



Metal & Steel Factory, Ishapore  
A Government of India Enterprise  
Ministry of Defence  
A unit of Yantra India Limited

धातु एवं इस्पात निर्माणी, ईशापुर  
भारत सरकार का उद्यम  
रक्षा मंत्रालय  
यंत्र इंडिया लिमिटेड की एक इकाई



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ITEM CODE	ITEM SPECIFICATION
0133000055	HOT ROLLED HEAT TREATED PEELED/MACHINED & UT PASSED STEEL ROD TO SIZE 71+/-0.1MM DIA X 2-3 MTR LENGTH MAINTAINING ECCENTRICITY/BEND NOT MORE THAN 0.5 MM IN 1000 MM LENGTH TO SPECN GOST B 19032-73 STEEL GRADE II IOA FOR MAKING OF STEEL BLANKS FOR 30MM CARTRIDGE CASES AS PER MSF SCOPE OF WORK.

**SCOPE OF SUPPLY**  
**FOR**

**HOT ROLLED, HEAT-TREATED, PEELED/MACHINED, UT PASSED STEEL**  
**ROD TO SIZE Ø71 (+/-0.1) MM x 2-3 MTRS. LENGTH REQUIRED FOR**  
**30MM BMP-II CARTRIDGE CASE**

This scope of work elaborates supplying of "Hot Rolled, Heat-treated, Peeled/Machined, UT Passed Steel Rod to "size Ø71 (+/- 0.1 mm x 2-3 Meters length maintaining eccentricity/bend not more than 0.5 mm in 1000 mm length".

**1.0** Capacity requirement in r/o Process, Plant & Machinery Capacity for the production of "Hot Rolled, Heat Treated, Peeled/Machined & UT Passed Steel Rod", For 30 mm BMP-II Cartridge Case.

<b><u>Process</u></b>	<b><u>Plant &amp; Machinery</u></b>	<b><u>Capacity</u></b>
Melting	(LD CONVERTER/EAF/IF)	10MT (Min)/Tap to Tap
↓		
Refining	(LF-VD/VOD)	Do
↓		
Casting	Ingot/ Concast	Do
↓		
Hot Rolling	Rolling M/C	Matching Capacity for Hot Rolling
↓		
Parting/ Cutting	Band Saw/ Cold Saw M/C	Matching Capacity with Hot Rolling
↓		
Heat Treatment Following 'Spheroidising Annealing Cycle'	H.T. Furnace	Matching Capacity for H.T -Upto 900°C (max) with Water Quenching & Cooling alongwith agitation system
↓		
Peeled/Machined	Peeling Machine/ Centre Lathe	Matching Capacity

**With LAB TESTING FACILITIES to carry out:**

- Chemical Test
  - Mechanical Test
  - Hardness Test
  - Metallographic Test
  - Ultrasonic Test – as per under para 2.6 or 3.0 (vi)
- } As per Specification GOST: B 19032-73 Grade II I-OA

**2.0 SPECIFICATION OF INPUT MATERIAL OF STEEL ROD**

**2.1 Supply Condition:**

The Hot Rolled, Heat-treated, Peeled/Machined, UT Passed Steel Rod should be free from harmful defects such as Porosity, Lamination, Cracks, Lapping, Scaling, Welding etc. or any other defects which may affects the quality of steel blanks (as per MSF Drg. No. F-1633) to be manufactured from the Rods by MSF, Ishapore.

**2.2 Chemical Composition:**

The Chemical Composition of Steel Rod should as per **GOST B 19032-73 Steel Grade-II IOA**

*Handwritten initials and date: 31/03*

C%	Si%	S%	P%	Mn%	Ni%	Cr%	Cu%	Al%
0.09	0.13	0.025	0.025	0.30	0.15	0.20	0.20	0.03
0.13	Max.	Max.	Max.	0.50	Max.	Max.	Max.	0.09

**2.3 Hardening and Tempering operation of Steel Rod:**

To be done by the firm at their premises as per Heat-treatment Cycle 3A and 3B mentioned at **Annexure-A** (attached separately). The firm has to submit relevant records of Heat-treatment Cycle to MSF during supply of bulk quantity.

**2.4 Mechanical Properties:**

Mechanical properties as per **GOST B 19032-73 Steel Grade-II IOA** (at Rod stage)

UTS kgf/mm <sup>2</sup>	Elongation %	Charpy Impact (along rolling direction at 2mm U notch longitudinal) kgfm/cm <sup>2</sup>	Charpy Impact (across rolling direction at 2mm U notch Transverse) kgfm/cm <sup>2</sup>
34-41	35 (min)	15.0 (min)	9.0 (min)

NOTE : In case of unsatisfactory test result in Mechanical Properties, suitable action as per **Clause No. 3.14** of **GOST B 19032-73** to be taken. The representing heat-treatment batch is subjected to second heat-treatment and double quantity of samples to be tested for mechanical properties. The results of these tests are considered to be final.

