An ISO 9001
Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
MATERIALS MANAGEMENT

PROCUREMENT OF CARBON STEEL PIPES AS PER SPECIFICATION SA333GR6, AS PER TDC:D139-TDC-002-R01 & AS PER ENQUIRY.	Phone: +91 431 2577447 /2577058 Fax : +91 431 252 0719 Email : agk@bheltry.co.in

	Reference Number: Enquiry 1501100096	**Enquiry Date: 12.08.2011**	**Due date for submission of quotation: 20.09.2011**
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 CORBON STEEL PIPES AND SPECIFICATION SA333GR6.

BHEL/Trichy is looking for empanelment of new vendors for supply of pipes as per enquiry.
Kindly note that
1.All pipes are ID controlled and shall be specification SA333GR6 and as per TDC NO :D139-TDC-002-R01.
2.Offer should be from mill.
3.End user certificate will not be issued.

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 "1501100096"	
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

BHARAT HEAVY ELECTRICALS LIMITED

ENQUIRY
(INDIGENOUS)

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

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

Enquiry No	Enquiry Date	Due Date for Quotation
1501100096	~~04.08.2011~~ 12.08.2011	20.09.2011

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	D13930395001 PID 87 x 13.5 thk x 6000lg, Qty- 285 , ID controlled pipe to the following tollerence. 100 NB ID 87(±0.5)and Wall thickness 13.5mm(+1.0/-0.0).	M	1710.000	1,710.00	26.01.12
20	D13930395003 PID 59 x 10thk x 6000lg, Qty- 188 ,ID controlled pipe to the following tollerence. 65NB ID 59.0(±0.40) and Wall thickness 10.0 (+1.0/-0.0)	M	1128.000	1,128.00	26.01.12
30	D13930395004 PID 49.25 x 9thk x 6000lg, Qty- 117 , ID controlled pipe to the following tollerence. 50NB ID 49.25(±0.30)and Wall thickness 9.0(+1.0/-0.0)	M	702.000	702.00	26.01.12
40	D13930395005 PID 18.8 x 5thk x 6000lg, Qty- 77 , ID controlled pipe to the following tollerence. 20NB ID 18.80(±0.20)and Wall thickness 5mm(+0.5/-0.0).	M	462.000	462.00	26.01.12

General Note:

1) The tender will be opened on 'TWO PART BASIS". Vendors has to submit offers in TWO separate Covers (i) One cover duly super scribed as "Techno commercial Offer' and (ii) another cover as "Price Bid"
2) The covers should be duly super scribed with the ENQUIRY NO in BOLD letter without fail.
3) Both the Techno Commercial and Price Bid are to be submitted before 2.00 P.M on 20.09.2011
4) The date of opening of price bid will be informed later after acceptance of techno commercial offer.
5) All these pipes are ID controlled and shall be as per specification SA333GR6 and as per TDC NO:D139-TDC-002-R01.Tolerance mentioned against each tubes as indicated in the tender shall be met.

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.

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

N. GANAPATHY SUBRAMANIAN
Engineer
MM / MFG. / Purchase / Tubes
BHEL, Tiruchirappalli - 620 014.

MANAGER / PURCHASE
(FOSSIL BOILERS)
Yours faithfully,

BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
HIGH PRESSURE BOILER PLANT
PURCHASE DEPARTMENT - FOSSIL BOILERS
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E-mail: agk@bheltry.co.in
Web:

1501100096 / ~~04.08.2011~~ 12.08.2011

6) These ID controlled pipes are to be supplied as per the description and length mentioned. Any variation in length may please be mentioned in the offer itself.
7) Inspection will be by BHEL/NPCIL or authorised inspection agency
8) All rates should be for per meter basis including the third party inspection charges, packing and forwarding charges etc.
9) Vendors shall quote for both on Ex.Works and FOR basis .
10) The actual production of tube materials is permitted only after review/approval of manufacturing/testing/ Inspection drawings /documents and quality assurance plans (QAP) by BHEL, Trichy and by costumer NPCIL.
11) Five sets additional dialects containing test certificates, copies of the approved procedures DCR, Drgs etc apart from contractual requirements are required.
12)As we indent to procure all four items from same source,for evaluation of offers, all the four items will be considered together as a whole to asses financially lowest offer.However offer should be for individual items on per meter basis as mentioned under sl.no 8.
13) Offers should be kept valid for minimum 60 days. Offer with price validity less than 60 days will be liable for rejection.
14) Offer should be from mill.
15)End user certificate will not be issued.
16) Vendors should indicate clause by clause confirmation on TDC/specification and the enquiry terms. Deviation if any with respect to any clause should be clearly spelt out.
17) Vendor shall submit fully filled QAP as enclosed in the TDC: D139-TDC-002-R01,page no 11 and 12.
18)If the documents are not submitted as indicated in the point 16 &17 offer will be liable for rejection.
19)LC will not be opened.Payment will be made in 30days after acceptance of material.

