

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.



ndse Zaken





Schweizerische Eidgenossenschaft Confédération suisse Confederazione Svizzera Confederaziun svizra

Federal Department of Foreign Affairs FDFA



Copyright

Published in Switzerland by the Small Arms Survey

© Small Arms Survey, Graduate Institute of International and Development Studies, Geneva 2014

Published in April 2014

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior permission in writing of the Small Arms Survey, or as expressly permitted by law, or under terms agreed with the appropriate reprographics rights organization. Enquiries concerning reproduction outside the scope of the above should be sent to the Publications Manager, Small Arms Survey, at the address below.

Small Arms Survey Graduate Institute of International and Development Studies 47 Avenue Blanc, 1202 Geneva, Switzerland

Series editor: Matthew Johnson

Copy-edited by Deborah Eade Proofread by Donald Strachan

Typeset in Optima and Palatino by Frank Benno Junghanns Printed in France by GPS

ISBN 978-2-9700897-8-0

The Small Arms Survey

The Small Arms Survey is an independent research project located at the Graduate Institute of International and Development Studies in Geneva, Switzerland. Established in 1999, the project is supported by the Swiss Federal Department of Foreign Affairs and current or recent contributions from the Governments of Australia, Belgium, Denmark, Finland, Germany, the Netherlands, New Zealand, Norway, Spain, the United Kingdom, and the United States, as well as from the European Union. The Survey is grateful for past support received from the Governments of Canada, France, and Sweden. The Survey also wishes to acknowledge the financial assistance it has received over the years from foundations and many bodies within the UN system.

The objectives of the Small Arms Survey are: to be the principal source of public information on all aspects of small arms and armed violence; to serve as a resource centre for governments, policy-makers, researchers, and activists; to monitor national and international initiatives (governmental and non-governmental) on small arms; to support efforts to address the effects of small arms proliferation and misuse; and to act as a clearinghouse for the sharing of information and the dissemination of best practices. The Survey also sponsors field research and information-gathering efforts, especially in affected states and regions. The project has an international staff with expertise in security studies, political science, law, economics, development studies, sociology, and criminology, and collaborates with a network of researchers, partner institutions, non-governmental organizations, and governments in more than 50 countries.

Small Arms Survey

Graduate Institute of International and Development Studies 47 Avenue Blanc, 1202 Geneva, Switzerland

t + 41 22 908 5777

f + 41 22 732 2738

- e sas@smallarmssurvey.org
- w www.smallarmssurvey.org

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.

The Security Assessment in North Africa receives core funding from the Ministry of Foreign Affairs of the Netherlands. In addition, the project receives ongoing support from the Royal Norwegian Ministry of Foreign Affairs, the Swiss Federal Department of Foreign Affairs, and the Danish Ministry of Foreign Affairs, and has previously received grants from the US State Department and the German Federal Foreign Office.

Table of contents

List of boxes and photos	5
Abbreviations and acronyms	9
About the author	1
Acknowledgements 12	2
Introduction	3
General availability and pricing 10	6
Technical characteristics of the identified ammunition	8
7.62 × 39 mm ammunition 18	8
Ammunition manufactured in Iran and Syria	3
Chinese-manufactured ammunition 2:	2
Sudanese-manufactured ammunition 2:	2
Warsaw Pact/Eastern Bloc-manufactured ammunition 2.	4
Booby-trapped ammunition	6
$7.62 \times 54R$ mm ammunition	9
7.62 × 51 mm and .308 Winchester ammunition	9
12.7 × 108 mm ammunition	С
14.5 × 114 mm ammunition 3	1
Shotshells	2
8 mm and 9 mm blanks	5
Other ammunition	6
Likely existence of cartridges not yet observed	7
Conclusion	9
Annexe 1: Small calibre ammunition identified in Syria	D
Endnotes	С
References	4
Publications list	6

List of boxes and photos

Boxes

1	Differential Identification of Iranian and Syrian Ammunition	21
2	Syrian 9 × 18 mm Cartridge Marking Practices	38
Photo	s	
1	Syrian 7.62 × 39 cartridge case produced in 1984 by the Industrial Establishment of Defense (EID) in Damascus	19
2	Syrian 7.62 × 39 mm cartridge case produced in 1998	19
3	Iranian 7.62 × 39 mm cartridge case produced in 2001 by the Defense Industries Organization's Ammunition & Metallurgy Industries Group	19
4	Iranian 7.62 × 39 mm cartridge produced in 2011 by the Defense Industries Organization's Ammunition & Metallurgy Industries Group	19
5	Wooden outer packaging of Iranian origin, containing 1,000 7.62 × 39 mm cartridges produced in 1992	20
6/7	Cardboard inner packaging of Syrian origin, originally containing 50 7.62 × 39 mm cartridges produced in 1998	20
8	Chinese 7.62 × 39 mm cartridge produced in 1997 by State Factory 71	23
9	Chinese 7.62 \times 39 mm cartridge produced in 2011 by State Factory 811	23
10	Sudanese 7.62 × 39 mm cartridge produced in 2012 by the Military Industry Corporation	23
11	Sudanese 7.62 × 39 mm cartridge produced in 2009 by the Military Industry Corporation.	23
12	WOLF brand 7.62 × 39 mm cartridge likely manufactured at either Ulyanovsk Machinery Plant or Tula Cartridge Works,	

