

Enquiry items along with quantities:

Item. no.	Size & Item description	Technical requirement	Max. Quantity in kg	Quantity in Nos.- (Minimum bars)
1	56 mm Dia X 3000 mm – 6000 mm LG.	Stainless steel round bars as per corporate standard AA10723 Rev08 Straightness within 3 mm / meter. UT to be carried out as per BHEL standard AA0850118 (Acceptance level-2). TC covering all chemical and mechanical properties as per BHEL spec. shall be furnished along with the supply.	6600	--
2	63 mm Dia X 3000 mm – 6000 mm LG.		16500	--
3	100 mm Dia X 3000 mm – 6000 mm LG.		71500	--
4	120 mm Dia X 3000 mm – 6000 mm LG.		7150	--
5	150 mm Dia X 3000 mm – 6000 mm LG.		19800	--
6	200 mm Dia X 1450 mm LG.	Stainless steel round bars to material Spec. AA10723 Rev08. Material shall be supplied in forged, rough machined, hardened and tempered condition duly ultrasonically tested as per AA0850118 rev01 Cat II. Mechanical properties must be as per of bar dia 60-160 mm mentioned in 11.1 clause of AA10723. Straightness within 2 mm/ meter, minimum impact value required is 10 Joule.	12995	33 Nos.
7	210 mm Dia X 1625 mm LG.		9737	20 Nos.
8	230 mm Dia X 1650 mm LG.		32017	54 Nos.
9	260 mm Dia X 1950 mm LG.		10745	12 Nos.
TOTAL			187044 kg	

Quantity variation as per below:

For item 1 - Supplies quantity are to be restricted between 6600 kg & 5400 kg.

For item 2 - Supplies quantity are to be restricted between 16500 kg & 13500 kg.

For item 3 - Supplies quantity are to be restricted between 71500 kg & 58500 kg.

For item 4 - Supplies quantity are to be restricted between 7150 kg & 5850 kg.

For item 5 - Supplies quantity are to be restricted between 19800 kg & 16200 kg.

For item 6 - Supplies quantity are to be restricted between 12995 kg & 10633 kg. - Minimum numbers of 33 bars to be mandatory supplied.

For item 7 - Supplies quantity are to be restricted between 9737 kg & 7967 kg. - Minimum numbers of 20 bars to be mandatory supplied.

For item 8 - Supplies quantity are to be restricted between 32017 kg & 26195 kg. - Minimum numbers of 54 bars to be mandatory supplied.

For item 9 - Supplies quantity are to be restricted between 10745 kg & 8791 kg. - Minimum numbers of 12 bars to be mandatory supplied.

Pre-qualification criteria:

Sl. No.	Description of pre-qualification requirement	Vendor Response	
		Complied (YES / NO)	Supporting Documents required to accept compliance
1	Manufacturer of steel round bar/their authorized representative.		Relevant Certificate of being Manufacturer (for manufacturer not registered with BHEL) / authorization letter with validity (for authorized representative). Firm name and address, email, contact no. etc. from whom bars has been supplied to be furnished.
2	Vendors should have experience of Manufacturing, Material testing & supplying STAINLESS STEEL ROUND BAR (Martensitic Gr:X17 CrNi 16-2, HARDENED & TEMPERED) as per latest standards EN 10088-3 Gr: X 17 Cr Ni 16-2, H&T / AISI 431, Hot Rolled, H&T/ ASTM A276 type 431, H&T, IS 6603, Hot Rolled, H&T or comparable standard as per our requirement, during last 7 years (ending last day of month previous to the one in which NIT is published)		Purchase order, Mill test certificate. In case of authorized dealer required documents of there OEM is also considered.
3	Company shall be certified with ISO 9001 or equivalent. In case of authorized representative, Valid ISO certificate of manufacturer is required.		Valid certificate to be submitted.

Note:

1. BHEL has right to verify information / confirmation furnished by asking additional documents, proof etc.

ALL THE ABOVE POINT WISE PRE-QUALIFICATION REQUIREMENT ARE TO BE NECESSARILY ACCEPTED BY THE BIDDERS FOR THEIR OFFERS TO BE CONSIDERED FAILING WHICH OFFERS SHALL BE REJECTED.

