

ARCHIVED REPORT

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Tank Gun Ammunition (Europe)

Outlook

- Production of European tank gun ammunition is ongoing at moderate levels for domestic procurement and export
- The Rheinmetall 120mm Rh 120-series smoothbore tank gun and its associated ammunition continue to dominate the market
- We estimate total output of all artillery ammunition types and calibers from all European sources will average 265,000 rounds annually through 2020

Orientation

Description. Tank gun ammunition.

Sponsor. Both individual contractors and various governments sponsor the development of tank gun ammunition.

Licensees. A number of manufacturers worldwide produce European designs, with or without license. In addition, many European contractors produce U.S. pattern ammunition under license.

Status. Development through serial production.

Total Produced. Through 2010, we estimate the various European contractors produced at least

24.414 million rounds of tank gun ammunition, since 1980 inclusive.

Application. Destruction of enemy armor. These munitions can also provide direct-fire support for the other maneuver arms.

Price Range. In 2011 U.S. dollars, the unit prices for European tank gun munitions range from \$33 for 75mm High Explosive (HE) rounds to \$2,319 for the DM53 Armor Piercing Fin Stabilized Discarding Sabot (APFSDS) round.

Contractors

Prime

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| BAE Systems Land & Armaments, Global Combat Systems - Munitions | http://www.baesystems.com/Businesses/LandArmaments , Radway Green, Nr Crewe, Cheshire, CW2 5PJ Cumbria, United Kingdom, Tel: + 44 1270 882 261, Fax: + 44 1270 866 666, Email: media@baesystems.com , Prime |
| Diehl BGT Defence GmbH & Co KG, Werk Röthenbach a d Pegnitz | http://www.diehl-bgt-defence.de , Fischbachstrasse 16, Röthenbach, 90552 Germany, Tel: + 49 911 957 0, Fax: + 49 911 957 2510, Prime |
| Federal State Unitary Enterprise, Rosoboronexport, Rosoboronexport State Corp | http://www.rusarm.ru , 27/3 Stromynka St, Moscow, 107076 Russian Federation, Tel: + 7 495 964 61 40, Fax: + 7 495 963 26 13, Prime |
| Fiat SpA | http://www.fiatgroup.com , via Nizza 250, Turin, 10126 Italy, Tel: + 39 011 006 1111, Fax: + 39 011 006 3798, Email: mediarelationbs@fiatgroup.com , Prime |

Tank Gun Ammunition (Europe)

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| General Dynamics Santa Bárbara Sistemas | http://www.gdsbs.com , Via de los Poblados 3, Paque Empresarial Cristalia, Madrid, 28033 Spain, Tel: + 34 91 5850390, Fax: + 34 91 5850244, Email: info.sbs@gdels.com , Prime |
| Hellenic Defence Systems (EAS) SA, (EBO-PYRKAL) | http://www.eas.gr , 1 Ilioupoleos Ave, Hymettus, Athens, 17236 Greece, Tel: + 30 210 979 0900, Fax: + 30 210 979 0800, Email: info@eas.gr , Prime |

Tank Gun Ammunition (Europe)

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|----------------------------|--|
| MECAR SA | http://www.allieddefensegroup.com , 50 Rue Grinfaux, Petit-Roeulx-lez-Nivelles, 7181 Belgium, Tel: + 32 67 87 6411, Fax: + 32 67 21 1823, Email: mecar@compuserve.com, Prime |
| Nexter Munitions | http://www.nexter-group.fr , 7, route de Guerry, Bourges, 18023 France, Tel: + 33 2 48 21 91 11, Fax: + 33 2 48 21 91 42, Prime |
| Rheinmetall Defence | http://www.rheinmetall-defence.com , Rheinmetall Platz 1, Düsseldorf, 40476 Germany, Tel: + 49 211 473 01, Fax: + 49 211 473 4727, Email: info@rheinmetall-defence.com, Prime |

Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to www.forecastinternational.com (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Technical Data

| <u>Caliber</u> | <u>Designation</u> | <u>Type</u> |
|--|--------------------|--|
| Manufacturer - BAE Systems Land & Armaments | | |
| 76mm | L24 | High Explosive |
| 76mm | L25 | High Explosive - Practice |
| 76mm | L29 | High Explosive Squash Head |
| 76mm | L32 | Smoke |
| 76mm | L33 | Canister |
| 76mm | L40 | Squash Head - Practice |
| 76mm | L42 | Illumination |
| 90mm | RO 907 | High Explosive Anti-Tank |
| 90mm | RO 924 | High Explosive - Tracer |
| 90mm | RO 925 | White Phosphorous Smoke |
| 90mm | RO 932 | White Phosphorous Smoke - Tracer |
| 90mm | RO 929 | High Explosive Squash Head - Tracer |
| 90mm | RO 933 | Canister |
| 90mm | RO 940 | High Explosive Anti-Tank Target Practice - Tracer |
| 90mm | RO 964 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | H6/62 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | L35 series | High Explosive Squash Head |
| 105mm | L38 | Squash Head - Practice |
| 105mm | L39 | Hexachlorethane Smoke |
| 105mm | L52 series | Armor Piercing Discarding Sabot |
| 105mm | L63 | Discarding Sabot - Practice |
| 105mm | L64A4 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | Excalibur | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 120mm | L15 | Armor Piercing Discarding Sabot |
| 120mm | L20A1 | Discarding Sabot - Practice |
| 120mm | L23 | Armor Piercing Fin Stabilized Discarding Sabot |
| 120mm | L26 (CHARM 2) | Armor Piercing Fin Stabilized Discarding Sabot |
| 120mm | L27 (CHARM 3) | Armor Piercing Fin Stabilized Discarding Sabot |
| 120mm | L28 | Armor Piercing Fin Stabilized Discarding Sabot |
| 120mm | L31 | High Explosive Squash Head |
| 120mm | L32A6 | Squash Head - Practice |
| 120mm | L34 | White Phosphorus Smoke |
| Manufacturer - Diehl BGT Defence GmbH & Co KG | | |
| 105mm | DM13 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | DM23 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | DM33 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | DM63 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | DM68 | High Explosive Anti-Tank-Target Practice - Tracer |
| 105mm | DM148 | Target Practice Fin Stabilized Discarding Sabot - Tracer |