both located in the Russian Federation, prior to 2009 24

13	Kyrgyz 7.62 × 39 mm cartridge case produced in 2000 by the Bishkek Machine-Building Plant.	24
14	Romanian 7.62 × 39 mm armour-piercing incendiary (API) cartridges produced in 1996 by Uzina Mecanică Sadu S.A.	24
15	Unidentified 7.62 × 39 mm cartridge of possible Romanian origin, produced in 2012.	24
16	Sheet metal inner packaging containing 7.62 × 39 mm cartridges produced at Lugansk Cartridge Works in Lugansk, Ukraine	25
17	Wooden outer packaging containing 7.62 × 39 mm cartridges produced at Lugansk Cartridge Works in Lugansk, Ukraine	25
18	Ukrainian 7.62 × 39 mm cartridge case produced in 2010 by Lugansk Cartridge Works	25
19/20	Booby-trapped ammunition observed in Deir Sonbul	27
21	Alleged booby-trapped ammunition observed in Western Damascus.	27
22	Chinese 7.62 × 54R mm cartridge case produced in 2011 by	28
	State ractory 945.	20
23	Wooden outer packaging, likely of Syrian origin, containing 7.62 × 54R mm cartridges produced in 1963	20 28
23 24	Wooden outer packaging, likely of Syrian origin, containing 7.62 × 54R mm cartridges produced in 1963 Unmarked 7.62 × 51 mm cartridges observed in Idlib, in September 2012.	28 28 28
23 24 25	Wooden outer packaging, likely of Syrian origin, containing 7.62 × 54R mm cartridges produced in 1963. Unmarked 7.62 × 51 mm cartridges observed in Idlib, in September 2012. Wooden outer packaging containing 1,000 7.62 × 51 mm cartridges	28 28 28 28
23 24 25 26	Wooden outer packaging, likely of Syrian origin, containing 7.62 × 54R mm cartridges produced in 1963. Unmarked 7.62 × 51 mm cartridges observed in Idlib, in September 2012. Wooden outer packaging containing 1,000 7.62 × 51 mm cartridges Czechoslovakian .308 Winchester cartridge case produced in 1986 by Sellier & Bellot.	28 28 28 28 28
23 24 25 26 27	Wooden outer packaging, likely of Syrian origin, containing 7.62 × 54R mm cartridges produced in 1963. Unmarked 7.62 × 51 mm cartridges observed in Idlib, in September 2012. Wooden outer packaging containing 1,000 7.62 × 51 mm cartridges Czechoslovakian .308 Winchester cartridge case produced in 1986 by Sellier & Bellot. Cardboard inner packaging containing .308 Winchester cartridges	28 28 28 28 28 28 28
23 24 25 26 27 28	 Wooden outer packaging, likely of Syrian origin, containing 7.62 × 54R mm cartridges produced in 1963. Unmarked 7.62 × 51 mm cartridges observed in Idlib, in September 2012. Wooden outer packaging containing 1,000 7.62 × 51 mm cartridges Czechoslovakian .308 Winchester cartridge case produced in 1986 by Sellier & Bellot. Cardboard inner packaging containing .308 Winchester cartridges Soviet 12.7 × 108 mm cartridge case produced in 1970 by the Novosibirsk Low Voltage Equipment Plant. 	28 28 28 28 28 28 28 28 30
23 24 25 26 27 28 29	 Wooden outer packaging, likely of Syrian origin, containing 7.62 × 54R mm cartridges produced in 1963. Unmarked 7.62 × 51 mm cartridges observed in Idlib, in September 2012. Wooden outer packaging containing 1,000 7.62 × 51 mm cartridges Czechoslovakian .308 Winchester cartridge case produced in 1986 by Sellier & Bellot. Cardboard inner packaging containing .308 Winchester cartridges Soviet 12.7 × 108 mm cartridge case produced in 1970 by the Novosibirsk Low Voltage Equipment Plant. Wooden outer packaging containing 160 12.7 × 108 mm B-32 armour-piercing incendiary (API) cartridges produced in 	28 28 28 28 28 28 28 30

30	Chinese 14.5 × 114 mm cartridge case produced in 1982 by State Factory 9631
31/32	Chinese 14.5 × 114 mm BZT armour-piercing incendiary tracer (API-T) cartridge produced in 1972 by State Factory 631
33	14.5 × 114 mm MDZ high-explosive incendiary (HEI) cartridges of unknown provenance
34	Iraqi 14.5 × 114 mm armour-piercing incendiary (API) cartridges produced by the Al Yarmouk State Establishment
35	Cardboard packaging originally containing Turkish shotshells produced by Turaç Dış Ticaret Ltd. Şti. under its 'Sterling' brand 33
36	Turkish .410 bore slug cartridge produced by Yavaşçalar
37	A range of shotshells and blank ammunition for handguns displayed at a firearms and sporting goods store in al-Bab
38	Unidentified 12 gauge shotshell case documented in Ibleen, 2012 34
39	Özkursan, YAS 'Iron', and King brand 8 mm blanks (produced by Özkursan, Yavasçalar, and Çífsan, respectively)
40	Turkish Apaci and V.I.P. brand 9 mm blanks (produced by Avrasya and Turan, respectively)
41	Russian 5.45 × 39 mm FMJ cartridge produced in 1998 by Barnaul Machine Tool Plant JSC
42	Czechoslovakian 7.62 × 45 mm cartridge produced in 1952 by Považské Strojárne, A.S
43	Czech 7.62 × 25 mm cartridge produced by Sellier & Bellot
44	Syrian 9 × 18 mm cartridge produced in 1984 by the Industrial Establishment of Defence (EID)

