

ARCHIVED REPORT

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20 to 57mm Cannon Ammunition (International)

Outlook

- Serial production ongoing; non-U.S. and non-European manufacturers continue to increase their collective share of the international market
- International acceptance of NATO-standard 30mm ammunition continues to grow
- We expect production of medium-caliber cannon ammunition from all non-U.S. and non-European sources to average nearly 43 million rounds annually through 2019

Orientation

Description. Ammunition for medium-caliber automatic cannon, 20mm to 57mm.

Sponsor. Both individual contractors and various governments sponsor ammunition development and production.

Licensees. Due to the unique nature of this market, players rarely, if ever, make licensing arrangements.

Status. Development through serial production.

Total Produced. Through 2009, we estimate the various non-U.S. and non-European contractors

produced over 1.24 billion medium-caliber automatic cannon cartridges since 1980 inclusive.

Application. Ammunition for vehicle- and aircraft-mounted automatic cannon, providing direct-fire and air-defense support for offensive and defensive ground operations.

Price Range. In 2010 U.S. dollars, the unit prices range from \$1.08 for 20x120mm rounds to \$14.62 for 40x365mm cartridges.

Contractors

Prime

China North Industries Corp (NORINCO)	http://www.norinco.com , 12A Guang An Men Nan Jie, PO Box 2932, Beijing, 100053 China, Tel: + 86 10 6352 9988, Fax: + 86 10 6354 0398, Email: norinco@norinco.com.cn , Prime
Companhia Brasileira de Cartuchos, CBC Magtech	http://www.cbc.com.br , Av. Humberto de Campos 3220, Guapituba, 09426 000 Ribeirao Pires, Brazil, Tel: + 55 11 2139 8219, Fax: + 55 11 2139 8323, Email: export@cbc.com.br , Prime
Denel (Pty) Ltd	http://www.denel.co.za , Nellmapius Dr, Irene, 0046 South Africa, Tel: + 27 12 671 2700, Fax: + 27 12 671 2751, Email: marketing@denel.co.za , Prime
Fabrica Militar de Polvoras y	http://www.fanazul.com.ar , Route 80 Km 9, Azul, 7300 Buenos Aires, Argentina,

20 to 57mm Cannon Ammunition (International)

Explosivos Azul, FM "FANAZUL"	Tel: + 54 02281 433330, Fax: + 54 02281 430790, Email: ventas@fanazul.com.ar, Prime
Hsing Hua Electric Machinery Corp, Hsing Hua Arsenal	http://www.thh-electric.com.tw , No 7 Alley 29 Lane 29, Sec 1 Anjhong Rd, Tainan City, 709 Annan District, Taiwan, Tel: + 886 6 245 6156, Fax: + 886 6 255 8586, Email: hsinhua.edos@msa.hinet.net, Prime

20 to 57mm Cannon Ammunition (International)

Ordnance Factories Organization of India, Ordnance Factory Board - Export Division	http://ofbindia.gov.in/index.php , 10 A, S K Bose Rd, Kolkata, 700 001 India, Tel: + 91 33 2248 1209, Fax: + 91 33 2248 9744, Email: ofbtrade@vsnl.net, Prime
Pakistan Ordnance Factories	http://www.pof.gov.pk , Wah Cannt, 47010 Pakistan, Tel: + 92 51 931 4101, Fax: + 92 596 931 4058, Email: exports@pof.gov.pk, Prime
Poongsan Defense	http://www.poongsan.co.kr , Keuk-Dong Bldg, 12F, 60-1 3-ga Chungmu-Ro, Seoul, Korea, South, Tel: + 82 2 3406 5114, Fax: + 82 2 3406 5400, Email: jwkang@poongsan.co.kr, Prime
Singapore Technologies Kinetics Ltd	http://www.stengg.com , 249 Jalan Boon Lay, Singapore, 619523 Singapore, Tel: + 65 6473 6311, Fax: + 65 6471 0662, Email: comms.kinetics@stengg.com, Prime
Thales Australia	http://www.thalesgroup.com/australia , Locked Bag 3000, Potts Point, 2011 New South Wales, Australia, Tel: + 61 2 9562 3333, Email: communications@thalesgroup.com, Prime