MAKE IN INDIA format (to be filled by OeMs of the participating bidders)

**BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
MATERIAL MANAGEMENT – STEEL DIVISION**

For this Procurement, Government of India Public Procurement (Preference to Make in India), Order 2017 with its amendments and subsequent Orders issued by the respective nodal ministries shall be applicable even if issued after issue of this NIT but before finalization of contract/PO/WO against this NIT.

*As per the Provisions of this order, please submit **a self-certification complying with the conditions below on company letterhead duly signed by competent authority.***

I, hereby declare on behalf of M/s. that we are participating in the Enquiry No. floated by BHEL, Bhopal (MP), India and shall comply with following:

1. Public Procurement (Preference to Make in India), Order 2017 *with its amendments* and subsequent Orders issued by the respective nodal ministries shall be applicable even if issued after issue of this NIT but before finalization of contract/PO/WO against this NIT.

(a) A supplier will be treated as **Class-I Local Suppliers**, if the items quoted by bidder have local content equal to or more than 50%.

(b) '**Local Content**' means the amount of value added in India, which shall be total value of item quoted (excluding net domestic indirect taxes) minus the value of imported content in the item (including all custom duties) as a proportion of the total value, **in percent**.

2. I hereby declare that our firm qualifies as **Class-I Local Suppliers**.

a. The Local Content in the items quoted under this Enquiry is Percent

b. Details of location(s) in India where this value addition shall be done, is/are as follows:

(a)


(b)

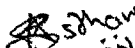
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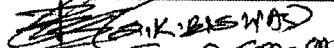
For M/s.

(Seal & Sign)


 Heat Exchanger Group BHEL Bhopal		STANDARD QUALITY ASSURANCE PLAN (SQAP)							QAP No.		CDE-18-3394		
									Revision No.		00		
		ITEM	STAINLESS STEEL BAR TO AA-10723 (Hot Rolled – Hardened & Tempered)							Date of Issue		15.05.2018	
										Page		Page 1 of 2	
S.No.	Components & Operations	Characteristics	Category	Type / Method of Check	Quantum of check	Reference Document	Acceptance Norms	Format of Records	Agency			Remarks	
									1	2	3		
1	2	3	4	5	6	7	8	9	10			11	
1.0 IN PROCESS INSPECTION													
1.1 MATERIAL INSPECTION													
a.	Verification of Co-related Mill Test Certificates - MTCs.	<ul style="list-style-type: none"> Chemical composition (Product Analysis) Mechanical Properties 	Major	Visual	100%	BHEL Specification AA-10723 Rev.08	BHEL Specification AA-10723 Rev.08	MTC	R	R	-	<ul style="list-style-type: none"> Hold point of BHEL-IA See Note-b, c & d 	
b.	Surface Finish	Physical	Minor	Visual	100%	---	---	IR	P	W	-	Bar should be free from any injurious defects.	
a.	Dimensional check	Measurement of Diameter, Length, straightness.	Major	H-Visual	100%	BHEL Specification AA-10723 Rev.08	BHEL Specification AA-10723 Rev.08	IR	P	W	-		
1.2 CHECKING OF FOLLOWING PARAMETERS													
a.	Heat Treatment (in case MTC is silent on the same)	Checking of HT data / Chart	Critical	Visual	100 %	BHEL Specification AA-10723 Rev.08	BHEL Specification AA-10723 Rev.08	IR	P	W	-	<ul style="list-style-type: none"> Calibrated HT furnace need to be used. BHEL-IA to ensure the same while inspection. 	
b.	Ultrasonic Examination	NDT to ensure absence of any volumetric defects	Major	I + Visual	100 %	BHEL Spec. AA-0850118	Cat-2 of BHEL Spec. AA-0850118	IR	P	W	-	<ul style="list-style-type: none"> Calibrated UT meter to be used. UT to be done by ASNT / ASNT Level-II person in UT only. 10% of the offered quantity to be witnessed by BHEL-IA. 	
c.	Impact test (in case MTC is silent on the same)	Toughness of material	Major	I + Visual	100%	BHEL Specification AA-10723 Rev.08	BHEL Specification AA-10723 Rev.08	IR	P	W	-	See Note- b & d also.	
d.	Documentation	Verification of Quality Documents .	Minor	Visual	100%	BHEL Specification AA-10723 Rev.08	BHEL Specification AA-10723 Rev.08	Three (03) sets of all the above documents.	P	R	-	<ul style="list-style-type: none"> Out of three sets, minimum one set shall be in original format. See Note-a 	


