**Terms of payment:** 50% advance payment of the total contract value after approved PO and contract signature - 50% remaining payment 5 days after FAT of every batch, before shipment.

**Terms of delivery:** 10,000 units will be delivered every Month and the exact schedule of deliveries will be set exactly after we understand the date of contract signature and time of the advance payment release.

**Delivery Timeline:** The delivery timeline considers its respective Starter Event related to OEM's obligations to the full occurrence of the 03 (three) events described in the paragraphs "1" to "3", as follows bellow:

1. Signature of the corresponding contract or PO.
2. Payment of the first instalment, advance payment.
3. Issuance of the Export Licence by the competent authorities (Following the receipt of End User Certificate).

**Lead time:** For first 10,000 units will be 95 days.

**Warranty:** OEM will provide warranty for the products supplied to the buyer for a period of 1 year from the date of receipt of the products by the buyer.

OEM will provide Certificate of Origin

**NSN:** – YES

**Validity:** 30 days.

**Annex 1:** Technical specification.

FOR ANY FURTHER QUESTIONS PLEASE CONTACT US AT ANY TIME.

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ANNEX 1

**HOWITZER AMMUNITION**

# 155 MM ARTILLERY PROJECTILE
# EXTENDED RANGE (ER)
# FULL BORE (FB)
# BASE BLEED (BB)



# TECHNICAL SPECIFICATIONS

# GENERAL DESCRIPTION

The 155 mm ER Full Bore BB – is a next-generation extended-range high-explosive artillery projectile designed for NATO-standard 155 mm howitzer systems. Featuring an Extended Range Full Bore Base Bleed (ERFB-BB) aerodynamic configuration, it combines a full-bore projectile profile with an integrated base bleed gas generator to minimize aerodynamic drag and maximize range without auxiliary rocket propulsion. The optimized external geometry enhances ballistic efficiency, flight stability, and dispersion performance, while ensuring full interoperability with standard 155 mm artillery platforms and fuzes. Designed for demanding military applications, the projectile provides reliable long-range precision fire support with high operational effectiveness and battlefield survivability.

| | | | |
|---|---|---|---|
| **Above 41km**<br>Maximum Range | **45.50 kg**<br>Total Weight | **8,250 ± 0,5 kg**<br>Explosive Charge (TNT) | **~2,000**<br>Fragment |

# DIMENSIONS & WEIGHT

| PARAMETER | VALUE |
|---|---|
| **Total length (with fuze)** | 960 mm |
| **Body diameter** | 154.2 mm |
| **Rear end diameter (Base Bleed)** | 154.0 mm |
| **Base Bleed angle** | 7° (convergent) |
| **Rear section length (Boat Tail)** | 100.2 mm |
| **Total weight** | 45.50 kg |
| **Explosive weight** | 8,250 ± 0,5 kg of TNT |
| **Propelling charge** | M203 - Triple-Base Propellant |
| **Primer** | M82 Artillery Primer |



155MM HE ERFB BB PROJECTILE

# OPERATIONAL DATA & COMPATIBLE SYSTEMS

## OPERATIONAL CHARACTERISTICS

| | |
|---|---|
| **Maximum range** | Above 41 km (**M203 - Triple-Base Propellant)**, 52-caliber gun) |
| **Lethal action radius** | 50 meters |
| **Effective fragmentation radius** | 150 meters |
| **Number of fragments** | Approx. 2,000 |
| **Concrete penetration** | 0.9 meters |
| **Operating temperature** | -40°C to +55°C |

## COMPATIBLE SYSTEMS

- **M109A5+ Paladin**
- **M777 Light Towed Howitzer**
- **FH-70**
- **CAESAR 155mm**
- **PzH 2000**
- **K9 Thunder**
- **ASTROS 2020 (AV-LMU version)**



