

# ARCHIVED REPORT

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## Mortar Ammunition (Europe)

### Outlook

- Serial production ongoing; acceptance of NATO-standard 120mm mortars and ammunition continues to grow
- Europe remains a major source of advanced mortar ammunition
- We expect production from all European sources to average about 1.6 million rounds (51mm-240mm) annually through 2019

### Orientation

**Description.** Mortar ammunition, 51mm to 240mm.

**Sponsor.** Individual contractors and governments sponsor the development and production of mortar ammunition.

**Licensees.** A number of private contractors and state-owned organizations produce the designs of TDA Armements and Patria plc, with and without license.

**Status.** Development through serial production.

**Total Produced.** Through 2009, we estimate the various European contractors produced 180.96 million mortar rounds since 1980 inclusive.

**Application.** Assisted and unassisted ammunition for mortars, providing indirect fire support for infantry offensive and defensive operations.

**Price Range.** In 2010 U.S. dollars, new-production unguided European mortar rounds range in unit price from around \$5.52 for a TDA Armements 81mm M82 HE round to \$438 for a Patria 160mm H1KT HE (extended-range) round.

### Contractors

#### Prime

<b>BAE Systems Land &amp; Armaments, Global Combat Systems - Munitions</b>	<a href="http://www.baesystems.com">http://www.baesystems.com</a> , The Steel, Ridsdale, Bellingham, NE48 2EZ Northumberland, United Kingdom, Prime
<b>BAE Systems Land &amp; Armaments, Global Combat Systems - BAE Systems Bofors AB</b>	<a href="http://www.baesystems.com">http://www.baesystems.com</a> , Karlskoga, 691 80 Sweden, Tel: + 46 586 733 000, Fax: + 46 586 850 30, Email: <a href="mailto:info.bofors@baesystems.se">info.bofors@baesystems.se</a> , Prime
<b>Diehl BGT Defence GmbH &amp; Co KG, Plant Überlingen</b>	<a href="http://www.diehl-bgt-defence.de">http://www.diehl-bgt-defence.de</a> , Alte Nussdorfer Strasse 13, Überlingen, 88662 Germany, Tel: + 49 75 51 8901, Fax: + 49 75 51 89 2822, Email: <a href="mailto:gerhard.dussler@bgt.de">gerhard.dussler@bgt.de</a> , Prime
<b>Dynamit Nobel Defence</b>	<a href="http://www.dn-defence.com">http://www.dn-defence.com</a> , Dr. Hermann Fleck Alee 8, Burbach, 57299 Germany,

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	Tel: + 49 2736 46 2014, Fax: + 49 2736 46 2107, Email: info@dn-defence.com, Prime
<b>Federal State Unitary Enterprise, Rosoboronexport, Rosoboronexport State Corp</b>	<a href="http://www.rusarm.ru">http://www.rusarm.ru</a> , 27/3 Stromynka St, Moscow, 107076 Russian Federation, Tel: + 7 495 964 61 40, Fax: + 7 495 963 26 13, Prime

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<b>MECAR SA</b>	<a href="http://www.allieddefensegroup.com">http://www.allieddefensegroup.com</a> , 50 Rue Grinfaux, Petit-Roeulx-lez-Nivelles, 7181 Belgium, Tel: + 32 67 87 6411, Fax: + 32 67 21 1823, Email: mecar@compuserve.com, Prime
<b>Patria Oy</b>	<a href="http://www.patria.fi">http://www.patria.fi</a> , Kaivokatu 10 A, Helsinki, 00100 Finland, Tel: + 358 20 469 1, Fax: + 358 20 469 2022, Email: info@patria.fi, Prime
<b>RUAG Ammotec</b>	<a href="http://www.ruag.com">http://www.ruag.com</a> , Uttigenstrasse 67, Thun, 3602 Switzerland, Tel: + 41 332 282 220, Fax: + 41 332 282 627, Email: info.ammotec@ruag.com, Prime
<b>TDA Armements SAS</b>	<a href="http://www.thaleson-line.com/landjoint/">http://www.thaleson-line.com/landjoint/</a> , Route d'Ardon, La Ferté Saint-Aubin, 45240 France, Tel: + 33 2 38 51 63 63, Fax: + 33 2 38 51 63 97, Email: dpt.communication@tda.thalesgroup.com, Prime