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Technical Data

<u>Caliber</u>	<u>Designation</u>	<u>Ammunition Type</u>
<u>Manufacturer – Thales Australia (formerly ADI Ltd)</u>		
20x102mm	M55A1	Target Practice
20x102mm	M56	High Explosive Incendiary
20x102mm	Mk 149-4 Phalanx	Armor Piercing Discarding Sabot
25x137mm	M793	Semi-Armor Piercing High Explosive Incendiary-Tracer
<u>Manufacturer – FM "FANAZUL"</u>		
20x110mm	FMK 1 Mod 0	High Explosive-Tracer
20x110mm	FMK 7 Mod 0	High Explosive Incendiary
20x110mm	FMK 15 Mod 0	High Explosive Incendiary
20x110mm	unknown	High Explosive Incendiary-Tracer
20x110mm	FMK 4 Mod 0	Target Practice-Tracer
20x110mm	FMK 6 Mod 0	Target Practice-Tracer
20x110mm	FMK 13 Mod 0	Target Practice-Tracer
20x110mm	unknown	Dummy
20x139mm	unknown	High Explosive Incendiary
20x139mm	unknown	Armor Piercing-Tracer
20x139mm	FMK 8 Mod 0	Target Practice-Tracer
20x139mm	unknown	Target Practice
30x113mm	SPEINC	Armor Piercing
30x113mm	EINC	High Explosive Incendiary
30x113mm	EINC-AD*	High Explosive Incendiary
30x113mm	EI	High Explosive
30x113mm	EJ	Target Practice
30x113mm	unknown	Target Practice-Tracer
30x170mm	EINC-AD	High Explosive Incendiary
30x170mm	EINC-T-AD	High Explosive Incendiary-Tracer
30x170mm	SPEINC	Armor Piercing
30x170mm	EJ	Target Practice
30x170mm	EJT	Target Practice-Tracer
40x311mm	unknown	High Explosive Incendiary-Tracer
40x311mm	FMK 3 Mod 0 EJ	Target Practice
40x311mm	FMK 3 Mod 0 EJT	Target Practice-Tracer
40x311mm	FMK 2 Mod 0 EJT	Armor Piercing-Tracer

20 to 57mm Cannon Ammunition (International)

Caliber	Designation	Ammunition Type
Manufacturer – China North Industries Corp (NORINCO)		
20x99mm	Unknown	High Explosive Incendiary
23x115mm	Type 2	High Explosive Incendiary
23x115mm	Unknown	High Explosive-Tracer
23x115mm	Unknown	High Explosive Incendiary-Tracer
23x115mm	Unknown	Armor Piercing Incendiary
23x152mm B	Unknown	High Explosive
23x152mm B	Unknown	High Explosive Incendiary
23x152mm B	Unknown	High Explosive Incendiary-Tracer
23x152mm B	Unknown	Armor Piercing Incendiary
25x218mm	Unknown	High Explosive Incendiary-Tracer
25x218mm	unknown	Armor Piercing-Tracer
25x218mm	unknown	Target Practice
30x121mm	unknown	High Explosive Incendiary
30x121mm	unknown	High Explosive Incendiary-Tracer
30x121mm	unknown	Target Practice-Tracer
30x210mm B	unknown	High Explosive
30x210mm B	unknown	High Explosive Incendiary
35x228mm	unknown	High Explosive Incendiary
35x228mm	unknown	High Explosive Incendiary-Tracer
35x228mm	unknown	Target Practice-Tracer
37x292mm	unknown	High Explosive
37x292mm	unknown	High Explosive-Tracer
37x292mm	unknown	High Explosive Incendiary-Tracer
37x292mm	unknown	Armor Piercing High Explosive
37x292mm	unknown	Armor Piercing Incendiary-Tracer
37x292mm	unknown	Armor Piercing-Tracer
37x292mm	unknown	Target Practice-Tracer
57x348mm	Type 59	High Explosive-Tracer
57x348mm	unknown	Armor Piercing-Tracer
Manufacturer – Companhia Brasileira de Cartuchos (CBC Magtech)		
20x80mm RB	unknown	High Explosive
20x80mm RB	unknown	Target Practice
20x80mm RB	unknown	Target Practice-Tracer
20x80mm RB	unknown	Dummy
20x102mm	M56A3	High Explosive Incendiary
20x102mm	unknown	Armor Piercing Incendiary
20x102mm	M220	Target Practice-Tracer
20x102mm	unknown	Dummy
20x110mm RB	M72E1	High Explosive Incendiary-Tracer
20x110mm RB	M74E1	High Explosive Incendiary
20x110mm RB	unknown	Target Practice-Tracer
20x110mm RB	unknown	Target Practice
20x110mm	M74E1	High Explosive Incendiary
20x110mm	M72E1	High Explosive Incendiary-Tracer
20x110mm	unknown	Target Practice-Tracer
20x110mm	unknown	Target Practice
30x113mm	unknown	Armor Piercing Incendiary
30x113mm	unknown	High Explosive Incendiary
30x113mm	unknown	High Explosive Incendiary-Tracer
30x113mm	unknown	Target Practice
30x113mm	unknown	Target Practice-Tracer
Manufacturer – Denel (Pty) Ltd		
20x82mm	unknown	High Explosive Incendiary
20x82mm	unknown	High Explosive Incendiary-Tracer
20x82mm	unknown	Semi-Armor Piercing High Explosive Incendiary
20x82mm	unknown	Target Practice
20x82mm	unknown	Target Practice-Tracer
20x139mm	unknown	High Explosive Incendiary

