



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT

**PROCUREMENT OF ALLOY STEEL PIPES AS PER
SPECIFICATION SA335 P91 AS PER TDC:123 Rev
00.**

Phone: +91 431 2577447 /2577058

Fax : +91 431 252 0719

Email : agk@bheltry.co.in

**Reference Number:
Enquiry 1501100112**

**Enquiry Date:
17.11.2011**

**Due date for submission of
quotation: 22.12.2011**

You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order

Sub: Requirement of additional sources for supply of ALLOY STEEL PIPES AND SPECIFICATION SA335 P91.

BHEL/Trichy is looking for empanelment of new vendors for supply of pipes as per enquiry.

BHEL commercial terms & conditions with Price Bid formats and all annexure can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units) Bharath Heavy Electricals Limited) under enquiry reference "1501100112"

Tenders should reach us before 14:00 hours on the due date
Technical bid will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who
have submitted their offers and who may like to be present.

Yours faithfully,

For Bharath Heavy Electricals Limited


SM/ PURCHASE/TUBES

**ENQUIRY****BHARAT HEAVY ELECTRICALS LIMITED**

(A Government of India Undertaking)
HIGH PRESSURE BOILER PLANT
PURCHASE DEPARTMENT - FOSSIL BOILERS
THIRUCHIRAPALLI - 620014
TAMILNADU (INDIA)

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PHONE :2577447
GRAMS : BHARATELEC
FAX NO: 2520719
E-mail: agk@bheltry.co.in
Web:

429-002/A

	Enquiry No	Enquiry Date	Due Date for Quotation
	1501100112	17.11.2011	22.12.2011
Please quote Enquiry No, Date and due date in all correspondences. This is only a request for quotation and not an order			

Item	Description	Unit	Quantity	Delivery Quantity	Schedule Date
10	150921596000 TUBE OD 21.3 X 7.47 X 6000 - SA335P91	M	7000.000	7,000.00	24.02.12
20	150921606000 TUBE OD 33.4 X 6.35 X 6000 - SA335P91	M	700.000	700.00	24.02.12
30	150921616000 TUBE OD 48.3 X 10.16 X 6000 - SA335P91	M	700.000	700.00	24.02.12
40	159581640000 PIPE OD33.4 X 9.09 - SA335P91	M	4500.000	4,500.00	24.02.12
50	159581650000 PIPE OD60.3 X 12.5 - SA335P91	M	5000.000	5,000.00	24.02.12
60	159581796000 PIPE OD33.4 X 4.55 X 6000 - SA335P91	M	6600.000	6,600.00	24.02.12
70	159581806000 PIPE OD60.3 X 5.54 X 6000 - SA335P91	M	1700.000	1,700.00	24.02.12
80	159581816000 PIPE OD 73 X 5.16 X 6000 - SA335P91	M	500.000	500.00	24.02.12

General Note:

1) Bidders shall submit the OFFER in English language (a single envelope containing two inner envelopes) as indicated below:

Envelope 1: This sealed envelope should contain

(a) technical bid

(b) un-priced commercial bid (copy of the Priced Bid without the price details)

This envelope should be clearly marked "Part I - Technical and Un-priced commercial bid, indicating Enquiry No., Due Date, Address & Reference of the Bidder.

Envelope II: This sealed envelope should contain price details. This envelope should be clearly marked "Part II - Price bid", indicating

Enquiry No., Due Date, Address & Reference of the Bidder.

The offers should reach us 30 minutes before the time of opening of tenders.

The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening. Late and delayed offers are liable to be rejected.

A. GOPALAKRISHNAN

Sr. Manager

MM / Purchase

BHEL, Tiruchirappalli

Yours faithfully,

For **BHARAT HEAVY ELECTRICALS LIMITED**

MANAGER / PURCHASE
(FOSSIL BOILERS)

Yours faithfully,



BHARAT HEAVY ELECTRICALS LIMITED

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2) The OFFER, sealed and Superscribed as "Parts I & II inside" indicating Enquiry No., Due Date, Address & Reference of the Bidder should reach this office on or before the due date by 14:00 Hrs (IST). OFFERS RECEIVED AFTER 14:00 Hrs (IST) WILL NOT BE CONSIDERED FOR EVALUATION.

The OFFER is to be addressed to:

SR. MANAGER / PURCHASE - TUBES / MM / MFG
4th Floor - Building 24
BHARAT HEAVY ELECTRICALS LIMITED
HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620 014
TAMIL NADU, INDIA.

3) Tenders should be free from CORRECTION AND ERASURES, Corrections if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, the lesser amount shall prevail.

