






Form No:	 PE&SD	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY 52 062</b>
		<b>PRODUCT STANDARD</b>	Rev. No. 00
		<b>MSPIPESIS-1239 (PART-1)</b> <b>SEAMLESS/ WELDED</b>	Page 1 of 4

<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	<b>MILD STEEL PIPESIS-1239 (PART-1)</b> <b>SEAMLESS/ WELDED</b> <b>ORDERING SPECIFICATION</b>			
	<b>1.0 GENERAL</b>			
	1.1	The Mild Steel Pipes (Seamless/ Welded) shall conform to the requirements of latest version of Indian Standard IS 1239 (Part – 1) “Specification for Steel Tubes, Tubulars and other Wrought Steel Fittings” and comply with the following additional requirements.		
	1.2	This specification is applicable to MS pipes of size 6 mm NB to 150 mm NB.		
	1.3	These pipes shall be suitable for Plant Air and Service Air applications.		
	<b>2.0 MANUFACTURE:</b>			
	2.1	This specification is applicable for both Seamless and Welded Pipes, to be manufactured as per process specified in Indian Standard IS 1239 (Part-1).		
	2.2	The pipes shall be supplied with Plain Ends.		
	<b>3.0 CHEMICAL COMPOSITION:</b>			
	Shall be as per the requirements of Indian Standard IS 1239 (Part-1).			
<b>4.0 CONDITIONS OF DELIVERY:</b>				
The pipes supplied shall meet all the requirements of IS-1239 (PART 1)				
<b>5.0 DIMENSIONS AND TOLERANCES:</b>				
5.1	Pipe Size (NB) and Wall Thickness shall be as per BHEL order.			
5.2	Dimensions and Tolerances shall be as per Indian Standard IS 1239 (Part-I).			
5.3	Unless otherwise specified, pipes shall be supplied in single random lengths of 5 to 7 meters.			
5.4	Quantity Tolerance shall be 0/ +1 random length. No negative quantity tolerance is accepted.			
<b>6.0 DESIGNATION:</b>				
Eg. PIPE(WELDED) NB50 HVY MSIS 1239.				
<b>7.0 TESTING REQUIREMENTS:</b>				
All the applicable tests as per the requirements of National Standard IS 1239 (Part-I) shall be carried out successfully.				
<b>8.0 INSPECTION REQUIREMENTS:</b>				

Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
	PROJECT ENGINEERING & SYSTEMS DIVISION	 G SRIKANTH	 G SRIKANTH	 VVSSUNDAR	12.03.15

Form No:	 PE&SD	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY 52 062</b>
		<b>TECHNICAL SPECIFICATION</b>	Rev. No. 00
		<b>MSPIPESIS-1239 (PART-1)</b> <b>SEAMLESS/ WELDED</b>	Page 2 of 4

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BHEL's representative shall have free access at all times to all parts of the manufacture's works, until the work on the contract of BHEL is being performed. The manufacturer shall offer BHEL's representative all reasonable facilities, without charge, to satisfy the latter that the material is being furnished in accordance with the specification.

**9.0 TEST SAMPLES:**

All tubes bearing the same designation and manufactured under a single process shall be grouped together to constitute a lot.  
 Each lot shall be sampled separately in accordance with IS: 4711.

**10.0 TEST CERTIFICATES:**

Three copies of test certificates shall be supplied, unless otherwise stated on the order. In addition, to the above, the supplier shall ensure to enclose one copy of the test certificate along with their dispatch documents to facilitate quick clearance of the material. The test certificate shall bear the following information:

**PY 52062:** Rev. No. 00: IS1239 (part1) pipes

BHEL order No:

Supplier's Reference:

Name:

Identification No:

Melt No:

Results of Tests: Results of Chemical, Mechanical tests and Hydraulic/ Eddy Current test

**11.0 PACKING AND MARKING:**

Each tube shall be plugged at both ends by means of tight fitting end caps.