# MAIN COMPONENTS

**155 MM ARTILLERY PROJECTILE – EXTENDED RANGE (ER) FULL BORE (FB) BASE BLEED (BB)**

| PROJECTILE BODY | |
|---|---|
| **Material** | High-strength forged steel - SAE 4140 or SAE 1060 |
| **Wall thickness** | 4.8 – 22.7 mm |
| **Heat treatment** | Quenching and tempering |
| **Finish** | NATO olive green paint |

| DRIVING BAND | |
|---|---|
| **Material** | Electrolytic copper alloy |
| **Width** | 37.9 mm |
| **Function** | Gas obturation and projectile rotation |

| BASE BLEED (BB) | |
|---|---|
| **Location** | Rear end of the projectile |
| **Function** | Reduction of base drag and increase of ballistic range |
| **Characteristic** | Recessed conical geometry (gas generator) |
| **Angle** | 7° relative to the longitudinal axis |
| **Composite charge** | HTPB composite Base Bleed charge, easily adjustable burning rate ($\sigma m \geq 1.0$ MPa at 20°C, $\varepsilon m \geq 23\%$) |

| FUZE | |
|---|---|
| **Type** | PD (Point Detonating) – PDM 572 |
| **Operating modes** | Point impact, delay and time |

| LOAD | |
|---|---|
| **Type** | Trinitrotoluene (TNT) |
| **Characteristic** | Military explosive with high chemical stability |
| **Hazard Class** | 1.1D, UN 0209 |

| PROPELLING CHARGE | |
|---|---|
| **Type** | M203 - Triple-Base Propellant |
| **Storage temperature** | Ambient temperature -20° C ~ +35° C, relative humidity 40%‑65% |
| **Impact sensitivity** | No ignition under 10 kg drop weight with 25 cm drop height |
| **Friction sensitivity** | No ignition in 90° friction test |
| **Auto-ignition temperature** | 178° C |

| PRIMER | |
|---|---|
| **Model** | M82 Artillery Primer |
| **Type** | Percussion primer |
| **Total weight** | ~ 63.5 g |
| **Total length** | ~ 49.3 – 50 mm |
| **Maximum diameter** | 15.15 mm |
| **Body diameter** | 11.25 mm |
| **Black powder mass** | ~ 1.43 g |
| **Maximum operating pressure** | ≤ 450 MPa |
| **Operating temperatue** | - 46°C to + 63°C |
| **Storage temperature** | - 54°C to +71°C |

# STORAGE, HANDLING & CERTIFICATION

| STORAGE CONDITIONS | |
|---|---|
| **Temperature** | -30°C to +50°C |
| **Relative humidity** | Maximum 70% |
| **Maximum stacking** | 2 levels |
| **Shelf life** | 10 years under proper conditions |

| HAZARD CLASSIFICATION | |
|---|---|
| **UN hazard class** | 1.1D |
| **Compatibility group** | D |
| **Classification code** | 1.1D |

| MARKINGS & IDENTIFICATION |
|---|
| **Caliber and type** |
| **Product code / NATO ammunition code** |
| **Lot number** |
| **Date of manufacture** |
| **Manufacturer** |
| **Explosive type** |
| **Charge weight** |

| STANDARDS & CERTIFICATIONS | |
|---|---|
| **STANAG 4425** | Safety and Suitability for Service |
| **STANAG 4123** | Ballistic Standardization |
| **MIL-STD-1316** | Safety Criteria for Fuzes |
| **AS9100 D:2016** | Aerospace and Defense Quality Management System |
| **.....** | Standard of the ….. Army |

## SAFETY REMARKS

Transport, storage, and use must strictly follow the procedures established in the specific technical manuals and ammunition safety regulations.

# PACKING LIST

## TOTAL MASS ESTIMATION (10,000 units)

| Component | Unit Weight | Total Weight (10,000 units) |
|---|---|---|
| **Projectiles** | ~ 45.5 kg | ~ 455 tons |
| **Charges** | ~ 10.7 kg | ~ 107 tons |
| **Fuzes** | ~ 1.05 kg (approx.) | ~ 10.5 tons |
| **Primers** | ~ 0.06 kg | ~ 0.6 tons |
| **TOTAL** | **57,31 kg** | **~ 573.1 tons** |

## CONTAINER REQUIREMENTS

Based on practice, **20 ft containers** are standard for ammunition transport, due to:

| | | |
|---|---|---|
| **Better weight distribution** | **Compliance with port restrictions** | **Easier segregation of hazard classes** |