Note: Bidders are requested to submit their offers only through sealed bids. As the part II (priced bid) will not be opened before the technical evaluation is completed, bidders are requested not to submit their bids through email/fax etc

4) Fixed price: All items should be quoted on "Per unit basis". Prices quoted by the bidder shall be fixed and not subject to any escalation whatsoever during the period of bid validity and execution of the Purchase Order. A bid submitted with an adjustable price will be liable for rejection. Prices shall be written in words and figures. In the event of any discrepancy with regard to total price and unit price whichever is less shall be considered correct. All rates should include the third party inspection charges. RATES QUOTED SHALL BE INCLUSIVE OF ALL CHARGES INCLUDING PACKING, INSPECTION ETC. NO EXTRA PAYMENT WILL BE MADE IN ANY CASE.

5) Bid currency: Indian bidders should submit the prices only in Indian Rupees. Foreign bidders may submit their bid in their preferred currency. For the evaluation purposes the TT selling exchange rate on technical bid opening date will be considered.

6) Terms of Delivery: Foreign Bidders should submit their offer for net FOB, Nearest port and CFR, Chennai with freight break up details. BHEL reserves the right to order on FOB or CFR basis. Hence if FOB rates also are not quoted in the offer, it is liable to be rejected. Indian Bidders should submit their offer for FOR, Trichy (inclusive of risk in transit) & Ex-Works with the applicable freight breakup details.

7) Taxes and Duties: (for Indian Bidders only) All Taxes and Duties

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Sr. Manager
MM / Purchase / Tubes
BHEL, Tiruchirappalli 620 014.

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MANAGER / PURCHASE
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payable as extra to the quoted price should be specifically stated in offers along with CST & TNGST No / Tariff No. etc., failing which the purchaser will not be liable for payment of such Taxes and Duties. Our T.N.G.S.T No. 3560005 Dt. 01-04-1995, C.S.T. No. 239383 dt. 11-06-1991.

The duplicate copy of the invoice meant for transporters should accompany the material as stipulated under Central Excise rules 52A and 173C or 57gG. A Photostat copy of the invoice for each delivery challan should be submitted along with the original bills routed through bank or if submitted directly to BHEL finance department.

8) Modvat credit : (for Indian Bidders only) If any Excise Duty is payable, the chapter head / sub-head reference and the rate of the duty should be quoted. If the tender is availing MODVAT credit for his input material, the effect of proforma credit should be passed on to the purchaser. The Bidder under 'MODVAT' shall be preferred.

9) Validity: The offers shall be kept open for acceptance for 90 days from the date of Tender opening. Once the tenders are submitted, rates cannot be changed on any grounds.

10) Terms of Payment :

Indian Bidders - The payment term is 100% payment after 45 days of satisfactory acceptance of materials at BHEL, Tiruchy. As per policy, LC will not be opened. Offers with LC requests/advance payments are liable for rejection.

Foreign Bidders - Cash against documents - Payment will be made 45 days from the date of submission of complete set of documents as specified in the PO at our bank.

Requests for LC will be loaded at 1.5% of the basic charge.

11) BHEL prefers the manufacturers to quote directly. In case this is not possible and the offer is being submitted by an Indian agent, the following details are to be furnished along with the offer:

a. The letter from their Principal authorising the Indian agent to submit the offer on their Principal's behalf. In case the Indian agent submits offer on their own letter head then a covering letter (in original) from the Principal should be enclosed, clearly mentioning that they are bound by the offer submitted by the Indian agent on their behalf.

b. Precise relationship between foreign suppliers and their Indian agents and their mutual interest in business, should be clearly spelt out.

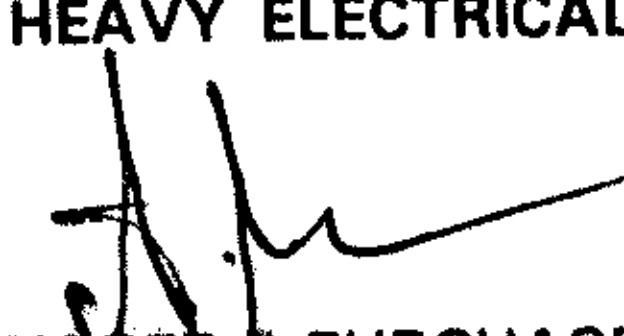
c. Any payment, which the agent receives in India or abroad, from the foreign supplier, whether as a commission or as a general retainer fee is to be mentioned in the offer.

d. All services to be rendered by the agent, whether of general nature

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Yours faithfully,
For BHARAT HEAVY ELECTRICALS LIMITED

A. GOPALAKRISHNAN
Sr. Manager
MM / Purchase / Tubes
BHEL, Tiruchirappalli - 620 014.


MANAGER / PURCHASE
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Yours faithfully,



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or in relation to the particular contract, must be clearly stated by the foreign supplier and the Indian agent.

e. The amount of agency commission agreed to between the foreign principal and the Indian agent should be specifically disclosed and the agency commission will be paid in Indian Rupees only on satisfactory completion of the contract.

f. For calculation of rupee equivalent of agency commission, exchange rate as prevailing on the date of order will be taken.

g. Copy of current agency agreement is to be enclosed without which the offer is liable for rejection.