**2.5 Metallographic Test:**

- (a) **Macro Etch Test:** Central porousness and of the liquation square must not exceed the stage quoted in the standard (Central porousness drawing 1a+1b & Liquation square drawing 2a+2b) as per **GOST B 19032-73**.
- (b) **Non Metallic Inclusion Rating (NMIR) Test:** Oxide and Sulphides must not exceed 3 as per **GOST: 1778-70**.
- (c) **Microstructure Checking:** Microstructure checking of heat treated material to be carried out as per **Clause No. 2.10** of **GOST B 19032-73**. Microstructure should be Equiaxial Ferrite Grains & uniformly arranged Granular Sorbitic Pearlite with complete absence of Widmansttaten pattern of Ferrite.  
In case of unsatisfactory test result in Microstructure, suitable action as per **Clause No. 3.14** of **GOST B 19032-73** to be taken. The representing heat-treatment batch is subjected to second heat-treatment and double quantity of samples to be checked for microstructure. The results of these tests are considered to be final.
- (d) **Grain Size Test:** The size of the Ferrite grains allowed within the limits of 7-10 units as per **GOST: 5639-65**.
- (e) **De-Carb Test:** The zone of complete decarburization should not be deeper than 0.25mm considering the first cementite grains as a boarder as per **GOST: 1763-68**.

## 2.6 Ultrasonic Test:

The firm shall supply ultrasonically flawless material. Normal Probe 10mm Ø, 2 or 4 MHz probe to be used. Angular Probe 8X9, 35°, 4MHz probe to be used. Reference gain to be set with respect to 2mm FBH and no flaw echo shall be accepted by Normal or Angular probe at this gain. Working gain may be set 2 to 4 mm higher depending upon the material condition, in this gain any defect echo shall be cause for rejection for normal or angular scanning. Supporting documents in respect of ultrasonic test to be submitted by the firm.

## 2.7 Documents to be submitted by the firm during supply of bulk quantity of steel Rods

- (i) Firm has to submit visual inspection details, cast-wise details and weight of the Steel Rods.
- (ii) Firm has to submit NABL certified chemical, mechanical & metallographic test certificates of the steel rods according to the test criteria mentioned under para 2.2, 2.4 & 2.5
- (iii) Firm has to submit 100 % ultrasonic test report (having no indication of any flaw) of the rods tested & certified by ASNT (Level-II) or ISNT (Level-II) authorized personnel only.

## 3.0 INSPECTION:

The inspection of supplied bulk qty. of steel rods will be done by concerned Inspection Authority of MSF at MSF premises.

### Inspection details of steel rods at MSF premises:

- (i) **Visual Inspection:** 100 % visual inspection of rods will be carried out by the concerned department at MSF. The rods should be free from harmful defects such as Porosity, Cracks, Rust, Dents, Pits, lapping, scaling, welding, untouched Black Patches etc.
- (ii) **Dimensional Inspection:** 100 % of the Rods should be strictly as per MSF specified size i.e. size Ø71 (+/- 0.1 mm) x 2 to 3 Meters in length maintaining eccentricity/bend not more than 0.5 mm in 1000 mm length.
- (iii) **Chemical Analysis:** Chemical Composition of the rods will be checked as per as per GOST B 19032 Steel Grade II IOA mentioned in para 2.2
- (iv) **Mechanical Testing:** Mechanical Properties of rods will be checked as per GOST B 19032 Steel Grade II IOA mentioned in para 2.4
- (v) **Metallographic Testing:** Metallographic Test to be carried out as per GOST B 19032 Steel Grade II IOA mentioned in para 2.5
- (vi) **Ultrasonic Testing:** 100 % ultrasonic test of the rods will be carried out at MSF premises.  
**Rejection Criteria:** W.r.t. 2mm FBH no flow echo shall be accepted by Normal or Angular probe as stated in para 2.6.

**Supplied steel rods should pass in the all the above-mentioned inspection/testing carried out at MSF premises.**

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#### 4.0 ACCEPTANCE/REJECTION OF RODS:

Rods passed in all the tests/inspection mentioned under para 3.0 shall be accepted.

Rods failed in chemical test or mechanical test or metallographic test or in all test mentioned above will re-tested (one time only) at MSF premises jointly with the firm. If the consignments failed in re-test then the whole consignment shall be rejected & taken back by the firm. If the consignments found passed in re-test then the whole consignment shall be accepted.

After being passed in above-mentioned tests, the consignment shall be visually/dimensionally inspected at MSF. The consignments failed in visual/dimension inspection at MSF, joint inspection with the firm shall be carried out at MSF premises and thereafter rejected stores during joint inspection, shall be taken back by the firm.