Abbreviations and acronyms

ACP	Automatic Colt Pistol
AK	Avtomat Kalashnikova ('Kalashnikov automatic rifle')
AKM	Avtomat Kalashnikova Modernizirovannyy
	('Kalashnikov automatic rifle, modernized')
AK-74	Avtomat Kalashnikova Obraztsa 1974
	('Kalashnikov automatic rifle, model 1974')
AK-74M	Avtomat Kalashnikova Obraztsa 1974 Modernizirovannyy
	('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')
РК	Pulemet Kalashnikova ('Kalashnikov machine gun')
РКМ	Pulemet Kalashnikova Modernizirovannyy ('Modernized Kalashnikov machine gun')
РКТ	Pulemet Kalashnikova Tankovyy ('Kalashnikov tank machine gun'; vehicle mounted, solenoid- fired variant of the PK machine gun)
PSL	Pușcă 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.

Acknowledgements

The author expresses his sincere gratitude to all of those who assisted with the production of this report. C.J. Chivers and Damien Spleeters, both tireless in their efforts to document the materiel used in conflict zones around the world, provided the bulk of the images upon which this analysis is based. Russ Cornell, Alexander Diehl, Federico Graziano, Ron Merchant, Hans Migielski, John Moss, and Jack Wells (SGM USA, Ret.) shared their considerable technical expertise, and continue to do so. Thanks are also due to Jonathan Ferguson, Nicolas Florquin, Nicholas Marsh, Neil Marshall, Reza Nazari, Michael Weber (SGM USA, Ret.), and several confidential sources who are not named for privacy or security reasons.

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 smallcalibre 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 7.62×54 R 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, 7.62×54 R 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 head-stamp 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



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.

© C.J. Chivers/The New York Times



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

© C.J. Chivers/The New York Times



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

© Damien Spleeters



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

© C.J. Chivers/The New York Times

the headstamp. It features a brass alloy case with translucent green sealant at the primer annulus. One older-style Iranian cartridge, produced in 1970, 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 \times 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 \times 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 7.62×39mm cartridges produced in 1992

[Confidential source]



Photo 6/7 Cardboard inner packaging of Syrian origin, originally containing 507.62×39mm 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.

C Damien Spleeters



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

© C.J. Chivers/The New York Times



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

© C.J. Chivers/The New York Times



Photo 11 Sudanese $7.62 \times 39 \,\text{mm}$ cartridge produced in 2009 by the Military Industry Corporation. Note the lack of a third entry in the headstamp.

© C.J. Chivers/The New York Times

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.

© C.J. Chivers/The New York Times



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



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

© Damien Spleeters

© BBC

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' $7.62 \times 39 \text{ mm}$ 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 1970.

Photo provided by Knights of the Year Battalion²⁸

Iranian-produced cartridge from 1970. 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 [boobytrapped] 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 7.62×54Rmm cartridge case produced in 2011 by State Factory 945.

© Damien Spleeters



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

[Confidential source]



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

© C.J. Chivers/The New York Times



Photo 25 Wooden outer packaging containing $1,0007.62 \times 51 \text{ mm}$ 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.

© Abkhazian Network News Agency

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 7.62×54 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 12.7×108mm 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

14.5×114mm 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.



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

© Abkhazian Network News Agency

© 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 antimony-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 Dıs, 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 10z (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 (Fiocchi, 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 firearms 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, Cheddite, 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 nickeled 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. (Çífsan)



Photo 39 Özkursan, YAS 'Iron', and King brand 8 mm blanks (produced by Özkursan, Yavasçalar, and Çífsan, 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.⁶⁶ It was marked ' $9 \times 17'$ 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 heads-tamp.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): $^{\rm 69}$

- 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 ' $9 \times 17'$ (11×1). 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
5.45×39 mm	Barnaul Machine Tool Plant JSC	1998	Russian Federation	17 98	17	HP01-24
7.62×39mm	State Factory 31 ⁷⁴	1964	China (PRC)	31 64		HP01-01
	State Factory 6175	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	Ó	HP01-05
	State Factory 61	1992	China (PRC)	61 92	(O) az	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	0	HP01-26
	State Factory 61	2008	China (PRC)	61 08	Ö	HP02-13
	State Factory 71	2008	China (PRC)	71 08		HP02-05
	State Factory 821 ⁷⁹	2008	China (PRC)	811 08	0	HP02-24
	State Factory 811	2011	China (PRC)	811 11	Ó	HP02-25
	VEB Mechanische Werkstätten Königswartha	1982	East Ger- many (now Germany)	04 82		HP02-41
	Mátravidéki Fémmûvek ⁸⁰	1984	Hungary	23 84	O	HP02-12