12) Bank Guarantee (BG) for import bidders: The Bidder, in the event of an order, should furnish a bank Guarantee from any one of the attached list of consortium banks or counter-guaranteed by any one of this list of banks, at no extra cost in a Performa which will be provided by BHEL along with the order, for an amount equivalent to 10% (Ten percent) of the value of the contract. The Bank Guarantee should remain in full force and effect during the period that would be taken for successful completion of the contract and shall continue to be enforceable till 12 months from the date of receipt of consignment at purchaser's site or 18 months from the date of last shipment at the port of delivery whichever is earlier, with a claim period of two months.

13) Liquidated damages : Where the seller supplies or despatches the goods, Liquidated damages at the rate of 1/2% of the value of goods delayed for each week of delay or part thereof, subject to a maximum of 15% of the order value will be levied.

LD, if applicable, will be levied from the order delivery date to the date of Bill of lading/LR in case of CFR/FOR contracts and to the date of the inspection in case of FOB/Ex-Works contracts. Grace periods are not acceptable.

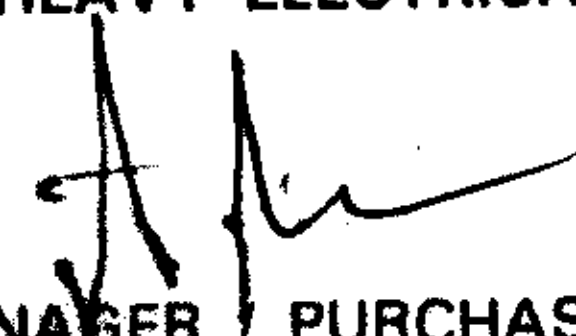
14) Risk purchase : Alternatively the purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss which the Purchaser may sustain by reason of such risk purchases in addition to penalty at the rate mentioned under liquidated damages.

15) The correspondence between the bidder and BHEL through email is considered to be valid document legally though not signed. It is treated as valid confirmations made on behalf of the respective company and comes under the legal ambit of the business transaction and hence binding on both the parties.

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16) Bidders participating in the tender should declare in their technical bid whether they have been black-listed / kept on hold / given Business holiday for a specified period by any Public Sector Undertaking or Government Departments. The reasons for such action with details and the current status of such hold shall be clearly furnished to BHEL. If no such details are mentioned in the offer, it will be construed that the bidder is not under any such hold. However, at a later date if it comes to the notice of BHEL about any such hold under enforcement, BHEL reserves the right to reject the offer at any point of time and also under any stage of the finalisation of the tender. Such bidders will not be permitted to participate in the further tender proceedings and will be communicated suitably.

17) Packing : The Supplier shall arrange for securely protecting and packing the stores to avoid loss or damages during transit.

18) Lowest price received against BHEL tenders need not be the technically acceptable one and in that case, BHEL reserves the right not to consider the same.

19) BHEL reserves the right to negotiate L1 rate or re float the tender opened if L1 price is not the lowest acceptable price to them inter-alia other reasons.

20) Any other conditions which might have been quoted by the seller and are in contravention to the terms prescribed in the order and which have not been specifically accepted in by purchaser will not be applicable to the contract.

21) All the tubes are to be supplied at the length of 6 meters. Length deviations are not acceptable.
Hence, any variation in length may please be mentioned in the offer itself.

22) We require all these tubes to be supplied positively before February 2012.

23) All tubes are to be supplied fully meeting the TDC No: 0:123: Rev 00 in all respects.

Point-by-Point confirmations to be indicated in the offer itself without fail, w.r.t TDC and Enquiry terms. If there is any deviation, the same should be mentioned clearly in the offer.

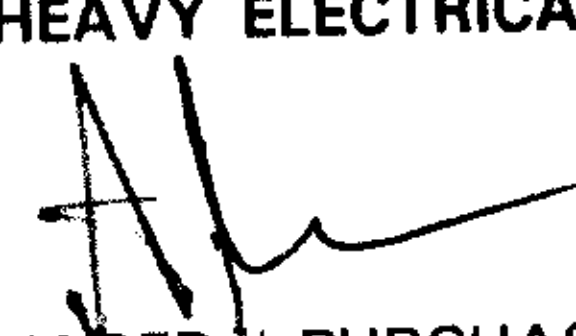
24) All tubes are to be stencilled and colour coded, longitudinally and continuously throughout the length of the tube with specific details as listed out in the above respective TDCs and the SIPPP 21 Rev 04.