# PACKING BY COMPONENT

## PROJECTILES

~ 26 containers (20 ft) for 10,000 units

| Parameter | Quantity |
|---|---|
| **Pieces per box (packaging)** | 8 |
| **Boxes per container** | 48 |
| **Total pieces per container 20 ft** | 384 |
| **Unit weight of product (inert body)** | 45,5kg |
| **Packaging weight** | 12kg |

## PROPELLING CHARGES

~ 5 containers (20 ft) for 10,000 units
1 charge per sealed metal container (PA37A1 type)

## FUZES (PDM572)

Final crate/pallet quantities to be confirmed at contract stage
~ 1 container (20 ft) for 10,000 units

## PRIMERS (M82)

294 units per metal container / 840 per wooden crate
~ 1 container (20 ft) for 10,000 units

## TOTAL SHIPPING PLAN for 10,000 units

| Component | Containers (20 ft) |
|---|---|
| **Projectiles** | ~ 26 |
| **Charges** | ~ 5 |
| **Fuzes** | ~ 1 |
| **Primers** | ~ 1 |
| **TOTAL** | **~ 33 containers (20 ft)** |

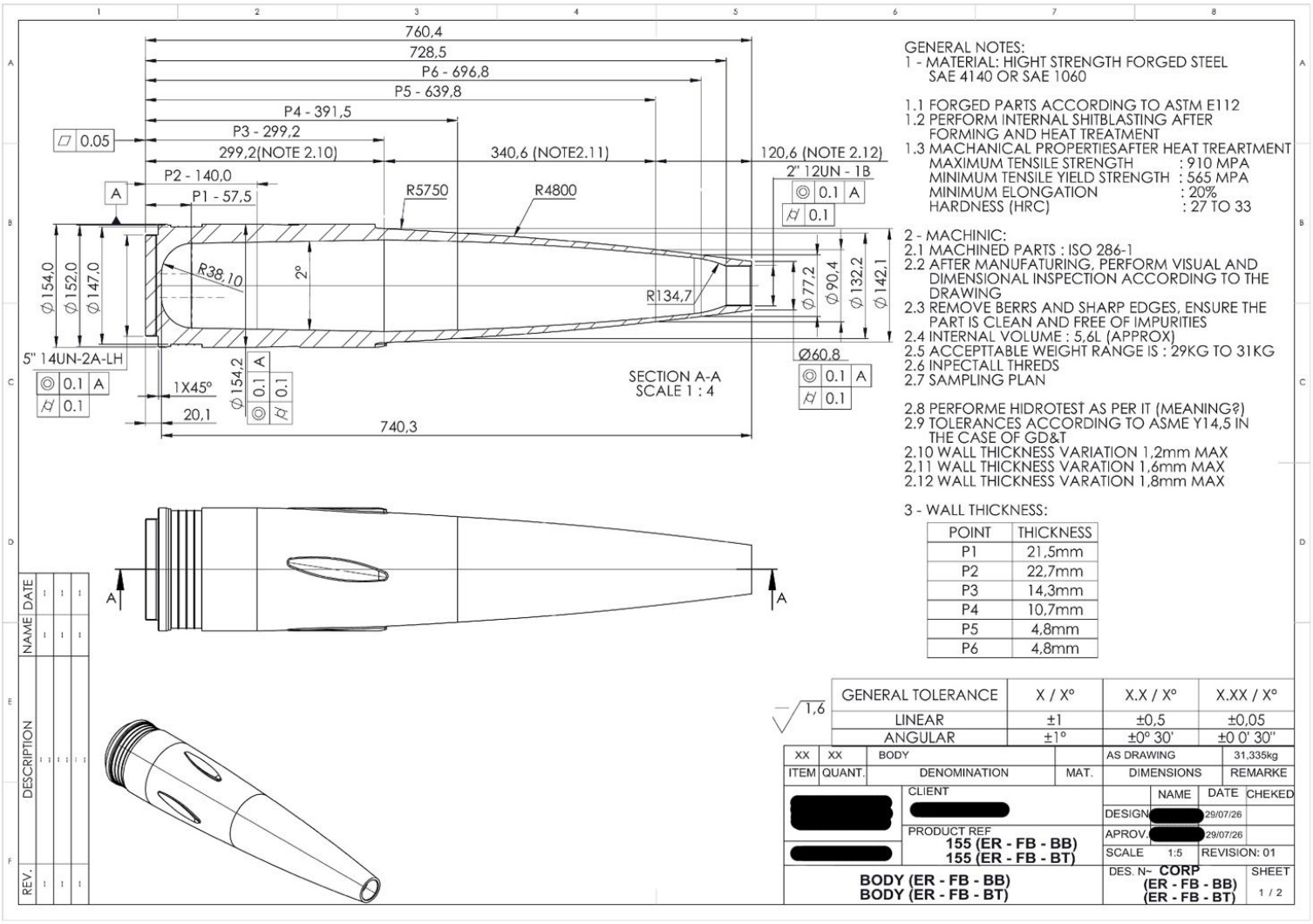
## HAZARDOUS CLASSIFICATION & SEGREGATION

