FACTSHEET

DENEL

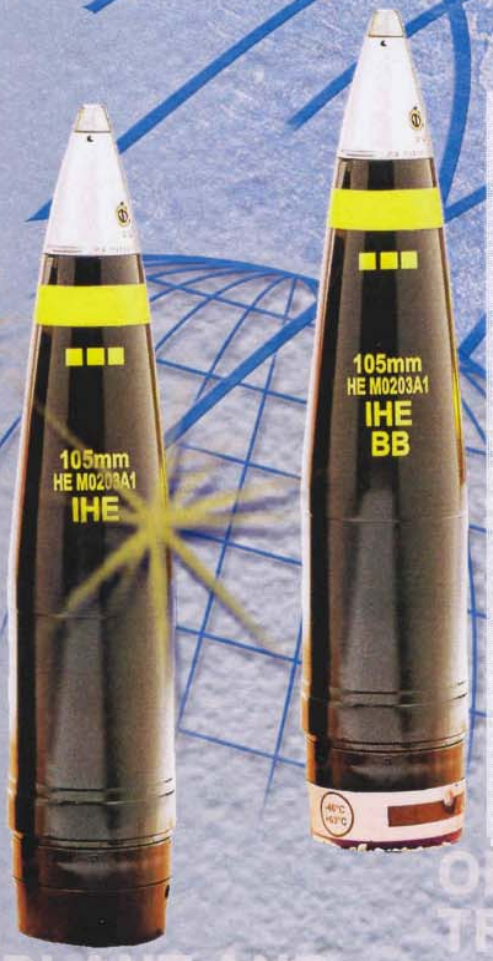
A Company with a vision that knows no boundaries.

AIR FORCE

NAVAL

INFANTRY

ARMOUR



SHELL 105 mm IHE M0203

105 mm NATURAL FRAGMENTING IHE SHELL, FOR USE WITH A SUPER QUICK/DELAY, PROXIMITY OR MULTI-OPTION FUZE IN THE LEO, L118, M119 AND OTHER COMPATIBLE 105 mm HOWITZERS. THIS SHELL IS IM-COMPLIANT.

ORDNANCE

TRAINING

PLANT AND EQUIPMENT

ARTILLERY

SHELL 105 mm IHE M0203

FACTSHEET

UNIQUE FEATURES

An optional feature of our 105 mm shell is the fact that the boat tail and base bleed motors can be totally field interchangeable, ensuring utmost flexibility. All shell types in the Igala family display ballistic similitude and utilize the same range tables.

TECHNICAL CHARACTERISTICS

	BOAT TAIL	BASE BLEED
Total mass unfuzed (kg):	15,15 to 15,45	15,15 to 15,45
Length unfuzed (mm)	455	455
Explosive type:	IHE	IHE
Maximum acceleration (g's):	22.000	22.000
Base design pressure (MPa):	400	400
Driving band diameter (mm):	107,4	107,4
Fuze cavity:	STD NATO	STD NATO

TYPICAL PERFORMANCE AT +21°C

	LEO (M21 CHARGE)		NATO HOWITZERS *	
	BOAT TAIL	BASE BLEED	M119 (M200) BOAT TAIL	L118 (L36) BOAT TAIL
Muzzle velocity (m/s):	950	960	620	695
Chamber pressure (MPa):	340	350	360	310
Maximum range (km):	24	29	15	17
Consistency (at 75% maximum range): -50% zone in range (%): -50% zone in azimuth (mils):	 ≤0,80 ≤2,0	 ≤0,80 ≤2,0	 ≤0,80 ≤2,0	 ≤0,80 ≤2,0
Qualification temperature (°C):	-46 to +63	-46 to +63	-46 to +63	-46 to +63

* EXPECTED

PACKING AND MARKING

Marking:	Standard NATO marking or as per customer requirements.
Packing:	16 Shells per pallet, or in customer preferred pack.

