAS; Steyr AUG)
- .50 BMG (Browning M2)
- 9 × 19 mm Parabellum (FN Browning Hi-Power; GLOCK 17; Sterling L2A3 Mk 4; Heckler & Koch MP5; Port Said submachine gun)
- .30-06 (Browning M1919A4)
- 7.5 × 54 mm French (MAS-36)⁷⁰
- 7.92 × 33 mm *Kurz* (MP 43; MP 44)
- various calibres primarily used for hunting/civilian purposes (hunting rifles in undetermined calibres).

Box 2 Syrian 9 × 18 mm Cartridge Marking Practices

It appears that at least some Syrian 9 × 18 mm Makarov cartridges which were produced by Établissement Industriel de la Défense (EID) in Damascus are marked with the Arabic characters for '9 × 17' (٩ × ١٧). This has led to some confusion, with these cartridges having been described variously as 9 × 18 mm and 9 × 17 mm (.380 ACP). Measurements of the cartridge case by several small arms ammunition specialists, as well as anecdotal evidence on the use of the cartridges with PM pistols and copies chambered for 9 × 18 mm, suggests that the case length ('17') marked on these headstamps is incorrect. It is not

known whether this was an intentional decision by EID, or an error on their part. Examples of cartridges marked in this way are known to exist from 1981, 1984, and 1987.⁶⁵



Photo 44 Syrian 9 × 18 mm cartridge produced in 1984 by the Industrial Establishment of Defence (EID). Note Arabic characters reading '9 × 17'.

© C.J. Chivers/The New York Times

Conclusion

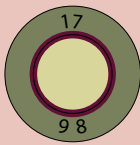

This is an initial report on the small arms ammunition present in Syria and documents 70 different headstamps from around the country, with dates of manufacture ranging from the 1950s to the present day. The report is based on a combination of open-source information and material provided by NGO workers, journalists, and others, including a variety of confidential sources. Several cartridges recorded were manufactured after the outbreak of hostilities in Syria, indicating an ongoing supply of ammunition from abroad. The primary countries of manufacture for the cartridges documented in this report are China, Iran, and Syria, as well as several former Eastern Bloc countries. Both domestic manufacture and the likelihood of notable supply from Iran are significant sources of ammunition for the Syrian government and, in turn, for the many rebel groups who capture military stockpiles.⁷¹








This report also provides initial information regarding the pricing and availability of different calibres. In general, cartridges in Eastern Bloc calibres are more common and widely available than those in NATO calibres. A shortage of NATO calibre cartridges, and of cartridges made to military specifications (as opposed to their commercial equivalents), has caused issues in several documented instances.

While the data-collection effort forming the basis of this report remains *ad hoc* and necessarily limited in scope by conditions on the ground, the Survey hopes that the report will provide an important baseline assessment of ammunition observed to date, and a first step for future work in documenting ammunition in Syria and the broader region.








Annexe 1.

Small calibre ammunition identified in Syria

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
5.45 x 39 mm	Barnaul Machine Tool Plant JSC	1998	Russian Federation	17 98		HP01-24
	State Factory 31 ⁷⁴	1964	China (PRC)	31 64		HP01-01
7.62 x 39 mm	State Factory 61 ⁷⁵	1991	China (PRC)	61 91		HP02-20
	State Factory 81 ⁷⁶	1982	China (PRC)	81 82		HP01-08
	State Factory 821 ⁷⁷	1982	China (PRC)	821 82		HP01-05
	State Factory 61	1992	China (PRC)	61 92		HP02-21

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62 × 39 mm	State Factory 71 ⁷⁸	1997	China (PRC)	71 97		HP01-26
	State Factory 61	2008	China (PRC)	61 08		HP02-13
	State Factory 71	2008	China (PRC)	71 08		HP02-05
	State Factory 821 ⁷⁹	2008	China (PRC)	811 08		HP02-24
	State Factory 811	2011	China (PRC)	811 11		HP02-25
	VEB Mechanische Werkstätten Königswartha	1982	East Germany (now Germany)	04 82		HP02-41
	Mátravidéki Fémművek ⁸⁰	1984	Hungary	23 84		HP02-12








Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62 x 39 mm	DIO AMIG ⁸¹	1991–1992	Iran	Sazman Sanaye Defa عیدانصع افند (ن امزاد)		HP11-01
	DIO AMIG	1999	Iran	7.62×39 99		HP01-11
	DIO AMIG	2001	Iran	7.62×39 2001		HP01-10
	DIO AMIG	2011	Iran	7.62×39 7 11		HP02-30
	Unknown Iranian or Syrian production facility	2003	Iran or Syria ⁸²	7.62×39 7 2003 7		HP01-09 & CP01-05
	Unknown Iranian or Syrian production facility	2004	Iran or Syria	7.62×39 6 2004 6		HP02-26
	Unknown Iranian or Syrian production facility	2004	Iran or Syria	7.62×39 7 2004 7		HP02-06 & HP02-07

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62 x 39 mm	Unknown Iranian or Syrian production facility	2005	Iran or Syria	7.62x39 7 2005 7		HP01-25
	Unknown Iranian or Syrian production facility	2006	Iran or Syria ⁸³	7.62x39 6 2006 6		HP02-01
	Unknown Iranian or Syrian production facility	2008	Iran or Syria	7.62x39 7 2008 1		HP02-28
	Unknown Iranian or Syrian production facility	2009	Iran or Syria	7.62x39 7 2009 7		HP01-03
	Unknown Iranian or Syrian production facility	2009	Iran or Syria	7.62x39 7 2009 1		HP02-04
	Unknown Iranian or Syrian production facility	2010	Iran or Syria	7.62x39 7 2010 7		HP02-29
	Bishkek Machine-building Plant (BMZ)	2000	Kyrgyzstan	60 00		HP01-04

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62 × 39 mm	Uzina Mecanică Sadu S.A.	1992	Romania	322 92		HP02-14
	Uzina Mecanică Sadu S.A.	1996	Romania	321 96		HP02-11 & CP02-04
	Unknown	2012	Romania	7.62×39 12		HP02-10
	WOLF Performance Ammunition	Unknown	Russian Federation ⁸⁴	7.62×39 WOLF.		HP02-31
	Barnaul Machine Tool Plant JSC	1998	Russian Federation	17 98		HP01-07
	Military Industry Corporation ⁸⁵	2009	Sudan	39 09 * ⁸⁶		HP02-17
	Military Industry Corporation ⁸⁷	2010	Sudan	39 10 1		HP02-18

* Headstamp includes only manufacturer and year data, and calibre markings where available or in the absence of year and/or manufacturer markings. See headstamp diagrams for other symbols or text, as well as actual layout.

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62 x 39 mm	Military Industry Corporation ⁸⁸	2011	Sudan	39 011 2		HP02-19
	Military Industry Corporation ⁸⁹	2012	Sudan	39 12 1		HP02-15
	Military Industry Corporation ⁹⁰	2012	Sudan	39 012 1		HP02-16
	Industrial Establishment of Defense (EID)	1982	Syria	٣٩ × ٧,٦٢ ٨٢		HP99-01
	Industrial Establishment of Defense (EID)	1984	Syria	٣٩ × ٧,٦٢ ٨٤		HP02-03
	Unknown Syrian production facility	1996	Syria	7.62x39 96		HP02-44
	Unknown Syrian production facility	1998	Syria	7.62x39 98		HP01-06 & HP02-02