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## Technical Data

<u>Caliber</u>	<u>Designation</u>	<u>Type</u>
<u>Manufacturer – BAE Systems Land &amp; Armaments</u>		
51mm	L1A1	High Explosive
51mm	L2A1	Hexachlorethane Smoke
51mm	L3A2	Illumination
81mm	L15A3	High Explosive
81mm	L31E3	High Explosive
81mm	L36A2	High Explosive
81mm	L40A1	White Phosphorous Smoke
81mm	L19A4	White Phosphorous Smoke
81mm	L20	Illumination
81mm	MBI 81 Mark 1	Illumination
81mm	L27A1	Target Practice
81mm	Merlin	Terminally Guided Round
120mm	unknown	High Explosive
120mm	unknown	White Phosphorous Smoke
120mm	unknown	Red Phosphorous Smoke
120mm	unknown	Illumination
120mm	unknown	Cargo (submunition dispensing)
<u>Manufacturer – BAE Systems Bofors</u>		
120mm	Strix	Terminally Guided Round
120mm	FFV 429-S	Hexachlorethane Smoke
120mm	FFV 429-T	Hexachlorethane Smoke
120mm	FFV 429-IR	Aerosol/Smoke
120mm	FFV 029	Illumination
120mm	FFV 266	Hexachlorethane Zinc Smoke
<u>Manufacturer – Diehl BGT Defence GmbH</u>		
120mm	M44	High Explosive
120mm	M44/67	White Phosphorous Smoke
120mm	M62-ED	Illumination
120mm	M64	High Explosive (long range)
120mm	M21	High Explosive
120mm	M21	Smoke
120mm	Bussard	Terminally Guided Round
<u>Manufacturer – Dynamit Nobel Defence</u>		
60mm	unknown	High Explosive
60mm	unknown	Illumination

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<u>Caliber</u>	<u>Designation</u>	<u>Type</u>
60mm	unknown	High Explosive (long range)
81mm	unknown	High Explosive
81mm	unknown	High Explosive (long range)
81mm	SprGr DNG	High Explosive Fragmentation
81mm	unknown	Illumination
82mm	unknown	High Explosive (long range)
120mm	unknown	High Explosive (long range)
120mm	unknown	White Phosphorous Smoke
<u>Manufacturer – FSUE Rosoboronexport</u>		
82mm	O-832DU	High Explosive Fragmentation
82mm	unknown	Illumination
82mm	unknown	Smoke
107mm (4.2 in)	OF-841A	High Explosive Fragmentation
120mm	F-843	High Explosive
120mm	OF-843	High Explosive Fragmentation
120mm	OF-843A	High Explosive Fragmentation
120mm	unknown	Incendiary
120mm	unknown	Smoke
120mm	unknown	Illumination
120mm	Gran	Terminally Guided Round
160mm	F-852	High Explosive
160mm	F-853A	High Explosive
160mm	F-853U	High Explosive
240mm	F-864	High Explosive
<u>Manufacturer – MECAR SA</u>		
81mm	M511A1	Titanium Tetrachloride Smoke
81mm	M512A2	High Explosive
81mm	M513A1	White Phosphorous Smoke
81mm	M514A1	Cargo (submunition dispensing - Anti-Tank)
81mm	M515A1	Illumination
81mm	M523A1	Target Practice
120mm	M530A1	High Explosive
120mm	M532A1	White Phosphorous Smoke
120mm	M528A1	Target Practice
120mm	M533A1	Illumination
<u>Manufacturer – Patria Oy</u>		
60mm	TAM 1.6	High Explosive (standard range)
60mm	TAM 1.8	High Explosive (extended range)
81mm	TAM 4.2	High Explosive
120mm	TAM 12.8	High Explosive
120mm	TAM 14.9	High Explosive
160mm	M55	High Explosive
160mm	M56H	High Explosive
160mm	H1KT	High Explosive (extended range)
<u>Manufacturer – RUAG Ammotec (includes former Hirtenberger Defence Systems line)</u>		
60mm	HE 80	High Explosive
60mm	ILL Mark 1	Illumination
60mm	MAPAM	Anti-Personnel/Anti-Materiel
60mm	RP-S Mark 1	Red Phosphorous Smoke
60mm	RP-I Mark 1	Red Phosphorous Incendiary
60mm	84 LD	High Explosive Fragmentation
60mm	WP-LD	White Phosphorous Smoke
81mm	HC	Hexachlorethane Smoke
81mm	HE 70	High Explosive
81mm	HE LD	High Explosive
81mm	WP	White Phosphorous Smoke
81mm	ILL Mark 3	Illumination