Enclosures:

"LD clause has to be confirmed without fail."
"Payment to vendors will be made only thro E-Payment mode"

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Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

MANAGER / PURCHASE
(FOSSIL BOILERS)
Yours faithfully,

BHARAT HEAVY ELECTRICALS LIMITED

ENQUIRY
(IMPORTS)

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

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

Enquiry No	Enquiry Date	Due Date for Quotation
1501100096	~~04.08.2011~~ 12.08.2011	20.09.2011

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MANAGER / PURCHASE
(FOSSIL BOILERS)
Yours faithfully,

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1501100096 / ~~04.08.2011~~ 12.08.2011

6) These ID controlled pipes are to be supplied as per the description and length mentioned. Any variation in length may please be mentioned in the offer itself.
7) Inspection by any of the following authorized third party TUV(Nord) ,BV & SGS acceptable at the time of ordering.
8) All rates should be for per meter basis including the third party inspection charges, packing and forwarding charges etc.
9)Vendors shall quote for both on FOB and CFR Chennai basis, with break-up of freight details.
10) The actual production of tube materials is permitted only after review/approval of manufacturing/testing/ Inspection drawings /documents and quality assurance plans (QAP) by BHEL, Trichy and by costumer NPCIL.
11) Five sets additional dialects containing test certificates, copies of the approved procedures DCR, Drgs etc apart from contractual requirements are required.
12) As we indent to procure all four items from same source,for evaluation of offers, all the four items will be considered together as a whole to asses financially lowest offer.However offer should be for individual items on per meter basis as mentioned under sl.no 8.
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Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

MANAGER / PURCHASE
(FOSSIL BOILERS)
Yours faithfully,

Revision Record:

Rev 00: Fresh

Rev 01: Cl.1.0 & 4.1.3 c – Text modified.
Cl. 4.1.3 e & 4.2.2 -'Y' type consumable inserts identified in place of Flat type inserts

Table of Contents

न्यूक्लियर पावर कार्पोरेशन ऑफ इंडिया लिमिटेड
NUCLEAR POWER CORPORATION OF INDIA LTD.
अनुमोदित / APPROVED
19/04/11
समीक्षा/Reviewed 19/4/11
जाँच किया गया/Checked 19.04.11
यह अनुमोदन किए जानेवाले कार्य के परिनिर्धारण का विक्रेता को विवरण की सटीकता के दायित्वों से मुक्त नहीं करता है ।
This Approval of Interpretation of the work to be done does not relieve the seller of responsibility of accuracy of details.

Prepared by Engr/QA (BHEL)	Reviewed & approved by (BHEL)	Approved by NPCIL
(K.Krishnamoorthi)	(M.Ponnusamy)	

1.0 Scope

This specification establishes the technical requirements for the material, manufacture, examination, inspection, testing documentation, identification and packaging of seamless carbon steel pipes SA–333 Grade 6 (modified) and butt welding seamless carbon steel fittings SA–420 Gr.WPL-6 (modified).

2.0 Specifications, Codes/standards and drawings

All Specifications, Codes/standards and drawings listed below of the issue in effect on the date of the pertinent tendering documents, apply as specified herein. In the event of any conflict between the provisions of this specification and the documents listed below, this specification with the concurrence of purchaser shall govern.

2.1 Specifications, Codes/standards

ASME	: Boiler pressure vessel code
	: Section II – Part A – Ferrous material specifications
	: Section III – division – 1 sub section NB – Class – 1 components
	: Section – V – Non destructive – Examination
ANSI	: Standards of american national standards institutes
ANSI – B 16.9	: Factory made wrought steel butt welding fittings
ANSI – B 16.25	: Butt Welding of ends
ANSI – B 16.28	: Wrought steel butt welding short radius elbows and Returns
ANSI – B 46.1	: Surface Texture
MSS – SP – 25	: Standard Marking system for Valves, fittings, Flanges and unions
ASTM	: Appropriate standards of american society for testing and materials
SA – 333	: Specification for seamless and welded steel pipe for Low temperature service
SA – 370	: Test method and definitions for mechanical testing of Steel products
SA – 420	: Specification for pipe fittings of wrought carbon steel and Alloy steel for low temperature service
SA – 530	: Specification for general requirements for specialized Carbon and alloy steel pipe
SE – 709	: standard guide for magnetic particle Examination
SE – 165	: Standard Method for liquid Penetrant Examination
SE – 213	: Standard method for ultrasonic inspection of metal pipe and tubing
ASTM – E – 94	: Recommended practice for Radiographic Testing
ASTM – E – 112	: Method for Estimating the Average Grain Size of metals.
ASTM – E – 381	: Method of macro Etch Testing Products, Inspection and Rating Comprising Steel Bars, Billets, Blooms and Forgings.

2.2 Refer applicable Drawings for 20NB TEES, 20NB ELBOWS, and 20NB End caps

3.0 Material and manufacturing Requirements

3.1 Material Requirements

3.1.1 General

All pipes and butt welding fittings shall be new and of high quality carbon steel material and manufacture. All the general requirements, specified herein, regarding material, manufacture, examination, inspection and testing shall be applicable to all pipes and butt welding fittings and shall also be applicable to the starting stock used for the manufacture of butt welding fittings. All pipes and butt welding fittings shall be of 'SEAMLESS' manufacture. They shall have the best workmanship like finish and be made by the best manufacturing practice.

a) The steel shall be clean, homogeneous and instrinsically tough and shall be produced by recognized "fine Grain melting practice" and shall be fully "killed". The manufacturer shall indicate in the bid the austenitic grain size guaranteed in the micro structure for their offered products and shall report the grain size actually achieved in the material certificates in the event of an order. Grain size should be 5 or finer.

b) The steel subjected to vacuum treatment and/or refinement is preferred. The manufacturer shall indicate in the bid the particular type of vacuum treatment and/or refinement method used for Purchasers consideration/evaluation.

c) The chemical composition shall be in accordance with the particular SA – Material specifications specified herein with the following restrictions on chromium, sulphur, phosphorus and other elements:

Chromium	:	0.20% min. and 0.25% max.
Sulphur	:	0.025% max.
Phosphorus	:	0.025% max.
Aluminium	:	0.04% max.
Vanadium	:	0.01% max.
Copper	:	0.30% max.
Cobalt	:	0.02% max.
Nickel	:	0.40% max.
Molybdenum	:	0.10% max.

d) All material product forms shall be supplied in the "Normalized" condition, unless otherwise specified herein and shall be delivered in "pickled" condition. All heat treatment and pickling procedures shall be subjected to purchaser's approval.

e) In addition to the particular SA – Material specification requirements, the following special or supplementary requirements shall be applicable to pipes and butt welding fittings, where appropriate for the material product forms and as specified herein. However, if any of the following requirements are already called for in the SA – Material specification, then such requirements need not be repeated, provided the scope of testing of the stricter of the two is followed :-

SL. No	Special Supplementary Requirement	Material Product Form	Remarks
1.	Metal Macro Structure/ Etching test	Pipes and pipes fittings	Vide 3.1.2(d) and 3.1.3(d)
2.	Grain size evaluation	Pipes and pipes fittings	Vide 3.1.2(d) and 3.1.3(d)
3.	Product analysis (Modified)	Pipes and pipes fittings	Vide 3.1.2(d) and 3.1.3(d)
4.	Hardness Test	Pipes fittings	Vide 3.1.3(d)
5.	Cold Bending (close coiling) test	Pipes	Vide 3.1.2(d) and 4.2 (c)
6.	Flattering test	Pipes	Vide 3.1.2 (d)
7.	Controlled bore and wall thickness	Pipes and pipe fittings	Vide 3.1.2(f) and 3.1.3(e)
8.	Hydrostatic test	Pipes and pipe fittings	Vide 3.1.2(d) and 3.1.3(d)

9.	Magnetic particle Examination	Pipes fittings	Vide 3.1.3(d)
10.	Liquid penetrant Examination	Pipes fittings	Only when magnetic particle examination is not feasible. Permitted only with prior approval of purchaser.
11.	Ultrasonic Examination	Pipes and pipe fittings	Vide 3.3.2 and 4.3
12.	No Repair by Welding	All Pipes and pipe fittings	
13.	No bar stock machined products	All pipe fittings	

3.1.2 Pipes

a) All pipes shall be in accordance with SA – 333 Grade 6 (modified). They shall also meet the requirements of ASME Section III – NB for Class I components and this specification

b) Pipes shall be cold drawn, followed by appropriate heat treatment for controlling and achieving the required micro-structure and mechanical properties. The pipes shall be finally bright annealed. All pipes supplied to this specification shall be suitable for cold bending (close coiling) to a minimum mean radius of the lesser of 250 mm or four times the pipe O.D. the manufacturing route and condition of each lot of pipe shall be recorded. Refer appendix – A for standard QAP.

c) Pipes shall be offered in lengths, unless otherwise specified in tendering documents. Pipes shall be supplied with sqaure cut ends. Average length of supplied pipes shall be 11 meter with minimum length of 7 meter.

d) For all pipes, the special / supplementary tests as defined below shall be conducted with satisfactory results.

1) Metal structure/etching test
2) Grain size evaluation (5 or finer Shall be obtained)
3) Product analysis (modified)

} These tests shall be conducted on one sample,. for each test, taken from each pipe size per lot.

4) Flattening test (as per SA – 530) — This test shall be conducted on each pipe at both ends.
5) Cold bending (close coiling) test, (vide 4.2 (c)). This test shall be conducted on two samples taken from pipes of each size per lot.
6) Hydrostatic test
7) Ultrasonic examination

} the test/examination shall be conducted on each pipe

e) No repair by welding shall be permitted on the pipes.

f) The pipe / header stubs supplied to this specification shall be of special dimensions with controlled bore diameter and wall thickness.

Nominal size	Special ID for feeder pipe/ header stub (mm)	Special thickness forfeeder stubs (mm) on reactor headers
100 NB	87.00 ± 0.50	$13.50^{+1.0/-0.0}$
65 NB	59.00 ± 0.40	$10.0^{+1.0/-0.0}$
50 NB	49.25 ± 0.30	$9.0^{+1.0/-0.0}$
20NB	18.8 ± 0.20	5.0 (min)

3.1.3 Butt welding pipe fittings

a) All butt welding fittings shall be in accordance with SA – 420 Gr.WPL -6 (modified). They shall also meet the requirements of ASME section – III – NB for class – 1 components and this specification. Pipes of same size and wall thickness. This shall be established and certified as described in NB – 3649 and NB – 3612.

b) Butt welding fittings shall be forged or formed to the finished shape and size by hot working. The hot working shall be done in such a way as to cause metal flow in directions most favorable for resisting the stresses encountered in service and as to achieve completely wrought structure. Forging for pipe fittings shall be done in number of stages. Fittings manufactured by hot working and / or cold forming processes shall be appropriately heat treated for controlling and achieving the required micro structure and mechanical properties. Fittings shall be finally annealed or normalized. The manufacturing route and condition of each lot of fittings shall be recorded. Refer Appendix – B for standard QAP.

c) No fittings shall not be manufactured by machining from bar stock.

d) For all fittings. The special/supplementary tests as defined below shall be conducted with satisfactory results.