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62 x 39 mm	Unknown Syrian production facility	2000	Syria	7.62×39 2000		HP02-45
	Unknown Syrian production facility	2001	Syria (presumed) ⁹¹	7.62×39 7 2001 7		HP02-42 & CP02-07
	Unknown Syrian production facility	2003	Syria (presumed)	7.62×39 7 2003 7		HP02-27
	Unknown Syrian production facility	2009	Syria (presumed)	7.62×39 7 2009 7		HP02-43
	Unknown Syrian production facility	1997	Syria (presumed)	7.62×39 97		HP02-23
	Lugansk Cartridge Works	2010	Ukraine	LCW 10 7.62×39		HP01-02, PP02-01 & PP06-01
	Tula Cartridge Works	1985	USSR (now Russian Federation)	539 85		HP02-22

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62 × 45 mm	Považské Strojárne, A.S. ⁹²	1952	Czechoslovakia (now Slovakia)	aym – 52		HP02-33 & CP02-05
7.62 × 51 mm & .308 Winchester	Sellier & Bellot JSC	1986	Czechoslovakia (now Czech Republic)	308W 86		HP01-20 & PP05-01
	Sellier & Bellot JSC	1987	Czechoslovakia (now Czech Republic)	308W 87		HP01-21, HP02-08 & PP02-05
	Unknown (unmarked cartridge)	Unknown	Unknown	None		HP02-09 & PP02-04
7.62 × 54R mm	State Factory 61	2006	China (PRC)	61 06		HP01-12
	State Factory 61	2008	China (PRC)	61 08		HP01-13
	State Factory 945 ⁹³	2011	China (PRC)	945 11		HP01-17

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62 × 54R mm	Soviet State Factory, Frunze ⁹⁴	1987	USSR (now Kyrgyzstan)	60 87		HP01-14
	Barnaul Machine Tool Plant, JSC ⁹⁵	1976	USSR (now Russian Federation)	17 76		HP02-38
	Barnaul Machine Tool Plant, JSC	1983	USSR (now Russian Federation)	17 83		HP02-39
	Novosibirsk Low Voltage Equipment Plant ⁹⁶	1990	USSR (now Russian Federation)	188 90		HP01-16
12.7 × 108 mm	State Factory 631 ⁹⁷	1972	China (PRC)	631 72		HP02-32 & CP02-08
	State Factory 41 ⁹⁸	2010	China (PRC)	41 10		HP02-37
	Novosibirsk Low Voltage Equipment Plant	1970	USSR (now Russian Federation)	188 70		PP03-03 ⁹⁹ & HP02-36

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
12.7 × 108 mm	Novosibirsk Low Voltage Equipment Plant	1971	USSR (now Russian Federation)	188 71		HP01-19
14.5 × 114 mm	State Factory 9631 ¹⁰⁰	1982	China (PRC)	9631 82		HP01-18
	Al Yarmouk State Establishment	Unknown	Iraq	Not sighted	N/A	PP10-01
7.62 × 25 mm	Sellier & Bellot	Unknown	Czech Republic	S & B 7.62×25		HP02-35
9 × 18 (marked 9 × 17)	Industrial Establishment of Defense	1984	Syria	٩ × ١٧ ٨٤		HP02-40
.410 bore	Yavaşçalar A.Ş.	Unknown	Turkey	CAL 36 CAL 36		HP02-34 & CP02-06
12 gauge ¹⁰¹	Yavaşçalar A.Ş.	Unknown	Turkey	CHEDDITE 12 ¹⁰²		PP01-02 ¹⁰³
	Unknown	Unknown	Unknown	12 12 12		HP01-23