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<u>Caliber</u>	<u>Designation</u>	<u>Ammunition Type</u>
20x139mm	unknown	High Explosive Incendiary-Tracer
20x139mm	unknown	Semi-Armor Piercing
20x139mm	unknown	Armor Piercing Capped Tracer
20x139mm	unknown	Target Practice
20x139mm	unknown	Target Practice-Tracer
23x152mm B	unknown*	High Explosive Incendiary-Tracer
23x152mm B	unknown	Armor Piercing Capped Incendiary-Tracer
23x152mm B	unknown	Semi-Armor Piercing High Explosive Incendiary
30x113mm	unknown	High Explosive Incendiary
30x113mm	unknown	High Explosive Incendiary
30x113mm	M1A1	Armor Piercing Capped Incendiary
30x113mm	unknown	Target Practice
30x113mm	unknown	High Explosive Incendiary-Tracer
30x113mm	M1A1-T	Armor Piercing Capped Incendiary-Tracer
30x113mm	unknown	Target Practice-Tracer
30x173mm	unknown	Armor Piercing Incendiary
30x173mm	unknown	Semi-Armor Piercing High Explosive Incendiary
35x228mm	unknown	High Explosive Incendiary
35x228mm	unknown	Target Practice-Tracer
35x228mm	M3A1	High Explosive Incendiary
35x228mm	M3A1	High Explosive Incendiary-Tracer
35x228mm	M1A1	Semi-Armor Piercing High Explosive Incendiary
35x228mm	M1A1	Target Practice-Tracer
40x311mm	unknown	High Explosive Incendiary-Tracer
40x311mm	unknown	High Explosive
40x311mm	unknown	Target Practice
40x311mm	unknown	Target Practice-Tracer
40x365mm	unknown	High Explosive Incendiary
40x365mm	unknown	High Explosive-Tracer
40x365mm	PFF	Pre-Fragmented High Explosive
40x365mm	unknown	Target Practice
40x365mm	unknown	Target Practice-Tracer

Manufacturer – Hsing Hua Electric Machinery Corp

40x365mm	Unknown	High Explosive Incendiary
40x365mm	Unknown	High Explosive Incendiary-Tracer
40x365mm	Unknown	Target Practice
40x365mm	Unknown	Target Practice-Tracer

Manufacturer – Ordnance Factories Organization of India

23x115mm	Unknown	High Explosive Incendiary-Tracer
23x115mm	unknown	Armor Piercing Incendiary
23x115mm	unknown	Target Practice-Tracer
23x115mm	Ghasha	unknown
23x115mm	Schilka	unknown
30x113mm	unknown	High Explosive
30x164mm	unknown	High Explosive Incendiary
30x164mm	unknown	High Explosive Incendiary-Tracer
30x164mm	unknown	Armor Piercing-Tracer
30x164mm	BMP-2K HE/T	High Explosive-Tracer
30x164mm	BMP-2K AP/T	Armor Piercing-Tracer
30x164mm	BMP-2K HE/I	High Explosive Incendiary
30x164mm	Ghasha	unknown
30x164mm	ADEN	unknown
40x365mm	unknown	High Explosive-Tracer
40x365mm	L70 HET	High Explosive-Tracer
40x365mm	L70 TPT	Target Practice-Tracer