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 DE/MA/IN
 CDE


 S.D. G. 1801-00E



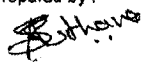
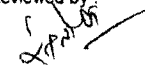
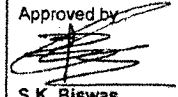

 Heat Exchanger Group BHEL Bhopal		STANDARD QUALITY ASSURANCE PLAN (SQAP)							QAP No.		CDE-18-3394		
									Revision No.		00		
		ITEM	STAINLESS STEEL BAR TO AA-10723 (Hot Rolled – Hardened & Tempered)							Date of Issue		15.05.2018	
										Page		Page 2 of 2	
S.No.	Components & Operations	Characteristics	Category	Type / Method of Check	Quantum of check	Reference Document	Acceptance Norms	Format of Records	Agency			Remarks	
									1	2	3		
1	2	3	4	5	6	7	8	9	10			11	

Approval does not relieve supplier from meeting our requirements as per the drawing / specification.

Note :

- (a) All the inspection report & test certificates shall be part of the final QA Document duly signed and stamped by BHEL-IA. Quantity of set = Three (03) Nos. All reports shall be arranged in sequential manner as per this QAP with proper index sheet at top and same to be submitted to BHEL along-with the supply only. Later submission of these reports are not at all acceptable. BHEL-IA to ensure it while giving final dispatch clearance.
- (b) In the absence of original correlated MTC, material to be tested to ensure both chemical & mechanical properties at Govt. Approved Lab / BHEL TSD / manufacturer's lab having calibrated instruments (duly approved by NABL / NABL appointed agency). Sample for check test shall be drawn in consultation with BHEL-IA from each heat & production lot.
In presence of original co-related MTC : No testing is required, record of the same duly endorsed by BHEL-IA with respect to original one to be furnished. ***In case of spectrometer for chemical testing, calibration by vendor in presence of BHEL-IA using master calibration blocks (as furnished by OEM) is also acceptable.***
- (c) Chemical composition shall comply as specified in Para-9.0 of BHEL-Specification AA-10723 Rev.08 only.
- (d) For mechanical properties, refer Para-11.1 of BHEL-Specification AA-10723 Rev.08. Above 160mm, tensile, yield and elongation value shall be taken same as that of up-to 160mm diameter bar except impact test at room temperature (which need to be ensured as 10 Joules – average of 03 ISO-V Samples).
- (e) All other technical requirements as specified in Spec. AA-10723 Rev.08 need to be ensured.

LEGEND: 1: Supplier, 2: BHEL IA, 3: Customer; P-Perform, W-Witness, R-Record review, MTC : Mill test Certificates, IR : Inspection report, IA : Inspection Agency, I : Instrument to be used for check.

Prepared by :  Sarvesh Asthana Droughtsman - CDE	Reviewed by :  Santosh Mahato Dy. Manager (D) CDE	Approved by :  S.K. Biswas. Sr. Dy. General Manager (D) CDE
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CORPORATE PURCHASE SPECIFICATION

AA 107 23

Rev. No. 08

PAGE 1 OF 4

STAINLESS STEEL BARS (MARTENSITIC), Gr: X17CrNi 16-2, H & T

1.0 GENERAL :

This specification governs the quality requirements of Stainless Steel Bars (Martensitic), Hardened and Tempered.

2.0 APPLICATION :

For general engineering purposes involving stresses under corrosive conditions.

3.0 CONDITION OF DELIVERY :

Hot rolled, hardened and tempered.

For size above 100 mm, forgings in H&T condition are also acceptable.