Tank Gun Ammunition (Europe)

| Caliber | Designation | Type |
|--|--------------------|--|
| <u>Manufacturer - Duna-Rit (Rosoboronexport)</u> | | |
| 100mm | OF-412 | High Explosive |
| 125mm | 3VBK18M | High Explosive Anti-Tank - Fin Stabilized |
| <u>Manufacturer - Rheinmetall Defence (Eurometaal Holding NV)</u> | | |
| 90mm | M318 | Armor Piercing - Tracer |
| 90mm | M353A1 | Target Practice - Tracer |
| 105mm | Unknown | Armor Piercing Discarding Sabot |
| 105mm | Unknown | Armor Piercing Fin Stabilized Discarding Sabot |
| 105mm | Unknown | Discarding Sabot Practice - Tracer |
| 105mm | Unknown | Squash Head |
| 105mm | Unknown | Squash Head - Practice |
| 105mm | Unknown | High Explosive |
| 105mm | Unknown | Target Practice - Tracer |
| 120mm | Unknown | Armor Piercing Fin Stabilized Discarding Sabot |
| 120mm | Unknown | High Explosive Anti-Tank - Practice |
| <u>Manufacturer - FIAT SpA (BPD Difesa e Spazio)</u> | | |
| 90mm | M71 | High Explosive |
| 90mm | M82 | Armor Piercing - Tracer |
| 90mm | M313 | White Phosphorous Smoke |
| 90mm | M431 | High Explosive Anti-Tank - Tracer |
| 105mm | M456 | High Explosive Anti-Tank - Tracer |
| 105mm | Unknown | High Explosive Anti-Tank - Tracer-Multipurpose |
| 105mm | Unknown | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | Unknown | Target Practice - Tracer |
| <u>Manufacturer - FIAT SpA (Simmel Difesa)</u> | | |
| 90mm | M82 | Armor Piercing Capped - Tracer |
| 90mm | M71 | High Explosive |
| 90mm | M313 | White Phosphorus Smoke |
| 90mm | M394 | Blank |
| 90mm | M431 | High Explosive Anti-Tank - Tracer |
| 105mm | M393 | High Explosive Plastic - Tracer |
| 105mm | M456A1 | High Explosive Anti-Tank - Tracer |
| <u>Manufacturer - Nexter Munitions (formerly Giat Industries)</u> | | |
| 90mm | ODR 90 F1 | Canister |
| 90mm | ODR 90 F2 | Canister |
| 90mm | OE 90 F1 | High Explosive - Fin Stabilized |
| 90mm | OE 90 F2 | High Explosive |
| 90mm | OE 90 S G1 | High Explosive |
| 90mm | OCC 90-62 | High Explosive Anti-Tank - Fin Stabilized |
| 90mm | OCC 90 F1 | High Explosive Anti-Tank - Tracer |
| 90mm | OCC 90 F2 | High Explosive Anti-Tank - Tracer |
| 90mm | BSCC 90 F1 | Inert |
| 90mm | BSCC 90 F2 | High Explosive Anti-Tank Target Practice - Tracer |
| 90mm | OFUM PH 90 F1 | White Phosphorus Smoke |
| 90mm | OFUM F2 | White Phosphorus Smoke |
| 90mm | OFL 90 F1 | Armor Piercing Fin Stabilized Discarding Sabot |
| 90mm | M645 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 90mm | M664 | Fin Stabilized Discarding Sabot - Target Practice - Tracer |
| 105mm | OCC 105 F2 | High Explosive Anti-Tank - Tracer |
| 105mm | OC 105 F3 | High Explosive |
| 105mm | OCC 105 | High Explosive Anti-Tank |
| 105mm | OE 105 Mle 60 | High Explosive |
| 105mm | OE 105 F1 | High Explosive |
| 105mm | OE | High Explosive |
| 105mm | OECL 105 F1 | Illumination |
| 105mm | OFL 105 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | OFL 105 E2 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |

Tank Gun Ammunition (Europe)

| <u>Caliber</u> | <u>Designation</u> | <u>Type</u> |
|----------------|--------------------|---|
| 105mm | OFL 105 F2 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | OFL 105 F1 | Armor Piercing Fin Stabilized Discarding Sabot |
| 105mm | OFL 105 F3 | Armor Piercing Fin Stabilized Discarding Sabot |
| 105mm | OFL 105 Mle G1A | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | OFL 105 G2 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | Excalibur | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | OFL 105 G3 | Armor Piercing Fin Stabilized Discarding Sabot |
| 105mm | OPPH 105 F1 | White Phosphorus Smoke |
| 105mm | OFUM | White Phosphorus Smoke |
| 105mm | OFUM 105 Mle F2 | White Phosphorus Smoke |
| 105mm | OFUM 105 Mle F3 | White Phosphorus Smoke |
| 105mm | OFUM PH 105 F1 | White Phosphorus Smoke |
| 105mm | BSCC | High Explosive Anti-Tank - Target Practice - Tracer |
| 120mm | BSCC 120 F1 | High Explosive Anti-Tank - Tracer-Target Practice |
| 120mm | OEEC 120 F1 | High Explosive Anti-Tank - Tracer |
| 120mm | OFL 120 E2 | Armor Piercing Fin Stabilized Discarding Sabot |
| 120mm | OFL 120 F1 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 120mm | OFL 120 F2 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 120mm | OFL 120 G1 | Armor Piercing Fin Stabilized Discarding Sabot |
| 120mm | OFL 120 FA | Armor Piercing Fin Stabilized Discarding Sabot |
| 120mm | PROCIPAC | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 120mm | POLY-NG | Smart High Explosive Anti-Tank |
| 120mm | Unknown | High Explosive |

Manufacturer - Luchaire (Giat Industries/Nexter Munitions)

Note: Since 1991, Luchaire has operated as a subsidiary of Giat Industries (now Nexter Munitions). However, because ammunition bearing the Luchaire name is still available worldwide, we continue to list the Luchaire product line separately.

| | | |
|-------|--------------|-------------------------------------|
| 75mm | OE | High Explosive |
| 75mm | PL/PN | High Explosive - Practice |
| 75mm | FUM-PH | White Phosphorous Smoke |
| 75mm | PRAC | Anti-Tank - Practice |
| 75mm | POT-PCOT | Armor Piercing |
| 75mm | Unknown | Dummy |
| 90mm | SCC F1 | High Explosive Anti-Tank - Practice |
| 90mm | OE 90 F1 | High Explosive - Fin Stabilized |
| 90mm | FUM 90 F1 | White Phosphorus Smoke |
| 90mm | SSC 90 F3 | High Explosive Anti-Tank - Practice |
| 90mm | OE 90 F3 | High Explosive - Fin Stabilized |
| 90mm | FUM PH 90 F3 | White Phosphorus Smoke |
| 90mm | Unknown | Dummy |
| 105mm | SCC | High Explosive Anti-Tank |
| 105mm | FUM | White Phosphorus Smoke |
| 105mm | OE | High Explosive |
| 105mm | SCC | High Explosive Anti-Tank |
| 105mm | OE | High Explosive |
| 105mm | FUM | White Phosphorus Smoke |
| 105mm | ECL | Illumination |