The tubes shall be suitably packed in bundles/ packages to prevent corrosion and damage during transit. Each bundle/ package shall bear the following information:


**PY 52062:** IS1239 (part1) pipes

BHEL Order No:

Consignment/ Identification No:

Nominal bore, Outside Diameter and Wall Thickness:


Supplier's Name:

Form No:	 PE&SD	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY 52 062</b>
		<b>TECHNICAL SPECIFICATION</b>	Rev. No. 00
		<b>MSPIPESIS-1239 (PART-1)</b> <b>SEAMLESS/ WELDED</b>	Page 3 of 4



**12.0 TECHNICAL DELIVERY CONDITIONS:**

For all the requirements not listed in this specification, BHEL Corporate Standard **AA0490001** shall be referred

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		<b>TECHNICAL SPECIFICATION</b>	Rev. No. 00
		<b>MSPIS-1239 (PART-1)</b> <b>SEAMLESS/ WELDED</b>	Page 4 of 4

**RECORD OF REVISIONS:**

Rev No	Date	Revision Detail	Revised by	Approved by
00	12.03.2015	FIRST ISSUE	 GKALYAN	 SRIKANTH G

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Form No:	 <b>PE&amp;SD</b>	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY 52 080</b>
		<b>PRODUCT STANDARD</b>	Rev. No. 00
		<b>MILD STEEL PIPES IS-3589</b> <b>SEAMLESS/WELDED</b>	Page 1 of 3

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**MILD STEEL PIPES IS-3589**  
**SEAMLESS / WELDED**  
**ORDERING SPECIFICATION**

**1.0 GENERAL**

- 1.1 The Mild Steel (MS) Pipes (Seamless/Welded) supplied according to this standard shall conform to the requirements of latest version of Indian Standard IS 3589 "Specification for Steel Pipes for Water and Sewage" and comply with the following additional requirements.
- 1.2 This specification is applicable to MS pipes of outside diameter from 168.3mm to 2540mm.
- 1.3 These pipes shall be suitable Water & Sewage applications.

**2.0 MANUFACTURE:**

- 2.1 This specification is applicable for both Seamless and Welded Pipes, to be manufactured as per process specified in Indian Standard IS-3589.
- 2.2 The method of manufacture (Seamless / Welded) shall be as per BHEL order. Welded Pipes can be manufactured from either of the Processes ERW or SAW.
- 2.3 The applicable grade of steel (Fe330/Fe410/Fe450) shall be as per BHEL order.
- 2.4 The pipes shall be supplied with Bevel Ends.

**3.0 CHEMICAL COMPOSITION:**

Shall be as per the requirements of Indian Standard IS-3589.

**4.0 CONDITIONS OF DELIVERY:**

The pipes supplied shall meet all the requirements of IS-3589.

**5.0 DIMENSIONS AND TOLERANCES:**

- 5.1 Pipe outside diameter and Wall Thickness shall be as per BHEL order and they shall be specified in "mm" unless otherwise indicated.
- 5.2 Dimensions and Tolerances shall be as per Indian Standard IS 3589.
- 5.3 Unless otherwise specified, pipes shall be supplied in single random lengths of 5 to 7 meters.
- 5.4 Quantity Tolerance shall be 0/+1 random length. No negative quantity tolerance is accepted.



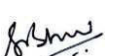
**6.0 DESIGNATION:**


A welded steel pipe of OD 219.1 mm, wall thickness of 6.3 mm and of grade Fe410, shall be designated as:

*PIPE (WELDED) MS 219.1 X 6.3 IS3589FE410.*

**7.0 TESTING REQUIREMENTS:**

All the applicable tests as per the requirements of National Standard IS3589 shall be carried out successfully.

Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
	PROJECT ENGINEERING & SYSTEMS DIVISION	 G KALYAN	 SRIKANTH G	 S B RAO	29.06.15

Form No:	 PE&SD	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> <b>PROJECT ENGINEERING &amp; SYSTEMS DIVISION</b>	<b>PY 52 080</b>
		<b>TECHNICAL SPECIFICATION</b>	Rev. No. 00
		<b>CARBON STEEL PIPES IS-3589</b> <b>SEAMLESS/WELDED</b>	Page 2 of 3

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**8.0 INSPECTION REQUIREMENTS:**

BHEL's representative shall have free access at all times to all parts of the manufacture's works, until the work on the contract of BHEL is being performed. The manufacturer shall offer BHEL's representative all reasonable facilities, without charge, to satisfy the latter that the material is being furnished in accordance with the specification.

**9.0 TEST SAMPLES:**

All Pipes bearing the same designation and manufactured under a single process shall be grouped together to constitute a lot.

Each lot shall be sampled separately in accordance with IS: 4711.

**10.0 TEST CERTIFICATES:**

Three copies of test certificates shall be supplied, unless otherwise stated on the order. In addition, to the above, the supplier shall ensure to enclose one copy of the test certificate along with their dispatch documents to facilitate quick clearance of the material. The test certificate shall bear the following information:

PY52080: MILD STEEL PIPES IS-3589

BHEL order No:

Supplier's Reference:

Name:

Identification No:

Melt No:

Results of Tests:

Results of Dimensional inspection.

Results of chemical analysis and mechanical & hydraulic tests.