Mortar Ammunition (Europe)

<u>Caliber</u>	<u>Designation</u>	<u>Type</u>
81mm	RPI Mark 3	Red Phosphorous Incendiary
81mm	RPS Mark 3	Red Phosphorous Smoke
81mm	unknown	High Explosive
81mm	unknown	Smoke
81mm	Model 73	Illumination
81mm	unknown	High Explosive Fragmentation
120mm	HE-78	High Explosive
120mm	LD-93	High Explosive
120mm	WP-93	White Phosphorous Smoke
120mm	HC-93	Hexachlorethane Smoke
120mm	ILL-93	Illumination
120mm	Model 64	High Explosive
120mm	Model 64	Incendiary/Smoke
120mm	Model 64	White Phosphorous Smoke
120mm	Model 74	Illumination
120mm	unknown	Cargo
<b>Manufacturer – TDA Armements (Thomson-DASA Armements)</b>		
60mm	Mark 60LP	High Explosive (extended range)
60mm	Mark 61	High Explosive
60mm	Mark 61	High Explosive (target indicating)
60mm	Mark 61	White Phosphorous Smoke
60mm	Mark 61	Titanium Chloride Smoke
60mm	Mark 61	Practice Inert
60mm	Mark 61	Practice Bursting
60mm	Mark 63	Illumination
60mm	Mark 72	High Explosive
60mm	Mark 72	High Explosive (target indicating)
60mm	Mark 72	White Phosphorous Smoke
60mm	LP	High Explosive (long range)
60mm	CC	High Explosive Anti-Tank
60mm	Canister	Anti-Personnel Canister
60mm	F601	Armor Piercing Fin Stabilized Discarding Sabot
81mm	M57D	High Explosive
81mm	M61	High Explosive
81mm	M82	High Explosive
81mm	M96	High Explosive
81mm	M57D (TiC14)	White Phosphorous Smoke
81mm	M61 (TiC14)	White Phosphorous Smoke
81mm	M68	Illumination
81mm	M77 A	Illumination
81mm	Model LP	High Explosive (extended range)
120mm	PEPA-R	High Explosive (rocket assisted)
120mm	M44	High Explosive
120mm	M44/66	High Explosive
120mm	M852	High Explosive
120mm	M44	White Phosphorous Smoke
120mm	M62	Illumination
120mm	M842	Illumination
120mm	120ED	Illumination
120mm	PRECLAIR	Illumination
120mm	PR AB	High Explosive Anti-Tank
120mm	PE PA	High Explosive (rocket assisted)
120mm	PE PA-LP	High Explosive (rocket assisted - extended range)
120mm	PR PA	High Explosive (rocket assisted)
120mm	PR 14	High Explosive
120mm	PR 14	Smoke (colored)
120mm	PR 14	White Phosphorous Smoke
120mm	unknown	Cargo (submunition dispensing)

## Mortar Ammunition (Europe)



"Hang!" – Loading a British Army 81mm Mortar

Source: U.K. Ministry of Defence

## Variants/Upgrades

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

**Modernization and Retrofit Overview.** Not applicable. The contractors usually integrate product improvements to a given round as production cut-ins.

## Program Review

**Background.** If the infantry mortar is to be as flexible and effective as its role demands, there must be a suitable range of ammunition types to permit close support of infantry units.

### *Market Trends*

To improve the effectiveness of mortar systems, a number of European players have been developing ammunition technology with a view to increasing range and lethality independent of the mortar itself. Efforts currently center on the development of guided, enhanced terminal effect, and extended-range munitions.

#### Belgium

**MECAR SA.** The Societe Anonyme Belge de Mecanique et d'Armement SA, better known as

MECAR, is famous as a manufacturer of tank cannon ammunition. However, this firm has also developed and produced 81mm mortar ammunition. The export of this mortar ammunition has greatly contributed to this firm's overall success. Especially popular has been the 81mm M523A1 practice round.

### *The 120mm Market*

Recently, MECAR entered the 120mm mortar ammunition market with a line optimized for Brandt-design mortars. Information about sales of these rounds has been scarce; MECAR reported a major 1998 sale to a southern Asian nation and another sale in early 2000 to a Middle Eastern nation.

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Finland

*Patria Oy*. This firm – the product of a 1991 merger of the government-owned Vammaskoski Works and the Defense Division of Tampella Ltd – inherited its parent companies' long history of involvement with mortar ammunition. The Patria organization has emerged as a major player, offering a complete line of mortar technology and ammunition.

