An ISO 9001 Company

Bharat Heavy Electricals Limited
(Seamless steel Tube Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA

TITLE: **REQUEST FOR EXPRESSION OF INTEREST FOR SUPPLY OF 200 MM DIAMETER CONCAST / ROLLED CARBON / ALLOY STEEL BLOOMS.**	Phone: +91 431 257 84 80 Fax : +91 431 252 0464 Email : lnsekar@bheltry.co.in Web : www.bhel.com

Reference Number: SSTP / PC / BLOOMS dtd. 11/01/2011	**Date: 01/02/2011**	**Due date for submission of application: 05/03/2011**
You are requested to quote the Reference Number in all your correspondences. This is only a request for registering the eligible suppliers for supply of 200 mm diameter carbon / alloy steel blooms and not an order		

Seamless Steel Tube Plant / BHEL / Trichy is looking for Indigenous / Import suppliers for supply of **Carbon / Alloy Steel Con-cast blooms dia 200 mm as per our TDC: 200BAR:GEN:CA:08 REV 00 DATED 21/01/2011 required to make boiler quality seamless steel tubes for boiler applications.**

The details are as follows**:**

1	**Size of Blooms**	**:**	**200 mm outside Diameter**
2	**Length of the blooms**	**:**	**11.01 to 12.00 Meters. Short length blooms having length from 5.01 to 11.0 will be accepted upto 5% of order quanity**
3	**Process of manufacture**	**:**	**Con-cast / Rolled**
4	**Specification – Carbon**	**:**	**As per ASME (latest on date of Purchase Order)** **SA 192, SA210 Gr A1, SA 210 Gr C, SA 106 Gr B & Gr C**
5	**Specification – Alloy**	**:**	**As per ASME (latest on date of Purchase Order)** **SA 209 T1, SA213 T11, T12, T22, T23, T91 & T92**
6	**Quantity in Metric TON**	**:**	**Carbon Steel Blooms** **80,000 – 90,000 MT per Annum** **(Monthly 8000 MT Approx.)** **Alloy Steel Blooms** **20,000 - 30,000 MT per Annum** **(Monthly 2500 MT Approx.)**

Interested steel suppliers (Indigenous & Import) are requested to submit the following forms for registration as a blooms supplier. The respective vendor registration forms could be downloaded from our Web site (www.BHEL.COM).

List of Forms - Indigenous Suppliers	**List of Forms - Import Suppliers**
1. Vendor Registration Forms – Indigenous	1. Vendor Registration Forms - Foreign
2. Clause wise confirmation for TDC for supply of carbon / Alloy steel blooms as per Annexure –A	2. Authorisation letter for Indian representative
	3. Agency agreement between Indian representative and Principals
	4. Clause wise confirmation for TDC for supply of carbon / Alloy steel blooms as per Annexure –A

Manufacturers alone need to be send their vendor registration formats for this requirement

Sr.Manager / Purchase /SSTP
Phone: 0431-257 8480, Fax: 0431-252 0464.
Mail: lnsekar@bheltry.co.in.

1.0 MATERIAL

a) Specification : ASME {Latest on date of Purchase Order (PO)}:
CS: SA 192, SA210 Gr.A1 & Gr.C, SA 106 Gr.B & Gr.C
AS: SA 209 T1, SA 213 T11, T12, T22, T23, T91 & T92

b) Additional Requirement : As listed below (Supplementary to Specification)

c) End Product : For Manufacture of Hot and Cold finished Seamless Steel Tubes / Pipes as per Indian Boiler Regulations (IBR)

d) Material Source : Indian Suppliers of Alloy Steel grades shall use only the Ingots /Blooms from IBR approved overall Creep Resistance Steel Manufactures (M/s. MUSCO/ Mumbai, M/s.TISCO/Jamshedpur , M/s.ASP/Durgapur , M/s Kalyani Steel Ltd./ Hospet , M/s. Remi Metals /Bharuch-Gujarat & ISMT/ Ahmednagar- Pune.

2.0 CHEMICAL COMPOSITION AND PROCESS OF MANUFACTURE.

Fully Killed, Vacuum de-gassed Bars in Concast or Rolled form. Ladle analysis to suit end product.
Product analysis and maximum trace elements: Al: 0.02%, Cu: 0.25%, Total: 0.5% for CS and 0.3% for AS.
SA 213 T12: Silicon : 0.2% min.

3.0 DIMENSIONS AND TOLERANCES

a) Diameter : 200 mm. -3 / +2mm; Ovality : < 1.4%
b) Length : As per Enquiry /Purchase Order.
c) Straightness : Permissible deviation is 2.5 mm / meter to 15 mm on the entire length of the bars.