Manufacturer - Hellenic Defence Systems (EAS) SA (EBO-PYRKAL)

| | | |
|-------|-------------|--|
| 75mm | M48 | High Explosive |
| 90mm | M71 | High Explosive |
| 90mm | M71A1 | High Explosive - Tracer |
| 90mm | M431A2 | High Explosive Anti-Tank - Tracer |
| 105mm | M456A1 | High Explosive Anti-Tank - Tracer |
| 105mm | M735 | Armor Piercing Fin Stabilized Discarding Sabot |
| 105mm | TP-7 (M467) | Target Practice - Tracer |

Manufacturer - MECAR SA

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|--------|------|---|
| 76.2mm | M329 | High Explosive Squash Head - Tracer |
| 76.2mm | M331 | High Explosive Squash Head Target Practice - Tracer |

Tank Gun Ammunition (Europe)

| <u>Caliber</u> | <u>Designation</u> | <u>Type</u> |
|----------------|--------------------|--|
| 90mm | M71 | High Explosive - Tracer |
| 90mm | M313 | White Phosphorous Smoke - Tracer |
| 90mm | M400 | High Explosive Anti-Tank - Tracer - Practice |
| 90mm | M404/3 | High Explosive - Tracer - Practice |
| 90mm | M431 | High Explosive Anti-Tank - Tracer |
| 90mm | M600 | High Explosive Anti-Tank - Tracer |
| 90mm | M601/3 | High Explosive - Tracer |
| 90mm | M602/3 | White Phosphorous-Titanium Smoke - Tracer |
| 90mm | M603 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 90mm | M607/3 | Canister |
| 90mm | M612/1 | White Phosphorous Smoke - Tracer |
| 90mm | M616 | High Explosive - Tracer |
| 90mm | M616A1 | High Explosive - Tracer |
| 90mm | M617 | High Explosive Anti-Tank - Tracer |
| 90mm | M618 | White Phosphorus Smoke - Tracer |
| 90mm | M618A1 | White Phosphorus Smoke - Tracer |
| 90mm | M620 | High Explosive Anti-Tank - Tracer |
| 90mm | M620A1 | High Explosive Anti-Tank - Tracer |
| 90mm | M621 | Canister |
| 90mm | M622 | High Explosive Anti-Tank - Tracer - Practice |
| 90mm | M623A1 | High Explosive Anti-Tank - Tracer - Practice |
| 90mm | M624 | High Explosive Anti-Personnel - Fragmentation |
| 90mm | M625 | High Explosive Squash Head - Tracer |
| 90mm | M625A1 | High Explosive Squash Head - Tracer |
| 90mm | M626 | High Explosive Anti-Tank - Tracer |
| 90mm | M627 | High Explosive |
| 90mm | M628 | White Phosphorous Smoke - Tracer |
| 90mm | M629 | Canister |
| 90mm | M630 | High Explosive Anti-Tank - Tracer |
| 90mm | M631A1 | High Explosive - Tracer |
| 90mm | M632 | White Phosphorous Smoke - Tracer |
| 90mm | M633A1 | Fin Stabilized Discarding Sabot Target Practice - Tracer |
| 90mm | M635 | Target Practice - Tracer (sub-caliber) |
| 90mm | M636 | Canister |
| 90mm | M637 | High Explosive Practice - Tracer |
| 90mm | M638 | High Explosive Practice - Tracer |
| 90mm | M639 | Smoke - Tracer |
| 90mm | M641 | High Explosive Anti-Tank Target Practice - Tracer |
| 90mm | M642 | Smoke - Tracer |
| 90mm | M643 | Target Practice - Tracer |
| 90mm | M644 | High Explosive Anti-Tank - Tracer |
| 90mm | M650 | Blank |
| 90mm | M652 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 90mm | M652A1 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 90mm | M653 | Fin Stabilized Discarding Sabot-Target Practice - Tracer |
| 90mm | M655A1 | High Explosive Squash Head Target Practice - Tracer |
| 90mm | M656 | High Explosive Squash Head - Tracer |
| 90mm | M660 | Smoke - Tracer |
| 90mm | M670 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 90mm | M671 | High Explosive Anti-Tank - Tracer - Practice |
| 90mm | M672 | High Explosive Squash Head - Tracer |
| 90mm | M690A2 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 90mm | M691A2 | High Explosive Squash Head - Tracer |
| 90mm | M692A2 | High Explosive Squash Head Target Practice - Tracer |
| 90mm | M693A2 | White Phosphorus Smoke |
| 90mm | M1000A1 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 90mm | M1004 | High Explosive-Canister |
| 90mm | M1006 | White Phosphorous Smoke - Tracer |
| 90mm | M1007 | High Explosive Anti-Tank - Fin Stabilized |
| 105mm | M393A2 | High Explosive Squash Head - Tracer |
| 105mm | M456A2 | High Explosive Anti-Tank - Tracer |

Tank Gun Ammunition (Europe)

| <u>Caliber</u> | <u>Designation</u> | <u>Type</u> |
|----------------|--------------------|--|
| 105mm | M416 | White Phosphorus Smoke |
| 105mm | M468 | High Explosive Squash Head - Tracer-Target Practice |
| 105mm | M490 | High Explosive Anti-Tank - Tracer-Target Practice |
| 105mm | M494 | Anti-Personnel - Tracer |
| 105mm | M724A1 | Target Practice Discarding Sabot - Tracer |
| 105mm | M1001 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | M1008 | Illumination |
| 105mm | M1009 | White Phosphorous Smoke |
| 105mm | M1010 | High Explosive |
| 105mm | M1050 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | M1053 | High Explosive Squash Head - Tracer |
| 105mm | M1056 | Fin Stabilized Discarding Sabot - Target Practice - Tracer |
| 105mm | M1057 | Fin Stabilized Discarding Sabot - Target Practice - Tracer |
| 105mm | M1060 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | M1060A1 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | M1060A2 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | M1061 | High Explosive Anti-Tank - Tracer |
| 115mm | unknown | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 120mm | M1080 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |

Manufacturer - Rheinmetall Defence

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|-------|---------------|--|
| 105mm | DM16 | Illumination |
| 105mm | DM78 | High Explosive Squash Head - Practice |
| 105mm | DM512 | High Explosive Squash Head |
| 105mm | DM43 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | DM128 (LKL) | Target Practice Fin Stabilized Discarding Sabot - Tracer |
| 105mm | unknown | High Explosive Anti-Tank - Tracer |
| 105mm | DM68 | High Explosive Anti-Tank - Target Practice |
| 120mm | DM12A1 | High Explosive Anti-Tank - Tracer |
| 120mm | DM18 | High Explosive Anti-Tank - Tracer - Target Practice |
| 120mm | unknown | High Explosive Fragmentation |
| 120mm | DM33 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 120mm | DM43 (LKE I) | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 120mm | DM53 (LKE II) | Target Practice Fin Stabilized Discarding Sabot - Tracer |
| 120mm | DM38 (LKL) | Target Practice Fin Stabilized Discarding Sabot - Tracer |

Manufacturer - Russian State Munitions Factories (Rosoboronexport)

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|-------|------------------|---|
| 125mm | 3VP6/3P6 | Target Practice Fin Stabilized Discarding Sabot |
| 125mm | 3VBM3/3BM9 | Armor Piercing Fin Stabilized Discarding Sabot |
| 125mm | 3VBM6/3BM12 | Armor Piercing Fin Stabilized Discarding Sabot |
| 125mm | 3VBM7/3BM15 | Armor Piercing Fin Stabilized Discarding Sabot |
| 125mm | 3VBM8/3BM17 | Armor Piercing Fin Stabilized Discarding Sabot |
| 125mm | 3VBM9/3BM22 | Armor Piercing Fin Stabilized Discarding Sabot |
| 125mm | 3VBM13/3BM32 | Armor Piercing Fin Stabilized Discarding Sabot |
| 125mm | 3VBM17/3BM42 | Armor Piercing Fin Stabilized Discarding Sabot |
| 125mm | unknown/3BM44 | Armor Piercing Fin Stabilized Discarding Sabot |
| 125mm | 3BVK7/3BK12M | High Explosive Anti-Tank - Fin Stabilized |
| 125mm | 3BVK10/3BK14 | High Explosive Anti-Tank - Fin Stabilized |
| 125mm | 3BVK16/3BK18M | High Explosive Anti-Tank - Fin Stabilized |
| 125mm | 3BVK17/3BK21B | High Explosive Anti-Tank - Fin Stabilized |
| 125mm | 3BVK25/3BK29M | High Explosive Anti-Tank - Fin Stabilized |
| 125mm | unknown/3BK37 | High Explosive Anti-Tank - Fin Stabilized |
| 125mm | 3OF19 | High Explosive Fragmentation - Fin Stabilized |
| 125mm | 3OF36/3OF26 | High Explosive Fragmentation - Fin Stabilized |
| 125mm | 3VP5/3P11 | High Explosive Anti-Tank - Fin Stabilized - Practice |
| 125mm | 3VP6/3P81 | Armor Piercing Fin Stabilized Discarding Sabot - Practice |
| 125mm | 3BVK25IN/3BK29IN | High Explosive Anti-Tank-Inert |
| 125mm | 4X33 | Blank |

Tank Gun Ammunition (Europe)

| <u>Caliber</u> | <u>Designation</u> | <u>Type</u> |
|---|--------------------|---|
| <u>Manufacturer - General Dynamics Santa Bárbara Sistemas</u> | | |
| 90mm | ME-431 | High Explosive Anti-Tank - Tracer |
| 90mm | unknown | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | OCC-105-F2 | High Explosive Anti-Tank |
| 105mm | OE-105-60 | High Explosive |
| 105mm | OE-105-F2 | High Explosive |
| 105mm | SCC-105-F2 | Target Practice - Tracer |
| 105mm | OPPH-105-F2 | White Phosphorus Smoke |
| 105mm | C-437 | Armor Piercing Fin Stabilized Discarding Sabot - Tracer |
| 105mm | OWC | High Explosive Anti-Tank - Tracer |
| 105mm | HWC | High Explosive Anti-Tank - Tracer |
| 105mm | CH-105-MZ | High Explosive Anti-Tank - Tracer |
| <u>Manufacturer - Vazov Engineering Plant (Rosoboronexport)</u> | | |
| 73mm | PG-15V | High Explosive Anti-Tank - Fin Stabilized |
| 73mm | PG-15VN | High Explosive Anti-Tank - Fin Stabilized |
| 73mm | PG-15NT | High Explosive Anti-Tank - Fin Stabilized |
| 73mm | OG-15V | High Explosive Fragmentation |
| 73mm | OG-15VM | High Explosive Fragmentation |
| 73mm | OG-15BG | High Explosive Fragmentation |
| 73mm | OG-15BG1 | High Explosive Fragmentation |
| 100mm | 3UBK10-1 | Gun-launched guided missile |
| 100mm | BK-5M | High Explosive Anti-Tank - Fin Stabilized |
| 100mm | UBR-412D | Armor Piercing Capped Tracer |



120mm DM63 KE Round

Source: Rheinmetall Defence

Variants/Upgrades

Variants. Not generally applicable. To achieve the highest degree of product differentiation, the contractors usually give upgraded or modified tank gun munitions new designations.

Modernization and Retrofit Overview. Not generally applicable. Contractors usually integrate enhancements of a specific munition as production cut-ins.

Program Review

Note. Throughout this report, the reader will notice repeated references to the Krauss-Maffei Wegmann Leopard 2 main battle tank and its Rheinmetall Defence 120mm Rh 120 main gun.

Rh 120: Industry Standard

The Rh 120 is clearly becoming the international industry standard for 120mm smoothbore tank gun technology. For more information on the Rh 120 and its impact on the international market, see the "Rh 120/M256 120mm Tank Gun" report in Tab D and

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the "Tank Gun Ammunition (United States)" report in this tab. Also of interest in terms of this topic is the "Leopard 2" report in Tab A of FI's *Military Vehicles Forecast*.

Background. Tank gun ammunition facilitates the primary mission of the main battle tank: to destroy enemy tanks. To this end, the various ammunition-producing organizations have developed a variety of chemical (High Explosive) and kinetic energy (Armor Piercing) munitions. Tank gun munitions must also be capable of providing direct-fire support against secondary, unarmored targets and enemy personnel.