Bars shall be supplied in the descaled condition.

The ends of bars shall be square and true.

The bars shall be supplied in straight lengths.

4.0 COMPLIANCE WITH NATIONAL STANDARDS :

The material shall comply with the requirements of the following National standard and also meet the requirements of this specification.

EN 10088-3, Gr. X 17 Cr Ni 16 - 2: General Purpose Semi-finished Products, Bars, Rods and Sections

5.0 DIMENSIONS AND TOLERANCES :

5.1 Sizes: The bars shall be supplied to the dimensions specified in BHEL order.

5.1.1 Length:

Unless otherwise specified, hot rolled bars shall be supplied in 3 to 6 metres lengths or in multiples with maximum of 10 per cent, shorts down to 1 metre.

Forged bars shall be supplied in lengths of 1.5 to 3 metres.

5.2 Tolerances:

5.2.1 Hot rolled bars:

The bars shall not vary from specified diameter or distance across flats by more than $\pm 2\frac{1}{2}$ %.

Revisions:

Cl. 31.2.0 of MOM of MRC-S&GPS

APPROVED:

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (S&GPS)

Rev. No. 08

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt:19.3.2008

Dt :

Year: 2013

BHOPAL

Corp. R&D

MAY, 1978

**5.2.2 Forged bars:**

The tolerance on the forged bars shall be as follows:

<u>Diameter, mm</u>	<u>Tolerance, mm</u>
50 to 125	+ 6.0
125 to 175	+ 8.0
175 ---	+ 12.5

Note: (FOR HOT ROLLED & FORGED BARS)

Insignificant surface defects in the form of dent and ripple marks are permissible provided their depth does not exceed half the tolerances on each size.

6.0 MANUFACTURE :

Process used for the manufacture of the bars is left to the discretion of the manufacturer. Bars shall be manufactured from fully killed steel. Sufficient reduction and discard shall be made from each ingot to ensure freedom from pipe, harmful segregation and other defects.

7.0 HEAT TREATMENT :

Following heat treatment cycles are suggested.

- 1) Hardening at : 980-1030°C followed by oil quenching.
- 2) Double tempering at : 640-680°C followed by 590-620°C.

Details of actual heat treatment cycles followed shall be specified in the test certificate.

8.0 FREEDOM FROM DEFECTS:

The bars shall be free from internal and surface defects. Bars shall be free from twists and bends.

9.0 CHEMICAL COMPOSITION :

The melt analysis of steel and the permissible variation in the composition of the material from the melt analysis shall be as follows :

Element	Melt analysis, percent		Permissible variation, percent,
	min.	max.	
Carbon	0.12	0.22	+ 0.01
Silicon	--	1.00	+ 0.05
Manganese	--	1.50	+ 0.03
Nickel	1.50	2.50	+ 0.07
Chromium	15.00	17.00	± 0.20
Sulphur	--	0.030	+ 0.005
Phosphorus	--	0.040	+ 0.005



CORPORATE PURCHASE SPECIFICATION

AA 107 23

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Note: Elements not listed in this table shall not be intentionally added to the steel without the agreement of the purchaser except for finishing the cast. All appropriate precautions are to be taken to avoid the addition of such elements from scrap and other materials used in production which would impair mechanical properties and the suitability of the steel.

10.0 TEST SAMPLES :

The test samples shall be selected as per EN 10088-3.

11.0 MECHANICAL PROPERTIES :

11.1 Tensile and impact:

The test samples when heat treated and tested in longitudinal direction in accordance with IS : 1608 or any other reputed equivalent International Standard shall show the following properties:

Ruling section, mm	Tensile strength, N/mm ²	Yield strength, min. N/mm ²	Percent Elongation, min	Impact Strength* at Room Temp.
Upto 60mm (Inclusive)	900-1050	700	12	20
Above 60 mm to 160 mm	900-1050	700	10	15

* (Average of 3 ISO-V samples in Joules).


The above properties are valid for ruling section upto and including 160 mm. The mechanical properties required for sizes above 160 mm shall be as per mutual agreement between BHEL and manufacturer.

