



GDIL GROUP

GLOBAL MUNITION LIMITED

ENERGETICS & EXPLOSIVES

EXPLOSIVES & ENERGETICS HANDBOOK

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GML — Manufactures TNT, RDX, HMX and other explosives for Defence and Military Use

This document provides standard specifications for GML product lines. Information is subject to revision without notice and is provided for procurement, evaluation, and export-documentation purposes.

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Global Munition Limited – Product Overview

Explosives and Energetics

GML manufactures energetics and explosive fill materials used across the M107, ERFB-BT, and ERFB-BB shells, manufactured and certified at a licensed fill facility separate from the body-forging and machining operations. The division's core product is military-grade TNT, procured and certified against MIL-DTL-248D, supplied either as a standalone fill or as a component of Composition B blends depending on buyer requirement. Each batch is certified for chemical purity, appearance, and melting-point specification prior to release, with material handled, stored, and transported under GDIL Group's dedicated hazard-classification and safety-documentation protocols. Fill integration is carried out as the final stage of the filled-shell configuration, following body inspection and driving-band/base-disc assembly, with fill weight and type verified and recorded per lot.

155 mm M107 HE Projectile (Filled Shell)

GML-155mm -M107

The M107 shell is the baseline conventional (non-extended-range) 155 mm high-explosive projectile, widely compatible with M107/M795-family 155 mm howitzer systems. GDIL Group supplies the body in both empty and explosive-filled configurations.

Dimensional & Material Specification

#	Description	Specification
1	Overall Length	601.98 ± 2.54 mm
2	Body Diameter	153.92 mm
3	Max. Diameter	154.71 mm
4	Finished Driving Band Dia.	157.89 mm
5	Empty Shell Weight	34.53 kg
6	Shell + Driving Band + Base Disc	35.14 ± 0.61 kg
7	Mean Internal Volume	4,350 – 4,450 cm ³
8	Body Material Grade	B14 Forging Steel
9	Driving Band Material	Gilding Metal (Copper Alloy No. 220, Annealed) per MIL-B-20292, or Copper-Zinc No. 220 “Glodgad” per MIL-B-20292

Characteristics

#	Description	Specification
1	Mass of Ammunition	42.1 Kg (Mass of the Shell without Fuze)
2	Length of Shell	604 mm (without Fuze)
3	Muzzle Velocity	685 m/s (with Charge-8)
4	Range	Up to 18 Km
5	Max. Chamber Pressure	386 Mpa
6	Quality Compliance	Quality as per International standards.
7	Safety	Compliance with all safety norms and safe to handle.
8	Hazard Classification	1.1
9	UNHD Compatibility	1.1D
10	Shelf Life	10 Years

Explosive Fill (Filled Configuration)

#	Description	Specification
1	Explosive Fill Type	TNT
2	Explosive Fill Weight	6.6 – 6.8 kg



155 mm ERFB-BT HE Projectile (Filled Shell)

GML-155mm-ERFB-BT

The ERFB Boat-Tail configuration extends effective range over the M107-pattern baseline through a tapered boat-tail afterbody, which reduces base drag in flight. Body material, driving-band, and base-disc specifications follow the common 155 mm platform.

Dimensional & Material Specification

#	Description	Specification
1	Overall Length	763 mm
2	Ogive Length	655 mm
3	Max. Diameter on body	154.69-0.12 mm
4	Max. Diameter over driving band	157.86-0.2 mm
5	Material Type	Steel to SAE 9260
6	Weight of empty shell	32.3 to 33.7 kgs
7	Pressure Testing Parameter	Pressure 840 kg (min), Time- 10 sec (min)
8	Groove for driving band	Groove with knurling
9	Driving Band material	Copper Alloy to JSS-4710-01, Grade II
10	Groove for driving band	Groove with knurling

Characteristics

#	Description	Specification
1	Overall length of Shell without fuze	861 mm
2	Compatible Fuze	PDM 572C1 Fuze
3	Maximum Chamber Pressure	397 +- 8 MPa
4	Maximum Range	24 km
5	Muzzle Velocity	827 m/s m/sec
6	Mass of Ammunition	42.84 to 45.34 Kg (without Fuze)
7	Main Components/Sub-assemblies	1. Boat Tail unit 2. Modified Aluminium Liner 3. Obturator 4. Felt pad 5. Scuff Protector 6. Plug Lifting 7. Grummet Assy.
8	Quality Compliance	Quality as per international standards.
9	Safety	Compliance with all safety norms and safe to handle.
10	Hazard Classification	1.1
11	UNHD Compatibility	1.1D (Plugged)
12	Shelf Life	15 years