1)	Metal structure/etching test	These tests shall be conducted on one sample, for each test, taken from each size of fittings per lot.
2)	Grain size evaluation (5 or finer shall be obtained)	
3)	Product analysis	
4)	Hardness test. Fittings shall have maximum hardness of 197HB	
5)	Hydrostatic test	The test shall be conducted on 2 samples for each size of fittings per lot. Hydro pressure shall be 174 kg/cm$^{2\,(g)}$
6)	Ultrasonic examination	To be carried out on all fittings refer note 4.3.1 (b)
7)	Magnetic particle examination	
8)	Dimension check	See note given below
9)	Thickness gauging by ultrsonic	

Note:

Ultrasonic thickness gauging:

In addition to thickness measurement by conventional methods, ultrasonic thickness gauging shall be carried out (in grid pattern) on pipe fittings from each lot on random basis. For elbows the extent of examination shall be minimum 10% and for other fittings it shall be minimum 2%. If results are found to be unacceptable, thickness gauging shall be extended on 100% of fittings.

e) The fittings shall have circular, uniform and smooth bores. This shall be demonstrated by Means of longitudinal and transverse sectioning on a representative fitting of each size and wall thickness, produced by the same production process / method for the bulk order fittings. The butt weld edge preparations shall be as per applicable drawings. Suitable for 'Y' type consumable inserts.

f) Ovality, concentricity, other tolerances (except ID and wall thickness) shall be as given in ANSI B 16.28 and B16.9 for pipe fittings.

g) No repair by welding shall be permitted on the fittings

h) Ball passage test shall be carried out on all the elbows. The size of the ball shall be worked out by the manufacturer considering the dimensional requirement and after establishing the procedure obtain BHEL approval.

3.2 Surface finish and End Preparation

3.2.1 The surfaces of pipes and pipe fittings shall be smooth and even, and shall be prepared as required for the examination, inspection and tests called for in para – 4.0 – examination, Inspection and testing.

3.2.2 Butt welding ends of pipe fittings shall be prepared in accordance with drawings for Butt Welding Edge Preparation for feeder fittings for 'Y' type consumable inserts.

3.3 Repair of Pipes and Fittings

3.3.1 All the surface of pipes and fittings shall be smooth and all surface, defects revealed by visual or non-destructive examinations shall be removed as required by ASME section – III NB – 2538 excepting that repair by welding shall not be permitted.

3.3.2 Pipes and pipe fittings containing sub surface defects which are greater than 5% of the wall thickness, as revealed by the volumetric examination such as ultrasonic / radiographic examination, are not acceptable and shall be rejected.

3.3.3 Repairs by thermal process shall not be performed and all local repairs shall be by mechanical means only, viz. grinding and machining and shall be smoothly blended into the surrounding surface. Removal of any defects, surface or sub surface, shall not reduce the remaining local defect free wall thickness under the repair areas to less than the specified minimum wall thickness in Para 3.1.2 (f) & 3.1.3 (e). All repaired areas shall be re-examined by magnetic particle and the volumetric examination by which the defect was detected, to ensure complete removal of the defect. Acceptance of repaired geometrics shall be at the discretion of the Purchaser.

3.3.4 However, repair by local grinding / machining shall not be permitted in such portions of any fitting, if it impairs the integrity or reinforcement of such fittings (e.g. high stress/ stress concentration areas).

4.0 Examination,Inspection and Testing

4.1 General

The manufacturer shall be responsible to provide and perform all the in process and final examination, inspection and testing specified herein. The examination, inspection and testing shall be programmed and conducted in a manner satisfactory to the Purchaser and hence the examination, inspection and testing programme and procedures shall be. subjected to the prior approval of the Purchaser.

The Purchaser or his authorized, agency shall have access to the Manufacture's or their sub-contractors premises at all reasonable times and to the extent necessary to assess compliance with the provisions of the said programme and this specification. Examination, inspection and test reports shall be submitted by the Manufacturer to the Purchaser.

4.2 Material inspection and tests

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a) All the materials shall be inspected / tested with satisfactory results and accepted in full compliance with the applicable SA – Material specification and in addition with this specification. The material shall be tested in its final finished and heat treated condition at delivery

b) The pipes and pipe fittings shall be impact tested and shall comply with the impact test requirements of the applicable SA – Material Specification

c) Cold Bend Tests for Pipes

Two pipe sample lengths selected from each size per lot shall be cold bend through 135° around a cylindrical or contoured mandrel to produce pipe bends of mean radius equal to lesser of 250 mm or 4 (four) times the pipe O.D. Suitable flexible bore mandrels or approved filler material shall be used to maintain the section circularity of the pipe bends. After bending, the external surfaces of each test bend shall be inspected and shall be found free from cracks, laminations and other defects. Further external surfaces of each test bend shall be examined by liquid penetrant method and shall be free from any indications. Similarly internal surfaces of the bend shall be inspected after sectioning and liquid penetrant examination carried out. After the successful completion of these inspection and examination, the bend specimens shall be forwarded to the Purchaser for his review and reference purposes.

If the test bends reveal any cracks, laminations or other defects on inspection or any unacceptable indications on liquid penetrant examination, the lot of pipes from which these test bends were made shall be rejected.

d) Documents in the form of Certified Material Inspection / Test reports and Mill Certificates that the required tests have been carried out at the sources shall be furnished by the Manufacturer to the Purchaser.

4.3 Non – destructive Examination of Pipes and Fittings

4.3.1 Examination of Pipes and Pipe – Stock

a) Pipes of all sizes shall be examined for both 'Longitudinal and Transverse' discontinuities by Ultrasonic examination by scanning with beam directed successively in two opposite circumferential directions and two opposite longitudinal directions. The examination shall be carried out in accordance with ASME section III NB – 2550.

b) In case of such pipe fittings which cannot be satisfactorily examined by ultrasonic method, their starting pipe stock material shall be ultrasonically examined as in (a) above. This aspect shall be checked, established prior to taking up manufacturing of pipe fittings and needs approval of purchasers. In addition to ultrasonic inspection, 5% (Min.5 Nos.) fittings of lot of each size shall be radiographed to detect any flaws.