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62×39 mm	DIO AMIG ⁸¹	1970	Iran	Sazman Sanaye Defa عیانص عافید) (نامزاس	Q	HP11-01
	DIO AMIG	1999	Iran	7.62×39 99	C)	HP01-11
	DIO AMIG	2001	Iran	7.62×39 2001	(O)	HP01-10
	DIO AMIG	2011	Iran	7.62×39 7 11	O	HP02-30
	Unknown Iranian or Syrian pro- duction facility	2003	Iran or Syria ⁸²	7.62×39 7 2003 7	(O)	HP01-09 & CP01-05
	Unknown Iranian or Syrian pro- duction facility	2004	Iran or Syria	7.62x39 6 2004 6	CON CONTRACTOR	HP02-26
	Unknown Iranian or Syrian pro- duction facility	2004	Iran or Syria	7.62×39 7 2004 7	Ö	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 × 39 mm	Unknown Iranian or Syrian pro- duction facility	2005	Iran or Syria	7.62×39 7 2005 7	Ó	HP01-25
	Unknown Iranian or Syrian pro- duction facility	2006	Iran or Syria ⁸³	7.62×39 6 2006 6	Ó	HP02-01
	Unknown Iranian or Syrian pro- duction facility	2008	Iran or Syria	7.62×39 7 2008 1		HP02-28
	Unknown Iranian or Syrian pro- duction facility	2009	Iran or Syria	7.62×39 7 2009 7		HP01-03
	Unknown Iranian or Syrian pro- duction facility	2009	Iran or Syria	7.62×39 7 2009 I	0	HP02-04
	Unknown Iranian or Syrian pro- duction facility	2010	Iran or Syria	7.62×39 7 2010 7		HP02-29
	Bishkek Machine-build- ing Plant (BMZ)	2000	Kyrgyzstan	60 00	Ó	HP01-04

Calibre	Production facility	Year of production	Country of manufacture	Headstamp information ⁷²	Headstamp diagram or photograph	Source material (ref. code) ⁷³
7.62×39mm	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.	Ö	HP02-31
	Barnaul Machine Tool Plant JSC	1998	Russian Federation	17 98	() ()	HP01-07
	Military Industry Corporation ⁸⁵	2009	Sudan	39 09 * ⁸⁶	(Ö)	HP02-17
	Military Industry Corporation ⁸⁷	2010	Sudan	39 10 1	Õ,	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 × 39 mm	Military Industry Corporation ⁸⁸	2011	Sudan	39 011 2	0	HP02-19
	Military Industry Corporation ⁸⁹	2012	Sudan	39 12 1	O	HP02-15
	Military Industry Corporation ⁹⁰	2012	Sudan	39 012 1	0	HP02-16
	Industrial Establishment of Defense (EID)	1982	Syria	4 × 7,17 71	₹ ^{4,× Y,} 7,≁ ★	HP99-01
	Industrial Establishment of Defense (EID)	1984	Syria	Ψ9×V,٦Υ Λ£	× × Y, 7, /	HP02-03
	Unknown Syrian production facility	1996	Syria	7.62×39 96	Ó	HP02-44
	Unknown Syrian production facility	1998	Syria	7.62×39 98	O)	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 × 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	0	HP02-42 & CP02-07
	Unknown Syrian production facility	2003	Syria (presumed)	7.62×39 7 2003 7	Ó	HP02-27
	Unknown Syrian production facility	2009	Syria (presumed)	7.62×39 7 2009 7	0	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	\bigcirc	HP01-02, PP02-01 & PP06-01
	Tula Cartridge Works	1985	USSR (now Russian Federation)	539 85	0	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	Czechoslo- vakia (now Slovakia)	aym – 52		HP02-33 & CP02-05
7.62×51mm & .308 Winchester	Sellier & Bellot JSC	1986	Czecho- slovakia (now Czech Republic)	308W 86	0	HP01-20 & PP05-01
	Sellier & Bellot JSC	1987	Czecho- slovakia (now Czech Republic)	308W 87	Ó	HP01-21, HP02-08 & PP02-05
	Unknown (unmarked cartridge)	Unknown	Unknown	None	86	HP02-09 & PP02-04
7.62×54R mm	State Factory 61	2006	China (PRC)	61 06	0	HP01-12
	State Factory 61	2008	China (PRC)	61 08	0	HP01-13
	State Factory 945 ⁹³	2011	China (PRC)	945 11	Ø	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 Fac- tory, Frunze ⁹⁴	1987	USSR (now Kyrgyzstan)	60 87	0	HP01-14
	Barnaul Machine Tool Plant, JSC ⁹⁵	1976	USSR (now Russian Federation)	17 76	0	HP02-38
	Barnaul Machine Tool Plant, JSC	1983	USSR (now Russian Federation)	17 83	0	HP02-39
	Novosibirsk Low Voltage Equip- ment Plant ⁹⁶	1990	USSR (now Russian Federation)	188 90		HP01-16
12.7 × 108 mm	State Factory 631 ⁹⁷	1972	China (PRC)	631 72	0	HP02-32 & CP02-08
	State Factory 41 ⁹⁸	2010	China (PRC)	41 10	0	HP02-37
	Novosibirsk Low Voltage Equip- ment Plant	1970	USSR (now Russian Federation)	188 70	0	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	0	HP01-19
4.5×114 mm	State Factory 9631 ¹⁰⁰	1982	China (PRC)	9631 82	0	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	9 × 1V A£	0	HP02-40
.410 bore	Yavaşçalar A.Ş.	Unknown	Turkey	CAL 36 CAL 36	Ø	HP02-34 & CP02-06
12 gauge ¹⁰¹	Yavaşçalar A.Ş.	Unknown	Turkey	CHEDDITE 12 ¹⁰²	CHEDO/A COMMENT 12	PP01-02 ¹⁰³
	Unknown	Unknown	Unknown	12 12 12	12 本 で 本 で や	HP01-23