Endnotes

- 1 On the widespread focus on heavy weapons and systems, e.g. man-portable air defence systems (MANPADS) and armoured vehicles, see, for example, Spleeters (2013). On the fatalities attributable to ‘gun shots’, the number claimed by Syria Tracker is at least 25,000 of the more than 70,000 fatalities recorded. The true proportion of fatalities caused by firearms is likely to be much higher, however, as the Syria Tracker database contains information on an additional 10,851 fatalities of ‘unspecified’ cause, most of which are likely to have been caused by firearms. Correspondence with Taha Kass-Hout, Syria Tracker, 13 July 2013.
- 2 Given the confidential nature of many of the sources of the photographs that form the basis of this report, the identification of the source is necessarily vague.
- 3 CO99-03.
- 4 Prices from mid-2012, CO99-03.
- 5 CO09-01.
- 6 HP11-01 (1970), HP01-11 (1999), HP01-10 (2001), and HP02-30 (2011).
- 7 HP11-01.
- 8 The date uses the Solar Hijri calendar (SH; the Iranian standard) and is equivalent to 1992 or 1993, depending on the exact date of production.
- 9 CO99-02.
- 10 HP02-04, HP02-28.
- 11 Unknown state manufacturer in China.
- 12 There are non-visual identification characteristics, such as the identification of a ferrous/non-ferrous projectile jacket, that are not included here.
- 13 Referring to FMJ (ball) cartridges.
- 14 HP02-15 and HP02-16.
- 15 HP02-17.
- 16 The headstamp is applied to the cartridge during manufacture. Specifically, it is applied during a process known as ‘drawing’ or ‘extrusion’. In the drawing process a machine forces a cup-shaped piece of brass or other case material into a mould or ‘die’ to form the initial, elongated shape of the cartridge case. A hardened steel plug, called a ‘bunter’, then punches a hole (the primer pocket) in the base of the cartridge and simultaneously impresses the headstamp on the cartridge base (Conflict Armament Research, 2012).
- 17 Confidential source.
- 18 Barnaul Machine Tool Plant JSC is now ‘Barnaul Cartridge Plant CJSC’. Ulyanovsk Machinery Plant has been owned by TCW since 2005. Some time during 2009, TCW split with WOLF due to legal disagreements. WOLF ammunition produced after the date of the split is made by other manufacturers and uses a different headstamp arrangement.
- 19 Since 2008, Mátravidéki Féművek has been known as RUAG Hungarian Ammotec Inc., a component factory of RUAG Ammotec AG, based in Switzerland. BMZ was formerly known as ‘Soviet State Factory, Frunze’ (production code ‘60’).

20 HP02-11 & CP02-04.
21 HP02-10.
22 This analysis was confirmed when images of the inner packaging and of the cartridges
themselves were published (Chivers, 2012a).
23 As noted on the KOTY website, accessed 14 November 2013.
24 A defecting Syrian Arab Army officer informed rebel forces of the existence of these 'hot'
cartridges in Syria (Chivers, 2012b).
25 Translation kindly provided to the author by Hasnaa El Jamali (YouTube, 2013).
26 Confidential source.
27 Translation kindly provided to the author by Hasnaa El Jamali (YouTube, 2013).
28 Image taken from the KOTY Facebook page, accessed 14 November 2013.
29 Translation kindly provided to the author by Hasnaa El Jamali (YouTube, 2013).
30 HP01-14, HP02-38, HP02-39, and HP01-16.
31 Novosibirsk Low Voltage Equipment Plant is currently known as LVE Novosibirsk Car-
tridge Plant JSC, Barnaul Machine Tool Plant is now Barnaul Cartridge Plant CJSC, and the
Soviet State Factory in Frunze is now Bishkek Machine-Building Plant (BMZ) in Bishkek,
Kyrgyzstan.
32 HP01-12, HP01-13, and HP01-17.
33 PP02-04.
34 HP02-09.
35 HP01-20, HP01-21, and HP02-08.
36 Now located in the Czech Republic. Packaging for the Sellier & Bellot rounds was also
documented.
37 HP02-32, HP02-36, HP02-36, and HP01-19.
38 PP03-02 and PP03-03.
39 Now LVE Novosibirsk Cartridge Plant JSC in the Russian Federation.
40 HP02-36.
41 HP01-19.
42 CP02-08, HP02-32.
43 Unknown state manufacturer in China.
44 HP02-36. Unknown state manufacturer in China.
45 The 14.5x114mm cartridge is used with KPV, KPVT, and Type 75 heavy machine guns
(Jenzen-Jones, 2013).
46 Unknown state manufacturer in China.
47 CP04-02, CP05-01.
48 PP01-01.
49 Estimate based on 4% antimony content.
50 PP02-02 and PP02-03.
51 PP01-02 and PP01-04.
52 Estimate based on 2% antimony content.
53 PP01-02.
54 Estimate based on 4% antimony content.
55 HP02-24 and CP02-06.
56 PP01-02.
57 The distinction between the two is very slight, as some observers consider many 'home
defence' weapons as 'military-style' shotguns. The author makes no distinction in most
cases.