***Mortars as Field Artillery***

Patria mortars reflect the Finnish Army's use of the mortar in a field artillery role, with enhanced accuracy at extended ranges. One of the more recent developments is the 120mm VAM 14.9 round; development of this round was completed in 1998. Patria has reportedly secured two domestic and three export sales of the round.

France

*TDA Armements (Thomson-DASA Armements)*. As part of a major 1995 restructuring of the French and German defense industries, the armaments component of (then) Thomson-CSF – including Thomson-Brandt – merged with the weapons component of Deutsche Aerospace (now DaimlerChrysler Aerospace). The new firm, equally owned by Thales and DaimlerChrysler Aerospace, operates as TDA Armements, headquartered in France.

***Leveraging the Brandt Name***

Despite the name change, the firm still uses the world-famous Brandt name, identifying with what is arguably the most experienced producer of mortars and mortar ammunition in the world. Throughout the 20th century, the Brandt name became virtually a generic term for mortars and mortar ammunition, as most designs in service worldwide exhibited the basic Brandt design.

Brandt's standard patterns of ammunition have had extensive commercial success. In addition to the direct sale of ammunition to at least 44 nations, several nations have also secured licensing agreements. Major clients for Brandt-design mortar ammunition have included Argentina, France, Germany, Italy, the Netherlands, the Republic of South Africa, and Thailand. TDA Armements has also established and fostered a strong client base in the Middle East and sub-Saharan Africa.

***Development Continues***

TDA Armements has been developing a family of gun mortars and ammunition for light armored fighting vehicles. Mortar ammunition types in development include:

- Armor Piercing Fin Stabilized Discarding Sabot (APFSDS) rounds
- Extended-range ammunition
- Precision guidance ammunition

The M852 High Explosive and M842 Illumination rounds are two of the contractor's next generation of 120mm mortar ammunition. Another recently introduced round is a 120mm cargo round that dispenses 16 combined shaped-charge and fragmentation submunitions; this round has been successful on the international market.

Federal Republic of Germany

*Diehl BGT Defence GmbH & Co KG*. While the Federal Republic of Germany has not produced an indigenously designed mortar since the end of World War II, the ammunition division of the Diehl Group has produced mortar ammunition under license from both Patria and TDA Armements. Diehl produces 120mm mortar ammunition for current first-line and reserve Bundeswehr service. Given German rules concerning client confidentiality, we cannot determine if Diehl has exported any mortar ammunition.

***Guided Mortar Round Technology***

With the Bussard program, Diehl is among the world leaders in developing a terminally guided mortar projectile. Development of the Bussard began in 1975. The round uses proportional navigation with a laser seeker mechanism to home-in on a target illuminated by a laser designator. The U.S. Army's guided mortar program is incorporating the Bussard technology.

*Dynamit Nobel Defence*. This firm took over Austria's old Sudsteirische Metallindustrie organization. Dynamit Nobel produces a wide range of products, including:

- British 81mm L15A1 ammunition (under license)
- Proprietary 81mm and 120mm long-range ammunition
- Mortar equipment and related stores

The firm continues to produce ammunition for the Austrian Army; it has also exported ammunition to the Middle East. Dynamit Nobel has not released any sales data since 1992.

Russian Federation

Russia remains the world's largest user of very large-caliber mortars. Not surprisingly, the majority of production focuses on 120mm and larger-caliber mortar rounds.

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### *An Evolving Infrastructure*

The Russian Federation continues to consolidate its ammunition manufacturing infrastructure, while developing new ammunition types employing modern technology. State-owned and -operated facilities still produce the majority of mortar ammunition in the Russian Federation. Over the next several years, semi-private organizations should become increasingly active in the export market.

*FSUE "Rosoboronexport."* This organization acts as the primary conduit between the Russian defense industry and the international market. All individual Russian contractors thus effectively operate under the auspices of Rosoboronexport. Major Russian contractors (under Rosoboronexport) involved in the mortar ammunition market include the following:

*Bazalt SRPE.* This organization produces a variety of 82mm and 120mm rounds.

*KBP Instrument Design Bureau.* The Russians have recently jumped on the guided mortar round bandwagon with the 120mm Gran projectile. This projectile features a laser seeker which homes-in on detected laser energy; a cluster of small thruster rockets correct the course of the Gran projectile. Rosoboronexport offers the Gran on the international market at a very competitive unit price, albeit without any reported success.