Endnotes

- 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 Fémmûvek 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 Cartridge 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 HPo2-36. 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 PPo2-o2 and PPo2-o3.
- 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'. HPo2-33 and CPo2-05.
- 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 location 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 Fémmûvek 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 cartridge 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.

References

- BBC News (London). 2012. "'Saudi Weapons'' seen at Syria rebel base'. Online edition. 8 October. http://www.bbc.co.uk/news/world-middle-east-19874256>
- Bussard, Michael. 2012. Ammo Encyclopedia (4th edition). Minneapolis: Blue Book Publications, Inc.
- Charbonneau, Louis. 2013. 'Iran steps up weapons lifeline to Assad'. *Reuters*. Online U.S. edition. 14 March. http://www.reuters.com/article/2013/03/14/us-syria-crisis-iran-idUSBRE92D05 U20130314>
- Chivers, C.J. 2009. 'Arms Sent by U.S. May Be Falling Into Taliban Hands'. *The New York Times*. Online edition. 19 May. http://www.nytimes.com/2009/05/20/world/asia/20ammo.html? pagewanted=all&_r=0>
- . 2012a. 'What a Crate in Syria Says About Saudi Help to the Rebels'. At War. Notes From the Front Lines (New York Times blog). 11 October. Accessed 1 July 2013. http://atwar.blogs.nytimes.com/2012/10/11/what-a-crate-in-syria-says-about-saudi-help-to-the-rebels/>
- . 2012b. 'Dirty Tricks of Government Forces: Where Deception and Deadliness Meet Inside a Gun'. At War, Notes From the Front Lines (New York Times blog). 7 November. Accessed 1 July 2013. http://atwar.blogs.nytimes.com/2012/11/07/dirty-tricks-of-government-forceswhere-deception-and-deadliness-meet-inside-a-gun/>
- 2012c. 'Arming for the Syrian War: Do Soaring Prices Predict Escalating Conflict?' At War (New York Times blog). 17 July. Accessed 23 July 2013. http://atwar.blogs.nytimes.com/2012/07/17/arming-for-the-syrian-war-do-soaring-prices-predict-escalating-conflict/>
- and Eric Schmitt. 2013. 'Arms Shipments Seen From Sudan to Syria Rebels'. The New York Times. Online edition. 12 August. http://www.nytimes.com/2013/08/13/world/africa/ arms-shipments-seen-from-sudan-to-syria-rebels.html?hp&r=0>
- Conflict Armament Research. 2012. *The Distribution of Iranian Ammunition in Africa: Evidence From a Nine-Country Investigation*. London: Conflict Armament Research. Accessed 4 July 2013. <http://www.conflictarm.com/images/Iranian_Ammunition.pdf>
- Fiocchi, Pietro. 2001. Correspondence with Michael Goines (email), November. Accessed 12 March 2013. http://www.fourten.org.uk/36gauge.html
- Fisk, Robert. 2013. 'Iran to send 4,000 troops to aid President Assad forces in Syria'. *The Independent*. Online edition. 16 June. http://www.independent.co.uk/news/world/middle-east/ iran-to-send-4000-troops-to-aid-president-assad-forces-in-syria-8660358.html>
- Florquin, Nicolas. 2013. 'Price Watch: Arms and Ammunition at Illicit Markets'. In *Small Arms Survey* 2013: *Everyday Dangers*. Cambridge: Cambridge University Press.
- Jenzen-Jones, N.R. 2012. 'Saudi Arabian Army ammunition in Syria'. *The Rogue Adventurer*. 10 October. Accessed 30 June 2013. http://rogueadventurer.com/2012/10/10/saudi-arabian-army-ammunition-in-syria/
- Knights of the Year (KOTY; (تب فنس اسرف من اسرد). 2012. Web site (Facebook page). Accessed 14 November 2013. https://www.facebook.com/KtybtFrsanAlsnt

