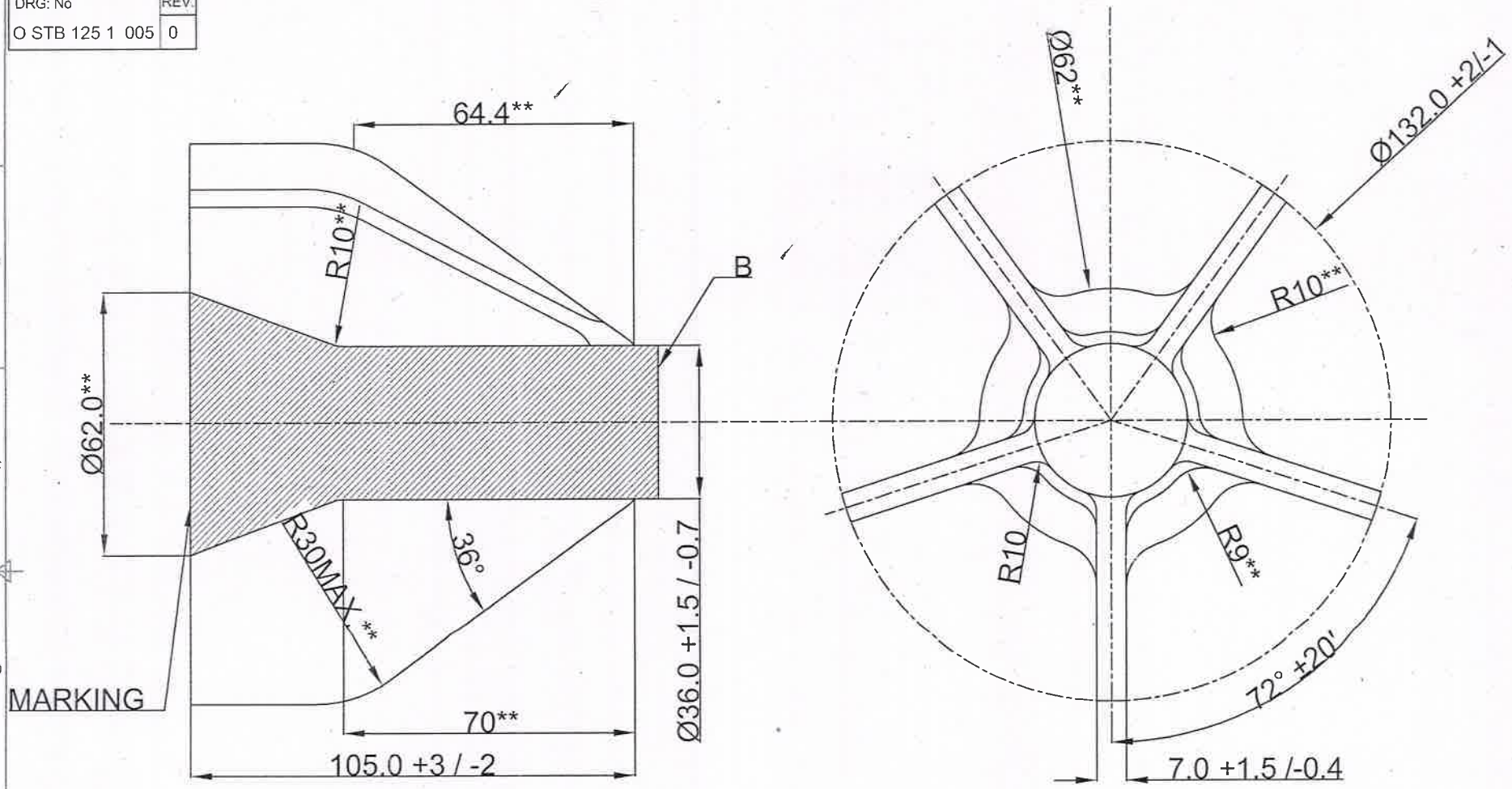
DRG: No	REV.
O STB 125 1 005	0



Note:

1. **Dimensions are provided for reference
2. The following is allowed along the planes on the outer surface of fins.
   a. Longitudinal scratch marks,recess caused by fallen iron scale with a depth of 1mm max.
   b. Under filling along the outrer profile of fin with a depth of 1.5mm max.
   c. Projection caused by the pusher on the surface B,not exceeding 2mm.
   d. Depression caused by the pusher on the surface "B" is not permitted.
3. Stamp of the heat identification letter.
4. Annealing to be done to the Hardness of≤241HB
5. After Annealing shot blasting tc be done.