FACTSHEET

DENEL

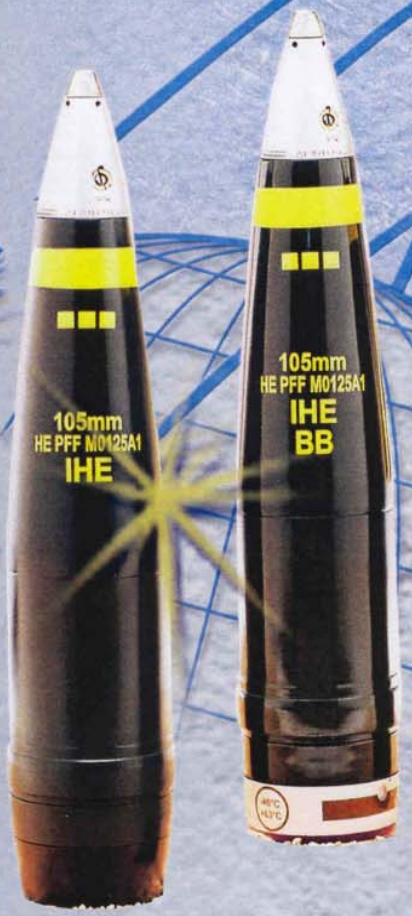
A Company with a vision that knows no boundaries.

AIR FORCE

NAVAL

INFANTRY

ARMOUR



SHELL 105 mm IHE PFF M0125

105 mm HE PRE-FRAGMENTED SHELL, FOR USE WITH A SUPER QUICK/DELAY, PROXIMITY OR MULTI-OPTION FUZE IN THE LEO, L118, M119 AND OTHER COMPATIBLE 105 mm HOWITZERS. THIS SHELL'S LETHALITY IS IN LINE WITH THAT OF A 155 mm HE SHELL, JUDGED AGAINST SOFT SKINNED TARGETS.

PLANT AND EQUIPMENT

ARTILLERY

SHELL 105 mm IHE PFF M0125

UNIQUE FEATURES

An optional feature of our 105 mm shell is the fact that the boat tail and base bleed motors can be totally field interchangeable, ensuring utmost flexibility. All shell types in the Igala family display ballistic similitude and utilize the same range tables.

TECHNICAL CHARACTERISTICS

	BOAT TAIL	BASE BLEED
Total mass unfuzed (kg):	15,15 to 15,45	15,15 to 15,45
Length unfuzed (mm)	455	455
Explosive type:	IHE	IHE
Maximum acceleration (g's):	22.000	22.000
Base design pressure (MPa):	400	400
Driving band diameter (mm):	107,4	107,4
Fuze cavity:	STD NATO	STD NATO

TYPICAL PERFORMANCE AT +21°C

	LEO (M21 CHARGE)		NATO HOWITZERS *	
	BOAT TAIL	BASE BLEED	M119 (M200) BOAT TAIL	L118 (L36) BOAT TAIL
Muzzle velocity (m/s):	950	960	620	695
Chamber pressure (MPa):	340	350	360	310
Maximum range (km):	24	29	15	17
Consistency (at 75% maximum range): -50% zone in range (%): -50% zone in azimuth (mils):	 ≤0,80 ≤2,0	 ≤0,80 ≤2,0	 ≤0,80 ≤2,0	 ≤0,80 ≤2,0
Qualification temperature (°C):	-46 to +63	-46 to +63	-46 to +63	-46 to +63

* EXPECTED

PACKING AND MARKING

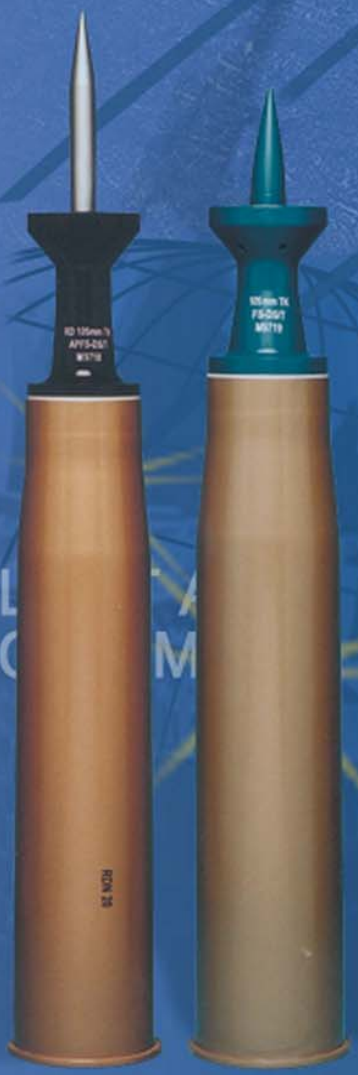
Marking:	Standard NATO marking or as per customer requirements.
Packing:	16 Shells per pallet, or in customer preferred pack.