Manufacturer – Pakistan Ordnance Factories

20x102mm	M56A3	High Explosive Incendiary
20x102mm	M53	Armor Piercing Incendiary

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<u>Caliber</u>	<u>Designation</u>	<u>Ammunition Type</u>
20x102mm	M55A2	Target Practice-Tracer
23x115mm	unknown	High Explosive
23x115mm	unknown	High Explosive-Tracer
23x115mm	unknown	High Explosive Incendiary
23x115mm	unknown	High Explosive Incendiary-Tracer
23x115mm	unknown	Target Practice-Tracer
23x115mm	unknown	Armor Piercing
23x115mm	unknown	Armor Piercing Incendiary
23x115mm	unknown	Armor Piercing Incendiary-Tracer
23x152mm B	unknown	High Explosive Incendiary-Tracer
23x152mm B	unknown	Armor Piercing Incendiary
30x113mm	unknown	Armor Piercing Incendiary
30x113mm	unknown	High Explosive Incendiary
30x113mm	unknown	Target Practice
30x121mm	unknown	High Explosive Incendiary
30x121mm	unknown	High Explosive Incendiary-Tracer
30x121mm	unknown	Semi-Armor Piercing High Explosive Incendiary
30x121mm	unknown	Target Practice-Tracer
35x228mm	unknown	High Explosive Incendiary
35x228mm	unknown	High Explosive Incendiary-Tracer
35x228mm	unknown	Semi-Armor Piercing High Explosive Incendiary
35x228mm	unknown	Target Practice-Tracer
37x292mm	unknown	High Explosive-Tracer
37x292mm	unknown	Target Practice
40x311mm	unknown	High Explosive-Tracer
40x365mm	unknown	High Explosive Incendiary-Tracer
40x365mm	unknown	Target Practice-Tracer
40x365mm	unknown	Target Practice

Manufacturer – Poongsan Defense

20x102mm	M56A3	High Explosive Incendiary
20x102mm	M246	High Explosive Incendiary-Tracer
20x102mm	M220	Target Practice-Tracer
20x102mm	M55A2	Target Practice
20x128mm	unknown	High Explosive Incendiary
20x128mm	unknown	High Explosive Incendiary-Tracer
20x128mm	unknown	Pre-Fragmented High Explosive Incendiary
20x128mm	unknown	Target Practice-Tracer
30x170mm	unknown	High Explosive Incendiary
30x170mm	unknown	High Explosive Incendiary-Tracer
30x170mm	unknown	Target Practice
30x170mm	unknown	Target Practice-Tracer
30x173mm	unknown	High Explosive Incendiary-Tracer
30x173mm	unknown	High Explosive Incendiary
30x173mm	unknown	Target Practice-Tracer
35x228mm	K202 KA1	High Explosive Incendiary-Tracer
35x228mm	K203	Target Practice-Tracer
40x311mm	unknown	Pre-Fragmented High Explosive Incendiary
40x311mm	Mk 2	High Explosive Incendiary-Tracer
40x311mm	unknown	High Explosive
40x311mm	Unknown	Armor Piercing Capped-Tracer
40x311mm	unknown	High Explosive Incendiary-Tracer
40x311mm	unknown	Pre-Fragmented High Explosive
40x365mm	K216	High Explosive Incendiary-Tracer
40x365mm	K219	Armor Piercing-Tracer
40x365mm	K218	Pre-Fragmented High Explosive

Manufacturer – Singapore Technologies Kinetics Ltd

20x102mm	unknown	Target Practice
20x102mm	unknown	High Explosive Incendiary
20x102mm	unknown	High Explosive Incendiary-Tracer

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<u>Caliber</u>	<u>Designation</u>	<u>Ammunition Type</u>
20x102mm	unknown	Armor Piercing Incendiary
20x102mm	unknown	Target Practice
20x102mm	unknown	Target Practice-Tracer
20x110mm	unknown	High Explosive Incendiary
20x110mm	unknown	Armor Piercing Incendiary
20x110mm	unknown	Target Practice
20x110mm	unknown	Target Practice-Tracer
20x120mm	unknown	High Explosive Incendiary
20x120mm	unknown	Armor Piercing Incendiary
20x120mm	unknown	Target Practice
20x120mm	unknown	Target Practice-Tracer
20x128mm	unknown	Target Practice
20x128mm	unknown	Target Practice-Tracer
20x128mm	unknown	High Explosive Incendiary
20x128mm	unknown	Semi-Armor Piercing High Explosive
20x139mm	unknown	High Explosive Incendiary
20x139mm	unknown	High Explosive Incendiary-Tracer
20x139mm	unknown	Armor Piercing-Tracer
20x139mm	unknown	Target Practice-Tracer
20x139mm	unknown	Target Practice
30x113mm	unknown	High Explosive Incendiary
30x113mm	unknown	Semi-Armor Piercing High Explosive
30x113mm	unknown	Armor Piercing Incendiary
30x113mm	unknown	Target Practice
30x113mm	unknown	High Explosive Incendiary
30x113mm	unknown	Semi-Armor Piercing High Explosive
30x113mm	unknown	Target Practice
35x228mm	unknown	High Explosive Incendiary
35x228mm	unknown	Semi-Armor Piercing High Explosive Incendiary
35x228mm	unknown	Target Practice-Tracer
35x228mm	unknown	Target Practice
40x365mm	unknown	High Explosive-Tracer
40x365mm	unknown	Pre-Fragmented High Explosive
40x365mm	unknown	Target Practice
40x365mm	unknown	Target Practice-Tracer

*Self-destruct-type ammunition.