ALL DIMENSIONS ARE IN mm
REMOVE ALL SHARP EDGES

MATERIAL	ISSUE	ALTERATIONS	DATE
GOST V 10230-75			
HEAT TREAT/GROUND			
SURFACE TREAT			
SUR. FINISH/COAT			
EST.MASS: --	PRO/FINAL		

TITLE : FORGING FOR STABLIZER
(125mm FSAPDS AMK-339)

HIGH ENERGY PROJECTILE FACTORY
TIRUCHIRAPALLI

LATEST REFERENCE :-		
DRAWN		
CHECKD. USER SEC.		
CHECKD. QAP		
APPRD.		
DATE	07.08.24	SHEET 1 OF 1
SCALE	NTS	
SECTION	SC	

DRG. NO:	REV
O STB 125 1 005	0

MONITORING INSTRUCTION FOR INSPECTION	Issue No. 01 Rev. No. 00
	Date of Issue 17.09.24
STEEL FORGING FOR AMK-339 STABLIZER	HEPF/QA/SC/AMK/019

Rev No.	Amendment	Date

DRAWING No. : O STB 125 1 005 0.

SPECIFICATION : HEPF/QA/AMK/SPEC/001

END USE : 125mm AMK-339 STABLIZER.

TABLE A: RAW MATERIAL INSPECTION CHECKS ON ROD TO BE CARRIED OUT AT FIRM'S PREMISES BY THE FIRM AS PER SPEC. СНИМ.710004.012И (AS PER SPEC.GOST V 10230-75 GR.40xФA).

SL. NO.	CHARACTERISTICS	SPECIFICATION / REQUIREMENT	SAMPLE SIZE
1	Workmanship (visual)	The material shall be uniform and free from defects such as rust, scale, burrs, and any other harmful defects.	100 %
2	Chemical test	As per table 1 in HEPF/QA/AMK/SPEC/001	One sample per heat
3	Mechanical tests	As per table 2 . in HEPF/QA/AMK/SPEC/001	HEPF/QA/AMK/SPEC/001
4	Hardness	As per table 2 . HEPF/QA/AMK/SPEC/001.	
5	Macro inspection	As per para 7 in HEPF/QA/AMK/SPEC/001	
6	Austenite grain size	As per para 9 in HEPF/QA/AMK/SPEC/001	
7	Ultrasonic Test	As per para 10 in HEPF/QA/AMK/SPEC/001	
8	Hot upset test	As per para 11 in HEPF/QA/AMK/SPEC/001	
9	Hardness test after forging	As per para 4 of this MI	5%

1. The firm has to offer the raw material for inspection and clearance by forwarding the following documents to HEPF
   a. Raw Material purchase details, like quantity, number of rods against each heat number (casting ladle).
   b. The firm will submit the characteristics tests certificates as per Table-A

2. HEPF shall verify all the documents as mentioned above and select the sample at random from the bulk for testing as specified in Table – A, either in whole or in part, at its discretion. If results are satisfactory, HEPF shall accord clearance for the forging operation. Firm shall proceed the forging operation after the receipt of clearance from HEPF.

3. Firm shall ensure absence of surface defects with a depth of more than 1mm, after forging operation.

4. Annealing to be done to achieve requisite hardness, hardness test of forgings to be done with following test conditions load(P)29430N(3000kgf) ±1%.Ball diameter Db-10mm,Exposure time 10-15 seconds, Ball impression not less than Ø 3.9mm.

5. After completi0on of hardness test on forgings 100% shot blasting shall be done.

TABLE B. INSPECTION / OPERATION TO BE CARRIED OUT AFTER FORGING BY THE FIRM

SI. NO.	CHARACTERISTICS	SPECIFICATION / REQUIREMENT	SAMPLE SIZE
1	Workmanship (visual)	The forging shall be uniform and free from defects such as cracks, folds, laps, seems, porosity, inclusions, stringers, die marks under fill, over heating, quench cracks etc.	100 %
2	Hardness Test	As per para 4	5%
3	Dimensional inspection	As per drawing.	100%
4	Marking	Stamp the Heat No. on both ends of the forging and the stamping letters highlighted with indelible paints.	100%
5	Packing	Suitably packed to avoid transit damages and securely tied with metal / plastic tag. Packing slip should specify HEPF supply order no. Quantity in nos. and producer's name or code. The material should be free from corrosion.	100%

