

HEPF, TRICHY

The HIGH ENERGY PROJECTILE FACTORY (HEPF) is an Indian Defence establishment under Munitions India Limited, A Government of India Enterprise, Ministry of Defence, for production of anti tank kinetic energy projectiles of various calibers and the factory is located about 25 kilometres from the main city of Tiruchirappalli.

SCOPE OF WORK

PR No:

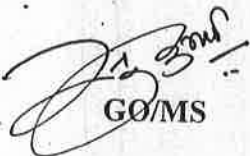
MACHINING OF PENETRATOR FOR 125MM PRACTICE SHOT FROM STEEL CUT BLANK (OD 30 MM AND LENGTH 330MM) AS PER DRG No: C PRA 125 0 101 0 and QUALITY ASSURANCE PROCEDURE (QAP)

1. Raw material, steel rod (OD 30 mm and length 330 mm) Steel 40Ni6Cr4Mo3 as per IS: 5517-1993 or En 24 'V' Condition as per B.S. 970 pt 1:1955 and weight 1.9 KGs approximately will be supplied by HEPF.
2. The firm has to carry out only machining work of Penetrator 125mm.
3. The firm need not return the scrap generated during machining, however, the firm should submit their offer lowest by taking the cost of steel scrap of 0.6 kgs (approx) generated in machining into account.
4. The firm has to take utmost care to avoid material rejection due to dimensional deviation during machining.
5. In case of rejection exceeds 2%, the existing cost of raw material will be recovered from the firm. The firm shall also return the rejected components to HEPF.
6. The firm should submit Bank guarantee for the cost of raw material for minimum 500 Nos, and collect the material from HEPF store within 10 days of placement of supply order. The amount will be intimated after placing supply order.
7. Firm should make their own arrangement (including loading/ unloading) for collection of raw material from HEPF stores and deliver the finished / accepted components to HEPF stores.
8. Firm should submit pilot sample along with dimension report within 15 days of receipt of raw material for prior approval.
9. The pilot sample submitted by the firm shall be inspected by HEPF Quality Control Section / inspection authority before bulk production.
10. After obtaining approval of pilot sample, the firm should maintain the delivery schedule of minimum 500 Nos for every week from the date of receipt of the raw material.

QUALITY ACCEPTANCE CRITERIA:

12. The components shall be inspected by Quality Control Section /HEPF as per drawing and Quality Assurance Procedure. If it is confirming to both drawing and Quality Assurance Procedure the same will be accepted.

- Note:**
1. Prospective bidders are free to visit HEPF before bidding, for understanding the operation.
 2. In case of technical clarification the bidders may contact : 0431-2584-645 & 662, 0431-2584600 Extn: 271.