**11.0 PACKING AND MARKING:**

Each pipe shall be plugged at both ends by means of tight fitting end caps. The pipes shall be suitably packed in bundles/packages to prevent corrosion and damage during transit. Each bundle/package shall bear the following information:

PY52080: MILD STEEL PIPES IS-3589

BHEL Order No:

Consignment/Identification No:

Nominal bore, Outside Diameter and Wall Thickness:

Supplier's Name:

**12.0 TECHNICAL DELIVERY CONDITIONS:**

For all the requirements not listed in this specification, BHEL Corporate Standard **AA0490001** shall be referred.

Form No:



**BHARAT HEAVY ELECTRICALS LIMITED  
PROJECT ENGINEERING & SYSTEMS DIVISION**

**PY 52 080**

**TECHNICAL SPECIFICATION**

Rev. No. 00

**CARBON STEEL PIPES IS-3589  
SEAMLESS/WELDED**

Page 3 of 3

**RECORD OF REVISIONS:**

Rev No	Date	Revision Detail	Revised by	Approved by
00	29.06.2015	FIRST ISSUE	 G KALYAN	 SRIKANTH G

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TD-201

Rev No. 00

Form No.



**PRODUCT STANDARD**  
PROJECT ENGINEERING & SYSTEMS DIVISION  
HYDERABAD

ANNEXURE - to  
PY 52062

Rev No. 00

Page 1 of 3

## QAP GUIDELINES & FORMAT

( ANNEXURE - TO PY 52062 )


The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement.


**Note :**

1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval.
2. No deviation to reference document is acceptable.

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Form No.	 <b>HYDERABAD</b>	<b>PRODUCT STANDARD</b> PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE - to PY 52062 Rev No. 00 Page 2 of 3
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<b><u>GUIDELINES TO VENDORS FOR          PREPARATION OF QUALITY ASSURANCE PLAN</u></b>		
	Ref. Doc	<ol style="list-style-type: none"> <li>1. QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10.</li> <li>2. Each page of QAP shall contain the following information.           <ol style="list-style-type: none"> <li>a) Vendor's name &amp; address.</li> <li>b) Customer: BHEL, Hyderabad.</li> <li>c) Project.</li> <li>d) BHEL Product Standard Number/revision number as referred in P.O.</li> <li>e) BHEL Purchase Order Number &amp; Date.</li> <li>f) Product as per P.O. description.</li> <li>g) QAP Number (unique and shall not repeat)/revision number/date.</li> <li>h) Page number and number of pages</li> </ol> </li> <li>3. QAP shall contain four parts / stages as follows.           <ol style="list-style-type: none"> <li>a) Raw materials and bought out items.</li> <li>b) In process Control / Inspection.</li> <li>c) Final assembly, Inspection &amp; Testing.</li> <li>d) Painting, preservation &amp; packing.</li> </ol> </li> <li>4. Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc).</li> <li>5. Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT,DP etc.), hydrostatic test, calibration check etc.)</li> <li>6. Under 'Class', indicate minor, major or critical depending on the importance of characteristic.</li> <li>7. Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.)</li> <li>8. Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.)</li> <li>9. Under 'Reference document' and 'Acceptance norms', appropriate National &amp; International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review &amp; approval by our Engineering dept.</li> <li>10. Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc.</li> <li>11. Please refer 'Agency' in QAP format.            Under P: Perform, W: Witness, V: Verify            Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR            2: (Vendor / Sub vendor)</li> </ol>	

Form No.	 <b>HYDERABAD</b>	<b>PRODUCT STANDARD</b> PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE - to PY 52062 <hr/> Rev No. 00 <hr/> Page 3 of 3
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, Under Witness (W) column use 1. Under 'Verify' column, use code 1.</p> <p>12. Under 'D' please put ( <input type="checkbox"/> Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification.</p> <p>13. Vendor's signature &amp; stamp should be available on each page of QAP.</p> <p>14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification &amp; Approved Drawings.</p> <p>15. The following operations/characteristics/check points may be included (AS APPROPRIATE)</p> <ol style="list-style-type: none"> <li>a) Visual check</li> <li>b) Dimensional check</li> <li>c) Mechanical and Chemical properties.</li> <li>d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.)</li> <li>e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc.</li> <li>f) Check for correctness for all components mounted as per General arrangement Drawing, Bill Of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc.</li> <li>g) Verification of test certificate for protection class for the enclosures.</li> <li>h) Mechanical functioning of switches.</li> <li>i) Continuity of earthing and provision of earth points.</li> <li>j) Colour coding of wiring, size, tightness &amp; dressing of wiring.</li> <li>k) Review of test certificates of assembled items, raw materials, internal test reports etc.</li> <li>l) Witness of functional checks, which may include mechanical run &amp; electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc.</li> <li>m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc.</li> <li>n) Material identification ( for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.)</li> <li>o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non Destructive Tests.</li> <li>p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating)</li> <li>q) All tests as per BHEL Product Standard &amp; approved drawings including Type tests and Routine tests on individual items and on System as a whole.</li> <li>r) Packing and Preservation.</li> </ol> <p>16. <b>QAP Format enclosed.</b></p> <p>17. <b>Typical Manufacturing QAP(s) is /are attached.</b></p>		
Ref. Doc			