25) While despatching tubes, in addition to bundling with metal straps,

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MANAGER / PURCHASE
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we require slinging arrangement with nylon belt (not rope) for easy handling at loading and unloading points.

26) In addition to TCs in relevant IBR forms corresponding mill TCs should also be provided along with despatch of tube material.

27) Offer from stockists is not acceptable and will not be entertained.

28) BHEL reserves the right to inspect the item ordered at any stage at vendor's works.

29) Date of price bid opening will be informed later after acceptance of offer on technical ground.

30) INSPECTION AGENCY - For import vendors, if not IBR approved, certification is to be done by approved third party inspectors. Offer should indicate the name of inspection agency.
Indigenous vendors have to be approved by IBR.

31) Offers will be evaluated on the basis of financial lowest status on technically suitable offers.

32) IN ADDITION TO THE TECHNICAL AND COMMERCIAL CONDITIONS LISTED ABOVE, VENDORS WHO ARE NOT REGISTERED VENDOR OF BHEL TRICHY HAVE TO SUBMIT THE FILLED IN SUPPLIER REGISTRATION FORMS AVAILABLE IN THE BHEL WEBSITE - www.bhel.com ALONG WITH THE TECHNICAL BID WITHOUT FAIL.

33) Bidders are to confirm all the above points in their "Technical and unpriced commercial bid". Incomplete offers will not be considered.

Enclosures:

"LD clause has to be confirmed without fail."

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For BHARAT HEAVY ELECTRICALS LIMITED


MANAGER / PURCHASE
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Revision record:

Rev 00: 05-01-2010 : Fresh Issue

1.0 MATERIAL:

Specification: ASME {Latest on date of Purchase Order (PO)}:

ALLOY STEEL(AS) : SA 335 Gr.P23 (Code case:2199),SA335 Gr P91 and Gr.P92(Code Case:2179)

Additional Requirement : As listed below(Supplementary to Specification)

Size and Qty. :As per Purchase order

2.0 CHEMICAL COMPOSITION AND PROCESS OF MANUFACTURE:

Process of Manufacture:- Hot finished.

Product analysis is required for all Pipes / one per Heat.

Analysis shall comply with the following requirements in addition to the specification.

SA335 P23: Si:0.25-0.50% and Cu:0.25 max

SA335 P92: Si:0.10-0.50%; Ni:0.30max and Cu:0.25max

3.0 DIMENSIONAL TOLERANCES: As per the specification.For Outside Diameter(OD)controlled Pipes the tolerance on OD shall be : $\pm 1\%$ (Max: 4mm)of Nominal OD.

For Inside Diameter (ID) controlled Pipes the tolerance shall be as indicated in the Purchase Order.

Otherwise the tolerance shall be: On ID +0.0mm/-3.2mm. On thickness:+3.2mm / -0.0mm.

4.0 HEAT TREATMENT:

All the Pipes shall be Normalized and Tempered in the temperature as given below. The heat treatment temperature and the soaking time shall be reported in the test certificate.

Normalizing Temperature: 1050-1080°C

Tempering Temperature: 750°C-780°C. Soaking:1 Hour minimum. Still Air Cooling

5.0 MECHANICAL TESTS:As per the Specification.

Number of Test: (as per IBR) Minimum 2 pipes for first 100 pipes and 1 per 100 or part thereof for pipes over 100 numbers. Additionally the material supplied shall meet the requirements as below.

P91- Ys:(0.2% offset):450MPa min. Ts:Min:630MPa,Max:850MPa Hardness(HB):Min:191.Max:250

P92- Ts:Min:655 MPa, Max:850 MPa Hardness(HB):Min:196.Max:250

P23- Ts:Min:510 MPa, Max:730 MPa Hardness(HB):Min:150.Max:220

6.0 NON DESTRUCTIVE TEST: On All Pipes.(a)**Ultrasonic Testing:** Shall be conducted as per ASTM E213. Calibration:2 axial 50mm long notches (V or Square), one in outer surface and the other in inside surface. Notch depth: 5% of Nom. thickness. (min. of 0.3mm. max:1.5mm). Scanning: Clockwise & Anti clockwise.**7.0 STRAIGHTNESS:**

The pipes shall not deviate from straightness by more than 1mm in any one meter, and shall not be more than 6mm over the entire length. A sharp bend at the end or kink and twist are not acceptable. These limitations are applicable for any given plane.

8.0 FINISH AND REPAIR

Inside and outside surface shall be free from imperfections and defects like laps, seams, folds, cracks, pitting etc Repairs by welding is prohibited Surface defects can be removed mechanically by grinding circumferentially without inducing any kind of depression and the depth of grinding shall not exceed 1.5mm.(not extending over a large area across the length and circumference of the pipe which affects the workmanlike finish), maintaining the specified minimum thickness without affecting the workmanlike finish. Loose scales shall be removed by blast cleaning in both inside and outside surface.