TABLE C. INSPECTION CHECKS TO BE CARRIED OUT ON RECEIPT AT HEPF

SL. NO.	CHARACTERISTICS	SPECIFICATION / REQUIREMENT	SAMPLE SIZE
1	Workmanship (visual)	The forging shall be uniform and free from defects such as cracks, folds, laps, seems, porosity, inclusions, stringers, die marks under fill, over heating, quench cracks etc..	100 %
2	Dimensions	As per drawing No. O STB 125 1 005 0.	10%
3	Hardness Test	As per para 4	5%
4	Verification of documents	As per Table – A & B.	100%
5	Packing	Suitably packed to avoid transit damages and securely tied with metal / plastic tag. Packing slip should specify HEPF supply order no. Quantity in nos. and producer's name or code. The material should be free from corrosion.	100%

QUALIFICATION CRITERIA FOR A NEW SUPPLIER / VENDOR

7. Firm has to supply a minimum of 250 nos. of forgings from a single heat. After on receipt inspection at HEPF as per table-C, forgings will be subjected to machinability trial and further Type Testing trial.

   a. For type test evaluation, ammunition will be assembled with stabilizer manufactured from the supplied lot of 250 Nos. of forgings. This ammunition will be subjected to dynamic proof.

   b. If the type test results are satisfactory and meeting the qualifying criteria, then only the 250.nos of forgings will be accepted and Vendor/Supplier will be given clearance for bulk supply. ,

TABLE D: VERIFICATION OF INSPECTION DOCUMENTS

FOLLOWING INSPECTION DOCUMENTS MUST BE ENCLOSED WITH EACH SUPPLY.

1	The raw material details, like heat number, quantity purchased and number of bars etc.
2	Test certificates for characteristics mentioned in table A & B from NABL accredited or Govt. Approved laboratory as applicable.
3	Packing slip details.
4	In addition to the above, soft copies of all the certificates mentioned shall be sent to following e-mail id's. happqa@ord.gov.in, mmhapp@ord.gov.in.
Note	1.In case of any differences, Specification & drawing shall prevail. 2.explicit deviation(s) if any such as typographical error, values, numeric, other parameter, etc. is / are found in monitoring instruction of the above stores, the relevant standard conforming to the concerned specification shall be referred to confirm the parameter.

GANDI VIVEK KUMAR RAJA
WM / Q and R&D
MEMBER / TECHNICAL COMMITTEE

M.THEJANATHAN
DO / MS
MEMBER / TECHNICAL COMMITTEE

17/09/24

SREENIVASA RAO BODALA
Jt.GM/E & Q
TECHNICAL EXPERT & CHAIRMAN
TECHNICAL COMMITTEE

SUMANT KUMAR
WM/ P
MEMBER / TECHNICAL COMMITTEE

1. **Raw material : Hot rolled steel.**

2. **Specification : HEPF/QA/AMK/SPEC/001**

3. **END USE : 125mm AMK-339 STABLIZER.**

4. Reference Document : Instruction on quality control and acceptance of rolled steel Grade **40XФA as per СНИМ.710004.012И (AS PER SPEC.GOST V 10230-75 GR.40xФA)**

5. **TABLE-1 CHEMICAL COMPOSITION**

The chemical composition of the material shall be:-

	Elements	%
1	Carbon	**0.37 - 0.44**
2	Silicon	**0.17 - 0.37**
3	Manganese	**0.50 – 0.80**
4	Chromium	**0.80 - 1.10**
5	Vanadium	**0.10 - 0.18**
6	Phosphorus	**0.025 max**
7	Sulfur	**0.025 max**
8	Copper	**0.300 max**
9	Nickel	**0.300 max**

6. **TABLE –2 MECHANICAL AND OTHER INSPECTION PARAMETERS(IN HARDENED & TEMPERED CONDITION)**

Samples to be selected from Raw material and shall be Hardened & Tempered, these heat treated specimens shall meet the following parameters:

	Properties	Description		Samples
1	Yield stress in N/sq.mm (kgf/sq.mm)	735 (75)	min	One specimen/ heat
2	UTS in N/sq.mm (kgf/sq.mm)	880 (90)	min	
3	% of elongation	10%	min	
4	Contraction Ratio	50%	min	
5	Impact viscosity in J/sq.cm (kgf.m/sq.cm)	88 (9)	min	Two specimen/ heat
6	Macro inspection	As per para 08		one specimen/heat
7	Austenite grain size	As per para 10		One specimen/heat
8	Ultrasonic test	As per para 11		100%
9	Upsetting test	As per para 12		Three specimen/heat
10	Hardness test on rolled rod	241 HB max.		5 rods / heat-batch