- Spleeters, Damien. 2012. 'Guerrilla Country'. Foreign Policy. Web edition. 15 October. http://www.foreignpolicy.com/articles/2012/10/15/Guerrilla_Country_Syria_Jebel_Zawiya
- 2013. 'Sur les traces des missiles sol-air en Syrie'. Slate.fr. 28 March. Accessed 22 July. http://www.slate.fr/story/69965/syrie-missiles-sol-air
- SCWN (Syria Civil War News). 2013 'Syria: SAA Sabotage Rebel Ammuntion'. Posted on SCWN YouTube Channel, 12 April. https://www.youtube.com/watch?v=_ms5Qd2Lx40
- Syria Tracker. 2013. *Cause of Death by Governorate*. Fatality data for Syria as of 7 June 2013, and provided by Taha Kass-Hout, Syria Tracker, a project of the Humanitarian Tracker, 13 July.
- Worth, Robert F. 2012. 'Citing U.S. Fears, Arab Allies Limit Syrian Rebel Aid'. The New York Times. Online edition. 6 October. http://www.nytimes.com/2012/10/07/world/middleeast/citing-us-fears-arab-allies-limit-aid-to-syrian-rebels.html?hpw>

YouTube. 2013 '(untitled)'. Accessed 14 November.

<https://www.youtube.com/watch?v=5RHGwRdSr>

Publications list

Occasional Papers

- 1 Re-Armament in Sierra Leone: One Year After the Lomé Peace Agreement, by Eric Berman, December 2000
- 2 Removing Small Arms from Society: A Review of Weapons Collection and Destruction Programmes, by Sami Faltas, Glenn McDonald, and Camilla Waszink, July 2001
- 3 *Legal Controls on Small Arms and Light Weapons in Southeast Asia,* by Katherine Kramer (with Nonviolence International Southeast Asia), July 2001
- 4 Shining a Light on Small Arms Exports: The Record of State Transparency, by Maria Haug, Martin Langvandslien, Lora Lumpe, and Nic Marsh (with NISAT), January 2002
- 5 Stray Bullets: The Impact of Small Arms Misuse in Central America, by William Godnick, with Robert Muggah and Camilla Waszink, November 2002
- 6 Politics from the Barrel of a Gun: Small Arms Proliferation and Conflict in the Republic of Georgia, by Spyros Demetriou, November 2002
- 7 Making Global Public Policy: The Case of Small Arms and Light Weapons, by Edward Laurance and Rachel Stohl, December 2002
- 8 Small Arms in the Pacific, by Philip Alpers and Conor Twyford, March 2003
- 9 Demand, Stockpiles, and Social Controls: Small Arms in Yemen, by Derek B. Miller, May 2003
- 10 Beyond the Kalashnikov: Small Arms Production, Exports, and Stockpiles in the Russian Federation, by Maxim Pyadushkin, with Maria Haug and Anna Matveeva, August 2003
- 11 In the Shadow of a Cease-fire: The Impacts of Small Arms Availability and Misuse in Sri Lanka, by Chris Smith, October 2003
- 12 Small Arms in Kyrgyzstan: Post-revolutionary Proliferation, by S. Neil MacFarlane and Stina Torjesen, March 2007, ISBN 2-8288-0076-8, also in Kyrgyz and Russian (first printed as Kyrgyzstan: A Small Arms Anomaly in Central Asia?, by S. Neil MacFarlane and Stina Torjesen, February 2004)
- 13 Small Arms and Light Weapons Production in Eastern, Central, and Southeast Europe, by Yudit Kiss, October 2004, ISBN 2-8288-0057-1
- 14 Securing Haiti's Transition: Reviewing Human Insecurity and the Prospects for Disarmament, Demobilization, and Reintegration, by Robert Muggah, October 2005, updated, ISBN 2-8288-0066-0
- 15 Silencing Guns: Local Perspectives on Small Arms and Armed Violence in Rural South Pacific Islands Communities, edited by Emile LeBrun and Robert Muggah, June 2005, ISBN 2-8288-0064-4
- 16 Behind a Veil of Secrecy: Military Small Arms and Light Weapons Production in Western Europe, by Reinhilde Weidacher, November 2005, ISBN 2-8288-0065-2
- 17 Tajikistan's Road to Stability: Reduction in Small Arms Proliferation and Remaining Challenges, by Stina Torjesen, Christina Wille, and S. Neil MacFarlane, November 2005, ISBN 2-8288-0067-9
- 18 Demanding Attention: Addressing the Dynamics of Small Arms Demand, by David Atwood, Anne-Kathrin Glatz, and Robert Muggah, January 2006, ISBN 2-8288-0069-5