9.0 MARKING: (in English only)

Details to be identified.: 1) PO Number, 2) Maker's emblem/code 3) Specification & grade,

4) Heat number 5) Size, 6)Inspector's seal 7) Condition:Hot finished 8)BHEL TDC No:TDC:0:XXX

Sl.No: 2,3,4 & 6 to be hard stamped at 100mm from both ends on the outer surface of the pipe with round edge stamp and Sl.No:1 to 5 ,7and 8 to be paint stenciled on each Pipe.

Color Coding: Longitudinally on entire length of all pipes: As per the procedure SIP:PP:21 (latest)

Product : SEAMLESS STEEL PIPES for SUPER CRITICAL BOILER.(SA335 P23, P91,P92)

Document No: TDC:0:123

Rev No : 00

Effective Date: 05-01-2010

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10.0 PRESERVATION:

All Pipes shall be applied with resin type rust preventive coating suitable for at least 6 months outside storing with visibility to stenciled details on outside and either with rust preventive coating or rust inhibitor inside. Ends to be closed with end caps secured for storage.

11.0 INSPECTION AND CERTIFICATION

11.1: Products must be inspected at works and the manufacturers test certificate must be countersigned by the Inspecting Authority. Inspecting Authority Approved by IBR for the Country of Origin.

(To be concurred by BHEL before placing PO.)



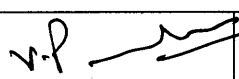
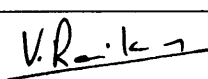
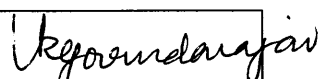
1.Manufacturers test certificate (ORIGINAL) in English. for each product with following details shall accompany the product. Manufacturers test certificate in IBR Form-IIID (Annexure-I) sufficient for IBR items from "IBR-Well Known Pipe Maker" and for Others IBR Form-IIIA(i) (Annexure-II) as per the enclosed format.

2.Purchase Order No.(BHEL), TDC No.& Test certificate No., Size and Quantity-Melt wise.

3.Specification and Grade with year of code, Code case number, Heat Number, Steel & Pipe making process, chemistry including incidental elements on Ladle and Product Analysis.

4.Heat Treatment details with actual temperature and soaking time, Mechanical test Results.

5.Detailed N.D.E. report with reference norms, Acceptance standards and test results.

				
V.Kalyanaraman	N.Ravi	V. Prabhakaran	V.Ravikumar	S.R.Govindarajan
PREPARED BY	REVIEWED BY			APPROVED BY

COMPANY EMBLEM AND DETAIL

(As published in IBR)

TEST CERTIFICATE – FORM III D

IBR Approval (Well known) Reference : Certificate No.. XXX Dt. DD/MM/YY, Valid upto DD/MM/YY

TC No. , & Date:		TDC No./Rev :	
PO. No., & Date:		Specification & Grade	
Steel Making Process		Year of Code	
Finishing operation	Hot Finished/Cold Finished	Deoxidation process	

Identification

Supply particulars	PO item No	Size D x T x L	Heat No	Weight (Kgs)	Qty	

Chemical Analysis

Elements ^{N1}	C	S	P	Si	Mn	Ni	Cr	Mo	V	Cu	Sn	Al	Cb
min													
max													
Heat													
Product													

Heat treatment details

	Type of HT	Soaking Temp° C	Soaking time/cooling media
Product			
Test Coupon ^{N2}			

Mechanical Properties^{N3}

Longitudinal / Transverse direction

Specified	YS	UTS	%E	%RA		Hardness
	Kg/mm ²	Kg/mm ²	GL=50mm			BHN
Min						
Max	---	---	---	---		
Test results						

Flattening test/Bend test^{N4}

Surface Treatment details(SS only)

Non destructive tests

Appearance and dimensions

Hydrostatic test

N1 : As applicable to the specification

N2 : If the heat treatment condition differs from the pipes

N3 : The tests specified shall be made on minimum 2 pipes for the first 100 pipes and 1 per 100 or part thereof for pipes over 100 numbers

N4 : as applicable

Surface preparation and preservation

Certified that the particulars entered herein are correct. The part has been manufactured to comply with the Indian Boiler Regulations at our Works above named and satisfactorily withstood a water test of _____ on the _____ day of _____ 20____ in the presence of our responsible representative whose signature is appended hereunder:

Maker's Representative
(Sign. & Name Seal of Quality Control)

Maker
(Sign. & Name Seal of Production)

N
o
t
e
:
In the case of pipes made from steel, made and certified by well-known Steel Makers in India or other countries, particulars regarding the 'material' as certified by them (in any form) shall be noted in the appropriate columns or paragraphs in this certificate.