FACTSHEET

DENEL

A Company with a vision that knows no boundaries.

NAVAL



ROUND 105 mm APFSDS/T AND TP-FSDS/T

- DESIGNED TO MEET MIL-STANDARD AND STANAG GUIDELINES.
- COMPATIBLE WITH L7 – GUNS AND SIMILAR SYSTEMS.
- USED AGAINST/FOR:
  - ✓ ARMOUR STEEL
  - ✓ LAYERED TARGETS
  - ✓ TRAINING (TP-FSDS)

ROUND (OR CARTRIDGE) 105 MM M9718 (APFS) OR M9719 (FS-DS)

UNIQUE FEATURES

- APFS and TPFS follow same trajectory to 2 000 m.
- Flight range markedly reduced for the training round for accidental launching at high elevations

TECHNICAL CHARACTERISTCS

	COMBAT	PRACTICE
Overall length (mm):	950	850
Total mass (kg):	18,5	16,5
Design pressure (MPa):	500	500
Driving band diameter (mm):	109,0	109,0
Temperature range (operational) (°C)	-20 to +52	-20 to +52

TYPICAL PERFORMANCE AT +21°C

	COMBAT	PRACTICE
Muzzle velocity (m/s):	1 450 – 1 500	1 550 – 1 600
Chamber pressure (MPa):	350 – 400	350 – 400
Combat range (m)	3 000	2 000
Safety range (at 10% elevation) (m):	30 000 +	< 12 000
Electrical Primer	M32A2	M32A2
Dispersion up to 3 000 (m):	0,30 x 0,30	0,30 x 0,30 (@ 2 000 m)
Penetration capability (RHA) (mm):	450+	N/A
Tracer visibility distance (m):	3 000	2 000

PACKING AND MARKING

Marking:	Standard or per customer requirements.
Packing:	Palletized wooden boxes (16/pallet) or per customer requirements.

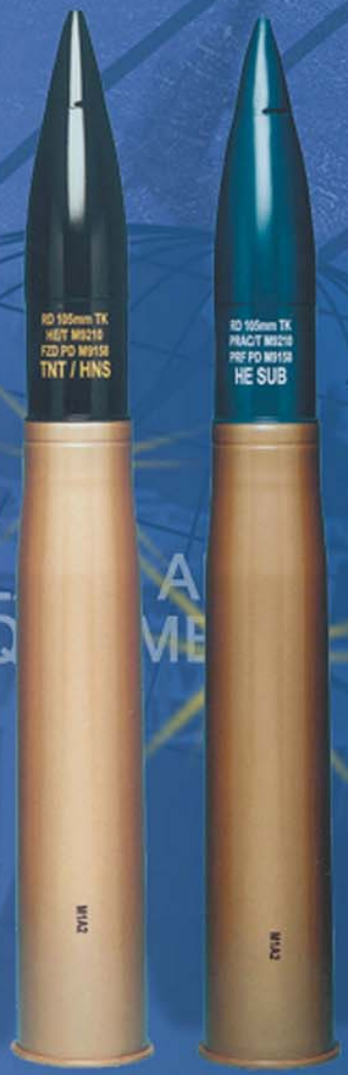
DENEL

DENEL

A Company with a vision that knows no boundaries.