Explosive Fill (Filled Configuration)

#	Description	Specification
1	Explosive Fill Type	TNT
2	Filling Mass	8.71 kg

155 mm ERFB-BB HE Projectile (Filled Shell)

GML-155mm -ERFB-BB

The ERFB Base-Bleed configuration integrates a base-bleed unit that reduces base drag by injecting combustion gas into the low-pressure wake behind the projectile, extending range beyond the boat-tail configuration. The body retains an integrated base-bleed cavity in place of a simple boat-tail.

Dimensional & Material Specification

#	Description	Specification
1	Overall Length	763 mm
2	Ogive Length	655 mm
3	Max. Diameter on body	154.69-0.12 mm
4	Max. Diameter over driving band	157.86-0.2 mm
5	Material Type	Steel to SAE 9260
6	Weight of empty shell	32.3 to 33.7 kgs
7	Pressure Testing Parameter	Pressure 840 kg (min), Time- 10 sec (min)
8	Groove for driving band	Groove with knurling
9	Driving Band material	Copper Alloy to JSS-4710-01, Grade II
10	Groove for driving band	Groove with knurling
11	Operating Temperature	-20°C to + 60°C



Characteristics

#	Description	Specification
1	Overall length of Shell without fuze	861 mm
2	Compatible Fuze	PDM Fuze
3	Maximum Chamber Pressure	444 Mpa
4	Maximum Range	38.4 km
5	Muzzle Velocity	897 ±5 m/sec
6	Quality Compliance	Quality as per international standards.
7	Safety	Compliance with all safety norms and safe to handle.
8	Hazard Classification	1.1
9	UNHD Compatibility	1.1D
10	Shelf Life	10 years

Explosive Fill (Filled Configuration)

#	Description	Specification
1	Explosive Fill Type	TNT
2	Filling Mass	8.71 kg

Energetic Materials

TNT — 2,4,6-Trinitrotoluene

GML: Gr-I TNT

Military-grade TNT is used as a standalone fill or as a component of Composition B fills across the 155 mm and other ammunition shells. Material is procured and certified against MIL-DTL-248D.

Technical Specifications

Acetone Insoluble Matter	<0.05%
Acidity as HNO ₃	<0.015%
Set Point	80.3°C
Vacuum Stability at 120°C for 40 hrs	<4 cm ³

Physical Specification

Appearance	Pale yellow crystalline solid
Purity (GC)	≥ 99%
Melting Point/ Set Point	80.2 – 80.6 °C



Energetic Materials

RDX — Cyclotrimethylenetrinitramine

GML: RDX

Military-grade RDX is used as a high-explosive primary component in melt-cast formulations (such as Composition B) and plastic-bonded explosives (PBX) across artillery and high-explosive munition families. Material is procured and certified against MIL-DTL-398D.

Technical Specifications

Assay as RDX (%)	99%
Acetone Insoluble Material	0.05% (Max)
Acidity as HNO ₃	0.015% (Max)
Melting Point	204°C
Particle Size	50 µm
Reference Standard	MIL-DTL-398D, Military Grade

Physical Specification

Appearance	White to off-white crystalline solid
Purity (GC)	≥ 98.0%
Melting Point	200.0 – 205.0 °C



Energetic Materials

HMX — Cyclotetramethylenetetranitramine

GML: HMX

Military-grade HMX (Octogen) is a high-density, high-velocity secondary explosive utilized in high-performance warhead fills, Octol compositions, and modern insensitive/PBX applications requiring maximum detonation velocity. Material is procured and certified against MIL-DTL-45444C.

Technical Specifications

Assay (%)	98%
Acetone Insoluble Material	0.05% (Max)
Acidity as Acetic Acid	0.02% (Max)
Melting Point	277°C
Inorganic Insoluble Material (%Max)	0.03% (Max)

Physical Specification

Appearance	White crystalline solid
Purity (GC)	≥ 98.0%
Melting Point	275.0 – 280.0 °C



Energetic Materials

Nitrocellulose — Cellulose Nitrate

GML: NC

Nitrocellulose (Cellulose Nitrate) is a nitrated polysaccharide ester utilized as a primary base in single-base, double-base, and multi-base propellants, as well as in industrial coatings, lacquers, and celluloid plastics. Technical- and military-grade grades are graded primarily by nitrogen content and viscosity, procured and certified against established specifications such as MIL-DTL-244.