COMPANY EMBLEM AND DETAIL

(As published in IBR)

FORM III A (i)

CERTIFICATE OF MANUFACTURE AND TEST

[REGULATION 4(h)]

TC No., & Date:		TDC No./Rev		P.O. No. & Date	
Specification & Year		Finishing Operation		Hot Finished / Cold Finished	
Name of part					
Design pressure					
Design temperature					
Material					
Process of manufacture					
Fully killed/rimmed					
Chemical composition					
Supply particulars		PO item No	Size D x T x L	Heat No	Weight (Kgs)
					Qty
Elements ^{N1}	C	S	P	Si	Mn
min					
max					
Heat					
Product					
Pipes					
Main dimensions					
Tolerances					
Mode of manufacture					
Identification marks					
Drawing numbers					
Bend test on pipe					
Bend test on weld					
Flattening test					
Mechanical Properties ^{N3}		Longitudinal / Transverse direction			
Specified	YS	UTS	%E	%RA	Hardness
	Kg/mm ²	Kg/mm ²	GL=50mm		BHN
Min					
Max	---	---	---	---	
Test results					
Mode of attachment of flanges					
Flange particulars					
Size of branches					
Mode of attachment of branches					
Heat treatment details		Type of HT	Soaking Temp° C	Soaking time	Cooling medium
	Product				
	Test Coupon				
Surface Treatment Details(SS Only)					
Other tests					
Ultrasonically tested to		UTUTUTUTUTUT		and found satisfactory to	
Appearance and dimensions		UTAUTAUTA.			
Final hydraulic test					
Surface preparation and preservation					

NOTE.- In addition, the following information in respect of the material shall be furnished in a tabular form in conformity with the requirements of regulation 4(c)(vi) or the note thereto, as the case may be. The information may be given from the established test data or if the material is of standard quality an extract from the standard may be furnished instead.

Metal temperature upto °C	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600
E_t															
S_e															
S_r															

Tensile strength at 20°C.

Where

E_t Yield point at temperature t (0.2% proof stress)

S_e Average stress to produce an elongation of 1% (creep) in 100,000 hours at various working metal temperatures.

S_r Average and lowest stress to produce rupture in 100,000 hours at the various working metal temperatures.

Temperature range in the table may extend upto the limit of applicability of the material.

The value of S_e and S_r need be furnished only in respect of Pipes/Tubes intended to be used for working metal temperature above 454°C (850°F).

Certified that the particulars entered herein are correct.

The particulars of fabricated component are show in drawing No. _____.

The part has been designed and constructed to comply with the specifications and the Indian Boiler Regulations for a working pressure of _____ and temperature _____ and satisfactorily withstood a water test of _____ on the _____ day of _____ 20____, in the presence of our responsible representative whose signature is appended hereunder.

Maker's Representative
(Name and signature)

Maker
(Name and signature)

We have satisfied ourselves that the pipes have been constructed in accordance with chapter VIII and the specifications. The tests conducted on the samples taken from the finished pipes have been witnessed by us and the particulars entered herein are correct.

Place _____

Date _____

Name and signature of
Inspecting Authority.

NOTE (1).- This form is intended for the use of both pipe manufacturers and pipe fabricators. Only such of the columns or paragraphs that are applicable, or information that can be obtained and furnished from other certificates, need be filled or entered in this form.

NOTE (2).- In the case of fabrications made from steel pipes obtained from elsewhere, particulars in regard to the "material" and "pipes" shall be taken from similar forms of certificates obtained in respect of pipes and noted in the appropriate columns or paragraphs.

In the case of pipes made from steel, made and tested by well known Steel Makers in India or other countries, particulars regarding the 'material' as certified by them (in any form) shall be noted in the appropriate columns or paragraphs in this certificate

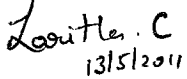
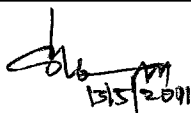
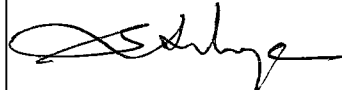
BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPALLI 620 014

QUALITY ASSURANCE

SIP:PP:21/ 04

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COLOUR CODES FOR TUBES AND PIPES
(FOR BOILERS, PRESSURE VESSELS & HEAT EXCHANGERS)

REV	DATE	PREPARED	REVIEWED	APPROVED
01	05/02/99	R. Sasikumar	A.R.Reddy	K. Rengachari
02	22/07/04	K. Ganesan	U. Revisankaran	C.R.Raju
03	20/01/09	V.Kalyanaraman	S.Selvarajan	U.Revisankaran
04	13/05/2011	 C.Haritha	 V.Kalyanaraman	 S.Selvarajan