VENDOR'S NAME & ADDRESS:		<b>MANUFACTURING QUALITY PLAN</b>							QP. NO.:				
		CUSTOMER: BHEL, HYDERABAD – 32.			BHEL P.O.NO.:			REV NO:	DATE:				
		PROJECT:			P.O.DATE:			PAGE 1 OF 1					
		PRODUCT:			BHEL SPEC:			REV:					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
<b>1.0</b>	<b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b>												
<b>2.0</b>	<b>INPROCESS INSPECTION</b>												
<b>3.0</b>	<b>FINAL INSPECTION &amp; TESTING</b>												
<b>4.0</b>	<b>PRESERVATION &amp; PACKING</b>												

**VENDOR TO NOTE:** THIS FORMAT IS IN MICROSOFT WORD. HEADER & FOOTER SHALL BE AVAILABLE IN EACH PAGE OF QP. QP SHALL BE IN LANDSCAPE & A4 SIZE ONLY. FONT SIZE SHALL BE MIN 10. VENDOR SHALL SIGN & STAMP IN EACH PAGE OF QP. LOI REF. & DATE ARE NOT ACCEPTABLE. P.O.NO. & DATE SHALL BE INDICATED. QP NO. SHOULD BE UNIQUE AND SHALL NOT REPEAT. ALL THE TESTS / CHECKS INDICATED IN THE BHEL SPEC. SHALL BE INDICATED IN THE QP.

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY	APPROVED BY	APPROVED BY
	VENDOR'S SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP



**TYPICAL MANUFACTURING QUALITY PLAN**

MQP. NO.:

PROJECT ENGINEERING & SYSTEMS  
DIVISION BHEL,  
RC PURAM, HYD-502032

PROJECT:  
PACKAGE: **PIPES**  
BHEL TECH SPEC:

REV NO:

DATE:

PAGE 1 OF 6

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	

<b>1.0</b>	<b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b>												
	Raw Material (Mother Hollow, Billets etc.)	Mechanical & Chemical Properties	Major	Mech., Chem. Analysis	One per Lot/Batch /Heat	BHEL Spec	BHEL Spec	MTC	√	2		1	
<b>2.0</b>	<b>INPROCESS INSPECTION</b>												
		Heat Treatment	Major	TC Review	One per Lot/Batch /Heat	BHEL Spec	BHEL Spec	TC, HT Chart	√	2	2	1	
		WPS, PQR, WPQ*	Major	Doc. Review	100%	BHEL Spec	BHEL Spec	WPS,PQR, WPQ	--	2		1	*for Welded pipes
		NDE*	Critical	RT/UT /LP	As per BHEL Spec	BHEL Spec	BHEL Spec	NDE Reports	√	2		1	*as applicable
<b>3.0</b>	<b>FINAL INSPECTION &amp; TESTING</b>												
	PIPES	Mechanical Analysis (UTS, YS, EL, BEND/Flattening)	Major	Mech. Analysis	One per Lot/Batch /Heat	BHEL Spec	BHEL Spec	MTC	√	2		1	
		Chemical Analysis	Major	Chem. Analysis	One per Lot/Batch /Heat	BHEL Spec	BHEL Spec	MTC	√	2		1	
		Dimensional (OD, ID, Length, Thickness, Edge preparation, Straightness, etc.)	Critical	Measurement	100%	BHEL Spec	BHEL Spec	TC	√	2	1		10% Witness by BHEL/BHEL's TPIA
		Hydrostatic Test/ Eddy Current test/ Ultrasonic test	Critical	Hydro Test ET/UT	100%	BHEL Spec	BHEL Spec	TC	√	2		1	10% Witness by BHEL/BHEL's TPIA
		IBR Certificate*	Critical	TC Review	100%	BHEL Spec	BHEL Spec	TC	√	2		1	*If applicable
		PMI*	Critical	PMI test	Random	BHEL Spec	BHEL Spec	TC	√	2	1		*If applicable