4.3.2 Examination of pipe Fittings

a) Each pipe fitting shall be ultrasonically examined completely to cover its entire volume

b) If it is not possible to cover the entire volume in the finished form the starting stock or semi-finished material, shaped nearest to the final form shall be ultrasonically examined completely and subsequently the finished product shall be ultrasonically examined to the maximum extent possible. Further, if the purchaser deems it necessary the Manufacturer shall examine by radiographic method, to Purchaser's satisfaction, such portion of the finished product which cannot be either ultrasonically examined meaningfully or examined to the required ultrasonic acceptance standards.

The bidder shall describe in detail the stages and extent of volumetric examination in his quotation for Purchaser's evaluation

c) Each pipe fitting shall be examined by magnetic particle method. This examination shall cover completely all the external surfaces and accessible internal surfaces. The examination shall be repeated with magnetization applied successively in two mutually perpendicular directions over the surfaces. When magnetic particle examination cannot be meaningfully carried out over an part of a fitting liquid penetrant examination may be carried out in such cases with prior approval of the Purchaser.

d) The Ultrasonic, Radiographic Magnetic Particle and Liquid Penetrant Examinations shall be in accordance with ASME section III – NB – 2550. The ultrasonic examination acceptance standards for the starting stock or semi – finished material shall be same as called for the corresponding finished product thickness.

e) Ultrasonic thickness gauging for elbows to be done as per approved procedure.

4.4 Additional Examination, Inspection and Testing Requirements

4.4.1 All examination, inspection and testing procedures shall be submitted to Purchaser for approval and only after the approval of such procedures work shall commence.

4.4.2 All chemicals and fluids such as cleaning agents, penetrants, developers and water used for hydrostatic testing and paints used for marking shall preferably be free from halogen and sulphur. However, in no case more than 25 ppm of halogen and sulphur shall be permitted. For hydro testing, the potable quality water is acceptable. Examination materials, chemicals, fluids, or any other material used for examination, inspection and tests shall be removed from the product to achieve a clean – dry surface.

4.4.3 Fittings shall be demagnetized immediately after magnetic particle examination.

4.4.4 In addition to the above examination, inspection and tests, the finish of all surfaces of all pipes and fittings shall be inspected visually as required by the basic SA – Material Specification. This shall include the use of boroscope, dental mirrors or any other devices where necessary.

5.0 Documentation and Identification

5.1 Documentation

All manufacturing procedures, Examination/Inspection/Testing programme and procedures, after approval by Purchaser as called for in this Specification, shall form part of documentation. Various Examination, Inspection and Testing data/results obtained their evaluation and disposition etc, shall be properly documented and certified by the Manufacturer. The final documentation, before issue, shall be countersigned by the purchaser or his Authorized Agency. At least 6 (six) sets of such final documentation shall be supplied to the purchaser.

5.2 Identification

a) Pipes shall be marked in accordance with SA – 530 and the applicable SA – Material Specification. Marking shall be done on both the ends of pipes.

b) All fittings shall be marked in accordance with the applicable SA – Material Specification.

c) In addition, all pipes and fittings shall be identified with this specification no. and the lot reference number.

d) Marking shall be by vibro-tool or electro-etching only.

e) To indicate that the materials have undergone non-destructive examinations an additional material identification shall be painted on each piece as described below
   i) Pipes : A continuous longitudinal white strip
   ii) Fittings : A continuous white strip on the major dimensions but not extending over the machined end preparation.

6.0 Preservation and Packing for Shipping

6.1 The Manufacturer shall not ship the materials without obtaining the clearance for shipment by the Purchaser or his Authorized Agency.

6.2 The supplier shall be responsible for preparing, preserving and packing the materials supplied to this specification, to protect them against corrosion and damage of any kind during shipment to the destination and also during storage at site. Protective measures shall be adequate to prevent corrosion in transit and in storage at the destination for a period of about 48 months in a tropical climate.

6.3 All material shall be cleaned and coated with removable preservative to prevent corrosion. Pipes fittings shall be packaged to protect their weld edge preparation. Pipe ends shall be sealed by water proof plastic end caps. All material shall be packed in weather proof wooden boxes in such a way that material will not undergo any damage or rusting during shipment, handling and site storage. The packaging shall be subjected to the inspection and approval of purchaser or his Authorized Representatives.

6.4 All pipes shall be in bundles with each pipe ends closed, machine strapped at 3 places and box packed.

7.0 Technical Information Required to be Submitted with Bids

1) Catalogue, technical literature indicating product range, manufacturing and testing facilities available at bidder works.
2) Confirmation to the effect that the specifications have been clearly understood by the bidder.
3) Confirmation to the extent that the material shall be supplied completely in accordance with technical specification. In case of any deviations from technical specifications, the fact should be clearly brought out giving cross reference to the Para no., section no. of this specification.
4) Complete manufacturing sequence with details of the process at each stage. Indicate clearly the method for manufacturing ID controlled pipe fittings.
5) Raw material proposed to be used for manufacturing of each type item. i.e. material specification, size, thickness of raw material to be used for manufacturing pipes and pipe fittings.
6) Indicate specifically :
   i) Type of vacuum treatment method used.
   ii) Meeting additional chemistry control requirements.
   iii) Forging ratio for making pipe fittings.
   iv) Availability of pickling facility.
7) Vendor shall indicate the activities to be carried out in house and furnish the details of sub vendors for manufacturing / inspection activities.