Material Identity

Chemical Name	Nitrocellulose (Cellulose nitrate, Pyroxylin, Guncotton)
Chemical Class	Nitrate Ester / Nitrated Polysaccharide
CAS Number	9004-70-0
UN Number	UN 2556 (wetted with alcohol) / UN 2555 (wetted with water) / UN 0342
EC Number (EINECS)	618-396-5
Molecular Formula	$[C_6H_7O_2(OH)_{3-x}(ONO_2)_x]_n$
Molecular Weight	252 to 297 g/mol
Reference Standard	MIL-DTL-244 / ASTM D301

Physical Specification

Appearance	White to off-white fibrous pulp, chips, or cotton-like solid
Nitrogen Content	12.0% – 13.4%
Decomposition Temperature	160.0 – 180.0 °C



Propellants

Single Base Propellant

GML: SBP

A single-base propellant is a type of smokeless gunpowder that uses nitrocellulose as its sole energetic (energy-producing) component..

Material Identity

Chemical Name	Nitrocellulose (Cellulose nitrate, Pyroxylin, Guncotton)
Chemical Class	Nitrate Ester / Nitrated Polysaccharide
CAS Number	9004-70-0
UN Number	UN 2556 (wetted with alcohol) / UN 2555 (wetted with water) / UN 0342
EC Number (EINECS)	618-396-5
Molecular Formula	$[\text{C}_6\text{H}_7\text{O}_2(\text{OH})_{3-x}(\text{ONO}_2)_x]_n$
Molecular Weight	252 to 297 g/mol
Reference Standard	MIL-DTL-244 / ASTM D301

Physical Specification

Appearance	White to off-white fibrous pulp, chips, or cotton-like solid
Nitrogen Content	12.0% – 13.4%
Decomposition Temperature	160.0 – 180.0 °C



Propellants

Double Base Propellant

GML-DBP

A double-base propellant is a solid energetic material composed primarily of nitrocellulose plasticized and gelatinized by nitroglycerin.

Material Identity

Chemical Name	Nitrocellulose (Cellulose nitrate, Pyroxylin, Guncotton)
Chemical Class	Nitrate Ester / Nitrated Polysaccharide
CAS Number	9004-70-0
UN Number	UN 2556 (wetted with alcohol) / UN 2555 (wetted with water) / UN 0342
EC Number (EINECS)	618-396-5
Molecular Formula	$[C_6H_7O_2(OH)_{3-x}(ONO_2)_x]_n$
Molecular Weight	252 to 297 g/mol
Reference Standard	MIL-DTL-244 / ASTM D301

Physical Specification

Appearance	White to off-white fibrous pulp, chips, or cotton-like solid
Nitrogen Content	12.0% – 13.4%
Decomposition Temperature	160.0 – 180.0 °C



Propellants

Triple Base Propellant

GML-TBP

A triple-base propellant is an advanced type of [smokeless powder](#) that contains three distinct energetic components

Material Identity

Chemical Name	Nitrocellulose (Cellulose nitrate, Pyroxylin, Guncotton)
Chemical Class	Nitrate Ester / Nitrated Polysaccharide
CAS Number	9004-70-0
UN Number	UN 2556 (wetted with alcohol) / UN 2555 (wetted with water) / UN 0342
EC Number (EINECS)	618-396-5
Molecular Formula	$[C_6H_7O_2(OH)_{3-x}(ONO_2)_x]_n$
Molecular Weight	252 to 297 g/mol
Reference Standard	MIL-DTL-244 / ASTM D301

Physical Specification

Appearance	White to off-white fibrous pulp, chips, or cotton-like solid
Nitrogen Content	12.0% – 13.4%
Decomposition Temperature	160.0 – 180.0 °C



30× 173 mm Ammunition

GML 30 ×173 mm

A medium-calibre ammunition designed to deliver high accuracy and penetration against aerial and ground threats.