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED √ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

SL NO		COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
											P	W	V	
			Galvanizing (Coating weight, uniformity, Adherence)	Critical	Strip test, Preece test, Bend/ Pivot hammer test	Random	BHEL Spec	BHEL Spec	TC	√	2	1		*for G.I Pipe
<b>4.0</b>	<b>PRESERVATION &amp; PACKING</b>													
			Painting*, (Shade, DFT Check) Marking	Major	Visual, Measurement	Random	BHEL Spec	BHEL Spec	TC	√	2	1		*if applicable
			Packing*	Major	Visual	Random	BHEL Spec	BHEL Spec	Packing List	√	2		1	

**Abbreviations:-**

MTC	-	Material Test certificate	WPS	-	Welding Procedure Specification
IBR	-	Indian Boiler Regulations	PQR	-	Procedure Qualification Record
DFT	-	Dry Film Thickness	WPQ	-	Welder Performance Qualification
TC	-	Test Certificate	NDE	-	Non Destructive Examination
IS	-	Indian Standards	UTS	-	Ultimate Tensile Strength
Appd.			YS	-	Yield Strength
Dwg.	-	Approved Drawing	EL.	-	Elongation
PMI	-	Positive Material Identification	OD	-	Outer Diameter
G.I	-	Galvanized Iron	ID	-	Internal Diameter

**NOTE:**

1. This standard MQP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Drawing/data sheet shall prevail over quality plan for contradiction if any between quality plan and drawing/specification.
3. All test certificates/reports reviewed and certified by TPI/BHEL shall be submitted to BHEL as documentation package.
4. All type test reports submitted shall not be older than 5 yrs from the date of purchase order.
5. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

TD-201

Rev No. 00

Form No.



**PRODUCT STANDARD**  
PROJECT ENGINEERING & SYSTEMS DIVISION  
HYDERABAD

ANNEXURE - to  
PY 52080

Rev No. 00

Page 1 of 3

## QAP GUIDELINES & FORMAT

( ANNEXURE - TO PY 52080 )


The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement.


**Note :**

1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval.
2. No deviation to reference document is acceptable.

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Form No.	 <b>HYDERABAD</b>	<b>PRODUCT STANDARD</b> PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE - to PY 52080 Rev No. 00 Page 2 of 3
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<b><u>GUIDELINES TO VENDORS FOR          PREPARATION OF QUALITY ASSURANCE PLAN</u></b>		
	Ref. Doc	<ol style="list-style-type: none"> <li>1. QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10.</li> <li>2. Each page of QAP shall contain the following information.             <ol style="list-style-type: none"> <li>a) Vendor's name &amp; address.</li> <li>b) Customer: BHEL, Hyderabad.</li> <li>c) Project.</li> <li>d) BHEL Product Standard Number/revision number as referred in P.O.</li> <li>e) BHEL Purchase Order Number &amp; Date.</li> <li>f) Product as per P.O. description.</li> <li>g) QAP Number (unique and shall not repeat)/revision number/date.</li> <li>h) Page number and number of pages</li> </ol> </li> <li>3. QAP shall contain four parts / stages as follows.             <ol style="list-style-type: none"> <li>a) Raw materials and bought out items.</li> <li>b) In process Control / Inspection.</li> <li>c) Final assembly, Inspection &amp; Testing.</li> <li>d) Painting, preservation &amp; packing.</li> </ol> </li> <li>4. Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc).</li> <li>5. Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT,DP etc.), hydrostatic test, calibration check etc.)</li> <li>6. Under 'Class', indicate minor, major or critical depending on the importance of characteristic.</li> <li>7. Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.)</li> <li>8. Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.)</li> <li>9. Under 'Reference document' and 'Acceptance norms', appropriate National &amp; International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review &amp; approval by our Engineering dept.</li> <li>10. Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc.</li> <li>11. Please refer 'Agency' in QAP format.            Under P: Perform, W: Witness, V: Verify            Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR            2: (Vendor / Sub vendor)</li> </ol>	