8.0 Appendix – A: Standard Quality Assurance Plan for Pipes

Sl no	OPERATION	INSPECTION			SAMPLE	INSPECTION
		A	B	C		
1	Heat analysis	√			One sample per heat	Checking of test certificates- Heat no. grade, fine grain melting practice and fully killed. See restrictions of para 3.1.1 (c)
2	Heat treatment	√	√		All pipes must be heat treated	H.T. by normalizing, checking of time temperature chart.
3	Product analysis	√			As per material spec (min. one sample from each size per each lot)	Checking of test certificates see restrictions of para 3.1.1 (c)
4	Tensile test	√		√	On 5% of the pipes from lot (min.two per lot)	Witness the test operation
5	Impact test	√		√	As per material spec.	Witness the test operation
6	Grain size	√		√	One sample from each size per lot	Checking
7	Flattening test	√		√	Test shall be made from both ends of each pipe	Witness the test operation
8	Cold bending test & liquid Penetrant test	√		√	Two samples taken from pipes of each size per lot	Witness the test operation
9	Metal macro structure / etching test	√			One sample from each size per lot	Also check that no seam and no repair by welding
10	Ultrasonic examination	√	√	√	Refer para 4.3.1	Witness the test operation
11	LP examination	√	√	√	On re- worked areas only	Witness the test operation
12	Hydrostatic test	√	√	√	Each pipe shall be tested at 174 kg / cm^2 (g)	Witness for pressure integrity and leak tightness
13	Dimension check	√		√	Each pipe	Check for double random length, controlled bore, ends, wall thickness, straightness
14	Visual inspection		√		10% random checking- surface quality, cleaning	Inside/outside of pipes to ensure absence of mill scale, degreased condition and dryness.
15	Marking, color coding	√			Each pipe shall be marked	Checking as per para 5.2
16	Document / test certificate verification	√			All certificates must be checked	Checking
17	Preservation and packing	√			All pipes must be suitably packed	Checking as per para 6.0
18	Issue of third party inspection certificate and shipping release Note	√		√		

Appendix – B: Standard Quality Assurance Plan for Pipe Fittings

Sl No	OPERATION	NPC'S INSPECTION			SAMPLE	INSPECTION
		A	B	C		
1	Inspection of pipes	√		√	All pipes	Co-relation with mill T.C., heat no. and grade, surface quality, dimensional check
2	Heat analysis	√		√	One sample per heat	Checking of test certificates. See restrictions of para 3.1.1 (c)
3	Ultrasonic test on starting stock / pipe	√	√	√	Only when UTE on final product is not feasible (as per para 4.3.1 (b))	Prior approval required. Witness the test operation
4	Forming	√		√	One sample from each lot of fittings per size and wall thickness	Longitudinal and transverse sectioning
5	Heat treatment	√	√		All pipe fittings must be heat treated	Checking of time temperature chart and temp. monitoring
6	Product analysis	√			As per material spec. (min. one sample from each size per each lot)	Checking of test certificates see restrictions of para 3.1.1(c)
7	Tensile test	√		√	One sample from each size of fitting per each lot (min. as per material spec.)	Witness the test operation
8	Grain size	√		√	One sample per size per lot	Checking of test certificates
9	Impact test	√		√	As per material spec.	Witness the test operation
10	Hardness test	√		√	One sample from each size of fittings per each lot	Witness the test operation
11	Etching test	√			One sample from each size per lot	Checking of seamless.
12	Micro structure test	√			One sample from each size per lot	Checking
13	Radiographic examination	√	√	√	Required on 5% qty (min. 5 nos. fittings of each size), when UTE is carried out on starting pipe stock material	See para 4.3.1 (b). Checking radiographs
14	Ultrasonic test	√	√	√	As per para 4.3.2	Witness the test operation
15	Magnetic particle examination (LPE if permitted)	√	√	√	Each fitting shall be tested	Witness the test operation
16	Dimension test	√		√	Each fitting	
17	Ultrasonic thickness gauging.	√	√	√	Fitting thickness gauging in grid pattern. Para 3.1.3 (d)	Witness the test operation

18	Hydrostatic test at 174 kg/cm^2(g)	√	√	√	On two samples from each size of fittings per each lot	Witness for pressure integrity and leak tightness
19	Ball passing test for elbows	√		√	100% elbows	Witness the test operation for circularity, ovality
20	Visual inspection test		√		10% random checking – surface quality, cleaning	Inside/outside of fittings to ensure absence of mill scale, degreased condition and dryness.
21	Marking and color coding	√			Each fitting shall be marked	Checking
22	Document / test certificate verification	√			All certificates must be checked.	Checking
23	Preservation and packing	√			All fittings must be suitably packed	Checking
24	Issue of third party inspection certificate and Shipping Release Note.	√				

Legends:

A= checking of test report
B= checking of material or equipment
C= witnessing of operation (customer hold point)

Notes:

1) The lot number, heat number, coil number, mill test certificate number and its quantity shall be identified at raw material stage for ladle analysis, check test analysis and for product analysis. Random samples for various testing as required by QAP and code / material specification shall be drawn by QA representative and stamped.

2) Original test certificate of raw materials shall be required for review at the time of first stage inspection.