Variants/Upgrades

Variants. Not generally applicable. Upgraded rounds usually carry new designations to distinguish them from other cartridges of similar design.

Modernization and Retrofit Overview. Not applicable. The contractors integrate product improvements as production cut-ins.

Program Review

Background. Medium-caliber automatic cannon provide a cost-effective means of outfitting light combat vehicles and aircraft with effective firepower. Since the 1980s, medium-caliber automatic cannon have become firmly established in four areas:

- Light armored vehicle armament
- Light anti-aircraft systems

- Naval secondary/anti-aircraft ordnance
- Aircraft armament systems

While development work in medium-caliber automatic cannon ammunition has typically concentrated on the interface of fuze and ammunition types, the development of course-corrected and even fully guided projectiles by non-U.S. and non-European players is

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rapidly accelerating, albeit at a generally slower pace than in the European market.

In other mission areas, such as combat vehicle-mounted ordnance, the requirements for high rates of fire coupled with good critical hit probability effectively trump the potential benefits of advanced "smart" munitions.

Rise of International Players

The period of domination over the international medium-caliber automatic cannon ammunition market by a select group of U.S. and European players is clearly coming to an end. The number of non-U.S. and non-European players in this market continues to grow as nations seek to become self-sufficient for political and strategic reasons. Many non-U.S. and non-European players in the international market can take ready advantage of economies of labor and increasingly sophisticated industrial bases to produce highly competitive ammunition products.

Mastering the Learning Curve

In general, ammunition development by countries beyond the U.S. and Europe exhibits one further trend: the importation of American or European munitions leads to licensed production, which in turn serves to establish the technical capability (manufacturing infrastructure and skilled personnel) for indigenous development and production. Given the dynamics of this progression, it comes as no surprise that the international medium-caliber automatic cannon ammunition producers are careful to identify, then follow, the prevalent trends in U.S. and European ammunition development. Witness the growing acceptance of NATO-standard 30mm ammunition as the worldwide standard.

At present, about 20 major non-U.S. and non-European contractors are involved in the medium-caliber automatic cannon ammunition market. In this report, we briefly review only the most active players in the international market, so as to present a cross-section of the entire market.

AFRICA

Republic of South Africa

Denel (Pty) Ltd. In 1992, the state-owned umbrella arms firm ARMSCOR reorganized, transferring its manufacturing companies to Denel Ltd. Under Denel, NASCHEM and Pretoria Metal Pressings produce a full range of medium-caliber cannon ammunition for light anti-aircraft, fighting vehicle, and aircraft applications.

South Africa's military hardware has enjoyed a measure of success on the international arms market, despite the country's years of political and commercial ostracism. Since the lifting of long-standing United Nations

sanctions against South Africa in 1994, the country has found its military products to be much easier to export.

New Generation 35x228mm Line

The most important recent development coming out of the Denel organization is the so-called New Generation 35x228mm line of ammunition. This line is applicable to the popular Oerlikon Contraves KD series cannon, as well as the Gepard, Marksman, ZA-35 and other self-propelled systems. While the ballistics of the new-generation 35x228mm rounds are the same as those of the earlier rounds, the design and manufacturing methods differ, reducing the unit price. This ammunition, available in six types, is compatible with all suitably chambered 35mm cannon.

In 1997, Pretoria Metal Pressings secured a contract worth \$4.47 million for production of an undisclosed number of belted 23x152mm cartridges. This Denel subsidiary also secured an export sale to an unspecified "regional" customer in late 1999.

ASIA

India

Ordnance Factories Organization of India. As a component of India's Ministry of Defence, the Indian Ordnance Factories Organization produces a variety of Russian-pattern and Western-pattern medium-caliber cannon ammunition, including:

- Russian-pattern 23x115mm High Explosive Incendiary ammunition (since 2000)
- British-pattern 30x113mm ADEN ammunition for the associated aircraft cannon requirements
- Russian-pattern 30x164mm ammunition for India's license-produced BMP-2 (as the Sareth) mechanized infantry combat vehicle, mounting the 2A42 cannon
- 40x365Rmm High Explosive-Tracer rounds for the L/70, produced under license from Bofors

In 1996, unconfirmed reports suggested that India had conducted negotiations with one or more European cannon ammunition manufacturing firms regarding the development of an improved range of 30mm ammunition. In mid-1999, India reportedly accelerated "in a significant manner" its production of 30x164mm ammunition.

Pakistan

Pakistan Ordnance Factories. As a component of the Pakistan Ministry of Defense, the state-owned Pakistan Ordnance Factories employed around 45,000 people in 2000, making it the largest single industrial organization in Pakistan. This organization satisfies nearly all of

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Pakistan's ammunition requirements, producing a cross-section of NATO- and Chinese-pattern ammunition.