NAVAL

FACILITIES



ROUND 105 mm HE/T AND TP/T (PRAC/T)

- DESIGNED TO MEET MIL-STANDARD AND STANAG GUIDELINES.
- USED WITH DIRECT ACTION FUZE.
- COMPATIBLE WITH:
  - ✓ L7 – GUNS AND SIMILAR SYSTEMS.
  - ✓ PROX FUZES.
  - ✓ BUNKER FUZES.
- USED AGAINST/FOR:
  - ✓ PERSONNEL
  - ✓ BUNKERS
  - ✓ SOFT TARGETS
  - ✓ TRAINING (TP)

ROUND 105 mm (M9210) OR CARTRIDGE (M0238)

UNIQUE FEATURES

Usually supplied with point detonating direct action fuze, which is interchangeable with transit plug or other fuze types. HE and TP Rounds utilize same range tables. Fuze has Super Quick, Delay and Graze action features. Low operating pressure and muzzle velocity. Effective against vehicles and sand/concrete bunkers.

TECHNICAL CHARACTERISTCS

	COMBAT	PRACTICE
Overall length (mm):	1 006	1 006
Total mass (fuze/PRF included) (kg):	24,5	24,5
Design pressure (MPa):	400	400
Driving band diameter (mm):	108,5	108,5
Fuze cavity	STD NATO	STD NATO
Explosive filling:	TNT/HNS	Inert
Lethality radius (personnel) (m):	17	N/A
Temperature range (operational) (°C)	-20 to +52	-20 to +52
Fuze (Super quick and delay):	PD M9158A2	PRF
Electrical primer:	M32A2	M32A2

TYPICAL PERFORMANCE AT +21°C

	COMBAT	PRACTICE
Muzzle velocity (m/s):	700	700
Chamber pressure (MPa):	200	200
Maximum range (m):	10 000 – 12 000	10 000 – 12 000
Dispersion to 3 000 m (m):	0,30 x 0,30	0,30 x 0,30
Consistency (at 10 000): -50% zone in range (%) (PE_r): -50% zone in azimuth (mils) (PE_u):	 ? 1,0 ? 2,0	 ? 1,0 ? 2,0
Tracer visibility time (s):	> 8	> 8

PACKING AND MARKING

Marking:	Standard or per customer requirements.
Packing:	Palletized wooden boxes (16/pallet) or per customer requirements.

DENEL

SHELL 105 mm HE M2019

105 mm NATURAL FRAGMENTING HE SHELL, FOR USE WITH A SUPER QUICK/DELAY, PROXIMITY OR MULTI-OPTION FUZE, IN THE LEO, L118, M119 AND OTHER COMPATIBLE 105 mm HOWITZERS.

Unique Features

An optional feature of our 105 mm shell is the fact that the boat tails and base bleed motors can be totally field interchangeable, ensuring utmost flexibility. All shell types in the Igala family display ballistic similitude and utilize the same range tables.

Technical Characteristics

	BOAT TAIL	BASE BLEED
Total Mass unfuzed (kg):	15,15 to 15,45	15,15 to 15,45
Length unfuzed (mm):	455	455
Base design pressure (MPa):	400	400
Maximum acceleration (g's):	22.000	22.000
Driving band diameter (mm):	107,4	107,4
Fuze cavity:	STD NATO	STD NATO
Explosive type:	TNH	TNH

Typical Performance at +21°C

	LEO (M21 CHARGE)		NATO HOWITZERS*	
	BOAT TAIL	BASE BLEED	M119 (M200) BOAT TAIL	M118 (L36) BOAT TAIL
Muzzle velocity (m/s):	950	960	620	695
Chamber pressure (MPa):	340	350	360	310
Maximum range (km):	24	29	15	17
Consistency (at 75% maximum range:):				
✓ 50% zone in range (%):	≤ 0,80	≤ 0,80	≤ 0,80	≤ 0,80
✓ 50% zone in azimuth (mils):	≤ 2,0	≤ 2,0	≤ 2,0	≤ 2,0
Qualification temperature (°C):	-46 to +63	-46 to +63	-46 to +63	-46 to +63

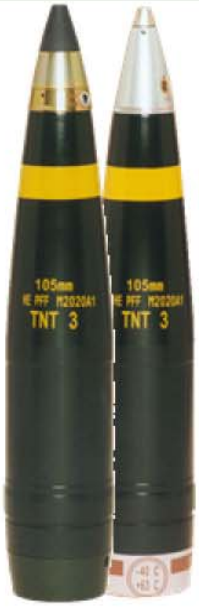
* Expected

Packing and Marking

Marking	Standard NATO marking or as per customer requirements
Packing	16 Shells per pallet, or in customer preferred pack.