#### Sweden

*BAE Systems Bofors.* The Bofors firm, which absorbed the old Forenade Fabriksverken firm in 1992, produces both smoke and illumination 120mm mortar rounds.

### *Corporate Evolution*

In 2000, United Defense Industries purchased Bofors. The contractor then began operating as Bofors Defence AB, a wholly owned subsidiary of UDI. In June 2005, BAE Systems acquired United Defense, and with it, Bofors Defence AB. The prime contractor now operates as BAE Systems Land & Armaments, BAE Systems Bofors.

The FFV 266 round is somewhat unique in that it features a sideways-thrusting rocket motor, which fires as the round begins its descent. This motor causes the round to yaw as the expelling charge blows off the ogive, releasing first a drogue then a main parachute. The round then descends in an inverted position; a pyrotechnic delay activates the smoke filler. This deployment technique prevents the round burying itself in soft ground or shattering on rocks. Information on export sales of the FFV 266 remains unavailable.

### *The Strix Guided Projectile*

Bofors is also cooperating with Saab in the development and production of a top-armor-attacking guided mortar round, the Strix. For a complete discussion of this program, see the "Strix Guided Anti-Armor Mortar Projectile" report in this tab.

#### Switzerland

*RUAG Ammotec.* After two reorganizations, the Swiss federal munitions facility at Thun is finally emerging as a component of the RUAG organization. RUAG Ammotec produces indigenously designed 81mm and 120mm mortar ammunition, as well as an 81mm illumination mortar round originally designed and produced in Sweden for a Swiss requirement. The 120mm Model 74 illumination round is also a Swedish design, mounting a Swiss fuze assembly. RUAG reported significant export sales in 2001 and early 2002; details have not been made available.

With its acquisition of Hirtenberger Defence Systems (Hirtenberg, Austria), RUAG continues to offer the Hirtenberger line of Vereinigte Edelmetallwerke 60mm, 81mm, and 120mm mortar ammunition. The most recent Hirtenberger offering is the 81mm HE LD, an enhanced-performance High Explosive round. This round reportedly scored three significant sales in 2001 and early 2002. Details are unavailable.

### *Birth of a New Player?*

In 2002, Nitrochemie AG (a mortar ammunition propulsion house jointly owned by Rheinmetall Defence and RUAG) entered into a cooperative agreement with Armtec Defense Products of the United States for the joint development of mortar ammunition propulsion technology. This arrangement could result in the emergence of a major new player in the European mortar ammunition market.

#### United Kingdom

*BAE Systems Land & Armaments.* With its acquisition of RO Defence (formerly Royal Ordnance), BAE Systems took over production of 51mm, 81mm, and 120mm mortar ammunition in the United Kingdom for British Army procurement and for export.

The 51mm mortar ammunition supports the contractor's RARDE mortar, which is replacing the old 2-inch and 3-inch mortars in British Army service. This mortar and ammunition have generated considerable interest worldwide, especially with the 20 nations currently employing the old 2-inch mortar.

The 81mm ammunition line supports the contractor's L16 mortar program. Apart from licensed production of



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the Brandt 81mm Illumination round, BAE Systems produces four indigenously designed tactical munitions and a practice round for the L16. In addition to British production, several other nations (including the United States) produce this ammunition under license.

At least 11 nations have purchased the L16 mortar and ammunition from RO Defence/BAE Systems. These countries will remain clients for BAE Systems 81mm ammunition until they either desert their current supplier or acquire the technology for domestic production.

*New 120mm Opportunities*

BAE Systems recently added a family of 120mm mortar ammunition to its product line. Originally developed for the now-defunct RO2003 Armored Mortar Carrier main armament program, the 120mm mortar ammunition line provides BAE Systems with new opportunities as the international trend toward adopting NATO-standard 120mm mortars progresses. The 120mm ammunition also supports the new BAE Systems Armored Mortar System. Saudi Arabia has ordered this system (including ammunition) for integration with the 8x8 version of the Piranha armored vehicle.

## Related News

***Patria's Nemo Mortar System Selected for LAV II Vehicles*** – The Patria Nemo 120mm mortar system has been selected as weaponry for LAV II vehicles delivered by General Dynamics Land Systems - Canada as a Foreign Military Sale by the U.S. government. Patria and Mecar, S.A., from Belgium have signed a Memorandum of Understanding for an undisclosed number of Patria Nemo systems.