12.0 ULTRASONIC TEST:

12.1 Each bar above 100 mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects. The norms of acceptance shall be as per category 2 of the above standard.

12.2 Optional tests:

If specified in order, each bar > 40 to 100mm shall be tested ultrasonically in accordance with BHEL standard AA 085 01 18 to ensure freedom from internal defects and the norms of acceptance shall be as per category 2.

AA 107 23	CORPORATE PURCHASE SPECIFICATION	
Rev. No. 08		
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13.0 TEST CERTIFICATES :
Three copies of test certificates shall be supplied, unless otherwise stated in the order. In addition, the supplier shall ensure to enclose one copy of the test certificate along with their despatch documents to facilitate quick clearance of the material. The test certificate shall bear the following information:

BHEL References :

AA 10723 Rev. No.08: Stainless Steel Bars, Gr.X17CrNi 16-2 – H&T.
BHEL Order No.

Supplier's References :
Name
Identification No.
Melt No.

Details of heat treatment followed.

Result of Tests:
Dimensional inspection.
Results of chemical analysis, mechanical tests and ultrasonic test called for in this specification.

14.0 PACKING AND MARKING:

The material shall be suitably packed in bundles-Hessian wrapped-to prevent sagging and damage during transit.

Each bar/flat 50 mm in diameter/width across flats shall be stamped with 'AA 107 23', melt No., BHEL order No., at one end or on the end face.

Bars/flat upto and including 50 mm in diameter/width across flats shall be bundled together and tied with wire at 3 to 4 places along the length of the bars.

A metal label shall be securely attached to each bundle and shall bear the following information

AA107 23: Stainless steel bars Gr: X17CrNi 16-2, H&T
BHEL Order No.
Consignment/Identification No.
Melt No.
Size and Weight.
Supplier's Name.

15.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. EN 10088-3

2. IS 1608

3. AA 085 01 18



CORPORATE STANDARD

AA 085 01 18

REV.No. 01

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ULTRASONIC TESTING, CLASSIFICATION AND ACCEPTANCE STANDARDS FOR STEEL FORGINGS, BILLETS AND BLOOMS

1.0 SCOPE:

This standard deals with the ultrasonic testing of steel forgings, billets and blooms. The procedure covers pulse echo direct contact manual ultrasonic flaw detection technique. This standard does not apply to austenitic steel forgings.

2.0 PERSONNEL REQUIREMENT:

Personnel performing non-destructive examination and evaluation shall be qualified to the recommended practice SNT - TC - 1A or any other recognised practice.

3.0 EQUIPMENT CHARACTERISTICS:

3.1 Frequency range:

The ultrasonic equipment shall be suitable for operating at frequencies within the range of 0.5 to 6 MHz.

3.2 Sensitivity:

The sensitivity of the equipment shall be tested to ensure that the number of full screen back wall echo is not less than that given below, when the appropriate probe is placed on the metalised surface of plastic insert of the Indian Standard reference block (IS:4904)/IIW block.

<u>Frequency range, MHz</u>	<u>Min.No. of full screen back echoes</u>
1	5
2	4
4 to 6	2

3.3 Resolution:

The resolution of the equipment and probe combined shall be such as to show separately indications of the three grooves in the IIW - VI block.

Revision:

C1.9.4 OF MOM OF WG(NDT)

Approved:

INTERPLANT STANDARDIZATION
COMMITTEE - (WG-NDT)

Rev.No. 01

Amd.No.

Reaffirmed

Prepared

CFFP
HARDWARIssued
CORP. R&D

Dt. of 1st issue

Jan '80

Dt. Jan '95

Dt.

Year:

**4.0 SURFACE CONDITION:**

The test surface shall be free from loose scales, rust and such other extraneous material that would interfere with the ultrasonic energy transmission. In case of machined surface, it is desirable to have a surface finish of 6.25 microns or better. A gramophone record type of finish and tear produced by machining tools shall be avoided since these give rise to spurious echoes and cause probe wear.

5.0 COUPLANT:

To ensure adequate transmission of ultrasonic energy between the probe and the test object, a suitable couplant having good wetting characteristics such as oil, grease, water, glycerine or cellulose paste shall be used.