58 'Semi-legitimate' sales are defined herein as sales where the seller believes that the
products will be smuggled out of the country in violation of the law, but make the
sale regardless. CO99-01, CO08-01.

59 PP01-02, PP01-03, PP01-4.

60 This weapon is often (incorrectly) referred to as the 'CZ 52'. HP02-33 and CP02-05.

61 Most recently known as 'PS-Grand a.s.', of Povážská Bystrica, located in what is now
Slovakia.

62 HP01-24.

63 Most recently known as Barnaul Cartridge Plant CJSC. HP01-24 and CP01-02.

64 HP02-35.

65 CO99-02.

66 HP02-40.

67 CO99-02.

68 Should you be able to assist by providing images of headstamps not included in this
report, please contact the Small Arms Survey at: weaponsid@smallarmssurvey.org.

69 These are given as a guide only of expected calibre, and may not represent exact models or
account for possible calibre conversions.

70 This calibre has been produced in Syria, featuring an Arabic script headstamp.

71 As noted above, the use of captured ammunition by rebel forces is not without its dangers,
as some stockpiles appear to be salted with booby-trapped cartridges.

72 Clockwise from top, with a '|' separating each portion. Symbols (such as stars) are not
included.

73 Codes marked with a superscript '#' symbol refer to information where the precise loca-
tion and date of the photo is not known or verifiable.

74 Unknown state manufacturer in China.

75 Unknown state manufacturer in China.

76 Unknown state manufacturer in China.

77 Unknown state manufacturer in China.

78 Unknown state manufacturer in China.

79 Unknown state manufacturer in China.

80 Mátravidéki Fémművek is now known as 'RUAG Hungarian Ammotec Inc.', a component
factory of RUAG Ammotec AG, based in Switzerland.

81 Iran's Defence Industries Organization's Ammunition & Metallurgy Industries Group is
the organization responsible for small arms ammunition production in Iran. It is believed
to operate multiple subsidiary factories. It is unknown at which specific factory this car-
tridge was manufactured.

82 See Box 2.

83 See Box 2.

84 WOLF contract several production plants. This example is likely to be from either Tula
Cartridge Works or Ulyanovsk Machinery Plant, both situated in the Russian Federation.

85 Likely 'Alshagara Industrial Complex'.

86 This may have been deliberate or accidental. See discussion in the text.

87 Likely 'Alshagara Industrial Complex'.

88 Likely 'Alshagara Industrial Complex'.

89 Likely 'Alshagara Industrial Complex'.

90 Likely 'Alshagara Industrial Complex'.

91 See Box 2.

- 92 Now PS-Grand a.s.
93 Unknown state manufacturer in China.
94 Now Bishkek Machine-Building Plant.
95 Now Barnaul Cartridge Plant CJSC.
96 Now LVE Novosibirsk Cartridge Plant JSC.
97 Unknown state manufacturer in China.
98 The factory code is obscured by an extractor mark, but is likely '41'. Unknown state manufacturer in China.
99 Headstamp not sighted; extrapolated from packaging.
100 Unknown state manufacturer in China.
101 Please see note on shotshell identification under *Shotshells*.
102 'Cheddite' headstamp is due to use of Cheddite brass heads by Yavaşçalar.
103 Headstamp not sighted; taken from packaging image.

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