Technical Specifications

#	Description	Specification
1	Cartridge weight/length	690g/290mm
2	Projectile weight/length	380g/166mm
3	HE (A7) weight	41g
4	Propellant weight (single base)	160g
5	Muzzle velocity	1,100 m/sec
6	Chamber pressure	380 MPa
7	Accuracy (Trp.)	0.4x0.4 mils
8	Trace time	5 sec.
9	Fuze	PDD fuze with two safety systems
10	Temperature limits: Firing Storage	-46°C/+63°C -54°C/+71°C
11	Hazard class	1.2E UN0321



120 mm Mortar

GML-120mm

A 120mm mortar is a heavy, smoothbore, muzzle-loaded artillery weapon designed to provide high-angle indirect fire support for infantry units. It bridges the gap between light infantry mortars and heavy artillery, offering a devastating balance of mobility and firepower.

Dimensional & Material Specification

#	Description	Specification
1	Outer Diameter	119.3 - 119.7 mm
2	Total Body Length	585 mm to 665 mm
3	Wall Thickness	8 mm to 12 mm
4	Tail Boom Diameter	28 mm to 32 mm
5	Fin Span (Diameter)	119.0 mm to 119.5 mm
6	Number of Fins	10 to 12 canted or straight fins
7	Empty Steel Body Weight	10.5 kg to 11.5 kg



120 mm Guided Mortar Ammunition

GML-120mm GMA

The system incorporates GPS/SAL/IMU-based highly accurate guidance and offers a range capability of up to 12 km, with a CEP50 of less than 1 m in SAL mode. It is equipped with a 10.8 kg blast/fragmentation, double-reinforced concrete-penetrating warhead designed for enhanced target effects. The system supports multiple fuze options, including Point Detonation (PD), Point Detonation with Delay (PDD), and Proximity (Prox) fuzing modes, providing flexibility for different operational requirements.

Dimensional & Material Specification

#	Description	Specification
1	Range	1-12km (depending on mortar system)
2	Accuracy	cep 50%: gps <10m; sal <1m
3	Guidance	gps/imu+sal
4	Seeker/Sponsor	Strap Down CMOS dual mode
5	Hit Angle	50-75°
6	Warhead	10.8 kg (fragmentation/penetration)
7	Length	950mm
8	Mission Load Time	~15 sec



Suryastra Rocket (150 km)

GML-150 km SR

The Suryastra 150 km rocket is a high-precision, 306 mm calibre guided artillery munition designed for tactical deep-strike operations

Dimensional & Material Specification

#	Description	Specification
1	Range	30-150 km
2	Velocity	Mach 3.5
3	Precision	10 m - CEP
4	Payload	120 kg
5	Warheads	Unitary (MP)
6	Diameter	306 mm
7	Length	4500 mm



Suryastra Rocket (300 km)

GML-300 km SR

The Suryastra 300 km rocket is a heavy, long-range guided precision munition designed for deep-strike tactical and strategic warfare [EXTRA]. Developed as part of India's multi-calibre system, this specific rocket represents the maximum reach capability of the platform, designed to strike critical infrastructure deep behind enemy lines.

Dimensional & Material Specification

#	Description	Specification
1	Range	30-300 km
2	Precision	10 m - CEP
3	Payload	140 kg
4	Warheads	Unitary (MP)
5	Diameter	370 mm
6	Length	5500 mm



Quality Assurance & Reference Standards

All GDIL Group 155 mm product lines are manufactured and inspected against the following reference framework:

- Body steel grade: B14 forging steel, certified chemical composition and mechanical properties
- Driving band material: Gilding Metal / Copper Alloy No. 220 per MIL-B-20292
- Base disc: Cold-rolled carbon steel strip per ASTM-A109M
- Explosive fill: TNT per MIL-DTL-248D; Composition B per applicable ordnance reference
- 100%-dimensional gauging on driving band, base disc, fuze thread, and concentricity
- Hydraulic pressure-proof testing: 600 kg/cm² (588.4 bar), 10-second hold
- Mechanical testing: hardness (BHN), yield strength, elongation, and (where specified) Charpy impact

Buyer-specific requirements — including NATO STANAG references, customer drawings are accommodated on a contract basis, with first-article inspection and lot-acceptance test reports issued as per buyer requirement.



Global Headquarters & Contact

GDIL Group — Global Munition Limited

Global Sales & Support Inquiries

For technical specifications, test reports, or procurement inquiries regarding GDIL Group products, please contact our defence sales division:

Division	GDIL Group — Global Sales Office
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