Increasing Export Share

By the early 1990s, Pakistan Ordnance Factories had become much more active in the export market, with sales of automatic cannon ammunition to nations in Asia (early 2000) and sub-Saharan Africa (early 2002). With 14 facilities in the Wah complex and the potential to expand, Pakistan Ordnance Factories has the capability to increase its export market share.

People's Republic of China

China North Industries Corp (NORINCO). Under the auspices of NORINCO, China's state-owned ammunition factories mainly produce Russian-pattern ammunition for domestic People's Liberation Army (PLA) requirements.

Leveraging Production Capacity

Since the 1970s, the PRC has steadily increased the export of medium-caliber cannon ammunition. NORINCO is reportedly considering the production and marketing of Western-pattern medium-caliber automatic cannon ammunition, including the 25x184mm ammunition of the KBB cannon.

As with most other major military hardware markets, the sheer scale of the PRC's manufacturing capacity makes NORINCO a potentially dominant figure in the international medium-caliber automatic cannon ammunition market.

Republic of China (Taiwan)

Hsing Hua Electric Machinery Corp. While primarily concerned with domestic requirements, the Hsing Hua Arsenal (a component of the Hsing Hua Electric Machinery Corp) also produces medium-caliber automatic cannon ammunition for a moderate amount of regional export.

The company produces 40mm ammunition for use in the still-popular M42 self-propelled anti-aircraft system, as well as ammunition for the Bofors L/70 systems.

Hsing Hua has exported this ammunition to a number of nations in the Middle and Far East, including Saudi Arabia and Thailand. In 1999, the company reported one sale to an undisclosed Latin American nation. The United States has also purchased Hsing Hua ammunition, for regional use by U.S. forces.

Republic of Korea

Poongsan Defense. This firm, formerly Poongsan Metal Corp (PMC), produces a variety of medium-caliber automatic cannon ammunition for domestic requirements and moderate export sales. Products include:

- 30mm ammunition for M167 and Oerlikon Contraves KCB-B cannon, mounted on the Fiat 6614 reconnaissance vehicle. More recently, the ROK Army has integrated the KCB cannon as the basis of the new Bi-Ho self-propelled anti-aircraft artillery system, resulting in increased demand for this pattern of ammunition.
- 35mm and 40mm ammunition (produced under license) for use in Oerlikon GDF/353MK and Bofors L/70 cannon, respectively.

U.S. Buys Local Products

The Republic of Korea's principal export customer for its medium-caliber automatic cannon ammunition has been the United States, which issues PMC-produced ammunition to U.S. units based in the Republic of Korea and elsewhere in the region.

Republic of Singapore

Singapore Technologies Kinetics Ltd. Known as Chartered Industries of Singapore until 2000, this firm has managed to make extensive use of the international market.

Extensive Product Line

ST-K currently produces and markets a line of 20mm, 30mm, and 35mm cannon ammunition. Much of the 20mm ammunition, in particular the ADEN aircraft cannon rounds, is for domestic military procurement. ST-K is also one of the few players that still offers 20x120mm ammunition for the world-famous Madsen cannon.

Singapore has exported medium-caliber cannon ammunition to Australia, Malaysia, New Zealand, Thailand, the United Arab Emirates, and the United States (for units based in the Far East).

Unconfirmed reports suggest Singapore Technologies Kinetics may be involved in the development of case-telescoped ammunition technology.

AUSTRALIA/NEW ZEALAND

Australia

Thales Australia. The Australian Department of Defence Support coordinates the functions of eight major facilities and several smaller units in the production of all types of ammunition. The formerly government-owned Australian Defence Industries Ltd, which has operated as a component of the Transfield and Thales joint venture team since August 1999, runs a number of these facilities.

In October 2006, the Thales Group (Neuilly-sur-Seine, France) acquired ADI Ltd. The Australian contractor now operates as Thales Australia.

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Domestic Demand Dominates

On July 10, 1998, a new 17-year renewable munitions supply agreement between (then) ADI and the Australian Department of Defence increased the contractor's munitions revenue to about AUD100 million a year. The total value of the contract for the initial 17-year period is more than AUD1.7 billion. The contractor had previously (after securing a 1995 agreement with the Australian DoD) invested more than AUD160 million in the development of a modern munitions production facility on a site at Benalla in northern Victoria. This facility replaced three older munitions plants in Sydney and Melbourne.

At present, the only known medium-caliber cannon ammunition products of Thales Australia are the following:

- 20mm M55 Training rounds
- 20mm M56 High Explosive Incendiary rounds
- 25mm M793 Semi-Armor Piercing High Explosive Incendiary-Tracer rounds

As the Australian Light Armored Vehicle inventory continues to grow, demand for 25mm ammunition (for the 25mm M242 Bushmaster automatic cannon) will likewise increase over the forecast period.