Form No.	 <b>HYDERABAD</b>	<b>PRODUCT STANDARD</b> PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE - to PY 52080 <hr/> Rev No. 00 <hr/> Page 3 of 3
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, Under Witness (W) column use 1. Under 'Verify' column, use code 1.</p> <p>12. Under 'D' please put ( <input type="checkbox"/> Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification.</p> <p>13. Vendor's signature &amp; stamp should be available on each page of QAP.</p> <p>14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification &amp; Approved Drawings.</p> <p>15. The following operations/characteristics/check points may be included (AS APPROPRIATE)</p> <ol style="list-style-type: none"> <li>a) Visual check</li> <li>b) Dimensional check</li> <li>c) Mechanical and Chemical properties.</li> <li>d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.)</li> <li>e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc.</li> <li>f) Check for correctness for all components mounted as per General arrangement Drawing, Bill Of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc.</li> <li>g) Verification of test certificate for protection class for the enclosures.</li> <li>h) Mechanical functioning of switches.</li> <li>i) Continuity of earthing and provision of earth points.</li> <li>j) Colour coding of wiring, size, tightness &amp; dressing of wiring.</li> <li>k) Review of test certificates of assembled items, raw materials, internal test reports etc.</li> <li>l) Witness of functional checks, which may include mechanical run &amp; electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc.</li> <li>m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc.</li> <li>n) Material identification ( for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.)</li> <li>o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non Destructive Tests.</li> <li>p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating)</li> <li>q) All tests as per BHEL Product Standard &amp; approved drawings including Type tests and Routine tests on individual items and on System as a whole.</li> <li>r) Packing and Preservation.</li> </ol> <p>16. <b>QAP Format enclosed.</b></p> <p>17. <b>Typical Manufacturing QAP(s) is /are attached.</b></p>		
Ref. Doc			





**TYPICAL MANUFACTURING QUALITY PLAN**

MQP. NO.:

PROJECT ENGINEERING & SYSTEMS  
DIVISION BHEL,  
RC PURAM, HYD-502032

PROJECT:  
PACKAGE: **PIPES**  
BHEL TECH SPEC:

REV NO:

DATE:

PAGE 1 OF 6

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	

<b>1.0</b>	<b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b>												
	Raw Material (Mother Hollow, Billets etc.)	Mechanical & Chemical Properties	Major	Mech., Chem. Analysis	One per Lot/Batch /Heat	BHEL Spec	BHEL Spec	MTC	√	2		1	
<b>2.0</b>	<b>INPROCESS INSPECTION</b>												
		Heat Treatment	Major	TC Review	One per Lot/Batch /Heat	BHEL Spec	BHEL Spec	TC, HT Chart	√	2	2	1	
		WPS, PQR, WPQ*	Major	Doc. Review	100%	BHEL Spec	BHEL Spec	WPS,PQR, WPQ	--	2		1	*for Welded pipes
		NDE*	Critical	RT/UT /LP	As per BHEL Spec	BHEL Spec	BHEL Spec	NDE Reports	√	2		1	*as applicable
<b>3.0</b>	<b>FINAL INSPECTION &amp; TESTING</b>												
	PIPES	Mechanical Analysis (UTS, YS, EL, BEND/Flattening)	Major	Mech. Analysis	One per Lot/Batch /Heat	BHEL Spec	BHEL Spec	MTC	√	2		1	
		Chemical Analysis	Major	Chem. Analysis	One per Lot/Batch /Heat	BHEL Spec	BHEL Spec	MTC	√	2		1	
		Dimensional (OD, ID, Length, Thickness, Edge preparation, Straightness, etc.)	Critical	Measurement	100%	BHEL Spec	BHEL Spec	TC	√	2	1		10% Witness by BHEL/BHEL's TPIA
		Hydrostatic Test/ Eddy Current test/ Ultrasonic test	Critical	Hydro Test ET/UT	100%	BHEL Spec	BHEL Spec	TC	√	2		1	10% Witness by BHEL/BHEL's TPIA
		IBR Certificate*	Critical	TC Review	100%	BHEL Spec	BHEL Spec	TC	√	2		1	*If applicable
		PMI*	Critical	PMI test	Random	BHEL Spec	BHEL Spec	TC	√	2	1		*If applicable

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED √ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

SL NO		COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
											P	W	V	
			Galvanizing (Coating weight, uniformity, Adherence)	Critical	Strip test, Preece test, Bend/ Pivot hammer test	Random	BHEL Spec	BHEL Spec	TC	√	2	1		*for G.I Pipe
<b>4.0</b>	<b>PRESERVATION &amp; PACKING</b>													
			Painting*, (Shade, DFT Check) Marking	Major	Visual, Measurement	Random	BHEL Spec	BHEL Spec	TC	√	2	1		*if applicable
			Packing*	Major	Visual	Random	BHEL Spec	BHEL Spec	Packing List	√	2		1	