4.0 SUPPLY CONDITION :

Without Heat Treatment.
In every despatch schedule , the lot Quantity shall be atleast 30 MT per Melt/ Heat Number.
Each consignment of bloom despatches shall have the quantity bulked melt/Heat wise.

5.0 FINISH AND REPAIR

Free from mill scales and defects like laps, seams, folds, cracks, undue segregation, piping etc. Repairs by welding is prohibited. The Surface defects can be removed mechanically subject to meeting minimum diameter.

6.0 NON-DESTRUCTIVE TESTING

Ultrasonic Test: NDE Procedure No.: 13 (Latest) shall be referred for testing and acceptance for Rolled Blooms only.

7.0 METALLURGICAL TEST:

7.1 MACRO ETCH TEST: (CONCAST & ROLLED BLOOMS)

1)One sample of complete cross-section of a bloom (Bar) for each Heat / Melt Number shall be examined in accordance with ASTM E 381. The reference plates shall be as follows.

a) For the blooms made by Comcast Method (Plate – II &III) and
b) For the blooms made by Rolled Method. (Plate I & II).
b1) The Macro structure shall be better than or equal to C2 R2 S2 of ASTM E381 (Plate I & II)

2)Injurious defects of any category like Surface cracks, Pipe/center void, Star crack, center unsoundness, Dark center, Pin holes, White bands, Chill structure, and Dendritic structure (strong) - are not allowed.

3) Photo of Macrograph shall be provided along with test certificates per Heat/ Melt.

7.2 MICRO EXAMINATION FOR ROLLED BLOOMS.

The Specimen for Testing shall be taken on longitudinal plane , midway between the center and surface of the material. The 'Inclusion content of the steel," measured as per ASTM E 45 shall not exceed the following.

Classification							
Type 'A"		Type 'B"		Type 'C'		Type 'D	
Thin	Heavy	Thin	Heavy	Thin	heavy	Thin	Heavy
2	1	2	1	2	1	2	1

8.0 MARKING

a) On each bar Longitudinal colour coding to be done for entire length by a band of 50mm width and also both End faces.

b) Melt number & Specification shall be paint stenciled with white colour on both the faces .

SA 192	WHITE	SA 209 Gr. T1	BROWN, RED
SA 210 Gr. A1	YELLOW	SA 213 Gr. T11	BROWN, WHITE
SA 210 Gr. C	BLUE	SA 213 Gr. T12	BROWN, YELLOW
SA 106 Gr. B	RED	SA 213 Gr. T22	GREEN, RED
SA 106 Gr. C	BLUE	SA 213 Gr. T23	RED, WHITE
		SA 213 Gr. T91	GREEN, YELLOW
		SA 213 Gr. T92	BROWN, BLUE

9.0 INSPECTION AND CERTIFICATION

Foreign supplier of : Indian Boiler Regulations (IBR) approved Well Known Steel Maker:
Mill Inspection with TC as per Form IV of IBR
Others : Inspection , test and clearance by Third party Inspection agency(TPI) approved by IBR for the region with TC as per Form IV of IBR countersigned by TPI

Indian suppliers of : IBR Approved Well Known Steel Maker:
Mill Inspection with TC as per Form IV of IBR
Others : Inspection and test witnessed and cleared by Directorate of Boilers(DB) of the respective Region With TC as per FORM IV of IBR countersigned by DB.

TC Shall essentially contain:

1. BHEL Order No., TDC No. & Test certificate number, Size & Quantity- Heat / Melt No wise
2. Specification and Grade with year of code, Heat Number, Steel & bar making process.
3. Chemistry including incidental elements - Ladle and Product analysis.
4. Metallurgical Test results, NDE results with reference and acceptance standards as applicable.
5. Identification Mark on the Product.
6. Photo of Macro Etch Test.

A. Natarajan Sr. Manager/QA&C	**A. Rajendra Prasad** Sr. Manager/OP & C	**L. N. Sekar** Sr. Manager/Purchase	**R. Dharmar** SDGM/QA&C
Prepared By	Reviewed By		Approved By

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ANNEXURE - A

TDC Clause wise confirmation for Supply of 200 mm outside dia carbon / alloy steel blooms