7. Macroscopic inspection.

7. Macroscopic inspection.

a. The rolled stock shall have no residual shrinkage cavities, weakness, wormholes, pigeon holes, bubbles, cracks, layer separation, slag or foreign inclusions, crust turn-up, freckle-type segregation, or flakes, visible without magnifiers. Presence of conchoidal or silky fractures is not permissible.

b. Fracture discontinuity, segregation square and fracture tear-outs are not regarded as rejection criteria. Edge defects, such as separate subcutaneous blowholes or slag inclusions, shall not exceed the standard values given in Table 3.

c. Point discontinuity shall not exceed point 3, center porosity — point 2, pipe segregation point 1.

d. Defect dressing depth measured from the actual size shall not exceed the standard values given in Table 3. Separate small scratch marks, dents and rippling are admissible on the rolled stock surface without dressing if they lie within a half of the sum of the limit deviations. Hairline cracks Rolled and forged-out blisters are not admissible. (Limit deviations all with in Appendix-A)

8. **TABLE -3 MACROSCOPIC INSPECTION**

Surface quality	Rod dimension in mm	Defect depth (for surface quality group 3ГП or defect dressing depth (for surface group 1 ГП and 2 ГП) mm maximum.
1 ГП , 2 ГП	80-140 Less Than 80.	Total limit deviation A half of the sum of limit deviations
3 ГП	100 and above less than 100	Total limit deviation Negative tolerance.

9. Austenite grain size shall be not larger than number 4 or, upon the consumer's request, not larger than number 5. with reference scales. The reference scales are given in Appendix -B.

10. Ultrasonic inspection shall be done as per MIL STD-2154, Type-1 Class-A.

11. Upsetting test is conducted as follows:

a. The recommended specimen heating temperature for hot upset testing is 1150 to 1250 ° c.

b. Height of the specimens for upsetting test shall be equal to twice diameters of the cross section. Specimen height deviation shall not exceed ±5%. Surface of the specimens shall be untreated

c. Specimens butt ends shall be parallel. The axis of a specimen shall be perpendicular to its butt surface. Tests are conducted under static or dynamic load.

d. Upsetting test is conducted until the specimen reaches the final height (h1), mm, calculated using the following formula: h1=h(1 -X/ 100), where h is specimen height, prior to upset, mm; X is relative strain%.Relative strain value is 50 or 65 %

e. A specimen is considered to have passed the test, if no cracks appeared or widened and no back fins or surface tears appeared on the side surface of the specimen after it had reached the preset relative strain and was upset. Assessment of the test results in case roughness occurs on the side surface of the specimen is conducted in accordance with the standard technical documentation for the metal products.

f. Specimen surface after the test is inspected visually. Inspection for hairline cracks is conducted on ready parts by magnetic particles method or etching method.

g. Hot upsetting test, in accordance with the order specification, rolled stock with dimensions of up to 140 mm and surface quality group 1ГП is tested for hot upset to 1/2 (50 %) or 1/3 (65 %) of the initial height of the specimen. The upset group is stipulated with the order. There shall be no surface tears and cracks on the upset specimens.

16/09/24

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TECHNICAL EXPERT & CHAIRMAN
TECHNICAL COMMITTEE

17.09.24

SUMANT KUMAR
WM/ P
MEMBER / TECHNICAL COMMITTEE

Appendix-A
(Mandatory)

Nominal diameter, mm	Limit deviations, mm	Cross-section area, cm^2	Weight of 1 m of rolled stock length, kg
60.0	+0.5	28.274	22.195
62.0	-1.1	30.191	23.700
63.0		31.173	24.470
65.0		33.183	26.049
67.0		35.257	27.676
68.0		36.317	28.509
70.0		38.485	30.210
72.0		40.715	31.961
73.0		41.854	32.855
75.0		44.179	34.680
78.0		47.784	37.510
80.0	+0.5	50.266	39.458
82.0	-1.3	52.810	41.456
85.0		56.745	44.545
87.0		59.447	46.666
90.0		63.617	49.940
92.0		66.476	52.184
95.0		70.882	55.643
97.0		73.898	58.010
100.0		78.540	61.654
105.0	+0.6	86.590	67.973
110.0	-1.7	95.033	74.601
1 15.0		103.869	81.537
120.0	+0.8	113.097	88.781
125.0	-2.0	122.719	96.334
130.0		132.732	104.195
135.0		143.139	112.364
140.0		153.938	120.841

Appendix-B

GRAIN SIZE DETERMINATION SCALE 100% MAGNIFICATION GRAIN Nos.4-6