**Abbreviations:-**

MTC	-	Material Test certificate	WPS	-	Welding Procedure Specification
IBR	-	Indian Boiler Regulations	PQR	-	Procedure Qualification Record
DFT	-	Dry Film Thickness	WPQ	-	Welder Performance Qualification
TC	-	Test Certificate	NDE	-	Non Destructive Examination
IS	-	Indian Standards	UTS	-	Ultimate Tensile Strength
Appd.			YS	-	Yield Strength
Dwg.	-	Approved Drawing	EL.	-	Elongation
PMI	-	Positive Material Identification	OD	-	Outer Diameter
G.I	-	Galvanized Iron	ID	-	Internal Diameter

**NOTE:**

1. This standard MQP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Drawing/data sheet shall prevail over quality plan for contradiction if any between quality plan and drawing/specification.
3. All test certificates/reports reviewed and certified by TPI/BHEL shall be submitted to BHEL as documentation package.
4. All type test reports submitted shall not be older than 5 yrs from the date of purchase order.
5. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.



# CORPORATE STANDARD

AA 049 00 01

Rev. No. 04

PAGE 1 OF 3

## PROCEDURE FOR MARKING AND PACKING OF SEAMLESS STEEL TUBES & PIPES

### 1.0 SCOPE

This standard specifies the requirements for marking and packing of seamless steel tubes and pipes.

### 2.0 MARKING

Sl. No.	Particulars	Upto & incl. 33.4 OD and thickness < 6 mm	Above 33.4 and up to & incl. 114.3 OD and thickness < 6 mm	Other sizes and thickness not covered in columns. (3) & (4)
(1)	(2)	(3)	(4)	(5)

#### I. DETAILS TO BE IDENTIFIED

1.	Purchase order No.	1 to 7 to be stamped	2,3,4 & 5 only to	3, 4, & 7 to be hard
2.	Marker's emblem	on aluminium metal	be paint stenciled	stamped on the
3.	Specn.No.& grade	tag and securely	on each tube.	body of pipes 2, 5
4.	Melt Number	attached to each	1 to 7 to be stamped	and 7 to be paint
5.	Size (OD X TK X length)	bundle	on aluminium metal	stenciled on the
6.	No. of tubes/pipes		tag and securely	pipes. (Alternatively
7.	Inspector's seal		attached to each	paint stenciled is
			bundle.	permitted on mutual
				agreement for 3, 4
				& 7 only)

II	<b>COLOUR CODING:</b>	Circumferentially/ Longitudinally	Circumferentially/ Longitudinally	Circumferentially/ Longitudinally
----	-----------------------	--------------------------------------	--------------------------------------	--------------------------------------

**Note:** If specified on order, the colour code on pipes and tubes shall be as per Annexure - I

- 2.1** Stamping shall be done at about 100mm from the ends of the pipe with rounded letters and depth of stamping shall not exceed 0.5 mm.
- 2.2** Stainless steel tubes/pipes shall be paint stenciled only and the paint shall be free from corrosion promoting agents like sulphur and chlorine.
- 2.3** Marking shall be legibly done in ENGLISH language only, preferably with a stencil of 20 mm.

Revisions :  
Cl. 27.6.2 of MRC – FCF+HTM

APPROVED :  
INTERPLANT RATIONALIZATION  
COMMITTEE-MRC (FCF+HTM)

Rev. No. 04

Amd.No.

Reaffirmed

Prepared  
HYDERABAD

Issued  
Corp. R&D

Dt. of 1st Issue  
JUNE, 1978

Dt: 15.11.2002

Dt :

Year :



### 3.0 PRESERVATION

- 3.1 All painted details shall be protected with one coat of transparent rust preventive.
- 3.2 Other than stainless steel, all tubes and pipes shall be applied with rust preventive coating on the outside and either with a rust preventive coating or rust inhibitor on the inside **to provide protection against corrosion for a period of 3 months for out door storage in marine / industrial atmospheres.** For heat exchanger tubes, rust preventive coating shall given dry or wet type as specified in BHEL order.
- 3.3 The ends of the tubes/pipes shall be closed with end caps made of PVC /plastic which should be securely held so that it will not fall off during transit.

**Note:** The supplier must specify the type of rust preventive at the time of supply and also the method of its easy removal.