SOUTH AMERICA**Argentina**

FM 'FANAZUL.' The Direccion Generale de Fabricaciones Militares controls the production of ammunition in Argentina. The production of medium-caliber automatic cannon ammunition in Argentina is primarily for domestic consumption, with limited export. The Argentine Army employs 20mm, 30mm, 35mm, and 40mm anti-aircraft cannon; the Argentine Air Force employs 30mm cannon on its Etendard, Mirage, and Pucara aircraft.

Limited Regional Export

Argentina continues to export 20mm-40mm cannon ammunition on a limited basis to a number of other Latin American nations, including Venezuela. The 40mm L/60 ammunition has been an especially good seller, due to the wide use of the L/60 cannon worldwide.

Brazil

Companhia Brasileira de Cartuchos (CBC Magtech). This firm is engaged in licensed production of 20mm Vulcan, Oerlikon Contraves, and Hispano-Suiza ammunition, primarily for use in Brazilian military helicopters, armored vehicles, and aircraft. The firm also produces 40mm L/70 proximity-fuzed cannon ammunition. CBC Magtech reportedly secured an unspecified "regional" export sale in mid-2000.

Related News

Nammo and Thales Australia to Cooperate on Next-Generation Aircraft Ammunition – Nammo and Thales Australia signed a letter of intent at Eurosatory for a planned cooperation on the next-generation aircraft ammunition. This is driven by Norway's and Australia's involvement in the F-35 fighter program and the need for a new ammunition round capable of meeting all requirements and ensuring lethality against both soft and hard targets. This will include cooperation on the Norwegian ammunition concept, APEX, and a special training round, as well as Thales' frangible ammunition round called APFI. The APEX development and qualification effort is now fully funded by the Norwegian Ministry of Defense and Nammo. (Nammo, 6/10)

Denel Continues to Struggle – It seems that Denel cannot catch a break. The firm has struggled for years and, just when it appeared that it was pulling itself up, the economic crisis hit.

For 2009, Denel posted gross revenue of ZAR4.05 billion, a 4 percent increase from 2008 sales of ZAR3.89 billion. The company posted a loss of ZAR544 million in 2009, compared with a ZAR347 billion decline in 2008.

The company has not been able to adapt in the post-apartheid era despite its best efforts. With apartheid dismantled, the South African defense industry emerged into a world in which self-sufficiency was no longer required. In the not-too-distant past, Denel was the de facto source for a majority of the South African military's systems and equipment. From attack helicopters to missile boats, Denel kept the country's armed services stocked with world-class systems.

Now that the markets have opened up to international competition, Denel finds itself at a crossroads. No longer is the firm a prime contractor for a majority of the country's needs; instead, it now provides subcomponents for current procurements.

Recent South African procurements include new fighters (28 Gripens), lead-in trainers (24 Hawk Mk 120s), utility helicopters (30 A109s) for the Air Force, and new corvettes (four Meko A200s) and submarines (three

20 to 57mm Cannon Ammunition (International)

Type 209-1400Ms) for the Navy. In addition, four Super Lynx 300 helicopters for the new corvettes have also been ordered. Finally, the company's biggest procurement to date will be a multibillion-rand contract for Badger infantry combat vehicles (aka the Hoefyster). Under this award, Denel will license-produce some 264 Patria-designed vehicles for the South African National Defence Force.

All of these procurements are being undertaken with requirements for offsets to enhance the local economy and technology base. Denel, as the main arms-producing entity, receives the majority of this offset work. Current offset contracts cover production of ammunition components for the British military, manufacture of the rear fuselage section of the Gripen fighter, and production of the tail plane for the BAE Systems Hawk Trainer. The company has also been awarded contracts to provide helmet tracking systems for both the Hawk and Gripen.

While these offsets have provided much-needed work for Denel, the firm's capacity is not being fully utilized, leading to punishing losses over the last five years. Further, scandals have erupted with one of its major customers, India, which led to contracts being canceled. Finally, a succession of politically appointed CEOs have done more harm for the firm than good, thanks to their divergent managing styles.

To its credit, the company successfully implemented a restructuring plan in 2006 and began to turn things around. Agreements were brokered with Carl Zeiss and Saab in areas of optronics and aerospace components, respectively. In a more recent deal, Rheinmetall took a majority stake in Denel Munitions. Up next are likely mergers in the unmanned vehicles market as well as changes in the company's missiles and armored vehicle units.