6.0 TESTING TECHNIQUE:

6.1 Selection of testing technique shall be made after giving due consideration to the method of manufacture and shape of the object tested. Testing technique should be such that each and every part of the object volume is scanned at least once. Successive scans shall overlap a minimum of 15% of the probe width. Uniform contact shall be maintained between probe and object and scanning speed shall not exceed 100 mm/ second. The following techniques are considered to be minimum for providing adequate coverage.

6.2 Scanning Scheme (Solid And Hollow Forgings):

Complete length of the forging shall be scanned radially from sides / cylindrical surface through 360° using longitudinal wave probe. Whenever practicable the forging shall be scanned in axial direction also. Hollow forgings, and when necessary, solid forgings also shall be scanned using appropriate shear wave probes to detect axial and radial cracks. Hollow forgings are the forgings made hollow on the press by punching or ring rolling operation.

6.3 Solid Rectangular Forgings, Billets And Blooms:

Complete length of the object shall be scanned from two adjacent faces and whenever practicable one end face using longitudinal wave probe.

6.4 Radial cracks on round sections which can not be detected by normal testing method may be subjected to other crack detection methods such as MPI.

7.0 SCANNING:**7.1 Probes and Frequency:**

Overall scanning shall be done using 2 MHz nominal, 20-25 mm diameter probes except when large grain size and path length make it necessary to use a lower frequency. Smaller probes may be used when necessary. However, for forgings intended for backing material for white metal lined bearings, the examination shall be carried out by 4 MHz probes.



CORPORATE STANDARD

AA 085 01 18

REV.No. 01

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7.2 Time Base Calibration:

The time base shall be calibrated using a calibration block or a known dimension of forging under examination.

7.3 Sensitivity:

7.3.1 When Calibrated Attenuator Is Not Available:

Reference sensitivity of equipment shall be set such that the maximum acceptable defect equivalent flat bottomed hole in the test block is equal to 75% of the full screen height. Testing shall be carried out at the highest sensitivity possible.

7.3.2 When Calibrated Attenuator Is Available:

The sensitivity of the equipment during scanning shall be set 6 dB more than the sensitivity required to give a full screen height echo from the maximum acceptable size of defect.

Note: The above sensitivity level adjustment is purely for scanning purposes. Once a defect is encountered, the sensitivity shall be brought down to estimate the size of defect for evaluation of the material under test.

8.0 ESTIMATION OF FLAW SIZE:

8.1 Large Size Flaws:

The size of large flaws can be estimated by moving the probe in all directions and plotting the midpoint of the probe when echo falls to 50 percent or 6 dB.

8.2 Small Size Flaws:

8.2.1 When Calibrated Attenuator Is Not Available:

8.2.1.1 The size of the flaw may be estimated by comparing with the echoes of the flat bottomed holes at appropriate depths in a test block of ultrasonically similar material.

8.2.1.2 The size of the flaw may also be estimated by moving probe successively in all the four directions at right angles to each other and plotting the mid point of the probe when echo height falls to 50% or 6 dB. Due allowance shall also be made for beam spread, depth and orientation of flaw and diameter of the forging if the scanning is done from the curved surface.

8.2.2 When Calibrated Attenuator Is Provided With The Equipment:

The size of the flaw (smaller than the beam spread) can be estimated accurately in millimetres of equivalent circular flaw with the help of Krautkramer's DGS (Distance - gain - size) diagram. Method of estimating flaw size using a DGS diagram is given in Annexure - A.