### 4.0 PACKING

- 4.1 a) Tubes and pipes upto and including 33.4 mm OD and smaller shall be supplied in bundles.  
b) Tubes and pipes above 33.4 to 114.3 OD shall also be supplied in bundles, whenever the wall thickness is less than 6.0 mm.  
c) Tubes and pipes of OD above 33.4 mm and wall thickness above 6.0 mm shall be supplied loose.
- 4.2 a) Weight of each bundle shall not exceed 1 metric ton.  
b) No wooden pellets should be used to cover the tubes.  
c) The bundle must be fastened by using galvanized wire / metal straps.  
d) Two straps must be fastened one at each end of the bundle at one metre from the ends. For the balance length, there shall be a wire bundling at reasonable intervals.
- 4.3 All the tubes of wall thickness 3.2 mm and below shall be properly packed in wooden crates to avoid any dent formation and other transit damages to the tubes.
- 4.4 A packing list, sealed in a thick polythene cover, shall be sent along with each consignment with the following details:
1. BHEL order number:
  2. Number of bundles (including serial number also):
  3. Material specification No. and grade:
  4. Size of tube/pipe
  5. Customer's Name



# CORPORATE STANDARD

AA 049 00 01

Rev. No. 04

PAGE 3 OF 3

## COLOUR CODES FOR TUBES AND PIPES

## ANNEXURE - I

Specification	Colour - 1	Colour - 2	Colour - 3
13 x 1 MF	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 3602 PART 1 CDS 360	ALUMINIUM	BLACK	BLUE
NFA 49 - 213 42 C	ALUMINIUM	BLUE	BROWN
NFA49 - 213 TU 10 CD 9.10	ALUMINIUM	BLUE	RED
NFA49 - 213 TU 15 CD 2.05	ALUMINIUM	BLUE	GREEN
NFA49 - 213 TU Z10 CD 9	ALUMINIUM	BLUE	YELLOW
NFA49 - 213 TU Z10C VNSB 09.01	ALUMINIUM	GREEN	RED
SA 106 Gr. B	RED	-	-
SA 106 Gr. C	BLUE	-	-
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	GREEN	-
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. T5	BLACK	BROWN	GREEN
SA 213 Gr. T9	BROWN	WHITE	-
SA 213 Gr. T91	GREEN	YELLOW	-
SA 213 Gr. TP 304	BLUE	GREEN	YELLOW
SA 213 Gr. TP 304 H	BLACK	BLUE	YELLOW
SA 213 Gr. TP 304 L	BLUE	WHITE	YELLOW
SA 213 Gr. TP 304 M	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	-
SA 268 Gr. TP 405	ALUMINIUM	GREEN	-
SA 268 Gr. TP 410	BROWN	RED	YELLOW
SA 268 Gr. TP 443	BLUE	GREEN	WHITE
SA 269 TP 315	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 304L	BLACK	BLUE	BROWN
SA 312 Gr. TP 321	BLUE	BROWN	-
SA 312 Gr. TP 3347	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. P5	BLACK	BROWN	-
SA 335 Gr. P29	ALUMINIUM	BROWN	-
SA 335 Gr. P291	BROWN	RED	-
SB 163 Incono1	BLACK	GREEN	YELLOW
ST 35.4	ALUMINIUM	BLUE	-
STEEL 20	GREEN	-	-
Structural Tubes & Pipes	BLUE	BROWN	WHITE
X20 Cr Mo V 121	BLACK	-	-

**ANNEXURE-1**  
**PRICE BID FORM AT FOR PIPES**

Document No: Pipes/Kothagudem/001  
Rev No: 0  
Date: 03.11.2015

**PROJECT: 1X800 M W TSGENCO KOTHAGUDEM TELENGANA**  
**SPEC NO: PY 52062 Rev00 & PY 52080 Rev00**

S.NO	MATERIAL CODE	PIPE SIZE	OD ( max ) X Thickness in mm	APPLICABLE STANDARD	DESCRIPTION	MATERIAL	LENGTH IN 'Meters'	UNIT RATE	TOTAL AM T
1	PY9752062067	80 NB	As Per Standard	IS-1239 Part-I, Heavy Grade	Welded	MSPipe	300		
2	PY9752062075	100 NB	As Per Standard	IS-1239 Part-I, Heavy Grade	Welded	MSPipe	516		
3	PY9752062083	150 NB	As Per Standard	IS-1239 Part-I, Heavy Grade	Welded	MSPipe	1920		
4	PY9752080014	200 NB	219.1 x 6.3	IS-3589, Grade 410	Welded	MSPipe	900		
5	PY9752080022	250 NB	273 x 6.3	IS-3589, Grade 410	Welded	MSPipe	4812		
								<b>GRAND TOTAL</b>	

**Notes:**

- Bidder to note that this is a UNIT ITEM WISE CONTRACT.
- Each of the items i.e. Sl. No. 1, 2, 3, 4, and 5 shall be evaluated separately.
- Bidder to quote strictly as per BHEL's specification requirements. Responsibility of ensuring correctness & completeness of scope of supply as per specification requirement solely lies with bidder.
- Bidder to quote the base rates only. Applicable taxes and duties to be indicated separately.