Organizations continue to develop increasingly sophisticated munitions to enhance the performance of existing tank armament. The following European organizations are currently the most active in the tank gun ammunition market:

Belgium

MECAR SA. This firm produces a vast range of 90mm tank gun ammunition for use with its 90/28 Light Gun system, the KEnerga 90/46, and the Cockerill series (Mark II, III, and VII) of tank guns. In 1987, MECAR secured a contract worth more than \$100 million to supply ammunition to an undisclosed Asian country (apparently Pakistan) for use with its T-54/T-55/Type 59 and M47/M48 tanks. MECAR also secured a major 1999 contract with a Middle Eastern customer (reportedly Saudi Arabia) for 90mm ammunition. Among at least five similar contracts, the U.S. Army awarded MECAR a Foreign Military Sales contract worth \$130 million in March 2002 to supply Saudi Arabia with tank munitions. This represented the largest single contract in the firm's history.

MECAR Enters 120mm M1080 Market

MECAR entered the 120mm market segment in the 1990s with the introduction of its M1080 Armor Piercing Fin Stabilized Discarding Sabot (APFSDS) round, featuring an advanced-design tungsten penetrator. In 1995, the firm began development of an enhanced version of the M1080; the round became available in 1999.

France

Nexter Munitions. The Giat Industries Etablissement d'Etudes et Fabrications d'Armement de Bourges facility developed the French Army's 120mm CN-120 Lisse tank gun and its advanced ammunition, albeit with some German assistance. In addition, the contractor has developed enhanced 90mm and 105mm rounds.

105mm Excalibur Introduced

One of the contractor's 105mm Armor Piercing Fin Stabilized Discarding Sabot – Tracer (APFSDS-T)

rounds is the Excalibur, a joint program with Primex Technologies (now General Dynamics), and RO Defence (now a component of BAE Systems). The contractors claim the Excalibur exhibits performance equivalent to first-generation 120mm penetrator rounds. While the contractor manufactures its products primarily for the French Ministry of Defense, the firm actively pursues export contracts for its tank guns and ammunition.

120mm OFL 120 E2

Another recent development is the 120mm OFL 120 E2 APFSDS round for the CN-120 Lisse tank gun of the Leclerc tank. Flying in the face of European environmental concerns, this new round features a depleted uranium (DU) penetrator. A similar 105mm round, the OFL 105 E2, is in advanced development.

120mm POLY-NG Introduced

The contractor has long been involved in the development of 105mm and 120mm guided tank munitions. The contractor's 120mm anti-helicopter round (a proximity-fuzed, fragmentation munition) has reportedly reached an advanced stage of development. In mid-2002, Giat revealed that it was developing the 120mm POLY-NG, a sensor-fuzed round with an advanced-design shaped-charge warhead (designated CGN 3-D). The POLY-NG will supposedly be capable of tank-kills out to 8,000 meters (8,749 yd). At present, the status of the POLY-NG program remains unclear. Another new round is an impact-fuzed 120mm High Explosive round, optimized for use in urban operations.

Corporate Restructuring

In October 2006, Giat Industries approved a reorganization and an associated name change to Nexter. Under the restructuring, the group organized under four core operations:

- Nexter Systems
- Nexter Munitions
- Nexter Electronics
- Nexter Mechanics

The contractor reportedly undertook this move to better prepare itself for consolidation in the near future, possibly with either Thales or EADS.

Luchoire. Before it became a subsidiary of Giat Industries, Luchoire produced a range of 75mm, 90mm, and 105mm tank gun ammunition, principally for the AMX-13 light tank. Because the AMX-13 remains popular outside Europe, Nexter Munitions continues to offer the Luchoire product line for export.

Tank Gun Ammunition (Europe)

Germany

In 1999, Krauss-Maffei Wegmann and Diehl Stiftung teamed up with the Russian KBP Instrument Design Bureau to develop the Spear, a 105mm anti-tank guided missile compatible with the L7, Rh 105, and M68 tank guns.

Leveraging Russian Technology

Based on the technology of the Russian 9M117M tandem warhead guided missile system, the Spear features an effective range of 5,500 meters (6,014.8 yd). The Spear team plans to offer the system as a depot-level retrofit package. Development is ongoing; the contractors have successfully test-fired a number of Spear rounds.

Diehl BGT Defence GmbH & Co KG. The Ordnance Division of the Diehl Group has designed, developed, and produced tank gun ammunition since the late 1950s. The Diehl DM13 was the first kinetic energy round fielded for the 105mm Rh 105 tank gun. The DM33 is now the standard 105mm round. Diehl has also developed a still newer 105mm APFSDS-T round, based on the Israeli M426; this munition has yet to achieve significant sales.

105mm DM148 Developed

In conjunction with Israel Military Industries, Diehl has developed the 105mm Target Practice Fin Stabilized Discarding Sabot - Tracer (TPFSDS-T) round. This round is currently in production by Diehl (as the DM148) and IMI (as the CL-274).

Rheinmetall Defence. This component of Rheinmetall Industrie produces 105mm and 120mm operational ("hot," or warload) and target practice ammunition.

105mm DM128 & 120mm DM38

The kinetic energy target practice ammunition employs Rheinmetall's Lochkegelleitwerk ballistic principle, featuring a cone base pierced by holes that produce significant drag after a range of about 2,000 meters. Rheinmetall offers both 105mm (DM128) and 120mm (DM38) versions of this target practice round.

This product has proven particularly successful for the contractor. In 1986, the German Army (Bundeswehr) awarded Rheinmetall a contract worth DM134 million for 135,000 rounds. Additional large orders have followed.

120mm DM12A1 Provided to Bundeswehr

Rheinmetall has also provided the Bundeswehr with a large quantity of the 120mm DM12A1 High Explosive Anti-Tank – Tracer (HEAT-T) round and the equivalent training round, the DM18.

U.S. Procurement

The U.S. Department of Defense has adopted several Rheinmetall 120mm tank munitions, with U.S. contractors producing the munitions under license. For more information on U.S. tank gun ammunition programs, see our "Tank Gun Ammunition (United States)" report in this tab.

LKE Program Launched

Rheinmetall's development and production of 120mm penetrating munitions coincided with the development and fielding of its 120mm Rh 120 tank gun. More recently, Rheinmetall teamed with Giat Industries (now operating as Nexter Munitions) to develop two new penetrating rounds for the Rh 120 and CN-120 "Lisse" tank guns. The overall program operates under the Leistungsgesteigerte Kinetische Energie (LKE) title.