TDC ref: TDC:200BAR:GEN:CA: 08 REV :00 dtd 21/01/2011

Buyer : SEAMLESS STEEL TUBE PLANT / BHEL / TIRUCHIRAPPALLI -14, TAMILNADU, INDIA

SL NO	TDC CLAUSE NO	DESCRIPTION	SSTP /BHEL REQUIREMNT		Supplier's Acceptance / Remarks
1	1.0	Material - As per ASME (Latest on date of Purchase Order)	Carbon	SA192	
				SA 210 Gr A1	
				SA 210 Gr C	
				SA 106 Gr B	
				SA 106 Gr C	
			Alloy	SA 209 T1	
				SA 213 T11	
				SA 213 T12	
				SA 213 T22	
				SA 213 T23	
				SA 213 T91	
				SA 213 T92	
2	2.0	Chemical Composition and Process of Manufacture	Fully Killed Vacuum de-gassed bars in concast or Rolled Form. Ladle Analysis to suit end product.		
			Product Analysis and maximum trace elements : Al: 0.02%, Cu: 0.25%, Total : 0.5% for Carbon Steel and 0.3% for Alloy Steel		
			For SA 213 T12: Silicon :0.2% min		
3	3.0 a	Diameter	200 mm -3 / +2 mm , Ovality : < 1.4%		
	3.0 b	Blooms Length - 12 MTR	11.01 to 12 .00 meters in length.		
		Supply of short length blooms - 5.1 to 11.0 Meters long	Short length blooms having length 5.01 to 11.00 meters will also be acceptable up to 5% of order quantity		
	3.0 c	Straightness	Permissible deviation is 2.5 mm / Meter to 15 mm on the entire length of the bars.		
4	4.0	Supply Conditions	With out Heat Treatment .		
			In every Despatch schedule, the lot quantity shall be at least 30MT per Melt / Heat Number		
			Each consignment of bloom despatches shall have the quantity bulked melt / Heat wise.		
5	5.0	Finish and Repair	Free from mill scales and defects like laps, seams, folds cracks, undue segregation, piping etc. Repairs by welding is prohibited. The surface defects can be removed mechanically subject to meeting minimum diameter.		

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TDC Clause wise confirmation for Supply of 200 mm outside dia carbon / alloy steel blooms

TDC ref: TDC:200BAR:GEN:CA: 08 REV :00 dtd 21/01/2011

Buyer : SEAMLESS STEEL TUBE PLANT / BHEL / TIRUCHIRAPPALLI -14, TAMILNADU, INDIA

SL NO	TDC CLAUSE NO	DESCRIPTION	SSTP /BHEL REQUIREMNT			Supplier's Acceptance / Remarks
6	6.0	Non-Destructive Testing	Ultrasonic Test: NDE Procedure : 13 (latest) Shall be referred for testing and acceptance for rolled blooms only.			
7	7.0	Metallurgical Test				
	7.1	7.1 (1) Macro ETCH TEST	One Sample of complete cross -section of a bloom (Bar) for each Heat / Melt number shall be examined in accordance with ASTM E 381. The reference plates shall be as follows.			
			a. For blooms made by concast method - Plate II & III			
			b. For blooms made by Rolled method (Plate I & II) and B1. The Macro Structure shall be better than or equal to C2 R2 of ASTM E381 (Plate I & II)			
			b1. The Macro Structure shall be better than or equal to C2 R2 of ASTM E381 (Plate I & II)			
		7.1 (2)	Injurious defects of any category like surface cracks, Pipe / Centre void, Star Crack, Centre unsoundness, Dark Centre, Pin holes, White bands, Chill structure and Dendritic Structure (Strong) - are not allowed.			
		7.1 (3)	Photo of Macrograph shall be provided along with test certificates per Heat / Melt			
	7.2	MICRO EXAMINATION - For ROLLED BLOOMS	The Specification for testing shall be taken on longitudinal plane, midway between the centre and surface of the material. The "Inclusion content of the Steel" measured as per ASTM E 45 shall not exceed the following.			
			Type 'A'	Thin	Heavy	
				2	1	
			Type 'B'	Thin	Heavy	
				2	1	
			Type 'C'	Thin	Heavy	
				2	1	
			Type 'D'	Thin	Heavy	
				2	1	

ANNEXURE - A

TDC Clause wise confirmation for Supply of 200 mm outside dia carbon / alloy steel blooms