GOM/MS


DOM/MS

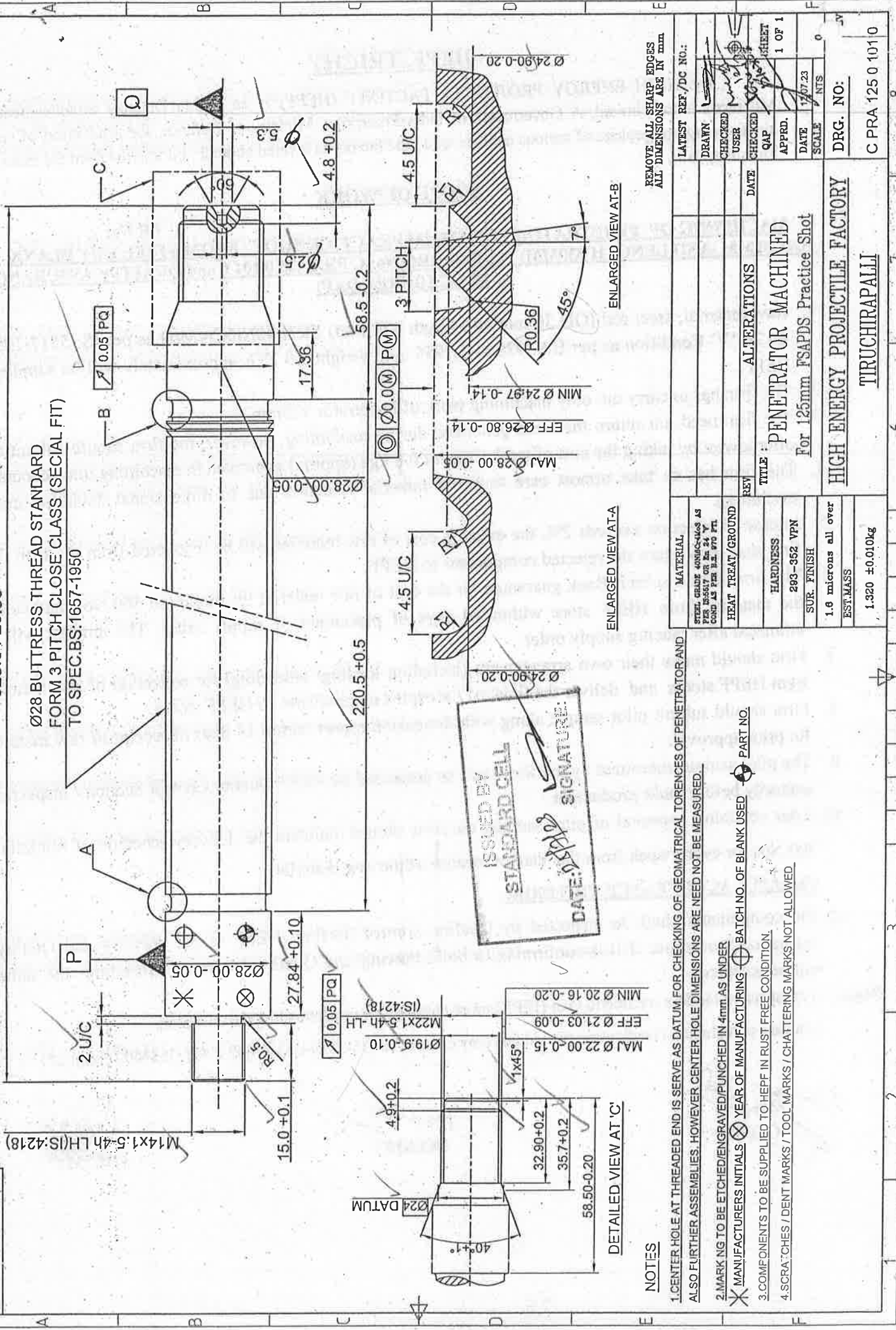

OIC/MS

DRG. NO.: C/PRA 125-0 10110

REV: UNSPECIFIED TOLERANCES USE: TOLERANCE CLASS: IS:2102 PART-1:1993-MEDIUM CLASS

323.84 ±0.50

Ø28 BUTTRESS THREAD STANDARD FORM 3 PITCH CLOSE CLASS (SEAL FIT) TO SPEC.BS:1657-1950



ISSUED BY: *[Signature]*
 STANDARD CELL
 DATE: 25/12/20
 SIGNATURE:

ENLARGED VIEW AT-A

ENLARGED VIEW AT-B

DETAILED VIEW AT 'C'

NOTES

- CENTER HOLE AT THREADED END IS SERVE AS DATUM FOR CHECKING OF GEOMETRICAL TOLERANCES OF PENETRATOR AND ALSO FURTHER ASSEMBLIES. HOWEVER CENTER HOLE DIMENSIONS ARE NEED NOT BE MEASURED.
- MARKING TO BE ETCHED/ENGRAVED/PUNCHED IN 4mm AS UNDER
 * MANUFACTURERS INITIALS * YEAR OF MANUFACTURING * BATCH NO. OF BLANK USED * PART NO.
- COMPONENTS TO BE SUPPLIED TO HEPP IN RUST FREE CONDITION.
- SCRAATCHES / DENT MARKS / TOOL MARKS / CHATTERING MARKS NOT ALLOWED

REMOVE ALL SHARP EDGES ALL DIMENSIONS ARE IN mm

MATERIAL		STEEL GRADE 40NiCr-MoS AS PER BS5517 OR BS 24 Y COND AS PER B.S. 970 Pt.	
HEAT TREAT/GROUND		ALTERATIONS	
HARDNESS		DATE	
SUR. FINISH		TITLE: PENETRATOR MACHINED	
1.6 microns all over		For 125mm FSAPDS Practice Shot	
EST.MASS		HIGH ENERGY PROJECTILE FACTORY	
1.320 ±0.010kg		TRUCHIRAPALLI	
DRG. NO.:		C/PRA 125 0 10110	
LATEST REF./DC NO.:		DRAWN: [Signature]	
CHECKED:		CHECKED:	
USER:		QAP:	
APPRD.:		DATE: 17/07/23	
SCALE:		SHEET: 1 OF 1	

Quality assurance procedure (QAP)

PENETRATOR

1. Drawing No. : C PRA 125 0 101 0
2. Method of manufacture : Machining
3. Receiving Inspection :
- Raw material : Steel to Grade 40Ni6Cr4Mo3 as per IS: 5517-1993 or En 24 'V' Condition as per B.S. 970 pt 1 :1955