RECORD OF REVISIONS

Rev. No.	Clause No.	Details of Revision	Remarks
01	--	New Specifications included based on TDC revision.	
02	--	Amendment A1 dt. 26.04.01 issued for Rev. 01 incorporated. Colour code for SA 213 Gr. T23 added.	
03	--	1)Colour code for SA 213 Gr. T92, P23,P92,SA178 Gr. D added. 2)Colour code for SA 210 Gr. C modified to BLUE only. (From BLUE & GREEN)	
04	--	Colour code for SUPER304 (Code Case : 2328) added	

Following Colour codes are to be applied as **longitudinal bands** (if not specified in other documents) on tubes & pipes to identify them to specification during receipt, storage, issue and processing. For heat exchanger tubes circumferential colour code can be provided at both ends of tubes (300 mm away from end).

Specification	Colour 1	Colour 2	Colour 3
12 X 1 MØ	RED	YELLOW	
13 Cr Mo 44	ALUMINIUM	BLACK	
A 200 Gr. T5	ALUMINIUM	RED	YELLOW
A 200 Gr. T9	ALUMINIUM	GREEN	YELLOW
AISI 602	WHITE	YELLOW	
API 5L Gr. B	ALUMINIUM		
BS 3059 PART2 CDS/HFS 360	ALUMINIUM	BLACK	BROWN
BS 3059 P2 S2 440	ALUMINIUM	BLACK	RED
BS 3059 P2 S2 622 Gr. 490	ALUMINIUM	BLACK	GREEN
BS 3602 PART1 CDS 360	ALUMINIUM	BLACK	BLUE
NFA49-213 42C	ALUMINIUM	BLUE	BROWN
NFA49-213 TU 10CD9.10	ALUMINIUM	BLUE	RED
NFA49-213 TU 15CD2.05	ALUMINIUM	BLUE	GREEN
NFA49-213 TU Z10CD9	ALUMINIUM	BLUE	YELLOW
NFA49-213 TU Z10CDVNB09.01	ALUMINIUM	GREEN	RED
SA 106 Gr. B	RED		
SA 106 Gr. C	BLUE		
SA 178 Gr. D	ORANGE		
SA 179	BLACK	BLUE	GREEN
SA 192	WHITE		
SA 199 T5	BLUE	BROWN	RED
SA 209 Gr. T1	ALUMINIUM	RED	
SA 210 Gr. A1	YELLOW		
SA 210 Gr. C	BLUE		
SA 213 Gr. T11	ALUMINIUM	YELLOW	
SA 213 Gr. T12	BROWN	YELLOW	
SA 213 Gr. T2	BROWN	GREEN	
SA 213 Gr. T22	GREEN	RED	
SA 213 Gr. T23	RED	WHITE	
SA 213 Gr. T5	BLACK	BROWN	GREEN
SA 213 Gr. T9	BROWN	WHITE	
SA 213 Gr. T91	GREEN	YELLOW	
SA 213 Gr. T92	BROWN	BLUE	
SA 213 Gr. TP 304	BLUE	GREEN	YELLOW
SA 213 Gr. TP 304H	BLACK	BLUE	YELLOW
SA 213 Gr. TP 304L	BLUE	WHITE	YELLOW
SA 213 Gr. TP 309H	BLACK	BROWN	YELLOW
SA 213 Gr. TP 316	BROWN		
SA 213 Gr. TP 316 Ti	BLACK	BLUE	
SA 213 Gr. TP 316L	BLUE	BROWN	YELLOW
SA 213 Gr. TP 321	BLUE	WHITE	
SA 213 Gr. TP 321H	BLACK	WHITE	
SA 213 Gr. TP 347H	BLACK	YELLOW	
SUPER 304 (Code Case -2328)	BLACK	RED	GREEN
SA 268 Gr. TP 405	ALUMINIUM	GREEN	