| Component | Hazard Class (Typical) |
|---|---|
| **Projectile (HE filled)** | **1.1D** |
| **Propelling Charge** | **1.3C** |
| **Fuze PDM572** | **1.4D** |
| **Primer M82** | **1.4S** |

# ENGINEERING REFERENCE DRAWINGS

## PROJECTILE BODY (sheet 1/2)

### 155 MM ARTILLERY PROJECTILE – EXTENDED RANGE (ER) FULL BORE (FB) BASE BLEED (BB)




GENERAL NOTES:

1 - MATERIAL: HIGHT STRENGTH FORGED STEEL SAE 4140 OR SAE 1060

1.1 FORGED PARTS ACCORDING TO ASTM E112
1.2 PERFORM INTERNAL SHITBLASTING AFTER FORMING AND HEAT TREATMENT
1.3 MACHANICAL PROPERTIESAFTER HEAT TREARTMENT
MAXIMUM TENSILE STRENGTH : 910 MPA
MINIMUM TENSILE YIELD STRENGTH : 565 MPA
MINIMUM ELONGATION : 20%
HARDNESS (HRC) : 27 TO 33

2 - MACHINIC:
2.1 MACHINED PARTS : ISO 286-1
2.2 AFTER MANUFATURING, PERFORM VISUAL AND DIMENSIONAL INSPECTION ACCORDING TO THE DRAWING
2.3 REMOVE BERRS AND SHARP EDGES, ENSURE THE PART IS CLEAN AND FREE OF IMPURITIES
2.4 INTERNAL VOLUME : 5,6L (APPROX)
2.5 ACCEPTTABLE WEIGHT RANGE IS : 29KG TO 31KG
2.6 INPECTALL THREDS
2.7 SAMPLING PLAN

2.8 PERFORME HIDROTEST AS PER IT (MEANING?)
2.9 TOLERANCES ACCORDING TO ASME Y14,5 IN THE CASE OF GD&T
2.10 WALL THICKNESS VARIATION 1,2mm MAX
2.11 WALL THICKNESS VARATION 1,6mm MAX
2.12 WALL THICKNESS VARATION 1,8mm MAX

3 - WALL THICKNESS:

| POINT | THICKNESS |
|---|---|
| P1 | 21,5mm |
| P2 | 22,7mm |
| P3 | 14,3mm |
| P4 | 10,7mm |
| P5 | 4,8mm |
| P6 | 4,8mm |





| REV. | DESCRIPTION | NAME | DATE |
|---|---|---|---|
| | | | |

1,6

| GENERAL TOLERANCE | X / X° | X.X / X° | X.XX / X° |
|---|---|---|---|
| LINEAR | ±1 | ±0,5 | ±0,05 |
| ANGULAR | ±1° | ±0° 30' | ±0 0' 30" |

| XX | XX | BODY | | AS DRAWING | 31,335kg |
|---|---|---|---|---|---|
| ITEM | QUANT. | DENOMINATION | MAT. | DIMENSIONS | REMARKE |

CLIENT [redacted]

PRODUCT REF
155 (ER - FB - BB)
155 (ER - FB - BT)

| | NAME | DATE | CHEKED |
|---|---|---|---|
| DESIGN | [redacted] | 29/07/26 | |
| APROV. | [redacted] | 29/07/26 | |