3) Manufacturer should use starting stock of pipe of sufficiently higher thickness for making pipe fittings to meet thickness reduction during process of bending, forming, scale removal, grinding (for removal of surface defects if found during Visual / MPE / UTE) marking, etc. manufacturer shall satisfy this aspect to the purchaser's representative before taking up the work.

4) The material test laboratory shall be approved by BHEL.

5) The heat treatment furnaces shall be in good condition and shall have temperature recorder and checked for calibration by BHEL QA / third party and the related certificate shall be submitted. The agency for heat treatment shall be approved by BHEL.

6) The loading and unloading of items in the furnace may be witnessed by BHEL QA / third party representative. Heat treatment chart shall be submitted for review

7) All items shall be identified to avoid mixing and proper identification during inspection and examination.

8) Vendor shall carry out 100% dimensional check on all pipe fittings.

9) All items shall be visually examined for any imperfections and defects.

10) All NDE examinations (UTE, MPE, LPE, eddy current testing, radiography, etc.) shall be carried out as per BHEL approved procedures. The selection of appropriate technique(s) / method(s) shall be approved by BHEL. Work shall be taken up after approval of procedures.

11) BHEL QA representative / third party shall witness 100% UT examination, 100% magnetic particle examination and 100% liquid penetrant examination.

12) On removal of surface defects after MPE / LPE (particularly on class – I components) thickness checking shall be carried out by ultrasonic gauging. The UT instrument shall have reference master thickness gauge of required contour and capable of measuring the least count accuracy as required.

13) Suitable GO – NO GO gauges and fixtures may be used for dimensional inspection. Threads shall be examined by plug and ring gauges. These gauges shall have proper certification for accuracy.

14) Material traceability report (indicating material, size, item description, lot no., heat no., NDE report nos., check test certificate, vendor's final certificate no.,etc.) shall be submitted.

15) Color coding, bin card and proper tagging along with entry in proper registers shall be maintained to identify the location of material at any point during manufacturing and to avoid mixing of materials.

16) All items shall be stamped by vendor's name / monogram apart from item description, size, serial no., class, material code, rating, grade, etc. and meeting BHEL specification. The fittings confirming to NPCIL specification shall be color coded as mentioned in specification.

17) The history docket containing all test certificates, inspection reports, approved procedures, QAPs along with shipping release shall be submitted in properly bound document, duly signed by BHEL QA / third party inspection agency, along with soft copy on CD.

18) In case, manufacturer intends to use "on line" UTE or eddy current examination or hydro test facility, the required system details shall be submitted for approval for on line witnessing and extent of witnessing.

19) Calibrated instruments shall be used for inspection, examination and testing.

20) Non destructive examinations shall be carried out by personnel qualified to level – 1 of ASNT / ISNT and evaluated by ASNT / ISNT level – II.

21) The portion at the end of pipe which is not examined by ultrasonic examination is to be discarded.

22) The visual examination and dimensional check shall cover outer diameter, wall thickness, workmanship, root face, end beveling, end squareness, outer and inner surface finish, out of roundness, straightness, dents on inside / outside surfaces, length, weight, marking, color coding, stamping, stenciling, processing / rolling marks on internal surface.

23) After repair by grinding on parent material up to minimum wall thickness, the repaired area should be blended smoothly to the surrounding surface.

24) Check and ensure consistency and repeatability of detection in ultrasonic examination.

25) The drawing for all non-standard pipe fittings (like branched outlet fittings, lateral tees, etc for which the dimensions are not given in ANSI standards) shall be submitted for BHEL approval.

26) QA representative shall stamp the inspected items.

27) Vendor shall submit guarantee certificate.

INDIGENOUS ENQUIRY TERMS AND CONDITIONS

1. QUOTATIONS: Each tender should be sent in double cover, inner cover should be sealed with tenderer's distinctive seal and super scribed with correct tender no. Item of supply and due date of opening the outer cover should only bear the address of this office and should not have any indication that a tender is within. Tow or more quotation should not be sent in one cover but the quotation against each tender should be sent separately to avoid confusion. Tender should not be addressed to any individual's name but only by designation.

b) 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, amount quoted in words shall prevail.

c) Price should be nett F.O.R. dispatching station inclusive of risk in transit and remain valid for 60 days from the due date.

d) If any sales tax is payable as extra to the quoted price is should be specifically stated in quotations along with CST &TNGST no falling which the purchaser will not be liable for payment of sales tax. Our T.N.G.S.T no 3560005 DT. 01.04.1995 CST no 239383 DT, 11.06.1991

e) No revision of prices will be entertained after tenders are opened.

f) Manufacturer's name trademark or patent no if any should be specified. Illustrative leaflets giving technical particulars are required along with quotation wherever necessary.

g) Products with I.S.I certification marks will be preferred.

h) The purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or full without assigning any reason whatsoever.

2. SAMPLES: Wherever possible sample should be submitted separately whether specifically requested or not so as to reach the purchaser on or before the due date of the enquiry. They should be clearly marked with the enquiry no and the date on the outside cover to facilitate identification.

3. PACKING AND MARKING: The supplier shall arrange for securely protecting and packing the stores to avoid loss or damages during transit.

4. TERMS OF PAYMENT: Payment will be made within 30 days of satisfactory receipt of materials at site. Wherever required by the purchaser, the successful tenderer must send the Operation and Maintenance manuals, Test Certificates, drawings, etc., for the materials ordered. These should be sent immediately after dispatch of the materials and a statement to that effect should be made in the invoice. Failure to comply with this provision will result in delay in payment of the bills. Goods dispatched either by V.P.P or by the document presented through bank will not be accepted unless agreed to by the purchaser.