Nevertheless, the economic crisis of late 2008 soon began to take its toll. As government purse strings tightened, programs were canceled and work began to slow. When the South African government canceled its order for eight Airbus A400M military transports due to delays and tightening budgets, Airbus turned around and canceled one of Denel Saab Aerostructure's A400M component contracts, and placed two others on review.

The loss of the contract was a major blow to Denel Saab Aerostructure's attempts to return to profitability after years of losses. The cancellation came despite assurances from Airbus, when SA canceled its aircraft order, that work being done by local companies would not be affected. However, Airbus is coming under intense pressure from its partners for work to be moved back to Europe. While two contracts remain with Denel, they could quite easily be canceled as the partner countries demand more work for their increased investment in the troubled program.

As it struggles with these difficulties, Denel will likely continue the process of breaking itself into smaller firms – ideally with international participation. If the situation or the corporate structure does not change, the firm could find itself again risking insolvency. (FI, 5/10)

Weapons Seized in Thailand Headed for Iran – The North Korean weapons seized by Thailand at a local airport were bound for Iran. Thai security officials are investigating this arms shipment, which included unassembled Taepodong-2 missile parts. North Korea's Taepodong-2 is a product of joint efforts with Iran, coinciding with the Iranian Shehab-5 and Shehab-6 missiles. The aircraft, carrying 35 tonnes of weapons, landed in Bangkok on December 11 to refuel.

A U.N. Security Council resolution, issued in June, bans the export of weapons by North Korea. In the past, Iran purchased North Korea's Taepodong-1 multistage missile. Other items in this cargo included rocket launchers, explosives, ammunition, rocket-propelled grenades, and components for surface-to-air-missiles. Thai police estimate the worth of this cargo at \$18 million. Arms exports earn North Korea more than \$1 billion a year. (Reuters News Service, 12/09)

Sri Lankan Government Wanted to Buy Ammunition Following War – The Sri Lankan government wanted to purchase artillery ammunition even though its war with Tamil separatists was over. The former commander of the Sri Lankan Army, Gen. Sarath Fonseka, said President Mahinda Rajapaksa and Defence Secretary Gotabaya Rajapaksa wanted him to make this purchase because they had interests in the company involved. Gotabaya Rajapaksa was head of state-owned Lanka Logistics and Technologies Ltd. The \$300 million order would have been placed with China. Relatives of Fonseka are accused of profiting from the war. (Express News Service, 12/09)

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20 to 57mm Cannon Ammunition (International)

Funding

Individual contractors and various governments fund the development of ammunition programs.

Timetable

A number of cartridges incorporating advanced-design ballistics, fuze, and warhead/projectile technology are in development for the medium-caliber automatic cannon ammunition market. The next major advance in this market will likely be the full development and deployment of case-telescoped technology. While the European and U.S. players continue to lead in this market segment, it is only a matter of time before this technology catches on in the rest of the world. Singapore Technologies Kinetics Ltd and at least one other international player are reportedly already involved in the development of this technology.

Worldwide Distribution/Inventories

Non-U.S. and non-European medium-caliber automatic cannon ammunition is available worldwide.

Forecast Rationale

Serial production of medium-caliber cannon ammunition is ongoing worldwide for domestic procurement and export. While most non-U.S. and non-European producers of medium-caliber automatic cannon ammunition remain primarily focused on domestic procurement, a number of contractors are challenging the traditional dominance of U.S. and European players in this market.

Exploiting an Opening

U.S. and European medium-caliber automatic cannon ammunition requirements are transitioning toward an emphasis on advanced technology over massive conventional stockpiles. To fill the growing vacuum left by the drop in production resulting from this new focus, a number of non-U.S. and non-European players have taken the technology and expertise acquired through licensed production of U.S. and European munitions and entered the international market.

Emerging Players

In this report, we highlight the non-U.S. and non-European contractors poised to have the greatest impact on the international medium-caliber automatic cannon ammunition market.

Growing Production Levels

Combined annual production by the non-U.S. and non-European players will average nearly 43 million rounds over the next 10 years – almost 3 million rounds greater than the combined output expected by their European competitors.

The international market has clearly adopted the NATO-standard 30mm round as the standard medium-caliber cannon ammunition. As the non-U.S. and non-European players develop and offer advanced-technology NATO-standard munitions, the overall value of production of non-U.S. and non-European medium-caliber cannon ammunition will close the gap with the European market.

Ten-Year Outlook

Given the scarcity of open-source data regarding non-U.S. and non-European medium-caliber cannon ammunition production, developing a viable 10-year production outlook has become increasingly problematic. Nevertheless, the Forecast International Weapons Group expects the combined output of non-U.S. and non-European manufacturers will average nearly 43 million rounds per year through 2019.

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