After being passed in above-mentioned tests ultrasonic test shall be carried out by the MSF, if any flaw is detected under para 2.6 or 3.0 (vi) the consignment shall be rejected in UT and joint inspection with the firm of the ultrasonically rejected rods shall be carried out at MSF premises. After joint inspection rejected rods shall be taken back by the firm. Only UT accepted material will be processed.

**Payment will only be made for the quantity of Rods which have been duly passed in all the tests/inspection mentioned in para 3.0 & sentenced accepted by MSF.**

#### 5.0 PACKAGING & IDENTIFICATION:

- (i) Steel Rods should be dispatched duly tied with Steel Wire.
- (ii) Proper identification marks like Cast No., Lot No., Quantity, Weight etc. to be clearly mentioned in each bundle for easy traceability.

#### 6.0 OTHER CONDITIONS:

- (a) Loading & un-loading material at MSF will be done by the firm at his own cost & risk. However, MSF will provide assistance of Material Handling Equipments like Forklift Truck, EOT Crane etc. subject to availability of the same.
- (b) Entry and working condition shall be as per MSF Security Rules.

#### 7.0 PRE-QUALIFICATION CRITERIA

Following Pre-qualification Criteria must be fulfilled by the Bidder:

##### (a) Manufacturing Facility :

- (i) Bidder must be a manufacturer or his authorized Distributer / Dealer. Source of Manufacturer should be clearly declared during submission of Tender. The manufacturer shall have in-house manufacturing facilities of Steel Melting and Refining, Forging/Rolling, Peeling/Machining and Heat-treatment in line with para 1.0. Detail evidence of facilities to be enclosed as proof of Production capability.

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- (ii) In the case of Authorized Distributer/Dealer, all the Quality certificates shall be issued from their Manufacturer only and to be submitted along with each consignment.
- (iii) The Guarantee certificate is to be issued by Manufacturer only for a period of One year for free replacement of the material. Under the Guarantee period, while processing of this input material, if, any quality issues are arisen in subsequent operations due to the quality of input material the firm has to replacement the same free of cost.

**(b) Testing Facility :**

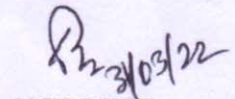
Bidder shall have adequate in-house Testing Facilities to carry out testing as per requirement of MSF specification. Firm to submit documentary evidence in this regard.

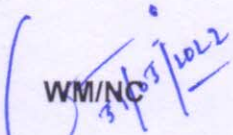
**(c) Minimum Experience :**

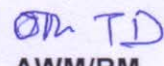
- (i) Bidder has to submit documentary evidence for supplying similar product or Steel Rod of diameter 50 mm or above in last 2 years.
- (ii) In support of above, Bidder to submit details as per following format :

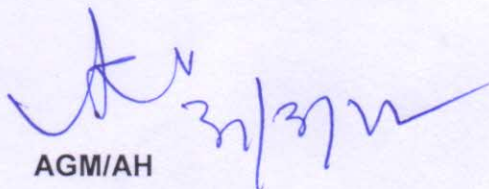
Sl. No.	Name of Customer	P. O. No. & Date	Dimension	Qty. Supplied	Period of Supply	T.C covering Chemical and Metallurgical properties/ Dispatch Invoice

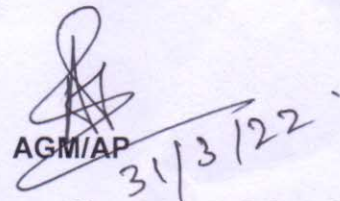
  
JWM/QA (STDN)