Specification	Colour 1	Colour 2	Colour 3
SA 268 Gr. TP 410	BROWN	RED	YELLOW
SA 268 Gr. TP 443	BLUE	GREEN	WHITE
SA 269 TP 316	GREEN	RED	YELLOW
SA 312 Gr. TP 304	BLUE	YELLOW	
SA 312 Gr. TP 304L	BLUE	RED	YELLOW
SA 312 Gr. TP 316	BLACK	GREEN	
SA 312 Gr. TP 316L	BLACK	BLUE	BROWN
SA 312 Gr. TP 321	BLUE	BROWN	
SA 312 Gr. TP 347	BLUE	RED	WHITE
SA 333 Gr. 1	BLACK	BROWN	RED
SA 333 Gr. 3	BLACK	GREEN	RED
SA 333 Gr. 6	BLUE	GREEN	RED
SA 334 Gr. 1	BROWN	GREEN	RED
SA 334 Gr. 3	BLACK	RED	YELLOW
SA 334 Gr. 6	BLACK	BLUE	RED
SA 335 Gr. P1	BROWN	GREEN	YELLOW
SA 335 Gr. P11	GREEN	WHITE	
SA 335 Gr. P12	BLACK	RED	
SA 335 Gr. P2	BLUE	BROWN	GREEN
SA 335 Gr. P22	BLUE	RED	
SA 335 Gr. P23	RED	WHITE	
SA 335 Gr. P5	BLACK	BROWN	
SA 335 Gr. P9	ALUMINIUM	BROWN	
SA 335 Gr. P91	BROWN	RED	
SA 335 Gr. P92	BROWN	BLUE	
SB 163 Inconel	BLACK	GREEN	YELLOW
ST 35.4	ALUMINIUM	BLUE	
Steel 20	GREEN		
Structural Tubes & Pipes	BLUE	BROWN	WHITE
X20 Cr Mo V 121	BLACK		

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(TO BE STAMPED IN ACCORDANCE WITH STAMP ACT)

1472

PERFORMANCE BANK GUARANTEE

429-011

In accordance of M/s. Bharat Heavy Electricals Limited (A Government of India Undertaking, a company incorporated under the Companies Act. 1956 having its Registered Office at "BHEL House" SHRI Fort, New Delhi 110 049") through its Tiruchirappalli Division (hereinafter called the Company) having agreed to exempt _____ hereinafter called the said contractor which term includes 'suppliers' for the purpose of this Bond) from the demand under the terms and conditions of the Agreement dt _____ made between _____ and _____ for _____ (hereinafter called the said agreement) for Security Deposit for the due fulfilment by the said Contractor of the terms and conditions contained in the said Agreement on production of a Bank Guarantee for Rs. _____ (Rupees _____ only). We (indicate the name of the Bank), (hereinafter referred to as the Bank) at the request of _____ (Contractor(s) do hereby undertake to pay to the company an amount not exceeding Rs. _____ against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reason of any breach by the said Contractor (s) of any of the terms and conditions contained in the said Agreement.

2. We, (Indicate the name of the bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the contractor(s) 'failure to perform' the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____

3. We undertake to pay unconditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this Bond shall be a valid discharge of liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority.

4. We, (indicate the name of Bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharge or till _____ office / Department / Division of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor (s) and accordingly discharges this guarantee.

5. (i) Unless a demand or claim under this guarantee is made on us in writing on or before the _____ we shall be discharged from the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date.

(ii) For the purpose of this clause, any letter making demand on the Bank by M/s. BHEL despatched by Registered Post with Ack. Due or by telegram addressed to the above mentioned address of the Bank shall be deemed to be the claim deemed in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the Bank personally.

6. We, (indicate the name of Bank), further agree with the Company that the company shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Company against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of the company or any indulgence by the company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to surities would but for this provision have effect of so relieving us.

7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

8. It shall not be necessary for the company to proceed against the contractor before proceeding against the guarantor bank and the guarantee herein contained shall be enforceable against them notwithstanding any security which the company may have obtained or obtain from the Contractor shall, at the time when proceedings are taken against the guarantor hereunder be outstanding or unrealised.

9. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Tiruchirapalli.

10. The guarantor hereby declare that it has power to execute this guarantee and the executant has full power to do so on its behalf under the Power of Attorney dated _____ granted to him by the proper authorities of the guarantor.

11. We (indicate the name of Bank) lastly undertake not to revoke the guarantee during its currency except with the previous consent of the company in writing.

In witness whereof we, (indicate the name of Bank) have hereunto set our Bank Seal the _____ day _____ month

13/20
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List of Consortium Bank			
Nationalised Bank		Nationalised Bank	
1	Allahabad bank	18	United Bank of India
2	Andhra bank	19	Vijaya Bank
3	Bank of Baroda	Public Sector Banks	
4	Bank of India	20	IDBI
5	Canara Bank	Foreign bank	
6	Corporation bank	21	CITI Bank N.A
7	Central bank	22	Deutsche Bank AG
8	Indian Bank	23	The Hongkong and Shanghai Banking Corporation Limited
9	Oriental bank of Commerce	24	Standard Chartered Bank
10	Punjab National Bank	25	The Royal Bank of Scotland N.V
11	Punjab & Sindh Bank	Private bank	
12	State Bank of India	26	Axis Bank
13	State Bank of Hyderabad	27	The Federal Bank Limited
14	Syndicate Bank	28	HDFC
15	State Bank of Travancore	29	Kotak Mahindra Bank
16	UCO Bank	30	ICICI
17	Union Bank of India	31	Indusind Bank