The first stage of this program yielded the DM43, or LKE I. Although the Bundeswehr declined to adopt this round, the French Army has procured it under the designation OFL 120 FA. Also, China North Industries (NORINCO) is marketing what is apparently an unlicensed direct copy of the DM43.

Rather than adopt the DM43, the Bundeswehr waited for the fourth-generation munition, the DM53 APFSDS-T round (also known as the LKE II), to reach production. The DM53 is optimized for employment with the newer Rh 120/55 tank gun. From this armament, the DM53 can achieve a muzzle velocity of 1,752 meters (5,747.96 ft) per second, making this gun/round combination the most potent anti-armor weapon on earth. The Netherlands and Switzerland also produce the DM53 under license.

Rheinmetall Defence has developed a new 120mm High Explosive Fragmentation (HE-Frag) round for the Leopard 2 main battle tank, responding to interest in such a round from the German and Dutch governments. Operational tests began in 2002.

Greece

Hellenic Defence Systems (EAS) SA. This firm operates three main production facilities (Hymettus, Lavrion, and Elefsis) for the production of 75mm, 90mm, and 105mm tank gun munitions, primarily for domestic procurement. EBO also enjoys moderate export sales of its tank gun munitions.

Feeding the Leopard 2 HEL

With Greece's selection of the Leopard 2 main battle tank, we expect EAS to initiate licensed production of 120mm ammunition; the contractor is seeking an international partner to produce the ammunition. Greece

Tank Gun Ammunition (Europe)

will need 35,000 APFSDS-T rounds over the next seven years; the requirement for training rounds will be even higher.

Corporate Evolution

In 2004, Hellenic Arms Industry SA (EBO) merged with Greek Powder & Cartridge Company SA (PYRKAL) to form Hellenic Defence Systems (EAS) SA. However, the more familiar EBO brand name is still in common use throughout the European market.

Italy

Despite its long-standing domestic production capability, Italy has imported large quantities of tank gun ammunition from France, Germany, the Netherlands, Spain, and the United States. In July 2002, Italy announced that it would procure 2,700 CL3143 APFSDS-T rounds and 2,100 CL3105 HEAT-T rounds from Israel Military Industries (IMI). In late 2002, Italy issued a requirement for 6,000 rounds of 120mm Target Practice - Tracer (TP-T) rounds. Diehl, Giat Industries (now Nexter Munitions), IMI, Poongsan, and Rheinmetall are on Italy's short list to address the requirement.

FIAT SpA - BPD Difesa e Spazio. This Fiat subsidiary runs several fully integrated facilities for the production of a wide range of ammunition. The firm also operates extensive research and development facilities.

Licensed Production

BPD Difesa e Spazio has produced U.S.-pattern 90mm ammunition for the now-retired M47 and M48 Patton tanks, as well as 105mm ammunition for the Leopard 1 and M60 tanks.

FIAT SpA - Simmel Difesa. Another subsidiary of Fiat, this firm has long produced tank gun ammunition, mainly for domestic use. Recent information suggests that Simmel Difesa has acquired the tank gun ammunition business of BPD Difesa e Spazio. Simmel Difesa has a history of acquiring tank gun ammunition components from other sources, such as Chamberlain and Rheinmetall.

Netherlands

Eurometaal Holding NV. Now operating as a component of Rheinmetall Defence, this Dutch contractor produces a wide variety of tank ammunition, mostly under license from the U.S. and Germany. In the past, Eurometaal produced the U.S.-pattern 90mm M353A1 TP-T round. The firm's production emphasis, however, has been on a variety of 105mm munitions (APDS, APFSDS, HESH, TP-T) for the L7 and M68 guns, as well as HE and TP-T rounds for the CN-105/57 gun of the AMX-13.

Licensed 120mm DM53

Eurometaal also held a license from Rheinmetall (prior to its acquisition by that German firm) for the production of all types of 120mm ammunition for the Rh 120 tank gun. In 1998, Eurometaal reached an industrial agreement with (then) Rheinmetall DeTec for the license production of the formidable 120mm DM53 APFSDS-T round. Production began in 2001.

Russian Federation

FSUE 'Rosoboronexport.' As the Russian defense industry continues its tortured evolution from a state-run organization to a system of private and semi-private entities, Rosoboronexport acts as the primary conduit between the Russian defense industry and the international market. Thus, all Russian defense contractors effectively operate under the auspices of Rosoboronexport.

Old & New

The Russian State Factories have been concentrating on the production of several types of 125mm tank gun rounds. However, vast stocks of 76.2mm, 85mm, 100mm, and 115mm tank munitions remain available; the factories can restart production of these older munitions if necessary.

Eye on Export Sales

As the Russian Federation is in desperate need of cash revenue, strong efforts continue to export tank gun ammunition. These efforts paid off in 1996, with a sale of 25,000 125mm APFSDS rounds to India. With the recent Indian selection of the T-90 tank, additional sales of this ammunition are fairly certain.

In the long-term, the Russian Federation is developing larger (140mm) tank guns. The Russian Army may begin fielding a 140mm tank gun by the end of the forecast period – depending, of course, on the health of the Russian Federation Ministry of Defense budget.

Spain

In 1999, Spain began to rationalize its long-diverse tank inventory by procuring the Krauss-Maffei Leopard 2. With this procurement, Spain no longer needed to import large quantities of 90mm and 105mm tank gun ammunition from France, Germany, and the United States. Further, the procurement of the Leopard 2 provides long-absent impetus to indigenous Spanish munitions production.

General Dynamics Santa Barbara Sistemas. Since 2001, Santa Barbara Sistemas has been a subsidiary of General Dynamics. A component of General Dynamics European Combat Land Systems, GD-SBS continues as-needed production of French-pattern 105mm

Tank Gun Ammunition (Europe)

ammunition for the CN-105-F1 gun on the Spanish Army's remaining AMX-30 tanks.

Supporting the Leopard 2E

In December 1998, SBS secured a license-production agreement worth \$2.23 billion with Krauss-Maffei Wegmann for Spanish production of 219 Leopard 2A5 main battle tanks. Service deliveries under this contract began in January 2003. The Forecast International Weapons Group expects General Dynamics Santa Barbara Sistemas will also begin licensed production of Rheinmetall 120mm ammunition (including possibly the DM53 munition) to support the Spanish Leopard 2A5 force.

United Kingdom

BAE Systems Land & Armaments. RO Defence (formerly Royal Ordnance) is now a component of BAE Systems (formerly British Aerospace). The firm continues to produce proprietary 76mm, 90mm, 105mm, and 120mm rifled tank gun munitions. In addition, BAE Systems continues to produce Cockerill 90mm tank gun ammunition under license, on an as-needed basis.