TDC ref: TDC:200BAR:GEN:CA: 08 REV :00 dtd 21/01/2011

Buyer : SEAMLESS STEEL TUBE PLANT / BHEL / TIRUCHIRAPPALLI -14, TAMILNADU, INDIA

SL NO	TDC CLAUSE NO	DESCRIPTION	SSTP /BHEL REQUIREMNT		Supplier's Acceptance / Remarks
8	**8.0**	**MARKING**	On each bar longitudinal colour coding to be done for entire length by a band of 50 mm width and also both end faces.		
			SA192	White	
			SA 210 Gr A1	Yellow	
			SA 210 Gr C	Blue	
			SA 106 Gr B	Red	
			SA 106 Gr C	Blue	
			SA 209 T1	Brown, Red	
			SA 213 T11	Brown, White	
			SA 213 T12	Brown, Yellow	
			SA 213 T22	Green, Red	
			SA 213 T23	Red, White	
			SA 213 T91	Gree,, Yellow	
			SA 213 T92	Brown, Blue	
9	**9.0**	**Inspection & Certification**			
		Foreign Suppliers of Indian Boiler Regulations (IBR) Approved Well Known Steel Maker.	**Mill Inspection with TC as per Form IV of IBR**		
		Others	**Inspection, test and clearance by Third party Inspection agency (TPI) approved by IBR for the region with TC as per Form IV of IBR countersigned by TPI.**		
		Indian Suppliers of Indian Boiler Regulations (IBR) Approved Well Known Steel Maker.	**Mill Inspection with TC as per Form IV of IBR**		
		Others	**Inspection and test witnessed and cleared by Directorate of Boilers (DB) of the respective region with TC as per FORM IV of IBR countersigned by DB.**		
		TC Shall essentially contain	**1. BHEL Order No, TDC NO & Test Certificate Number, Size & Quantity - Heat / Melt No. Wise**		
			2. Specification and Grade with year of Code, heat Number, Steel & Bar making process.		
			3. Chemistry including incidental elements - Ladle and Product analysis.		
			4. metallurgical test results, NDE results with reference and acceptance standards as applicable		
			5. Identification mark on the product		
			6. Photo of Macro Etch Test		

MANUAL ULTRASONIC TESTING OF ROUND ROLLED STEEL BLOOMS

Prepared By	Reviewed & Approved By
R.PARAMESHWARAN MANAGER / NDT LEVEL II	R.J.PARDIKAR AGM / NDT Sr. LEVEL III

EFFECTIVE FROM 09-08-2008

1.0 SCOPE:

1.1 This procedure deals with the ultrasonic testing of Round Rolled Steel blooms by contact pulse-echo method .

2.0 REFERENCE

2.1 ASME Section V Article 5

2.2 ASTM A 388

3.0 PERSONNEL QUALIFICATION:

3.1 Personnel performing examinations shall be qualified in accordance with NDE 01 to at least one of the following levels.

1) Operator	**Minimum Level-1**
2) Evaluation / Report issue	**Level-II**

4.0 EQUIPMENT and SEARCH UNIT

4.1 The examination shall be done with an ultrasonic pulse echo system generating frequencies of 1 MHz to 5 MHz and equipped with a stepped gain control of 2 dB.

4.2 Contact testing with manual scanning shall be done with 2 MHz frequency using longitudinal wave Straight beam probe with a crystal size of 20 to 25mm and 35 degree shear wave with crystal dimension 8x9 mm.

5.0 COUPLANT

5.1 Oil or Oil and grease mix shall be used as couplant.

6.0 SURFACE PREPARATION

6.1 The testing can be carried out on the Blooms as drawn condition . The surface shall be free from scales and deep pits and other foreign materials that may interfere with interpretation of test results.

7.0 EQUIPMENT CALIBRATION

7.1 The Screen height linearity and amplitude control linearity shall be performed in accordance with ASME Sec V Article 4 Appendix I, at the beginning of each period of extended use or every 3 months whichever is less.

8.0 PROCEDURE

8.1 CALIBRATION REFLECTORS

8.1.1 STRAIGHT BEAM TESTING

8.1.1.1 For Calibration purpose the mid portion of the bloom shall be taken .

8.1.1.2 The calibration reflector shall be the first back wall echo from the opposite side of a sound area of the bloom.

8.1.1.3 The gain shall be adjusted to get the back wall reflection to 80% of the FSH and this is taken as reference echo (RE)

8.1.2. ANGLE BEAM TESTING

8.1.2.1 For Angle beam, reference block with same curvature and material shall be used with side drilled hole of diameter 2.0 mm at 50 mm depth and the gain shall be adjusted to get a height of 80% of FSH and taken as Reference echo(RE)

8.2 SCANNING

8.2.1 The scanning shall be performed at a gain setting +6dB of the Reference echo(RE).

8.2.2 During inspection, the entire bloom shall be scanned circumferentially through 360 degree.

8.2.3 During inspection, areas showing complete loss of back reflection shall be rechecked to determine whether the loss of back reflection is due to poor coupling and contact.

8.2.5 The rate of probe movement for examination shall be less than 150 mm/sec.

8.2.6 Minimum 10% overlap between successive scanning shall be maintained.

8.3 CALIBRATION CHECK

8.3.1 When any part of the examination system is changed, a calibration check shall be made on the basic reflector at the finish of each examination, every 4 hours during the examination and when examination personnel are changed.

9.0 ACCEPTANCE STANDARD

9.1 Ultrasonic acceptance or rejection criteria for blooms shall be on a realistic appraisal of the end use.

9.2 Any signal greater than 20% of the FSH in the chill depth area shall be identified as defective in normal and angle beam.

9.3.1 For normal beam Central portion being an area of segregation, the defect echo shall be permitted up to 50% of FSH.

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