**9.0 CLASSIFICATION OF FORGINGS, BILLETS AND BLOOMS:**

9.1 Forgings, billets and blooms are classified into the following five categories depending upon the defect size admissibility for the purpose of ultrasonic testing:

Category**Unacceptable defects**

- | | |
|---|--|
| 1 | (i) Cracks, flakes, seams & laps.
(ii) Defects giving indication larger than that from a 2 mm diameter equivalent flaw.
(iii) Groups of defects with maximum indication less than that from a 2 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 70%.
(iv) Defects giving indications of 1 to 2 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws. |
| 2 | (i) Cracks, flakes, seams & laps.
(ii) Defects giving indication larger than that from a 4 mm diameter equivalent flaw.
(iii) Groups of defects with maximum indication less than that from a 4 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 50%.
(iv) Defects giving indications of 2 to 4 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws. |
| 3 | (i) Cracks, flakes, seams & laps.
(ii) Defects giving indication larger than that from a 6 mm diameter equivalent flaw.
(iii) Groups of defects with maximum indication less than that from a 6 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 40%.
(iv) Defects giving indications of 3 to 6 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws. |
| 4 | (i) Cracks, flakes, seams & laps.
(ii) Defects giving indication larger than that from a 10 mm diameter equivalent flaw.
(iii) Groups of defects with maximum indication less than that from a 10 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 20%. |

- (iv) Defects giving indications of 5 to 10 mm diameter equivalent flaw separated by a distance less than four times the size of the larger of the adjacent flaws.
- 5
 - (i) Cracks, flakes, seams & laps.
 - (ii) Defects giving indication larger than that from a 15 mm diameter equivalent flaw.
 - (iii) Groups of defects with maximum indication less than that from a 15 mm diameter equivalent flaw which cannot be separated at testing sensitivity if the back echo is reduced to less than 10%.

Note: Loss of back wall echo not attributable to the presence of defects or geometry and exceeding the limits mentioned in item (iii) of each category of unacceptable defects shall be a cause for rejection.

ANNEXURE - A

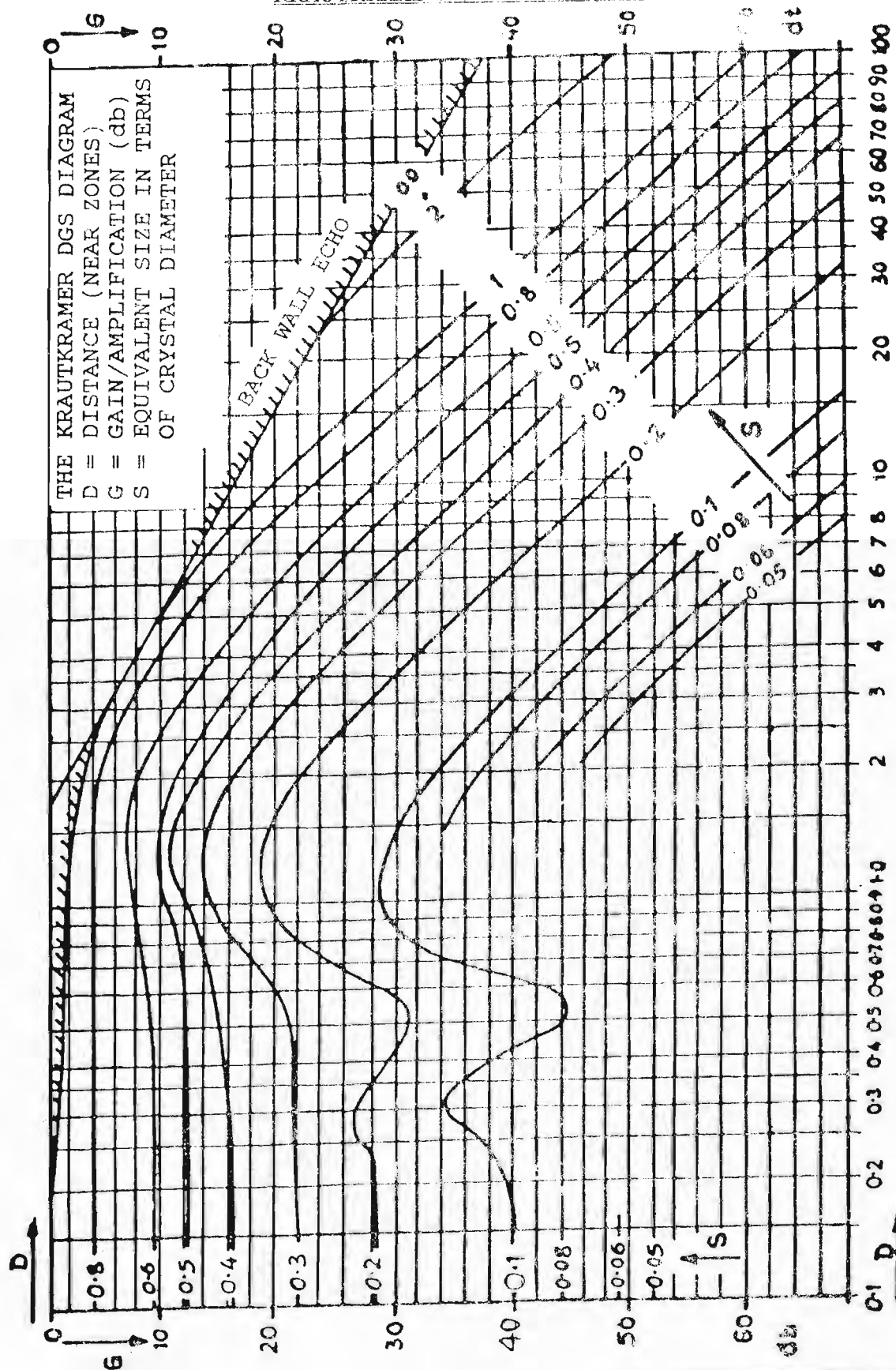
The equivalent flaw size curves of the DGS diagram is prepared by plotting the amplitude in decibels from a series of circular reflectors with increasing distance from the probe in water and so the graph incorporates only the loss in water. When it is found that the attenuation in the material under test is more (this can be checked using back echo curve of DGS diagram), this shall be taken into account while calculating the flaw size. Corrections will not be required for majority of heat treated forgings when tested with 2-4 MHz probes.