  
HOS/MME

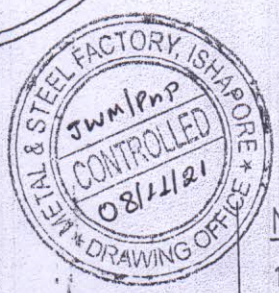
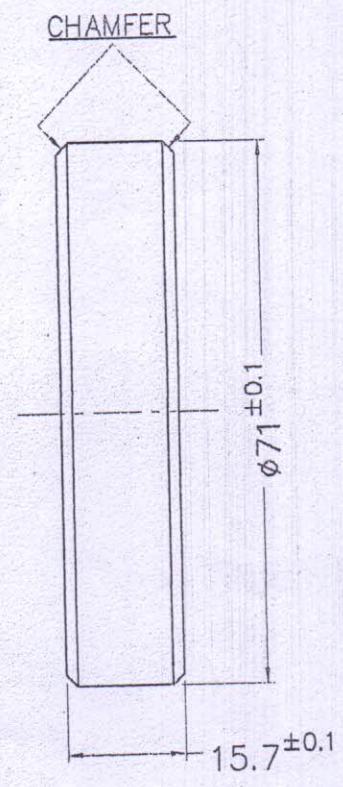
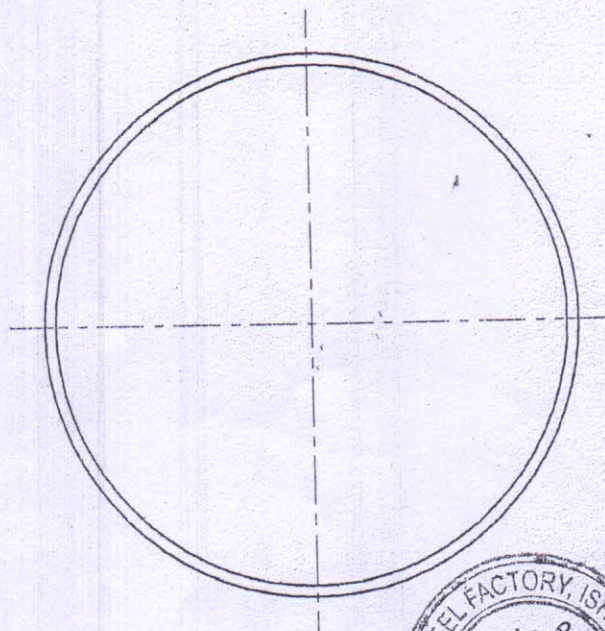
  
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[Note: QA(StdN.) has vetted the technical specification corresponding to para 2.0 to 2.7 & para 3.0 to 4.0 only & found satisfactory]



**MATERIAL SPECIFICATIONS :**

1. STEEL II I-0A GOST B 19032-73.
2. CONDITION : HARDENED & TEMPERED RODS WITHOUT PHOSPHATING FOR BLANKING OPERATION.
3. PREFERABLY VACUUM DEGASSED & AL KILLED STEEL.
4. BLANKS TO BE STRESS RELIEVED TO MAINTAIN HARDNESS 90-115 VP.
5. BLANKS TO BE PRESERVED TO AVOID RUSTING DURING HANDLING, TRANSIT & STORAGE.

**NOTES :**

1. DIMENSIONS ARE IN mm.
2. WEIGHT OF THE BLANK = 0.492 Kgs. (APPROX.)
3. SURFACE SHOULD BE FREE FROM PIT MARKS, LINE MARKS, SCORE MARKS, DENT ETC.
4. THE EDGES OF BLANKS TO BE POLISHED/ MACHINED/CHAMFERED TO REMOVE ANY BURS.

*Rahul*  
08/11/21  
AWM/RM

*Bhaskar*  
08/11/21  
JWM/QA (N/F)

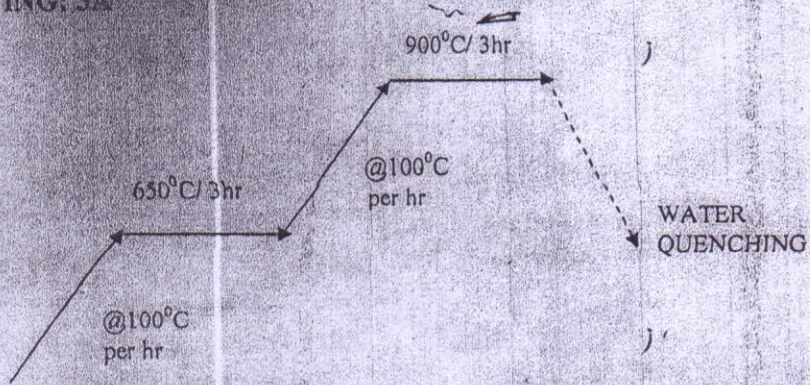
*JWM*  
08/11/21  
JWM/MME

PREPARED VIDE P&P MEMO NO. - MSF/P&P/Steel Blanks/OFA DATED 03/11/2021

ITEM NO.	DESCRIPTION	NO. OFF	MATERIAL	HARDNESS	REMARKS
AMENDMENTS					
INDEX	DESCRIPTION			DATE	NAME ZONE
	<p align="center"><b>STEEL BLANK FOR CASE CARTG. FOR 30 mm SARATH, BMP-II</b></p> <p align="center">REF. :- DRG. NO.-MM/187 A</p>	SCALE	DRAWN	03-11-21	A. Chaudhuri
		NTS	TRACED		
			CHECKED		
			APPROVED		
			<i>JWM/DO</i>		<i>WM/KR</i>
METAL & STEEL FACTORY, ISHAPORE			DRG. NO.	F-1633	

B. HEAT TREATMENT SCHEDULE

HARDENING: 3A



TEMPERING: 3B