- 19 A Guide to the US Small Arms Market, Industry, and Exports, 1998–2004, by Tamar Gabelnick, Maria Haug, and Lora Lumpe, September 2006, ISBN 2-8288-0071-7
- Small Arms, Armed Violence, and Insecurity in Nigeria: The Niger Delta in Perspective, by Jennifer
 M. Hazen with Jonas Horner, December 2007, 2-8288-0090-3
- 21 Crisis in Karamoja: Armed Violence and the Failure of Disarmament in Uganda's Most Deprived Region, by James Bevan, June 2008, ISBN 2-8288-0094-6
- 22 Blowback: Kenya's Illicit Ammunition Problem in Turkana North District, by James Bevan, June 2008, ISBN 2-8288-0098-9
- 23 Gangs of Central America: Causes, Costs, and Interventions, by Dennis Rodgers, Robert Muggah, and Chris Stevenson, May 2009, ISBN 978-2-940415-13-7
- 24 *Arms in and around Mauritania: National and Regional Security Implications,* by Stéphanie Pézard with Anne-Kathrin Glatz, June 2010, ISBN 978-2-940415-35-9 (also available in French)
- 25 Transparency Counts: Assessing State Reporting on Small Arms Transfers, 2001–08, by Jasna Lazarevic, June 2010, ISBN 978-2-940415-34-2
- 26 Confronting the Don: The Political Economy of Gang Violence in Jamaica, by Glaister Leslie, November 2010, ISBN 978-2-940415-38-0
- 27 Safer Stockpiles: Practitioners' Experiences with Physical Security and Stockpile Management (PSSM) Assistance Programmes, edited by Benjamin King, April 2011, ISBN 978-2-940415-54-0
- 28 Analysis of National Reports: Implementation of the UN Programme of Action on Small Arms and the International Tracing Instrument in 2009–10, by Sarah Parker, May 2011, ISBN 978-2-940415-55-7
- 29 Blue Skies and Dark Clouds: Kazakhstan and Small Arms, edited by Nicolas Florquin, Dauren Aben, and Takhmina Karimova, April 2012, ISBN 978-2-9700771-2-1
- 30 *The Programme of Action Implementation Monitor (Phase 1): Assessing Reported Progress,* by Sarah Parker with Katherine Green, August 2012, ISBN 978-2-9700816-2-3
- 31 Internal Control: Codes of Conducts within Insurgent Armed Groups, by Olivier Bangerter, November 2012, ISBN 978-2-9700816-8-5

Special Reports

- Humanitarianism Under Threat: The Humanitarian Impact of Small Arms and Light Weapons, by Robert Muggah and Eric Berman, commissioned by the Reference Group on Small Arms of the UN Inter-Agency Standing Committee, July 2001
- 2 Small Arms Availability, Trade, and Impacts in the Republic of Congo, by Spyros Demetriou, Robert Muggah, and Ian Biddle, commissioned by the International Organization for Migration and the UN Development Programme, April 2002
- 3 Kosovo and the Gun: A Baseline Assessment of Small Arms and Light Weapons in Kosovo, by Anna Khakee and Nicolas Florquin, commissioned by the United Nations Development Programme, June 2003
- 4 A Fragile Peace: Guns and Security in Post-conflict Macedonia, by Suzette R. Grillot, Wolf-Christian Paes, Hans Risser, and Shelly O. Stoneman, commissioned by United Nations Development Programme, and co-published by the Bonn International Center for Conversion, SEESAC in Belgrade, and the Small Arms Survey, June 2004, ISBN 2-8288-0056-3

- 5 Gun-running in Papua New Guinea: From Arrows to Assault Weapons in the Southern Highlands, by Philip Alpers, June 2005, ISBN 2-8288-0062-8
- 6 *La République Centrafricaine: Une étude de cas sur les armes légères et les conflits,* by Eric G. Berman, published with financial support from UNDP, July 2006, ISBN 2-8288-0073-3
- 7 Small Arms in Burundi: Disarming the Civilian Population in Peacetime (Les armes légères au Burundi : après la paix, le défi du désarmement civil), by Stéphanie Pézard and Nicolas Florquin, co-published with Ligue Iteka with support from UNDP–Burundi and Oxfam–NOVIB, in English and French, August 2007, ISBN 2-8288-0080-6 ISSN 1661-4453
- 8 Quoi de neuf sur le front congolais ? Evaluation de base sur la circulation des armes légères et de petit calibre en République du Congo, par Robert Muggah et Ryan Nichols, publié avec le Programme des Nations Unies pour le Développement (PNUD)–République du Congo, décembre 2007, 2-8288-0089-X
- 9 Small Arms in Rio de Janeiro: The Guns, the Buyback, and the Victims, by Pablo Dreyfus, Luis Eduardo Guedes, Ben Lessing, Antônio Rangel Bandeira, Marcelo de Sousa Nascimento, and Patricia Silveira Rivero, a study by the Small Arms Survey, Viva Rio, and ISER, December 2008, ISBN 2-8288-0102-0
- 10 Firearms-related Violence in Mozambique, a joint publication of the Ministry of the Interior of Mozambique, the World Health Organization–Mozambique, and the Small Arms Survey, June 2009, ISBN 978-2-940415-14-4
- Small Arms Production in Brazil: Production, Trade, and Holdings, by Pablo Dreyfus, Benjamin Lessing, Marcelo de Sousa Nascimento, and Júlio Cesar Purcena, a joint publication with Viva Rio and ISER, September 2010, ISBN 978-2-940415-40-3
- 12 *Timor-Leste Armed Violence Assessment Final Report,* edited by Robert Muggah and Emile LeBrun, a joint publication of ActionAid, AusAID, and the Small Arms Survey, October 2010, ISBN 978-2-940415-43-4
- 13 Significant Surpluses: Weapons and Ammunition Stockpiles in South-east Europe, by Pierre Gobinet, a study of the RASR Initiative, December 2011, ISBN 978-2-9700771-2-1
- 14 Enquête national sur les armes légères et de petit calibre en Côte d'Ivoire: Les défis du contrôle des armes et de la lutte contre la violence armée avant la crise post-électorale, by Savannah de Tessières, March 2012, ISBN 978-2-9700771-6-9
- 15 *Capabilities and Capacities: A Survey of South-east Europe's Demilitarization Infrastructure,* by Pierre Gobinet, a study of the RASR Initiative, April 2012, ISBN 978-2-9700771-7-6
- 16 Availability of Small Arms and Perceptions of Security in Kenya: An Assessment, by Manasseh Wepundi, Eliud Nthiga, Eliud Kabuu, Ryan Murray, and Anna Alvazzi del Frate, a joint publication of Kenya National Focus Point on Small Arms and Light Weapons, and the Small Arms Survey, with support from the Ministry of Foreign Affairs of Denmark, June 2012, ISBN 978-2-9700771-8-3
- 17 Security Provision and Small Arms in Karamoja: A Survey of Perceptions, by Kees Kingma, Frank Muhereza, Ryan Murray, Matthias Nowak, and Lilu Thapa, a joint publication of the Danish Demining Group and the Small Arms Survey, September 2012, ISBN 978-2-9700816-3-0
- 18 Costs and Consequences: Unplanned Explosions and Demilitarization in South-east Europe, by Jasna Lazarević, a joint publication of the Regional Approach for Stockpile Reduction, the US Department of State's Office of Weapons Removal and Abatement, and the Small Arms Survey, November 2012, ISBN 978-2-9700816-7-8