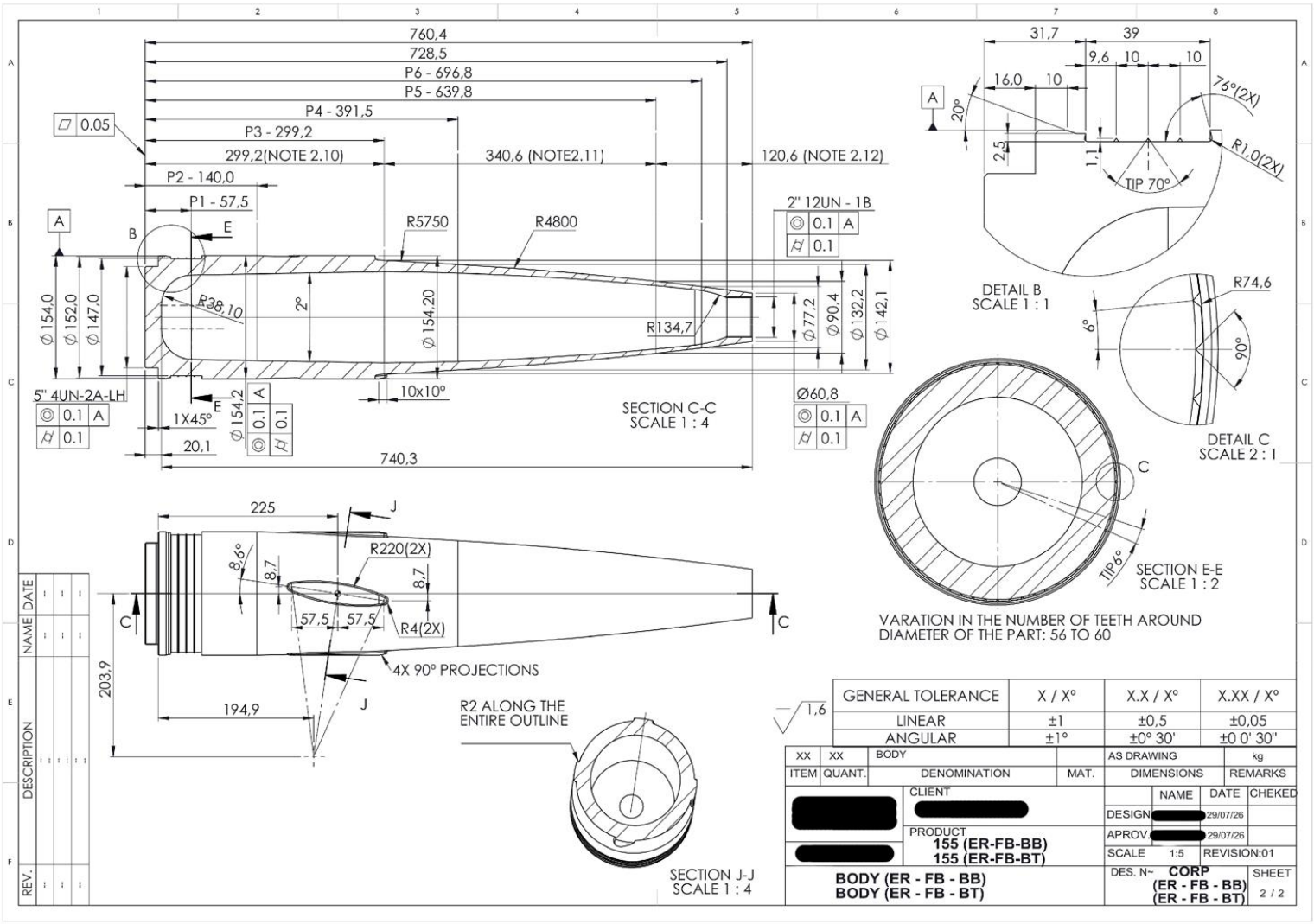
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BODY (ER - FB - BB)
BODY (ER - FB - BT)

DES. N~ CORP (ER - FB - BB) (ER - FB - BT) SHEET 1 / 2

# **PROJECTILE BODY** (sheet 2/2)

**155 MM ARTILLERY PROJECTILE – EXTENDED RANGE (ER) FULL BORE (FB) BASE BLEED (BB)**



# BASE BLEED ADAPTER (HOLLOW BASE)

**155 MM ARTILLERY PROJECTILE – EXTENDED RANGE (ER) FULL BORE (FB) BASE BLEED (BB)**