The duplicate copy of the invoice meant for the transporters should accompany the material as stipulated under C.E. rules 52a and 173 c (or) 57gg. A Photostat copy of the above invoice for each Delivery Chelan should be submitted along with the original bills routed through bank or submitted directly to BHEL finance department.

5. SECURITY DEPOSIT: For purchases over Rs. 5000/- the successful tenderers may be requested to furnish a Bank Guarantee, Security deposit for an appropriate value as may be determined by BHEL

6. LIQUIDATED DAMAGES PENALTY AND INTEREST ON ADVANCES FOR DELAY IN DELIVERY:

If the supplier fails to deliver the raw material equipment components within the period specified in the contract the purchaser shall deduct liquidated damages a sum equivalent to 0.5% of the price for each week of delay up to maximum of 15% of the price of the delayed undelivered goods. In addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advances. If the delay in delivery of a part contributes to delay in execution of total system, LD and interest on advances will be recovered on the total contract price total advance paid.

7. 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 dispatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitutes 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 in clause 6 above.

8. PREFERENTIAL DELIVERY: It should be noted if a contract is placed on a higher tenderer as a result of this invitation to tender in preference to the lowest acceptable offer in consideration of the earlier delivery, the seller will be liable to pay to the purchaser the difference between the contract rate and that of the lowest acceptable tender on the basis of final price F.O.R destination, including all eliminates of freights. Sales tax, duties and other incidents, incidental in case of failure to complete suppliers in terms of such contract within the date of delivery specified in the tender and incorporated in the contract.

9. MODVAT CREDIT: 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 this input material, the effect of Preformed credit should be passed on to the purchaser. Tenderer under "MODVAT" shall be preferred.

10. PURCHASE: Preference will be given to CPSUS as per. Government guidelines.

11. GENERAL: The purchaser reserves the right to split up the tender and place order for individual terms with different tenderers and also increase or decrease the quantity.

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.

IMPORTS ENQUIRY TERMS AND CONDITIONS

1. OFFER:

Offer in ENGLISH LANGUAGE AND IN TRIPLICATE in a SEALED COVER SUPERSCRIBING the enquiry number ad the due date shall be submitted addressed to:

THE MANAGER / PURCHASE / FB
BHARAT HEAVY ELECTRICALS LIMIT ED
HIGH PRESSURE BOILER PLANT
THIRUCHIRAPPALLI – 620 014
TAMIL NADU
INDIA

Offers should be firm for net FOB Nearest Sea Port price and C&F chennai port, indicating the shipping specifications and the earliest delivery inrespectof offers from overseas suppliers. Offers from indigenous sources shall be firm for FOR TIRUCHIRAPPALLI

2. DOCUMENTS:

(1) Offers should be accompanied by detailed technical literature, catalogue and detailed dimensional drawings in ENGLISH and in TRIPLICATE, or otherwise, the offers will not be considered.

(2) Incase overseas suppliers route their offer through their accredited selling agents, a letter of authority should be furnished mentioning
The name and address of their selling agents, who are authorized to bid, negotiate and conclude a contract on their behalf.

3. AGENCY COMMISSION:

(1) In respect of offers from overseas suppliers, agency commission, if any, payable to their agents in India, shall invariable be shown separately in the Performa invoice and this will be paid by us in India, in Indian rupees, on satisfactory completion of the contract.

(2) It overseas principal has any til- up with any third party in respect of agency commission it should be declared while submitting offers.

(3) Copies of current agency agreement / authorization letter in respect of agency commission shall be furnished along with offer, if not made available earlier.

(4) For calculation of rupee equivalent of agency commission, exchange rate as prevailing on the date of order will be taken

4. SPARES:

The tendered should quote separately for spares that are required for two years trouble free operation. The spares offer should accompany the offer of main equipment; otherwise the quotations will be overlooked.

5. VALIDITY:

The offers for main equipment and spares shall be kept open for acceptance for 120 days (one hundred and twenty days) from the date of opening of the tender.

6. TEST CERTIFICATES, OPERATING AND MAINTENANCE MANUALS:

The tenderer shall clearly mention in their offer, that test certificates and operation and maintenance manuals, etc., as called for in the technical specification, in the required number of copies will be provided at no extra cost. If any amount is payable as extra, the same shall be indicated separately in the offer

7. TERMS OF PAYMENT:

In the event of and order the purchaser will arrange for and irrevocable letter of credit against presentation of documents. Under no circumstances confirmed and irrevocable latter of credit will be established by the purchaser.

8. GENERAL:

(1) Preference will be given to suitable indigenous or ex-stock in ported offers, failing which imported offers from incoming consignment against the indigenous supplies “stock and license” will be accepted, if “stock and sale license” is not available with the indigenous suppliers, the same shall be indicated in their offer.

(2) Bank guarantee: the supplier in the event of an order, should furnish a bank guarantee from an approved bank at no extra cost in a Performa which will be supplied to the supplier, along with the order, for an amount equivalent to 10% 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.

9. LD/ PENALTY AND INTEREST ON ADVANCES FOR DELAY IN DELIVERY:

“ If the supplier fails to delivery the raw materials / equipment / components within the period specified in the contract the purchaser shall deduct liquidated damages a sum equivalent to 0.5% of the price for each week of delay upto a maximum of 15% of the price of the delayed / price / total advance paid” goods, in addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advance If the delay in undelivered delivery of a part contributes to delay in execution of total system, LD and interest on advances will be recovered on the total contract