Eye to Increasing Export Share

Although much of the former RO Defence production serves British Army requirements, BAE Systems is constantly striving to increase its export market share. In 1987, RO Defence demonstrated a new 105mm APFSDS round (the H6/62) as a replacement for the L64 round. The round is compatible with the L7 gun and the French F1 gun. While BAE Systems has not released any details, RO reportedly enjoyed significant sales through the 1990s.

In August 1998, RO Defence introduced a new line of 105mm ammunition to delegates from 15 countries. BAE Systems continues to keep the details of this new 105mm line under tight security. Research indicates the munitions do not include depleted uranium in any form, as such rounds would have virtually no export potential in the current political climate. Another new 105mm APFSDS-T round is the Excalibur, developed in conjunction with Primex Technologies (now General Dynamics) and Giat Industries.

British Army's Rifled 120mm Ammunition

RO Defence was a pioneer, virtually out of necessity, in the development of 120mm rifled tank gun ammunition. The British Army adoption of the 120mm L11 rifled tank gun for the FV4034 Challenger 1 tanks effectively made the British the only major user of rifled 120mm tank guns. This trend continued with the adoption of the 120mm L30 rifled gun for the Challenger 2. The latest

indigenous round for the L30 is the formidable L27 APFSDS-T round, also known as the CHARM 3.

In the late 1990s, RO Defence began the private development of a new tungsten penetrator-based APFSDS-T round (the L28) to enhance the appeal of the Challenger 2 tank on the export market. By late 2001, the British Army had begun procuring the L28 round.

Going Smoothbore Under CLIP

In late 2003, the U.K. Ministry of Defence began investigating the potential for rearming the Challenger 2 main battle tank with a 120mm smoothbore design through the Challenger Lethality Improvement Program (CLIP). Under a \$6.2 million MoD contract, BAE Systems (in collaboration with Rheinmetall Defence) investigated the integration of the Rheinmetall Rh 120/55 smoothbore tank gun with the Challenger 2.

This ordnance retrofit would enhance interoperability with NATO allies, who have all but universally adopted 120mm smoothbores for their tanks. The retrofit would also alleviate the problem of an increasingly limited supply of depleted-uranium rifled ammunition for the Challenger 2's rifled 120mm L30 main gun. Aside from the procurement of the new ordnance, the Challenger ammunition storage and handling equipment would require modification to accept the fixed 120mm smoothbore ammunition. The latest estimate to re-gun the entire inventory of British Army tanks is \$386 million.

March Toward NATO Standard

In 2005, BAE Systems and Rheinmetall completed initial static test firings of an Rh 120/55 – known within this program as the "L55 Hybrid" – on a modified Centurion chassis at the Rheinmetall test range in Germany. In early 2006, the contractors integrated the Rh 120/55 with a Challenger 2 in the U.K. for the next round of tests. Evaluations and test firings under the Smoothbore Option Technical Demonstrator Program (SOTDP) were completed by mid-2006.

For the British Army, Rh 120/55 ordnance integration would support the stated intention of extending the service life of the Challenger 2 to 2035. However, at present, the MoD is not funding the SOTDP effort.

C2 CSP

In May 2007, the U.K. Ministry of Defence Future Systems Group (FSG) issued an Invitation to Tender to BAE Systems Land Systems for the Challenger 2 Capability Sustainment Program (C2 CSP). This program consolidates all Challenger 2 modernization and retrofit efforts – including CLIP – into a single program.

Tank Gun Ammunition (Europe)

Mothballed Fleet?

But, despite the proven combat success of the FV4034 Challenger 1 and the Challenger 2 main battle tanks, severe budget shortfalls have effectively taken the Challenger out of action.

By June 2008, the C2 CSP program was facing cancellation due to increasingly severe MoD funding shortfalls. In September 2008, the MoD also canceled its base inspection and repair contract with its Defence Support Group (DSG) organization. Since the cancellation of this contract, the British Army has been placing Challenger tanks in storage once they reach the point of requiring "deep maintenance."

With the withdrawal of the last Challenger 2 squadron from Basra in 2009, the British Army's Royal Armoured Corps no longer has any Challenger tanks deployed in combat. Further, the RAC has had to cut funding for Challenger activity, including large-scale exercise participation, Challenger upgrade efforts, and maintenance/logistics support.

On October 19, 2010, the Conservative-led coalition government unveiled its much-anticipated Strategic Defence and Security Review (SDSR). Among its other cuts, the SDSR mandates reducing the active Challenger 2 main battle tank fleet by 40 percent, mothballing 155 tanks, leaving only 231 active Challenger 2 tanks in the entire British Army.

New Gun, New Ammo

If C2 CSP ever does indeed move ahead, BAE Systems would likely engage in licensed production of Rheinmetall 120mm tank gun munitions.

We believe the export users of the Challenger 2 (notably Jordan and Oman) would eagerly follow suit by integrating 120mm smoothbore main guns on their existing tanks. With this transformation, BAE Systems would likely scale down its production of older, rifled munitions in order to concentrate on the 120mm smoothbore munitions market.

Related News

Rheinmetall Defense Remains Strong – In what was a rough year, Rheinmetall was able to hold its own thanks to the strength of its defense operations. As the company moved through the financial crisis, its automotive operations were pounded. Defense, however, remained resilient. With defense strong for the company, Rheinmetall has continued to push forward on its strategy to grow its military operations.

The Rheinmetall Group posted sales of EUR3.42 billion for 2009, down 11.6 percent from 2008 sales of EUR3.87 billion. The Rheinmetall Group posted a loss of EUR52 million compared to net income of EUR135 million for 2008. The loss in 2009 was attributed to the impact of the financial crisis on the company's automotive operations. The company has gone shopping of late, buying up companies outright or purchasing controlling interests, whereas consolidation of Europe's armored vehicle producers has been moving at a near glacial pace. Rheinmetall is positioning itself to be a strong player no matter the changes. Key to this has been the bolstering of the firm's activities in the market. In early 2010, the company formed a new joint venture with MAN. Rheinmetall MAN Military Vehicles fuses the partner company's complementary product lines in wheeled military vehicles, including armored tactical and logistics models. In addition, Rheinmetall has pursued smaller niche acquisitions such as Verseidag Ballistic Protection and Simrad Optronics. Both firms offer complementary systems – in these cases, armor protection and optics – for Rheinmetall's signature military vehicles.