DENEL

SHELL 105 mm HE PFF M2020



105 mm HE PRE-FRAGMENTED SHELL, FOR USE WITH A SUPER QUICK/DELAY, PROXIMITY OR MULTI-OPTION FUZE, IN THE LEO, L118, M119 AND OTHER COMPATIBLE 105 mm HOWITZERS. THIS SHELL'S LETHALITY IS IN LINE WITH THAT OF A 155 mm HE SHELL, JUDGED AGAINST SOFT SKINNED TARGETS.

Unique Features

An optional feature of our 105 mm shell is the fact that the boat tails and base bleed motors can be totally field interchangeable, ensuring utmost flexibility. All shell types in the Igala family display ballistic similitude and utilize the same range tables.

Technical Characteristics

	BOAT TAIL	BASE BLEED
Total Mass unfuzed (kg):	15,15 to 15,45	15,15 to 15,45
Length unfuzed (mm):	455	455
Base design pressure (MPa):	400	400
Maximum acceleration (g's):	22.000	22.000
Driving band diameter (mm):	107,4	107,4
Fuze cavity:	STD NATO	STD NATO
Explosive type:	TNH	TNH

Typical Performance at +21°C

	LEO (M21 CHARGE)		NATO HOWITZERS*	
	BOAT TAIL	BASE BLEED	M119 (M200) BOAT TAIL	M118 (L36) BOAT TAIL
Muzzle velocity (m/s):	950	960	620	695
Chamber pressure (MPa):	340	350	360	310
Maximum range (km):	24	29	15	17
Consistency (at 75% maximum range):				
✓ 50% zone in range (%):	≤ 0,80	≤ 0,80	≤ 0,80	≤ 0,80
✓ 50% zone in azimuth (mils):	≤ 2,0	≤ 2,0	≤ 2,0	≤ 2,0
Qualification temperature (°C):	-46 to +63	-46 to +63	-46 to +63	-46 to +63

* Expected

Packing and Marking

Marking	Standard NATO marking or as per customer requirements
Packing	16 Shells per pallet, or in customer preferred pack.

DENEL

SHELL 105 mm ILLUMINATING BE M0102

105 mm ILLUMINATING SHELL, FOR USE WITH A TIME/MULTI OPTION FUZE, IN THE LEO, L118, M119 AND OTHER COMPATIBLE 105 mm HOWITZERS.

Unique Features

An optional feature of our 105 mm shell is the fact that the boat tails and base bleed motors can be totally field interchangeable, ensuring utmost flexibility. All shell types in the Igala family display ballistic similitude and utilize the same range tables.

Technical Characteristics

	BOAT TAIL	BASE BLEED
Total Mass unfuzed (kg):	14,95 to 15,25	14,95 to 15,25
Length unfuzed (mm):	476	476
Design pressure (MPa):	400	400
Driving band diameter (mm):	107,4	107,4
Fuze cavity:	STD NATO	STD NATO
Optimum deployment height (m):	500	500
Pyrotechnic mass (kg):	0,7	0,7
Average luminosity (candela):	600.000*	600.000*
Burning time (s):	50*	50*
Luminosity (candela):	500.000	500.000
Rate of descent (m/s):	6	6
Composition	Magnesium/Sodium Nitrate/Binder	Magnesium/Sodium Nitrate/Binder

* Can be adjusted to suit user's requirement.