Patria Nemo is a 120mm remotely controlled mortar turret, offering signature management and ballistic protection as well as providing both direct and indirect fire support. The Patria Nemo system was earlier selected by the Slovenian armed forces and the United Arab Emirates Navy. (Patria, 9/10)

***Belarus Selling Weapons to Hezbollah; Denies Selling S-300s to Iran*** – As Belarus denies reports it sold S-300 surface-to-air missiles (SAMs) to Iran, it is accused of selling weaponry to Hezbollah, the Lebanese terrorist group. The weapons from Belarus were funneled through Syria. Belarus is also suspected of providing rockets, mortars, anti-armor weapons and mines to Hamas, the Palestinian terrorist group.

Other customers of Belarus include Sudan, which reportedly received Mi-24 Hind attack helicopters and armored vehicles, and North Korea. Pyongyang is said to have taken delivery of tanks from Belarus. (Charter97, 8/10)

***European Mortar Market Remains Static*** – Serial production of various European mortar designs is ongoing for domestic procurement and export. However, the European and international markets for mortars remain generally static. As the Swedish 120mm m/29 and any number of Russian designs clearly demonstrate, the simple, robust mortar often outlasts several generations of owners and users. The wide availability of serviceable old mortars continues to hinder significant investment in new production.

While generally static, the European market for mortars is hardly dead. The introduction of mobile 120mm breech-loading heavy mortars clearly represents the most dynamic development in this market. Starting with the Russian 120mm 2S9 tracked mortar platform in the mid-1980s, the mobile 120mm breech-loader has become increasingly popular with armies worldwide. Virtually every major European player in the mortar market is involved in its own 120mm mobile mortar program. The heavy mortar market segment will drive production and procurement through the next decade.

Further, the introduction of the breech-loading 120mm mortar is precipitating an evolution in the tactical employment of mortars on the modern battlefield. The Patria 120mm Advanced Mortar System (AMOS) currently represents the state-of-the-art in mobile 120mm mortar design, paving the way for advanced design concepts such as the U.S. Army's Non-Line-of-Sight Mortar (NLOS-M).

Despite the growing number of non-U.S. and non European manufacturers, the established European players will remain the leaders in the international market for mortars. Many of the mortars available on the international market remain licensed-produced European designs or outright knock-offs of the European standards. We expect a steady base level of procurement, averaging nearly 15,000 weapons per year, through 2019. (FI, 12/09)

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## Mortar Ammunition (Europe)

### Funding

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Individual contractors and various governments fund the development and production of mortar ammunition.

### Timetable

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By 2010, we expect one or more of the European contractors will be offering a number of advanced mortar rounds, including terminally guided munitions.

### Worldwide Distribution/Inventories

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European mortar ammunition is widely available worldwide.

## Forecast Rationale

Serial production of mortar ammunition is ongoing throughout Europe for domestic procurement and export. However, with the ongoing drastic cuts in European defense spending, the more mundane procurement programs – such as mortar ammunition – continue to suffer disproportionately heavy cuts in funding, providing opportunities for an influx of new non-European players on the international market.

#### *Focus on Advanced Technology*

Contributing to the reduction in European mortar ammunition production is the focus of continental players on the development of advanced mortar rounds, including guided projectiles. Europe has shown an enthusiasm for advanced mortar rounds unequaled anywhere else in the world. This emerging market segment is one of the few defense development areas where Europe remains ahead of the United States.

#### *The International Standard*

Despite growing international competition, European mortar ammunition producers maintain a healthy level of export sales owing to the enduring worldwide

popularity of European (primarily Brandt) mortar designs. The growing acceptance of NATO-pattern 120mm mortars and ammunition as the international standard may now be the greatest asset of the European mortar ammunition market.

#### *Europe's Stable Market*

The European market for artillery ammunition remains generally stable. We expect the European players will maintain a combined annual production rate averaging nearly 1.6 million rounds throughout the forecast period.

Extended-range and terminally guided rounds will ultimately result in lower procurement levels, as fewer advanced-design rounds can achieve the same battlefield effect as conventional mortar ammunition. Nevertheless, the increased unit cost of these advanced munitions will maintain, if not actually increase, the overall value of European production on the international market.

### Ten-Year Outlook

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Given the scarcity of open-source data available regarding European mortar ammunition production, developing a viable 10-year production outlook has become increasingly problematic. Nevertheless, the Forecast International Weapons Group expects the combined output of European manufacturers will average about 1.6 million rounds per year through 2019.

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