- 19 Making a Mark: Reporting on Firearms Marking in the RECSA Region, by James Bevan and Benjamin King, a joint publication of Regional Centre on Small Arms in the Great Lakes Region, the Horn of Africa and Bordering States, and the Small Arms Survey; with support from the US Department of State's Office of Weapons Removal and Abatement. April 2013, ISBN 978-2-9700856-1-4
- 20 In Search of Lasting Security: An Assessment of Armed Violence in Nepal, by Mihaela Racovita, Ryan Murray, and Sudhindra Sharma, a joint publication of the Interdisciplinary Analysts, and the Small Arms Survey's Nepal Armed Violence Assessment project, supported by Australian Aid, AusAID. May 2013, ISBN 978-2-9700856-3-8

Book Series

- Armed and Aimless: Armed Groups, Guns, and Human Security in the ECOWAS Region, edited by Nicolas Florquin and Eric G. Berman, May 2005, ISBN 2-8288-0063-6
- Armés mais désoeuvrés: Groupes armés, armes légères et sécurité humaine dans la région de la CEDEAO, edited by Nicolas Florquin and Eric Berman, co-published with GRIP, March 2006, ISBN 2-87291-023-9
- *Targeting Ammunition: A Primer*, edited by Stéphanie Pézard and Holger Anders, co-published with CICS, GRIP, SEESAC, and Viva Rio, June 2006, ISBN 2-8288-0072-5
- *No Refuge: The Crisis of Refugee Militarization in Africa*, edited by Robert Muggah, co-published with BICC, published by Zed Books, July 2006, ISBN 1-84277-789-0
- *Conventional Ammunition in Surplus: A Reference Guide*, edited by James Bevan, published in cooperation with BICC, FAS, GRIP, and SEESAC, January 2008, ISBN 2-8288-0092-X
- Afghanistan, Arms and Conflict: Armed groups, disarmament and security in a post-war society, by Michael Bhatia and Mark Sedra, April 2008, published by Routledge, ISBN 978-0-415-45308-0
- Ammunition Tracing Kit: Protocols and Procedures for Recording Small-calibre Ammunition, developed by James Bevan, June 2008, ISBN 2-8288-0097-0
- Kit de Traçage des Munitions: Protocoles et Procédures de Signalement des Munitions de Petit Calibre, developed by James Bevan, co-published with GRIP, June 2008, ISBN 2-8288-0097-0
- The Central African Republic and Small Arms: A Regional Tinderbox, by Eric G. Berman with Louisa N. Lombard, December 2008, ISBN 2-8288-0103-9
- La République Centrafricaine et les Armes Légères: Une Poudrière Régionale, by Eric G. Berman with Louisa N. Lombard, co-published with GRIP, May 2009, ISBN 978-2-87291-027-4
- Security and Post-Conflict Reconstruction: Dealing with fighters in the aftermath of war, edited by Robert Muggah, January 2009, published by Routledge, ISBN 978-0-415-46054-5
- The Politics of Destroying Surplus Small Arms Inconspicuous Disarmament, edited by Aaron Karp, July 2009, published by Routledge, ISBN 978-0-415-49461-8
- Primed and Purposeful: Armed Groups and Human Security Efforts in the Philippines, by Soliman M. Santos, Jr. and Paz Verdades M. Santos, with Octavio A. Dinampo, Herman Joseph S. Kraft, Artha Kira R. Paredes, and Raymond Jose G. Quilop, a joint publication of the South–South Network for Non-State Armed Group Engagement and the Small Arms Survey, April 2010, ISBN 978-2-940415-29-8
- Controlling Small Arms: Consolidation, Innovation and Relevance in Research and Policy, edited by Peter Batchelor and Kai Michael Kenkel, January 2014, published by Routledge, ISBN 978-0-415-85649-2