Typical Performance at +21°C

	LEO (M21 CHARGE)		NATO HOWITZERS*	
	BOAT TAIL	BASE BLEED	M119 (M200) BOAT TAIL	M118 (L36) BOAT TAIL
Muzzle velocity (m/s):	950	960	620	695
Chamber pressure (MPa):	340	350	360	310
Maximum range (km):	24	29	15	17
Consistency (at 75% of maximum range):				
✓ 50% zone in range (%):	≤ 0,80	≤ 0,80	≤ 0,80	≤ 0,80
✓ 50% zone in azimuth (mils):	≤ 2,0	≤ 2,0	≤ 2,0	≤ 2,0
Qualification temperature (°C):	-46 to +63	-46 to +63	-46 to +63	-46 to +63

* Expected

Packing and Marking

Marking	Standard NATO marking or as per customer requirements
Packing	16 Shells per pallet, or in customer preferred pack.

DENEL

SHELL 105 mm ILLUMINATING IR M0235

105 mm INFRARED ILLUMINATING SHELL, FOR USE WITH A TIME/MULTI OPTION FUZE, IN THE LEO, L118, M119 AND OTHER COMPATIBLE 105 mm HOWITZERS. THIS SHELL IS USABLE IN CONJUNCTION WITH 2ND AND 3RD GENERATION NIGHT VISION EQUIPMENT

Unique Features

An optional feature of our 105 mm shell is the fact that the boat tails and base bleed motors can be totally field interchangeable, ensuring utmost flexibility. All shell types in the Igala family display ballistic similitude and utilize the same range tables.

Technical Characteristics

	BOAT TAIL	BASE BLEED
Total Mass unfuzed (kg):	15,15 to 15,45	15,15 to 15,45
Length unfuzed (mm):	476	476
Design pressure (MPa):	400	400
Driving band diameter (mm):	107,4	107,4
Fuze cavity:	STD NATO	STD NATO
Optimum deployment height (m):	500	500
Pyrotechnic mass (kg):	2,8	2,8
Average luminosity (candela):	600.000*	600.000*
Burning time nominal(s):	50*	50*
Visibility (%): ✓ Red S-20 GEN II ✓ GaAs GEN III	 100 100	 100 100
Rate of descent (m/s):	6	6

* Can be adjusted to suit user's requirement.

Typical Performance at +21°C

	LEO (M21 CHARGE)		NATO HOWITZERS*	
	BOAT TAIL	BASE BLEED	M119 (M200) BOAT TAIL	M118 (L36) BOAT TAIL
Muzzle velocity (m/s):	950	960	620	690
Chamber pressure (MPa):	340	350	360	310
Maximum range (km):	24	29	15	17
Consistency (at 75% of maximum range): ✓ 50% zone in range (%): ✓ 50% zone in azimuth (mils):	 ≤ 0,80 ≤ 2,0	 ≤ 0,80 ≤ 2,0	 ≤ 0,80 ≤ 2,0	 ≤ 0,80 ≤ 2,0
Qualification temperature (°C):	-46 to +63	-46 to +63	-46 to +63	-46 to +63

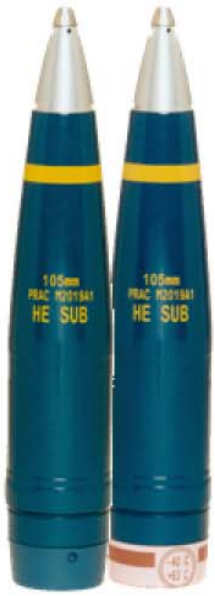
* Expected

Packing and Marking

Marking	Standard NATO marking or as per customer requirements
Packing	16 Shells per pallet, or in customer preferred pack.

DENEL

SHELL 105 mm PRACTICE M2019



105 mm LOW FRAGMENTATION SHELL, FOR USE WITH A SUPER QUICK/DELAY, PROXIMITY OR MULTI-OPTION FUZE, IN THE LEO, L118, M119 AND OTHER COMPATIBLE 105 mm HOWITZERS. THIS IS A BALLISTICALLY MATCHED SHELL, FOR TRAINING, CHARGE, FUZE AND GUN TESTING. THE SHELL CAN ALSO BE SUPPLIED WITHOUT A SUPPLEMENTARY CHARGE (INERT FILLED).