Tests/checks and acceptance criteria for raw material:

- i. Chemical analysis as per specification IS: 5517-1993 or B.S. 970, Pt -1 :1955
- ii. Ultrasonic testing of 100% bars with permissible crack size 0.8mm FBH by a certified NDT level II professional.
- iii. MPI of 100% semifinished penetrator blanks for detecting surface/subsurface cracks
- iv. Grain size 5 to 8 as per IS 4748:1988
- v. Inclusion rating ABCD max 3 thick and thin series as per IS 4163 :1982
- vi. Mechanical properties:

Sr. No.	Properties	Acceptance criteria
1.	UTS	1000 -1150 MPa
2.	0.2% PS	800MPa (min)
3.	% Elongation	12 % (min)
4.	Hardness	310-372 HV
5.	Izod impact	47 J min

4. In-process inspection : Nil
5. Stage inspection : Nil
6. Final Inspection:
- 6.1 Visual inspection:

Quality assurance procedure (QAP)

6.1.1 Features for visual examination and acceptance criteria:

Sr. No.	Details of features	Sample size	Acceptance criteria
1.	Burrs	100 %	Not permitted
2.	Damage to buttress threads	100 %	Not permitted
3.	Poor surface finish	100 %	Not permitted
4.	Tool Marks	100 %	Not permitted

6.2 Dimensional Inspection:

6.2.1 Critical Inspection:

Sr. No.	Dimension/feature	Drg Zone	Inspection Method
1.	Buttress thread (45° , 7° , Pitch 3mm), profile : Sample size 5%	D6	Shadowgraph/ profile projector
2.	M14X1.5 -4h LH	B1	GO/NO GO Gauge
3.	M22X1.5-4h LH	E2	GO/NO GO Gauge

6.2.2 Geometrical features:

Sr. No.	Geometrical features	Drg Zone	Defect Classification	Inspection Method set up	Acceptance value				
1.	Run out <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">↗</td> <td style="text-align: center;">0.05</td> <td style="text-align: center;">P</td> <td style="text-align: center;">Q</td> </tr> </table>	↗	0.05	P	Q	C4	Major	Measurement set up with dial gauge	50µm (max)
↗	0.05	P	Q						

6.2.3 Major dimensions:

Sr. No.	Dimension	Drg Zone	Inspection Method	
1.	323.84±0.50	D3	General engineering	
2.	Thread length 15.0+0.1	B2		
3.	Datum Ø24 at 35.7+0.2	E2		
4.	Ø 28.00 - 0.05	C2/ C4		
5.	58.50 - 0.20	C4		
6.	$40^{+1}0$	E1		Template/Gauge
7.	R1	B6/B7		Shadowgraph

Quality assurance procedure (QAP)

8.	32.90+0.20	E2	General engineering
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6.2.4. Minor dimensions:

Sr. No.	Dimension	Drg Zone	Inspection Method
1.	220.50+0.50	C3	General engineering

6.3. Test on finished Items: Sample size: as per sampling plan

6.3.1 Details of tests /checks on finished items and acceptance criteria:

Sr. No.	Tests/Surface Treatment	Acceptance value	Defect Classification	Inspection Method
1.	Phosphating as per specification IS: 3618 class A2	7.5 g/m ²	Major	As per specification
2.	Mass	1.320 ± 0.010 kg	Major	Digital Balance
3.	Hardness (100%)	310-372 HV	Critical	Hardness tester
4.	Gauging (100%)	Penetrator shall be passed through gauge	Critical	Cylindrical gauge with internal dia 28.036+0.005 mm and length 75+1mm
5.	Pitch Error	<20micron	Major	Profile projector /Shadowgraph/CMM

7. Details of tests and other information:

- Engraving of markings as per note no.6 of the drawing to be ensured.
- The threading tool will be checked optically for its correctness when the tools is changed.
- The first and the last piece machined on each machine during every production shift, the last piece produced before changing tool and the first produced after changing tool, shall be selected for inspection.
- Any tool change shall be considered at the beginning of a new production shift.
- If any defectives are observed, in initial production piece at the start of

Quality assurance procedure (QAP)

the production or after changing a tool, that piece shall be rejected and the machine producing defective piece will be shut down until it is confirmed that the machine is again ready for defect free production, which will be meeting the drawing requirements.

- If any defects are found in the pieces produced at the end of production or in the last piece produced before changing the tool, production of that shift will be reviewed in reverse order, until five consecutive pieces are found acceptable.