Also helping to boost Rheinmetall's defense sector has been the fruition of several major programs. One such project is the storied Boxer program that is being developed by the three members of the ARTEC consortium – Rheinmetall Landsysteme GmbH, Krauss-Maffei Wegmann GmbH, and Stork of the Netherlands, which Rheinmetall recently acquired. After struggling for years, the Boxer has finally entered production, with the first vehicle delivered in 2009 for the German and Dutch Ministries of Defense. In July 2009, Rheinmetall and partner Krauss-Maffei Wegmann received the go-ahead for serial production of the Puma infantry fighting vehicles for the Bundeswehr. Under their Projekt System und Management GmbH (PSM) venture, the two companies are expected to produce some 400+ vehicles over the span of the EUR3 billion program. Projects such as these are expected to become the basis for deeper cooperation and could ultimately lead to stronger tie-ups or mergers once the timing is deemed right.

Overall, the issue of consolidation remains highly political, with many European countries reluctant to give up their indigenous manufacturing capabilities despite the extremely low number of vehicles being produced. Rheinmetall is also aggressive in its pursuit of overseas teamings and other expansion opportunities. The company has taken a 51 percent interest in Rheinmetall Denel Munitions in South Africa, is establishing a joint venture in the UAE for ammunition production and disposal, and is expanding operations in the U.S. via American Rheinmetall Munitions.

Tank Gun Ammunition (Europe)

Thanks to its diversity, Rheinmetall is better positioned than either KMW or France's Nexter (formerly Giat). Further, the company's management is responding quickly to the shifting market dynamics. Through acquisitions, teamings, and new market initiatives, Rheinmetall is expected to be a formidable competitor in the years ahead. (FI, 10/10)

Allied Defense Completes Asset Sale to Chemring – The Allied Defense Group has completed the sale of its two subsidiaries to Chemring Group, plc, for \$59.6 million in cash. Under the terms of the deal, Chemring acquired all the stock in Mekar SPRL, which manufactures ammunition. It also obtained substantially all the assets of Mekar USA Inc, which provides load, assembly, pack, and procurement services for the U.S. government and other contractors. (Allied Defense Group, 9/10)

U.S. Marine Corps M1s to Receive New Ammunition, Remote Operated Weapons – The M1 Abrams tanks operated by the U.S. Marine Corps will be upgraded. The M1s will receive new 120mm ammunition and remotely operated weapon stations. The Marines plan to purchase 3,000 new multipurpose 120mm rounds for the tanks. The first new rounds will be in the field by spring. The new rounds will enable M1 tank crews to better engage reinforced concrete structures and bunkers. The new round is manufactured by Rheinmetall Defense of Germany.

The Marine Corps' M1 tanks will also receive a remotely operated weapons station. This station will replace the existing M240B 7.62mm machine gun mounted at the loader's hatch. The M240B is in an exposed mount. A competition to provide the remotely operated system will begin in March. The Marines plan to field the station by early 2011 and expects to purchase up to 500 stations, at an estimated unit cost of \$4 million. (Marine Corps Times, 3/10)

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Funding

Individual contractors and various governments fund the development of tank gun ammunition.

Contracts/Orders & Options

European governments and major manufacturers generally do not reveal contractual information. However, reports indicate that, in Jul 2005, the German Bundesamt für Wehrtechnik und Beschaffung (Federal Office for Military Technology and Procurement) awarded Rheinmetall Defence a contract worth about \$36 million for the procurement of the 120mm DM63 APFSDS-T round.

In December 2005, Turkey awarded Rheinmetall Defence a contract worth about \$59.5 million for the procurement of 15,000 rounds of 120mm DM63 KE ammunition and associated practice ammunition. Deliveries were to occur between Jul 2006 and Jun 2007.

In November 2006, the Danish Army ordered an unspecified number of Penetrator with Enhanced Lateral Effect (PELE) 120mm KE rounds from Rheinmetall Defence. The procurement package includes the modification of existing tank ammunition (the DM33A2) in order to improve its effectiveness in modern combat scenarios, including possible military operations in urban terrain. After Finland, Denmark is the second Scandinavian country to procure the DM53A1, an advanced version of Rheinmetall's DM53 120mm KE tank round.

In Mar 2009, the Netherlands Ministry of Defence awarded Rheinmetall Defence (Rheinmetall Waffe Munition GmbH) a contract of undisclosed value for the procurement of 20,700 rounds of 120mm M856C1 TPCSDS-T tank ammunition.

Timetable

European contractors continue to develop enhanced-performance 120mm ammunition, with some research into larger caliber (140mm) designs for the next-generation tank guns. The next full-generation tank gun is not likely to emerge in operational form until at least 2015.

Tank Gun Ammunition (Europe)

Until the next generation of main battle tank technology emerges, the Forecast International Weapons Group expects the smoothbore 120mm tank gun – especially the Rheinmetall Rh 120 – to reign supreme among European armies throughout the forecast period.

Worldwide Distribution/Inventories

European tank gun ammunition, which is nearly as ubiquitous as U.S. tank munitions, is available worldwide.

Forecast Rationale

Serial production of tank gun ammunition is ongoing throughout Europe for domestic procurement and export.

Post-Cold War Realities

While production levels remain generally stable, the European tank gun ammunition market continues to reflect the impact of a radically different post-Cold War threat environment. With the disintegration of the former Soviet Union and the Warsaw Pact, three major factors have driven the European tank gun ammunition market since 1990:

- A sharp decline in European tank gun ammunition procurement, driving European production to less than half its pre-1990 levels
- The vast remaining stockpiles of munitions from pre-1990s production
- An influx of new players (primarily from the former Soviet Union and Warsaw Pact) into the market, impacting the market share of the European players

Rheinmetall Dominates

Nevertheless, the established European players remain leaders in the development and production of tank gun ammunition. Rheinmetall Defence clearly dominates the international market for 120mm smoothbore tank guns and ammunition. Indeed, the Rheinmetall Rh 120-series ordnance and its associated ammunition have become the international industry standard for tank main armament of this type.

Stable European Market

The Forecast International Weapons Group expects to see a generally stable and relatively healthy European market for tank gun ammunition, focused on development and procurement for domestic requirements. The combined production rate will average 265,000 rounds per year among the various European players through 2020.

Although production levels are but a shadow of their Cold War past, the major European players each offer an extensive line of munitions, often targeting a specific customer base. In terms of export sales, Rheinmetall Defence remains the dominant force in the 120mm market segment, through direct sales and licensing agreements.

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