Unique Features

An optional feature of our 105 mm shell is the fact that the boat tails and base bleed motors can be totally field interchangeable, ensuring utmost flexibility. All shell types in the Igala family display ballistic similitude and utilize the same range tables.

Technical Characteristics

	BOAT TAIL	BASE BLEED
Total Mass unfuzed (kg):	15,15 to 15,45	15,15 to 15,45
Length unfuzed (mm):	455	455
Base design pressure (MPa):	400	400
Maximum acceleration (g's):	22.000	22.000
Driving band diameter (mm):	107,4	107,4
Fuze cavity:	STD NATO	STD NATO
Explosive type:	RDX/Wax	RDX/Wax
Explosive mass – Supplementary (g):	50 or 150	50 or 150

Typical Performance at +21°C

	LEO (M21 CHARGE)		NATO HOWITZERS*	
	BOAT TAIL	BASE BLEED	M119 (M200) BOAT TAIL	M118 (L36) BOAT TAIL
Muzzle velocity (m/s):	950	960	620	695
Chamber pressure (MPa):	340	350	360	310
Maximum range (km):	24	29	15	17
Consistency (at 75% maximum range)):				
✓ 50% zone in range (%):	≤ 0,80	≤ 0,80	≤ 0,80	≤ 0,80
✓ 50% zone in azimuth (mils):	≤ 2,0	≤ 2,0	≤ 2,0	≤ 2,0
Qualification temperature (°C):	-46 to +63	-46 to +63	-46 to +63	-46 to +63

* Expected

Packing and Marking

Marking	Standard NATO marking or as per customer requirements
Packing	16 Shells per pallet, or in customer preferred pack.

DENEL

SHELL 105 mm SCREENING SMOKE BE M0101

105 mm BI-SPECTRAL SCREENING SMOKE SHELL, FOR USE WITH A TIME FUZE/MULTI OPTION FUZE IN THE LEO, L118, M119 AND OTHER COMPATIBLE 105 mm HOWITZERS.

Unique Features

An optional feature of our 105 mm shell is the fact that the boat tails and base bleed motors can be totally field interchangeable, ensuring utmost flexibility. All shell types in the Igala family display ballistic similitude and utilize the same range tables.

Technical Characteristics

	BOAT TAIL	BASE BLEED
Total Mass unfuzed (kg):	15,15 to 15,45	15,15 to 15,45
Length unfuzed (mm):	476	476
Design pressure (MPa):	400	400
Driving band diameter (mm):	107,4	107,4
Fuze cavity:	STD NATO	STD NATO
Optimum deployment height (m):	350	350
Pyrotechnic mass (kg):	2	2
Smoke colour:	White/Grey	White/Grey
Amount of smoke canisters:	4	4
Emission time visual (s):	70	70
Emission time IR (s):	60	60
Obscuration: ✓ Visual ✓ Near ✓ IR	 450 – 750 nm 750 – 950 nm 1 – 4 µm	 450 – 750 nm 750 – 950 nm 1 – 4 µm

Typical Performance at +21°C

	LEO (M21 CHARGE)		NATO HOWITZERS*	
	BOAT TAIL	BASE BLEED	M119 (M200) BOAT TAIL	M118 (L36) BOAT TAIL
Muzzle velocity (m/s):	950	960	620	695
Chamber pressure (MPa):	340	350	360	310
Maximum range (km):	24	29	15	17
Consistency (at 75% maximum range): ✓ 50% zone in range (%): ✓ 50% zone in azimuth (mils):	 ≤ 0,80 ≤ 2,0	 ≤ 0,80 ≤ 2,0	 ≤ 0,80 ≤ 2,0	 ≤ 0,80 ≤ 2,0
Qualification temperature (°C):	-46 to +63	-46 to +63	-46 to +63	-46 to +63

* Expected

Packing and Marking

Marking	Standard NATO marking or as per customer requirements
Packing	16 Shells per pallet, or in customer preferred pack.

DENEL