A step by step method of estimating flaw size using universal DGS diagram is given below:

- (a) Adjust the depth range of the equipment to the required depth.
- (b) Adjust the back echo to 70% of screen height from a defect free area parallel wall of the material under test or ultrasonically similar test block and note the dB value (A) on the calibrated gain control.
- (c) Mark on the back echo curve of the diagram, the back wall of the distance in terms of near field in millimetres in the case of universal DGS diagram.
- (d) Move the probe to the defective area and get the maximum defect echo. Read off the flaw depth. Increase the gain with the calibrated gain control until echo height reaches 70% of screen height. Note the attenuator reading in dB (B).
- (e) Calculate the gain (G) in dB by subtracting 'A' from 'B'. Count off the gain 'G' downwards from the marked point on the back echo curve, and then move horizontally to intersect the vertical line from the base line corresponding to the flaw depth 'D' in terms of near field in the case of universal diagram.

- (f) Note the equivalent flaw size curve passing through the above point. Multiply the reduced flaw dimension (S) of the curve by the probe diameter to give the equivalent flaw size in millimetres.

ANNEXURE - A
KRAUTKRAMER'S DGS DIAGRAM



Annexure-1

DECLARATION (To be given by Bidder)

GeM Bid No.....

Item Description:

With reference to above reference bid, we M/s..... (Bidder's Name)
confirm/declare the following.

1. Quoted Make-.....
2. We are OEM or Reseller -
3. Valid OEM Authorization certificate with OEM's Contact Details attached (In case of reseller)
- Yes / NA
4. We confirm Nil deviation from GeM bid document (NIT).

Note:

1. OEM details such as name, designation, address, e-mail Id and Phone number required to be furnished along with the technical bid. (also refer ATC clause).
2. Commercial Deviation/deviation in delivery shown separately or found hidden in the offer, will not be taken cognizance of.

(Vendor's Seal & Sign)

Annexure-1

INTEGRITY PACT**Between**

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for Various Size of Stainless Steel Round Bars (B1443090)

_____ (hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint panel of Independent External Monitor(s) (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -
 - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder(s)/ Contractor(s)

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during participation in the tender process and during the contract execution.

- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process, terminate the contract, if already awarded, exclude from future business dealings and/ or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 - Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 -Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.


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- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a Bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some Bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

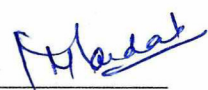
- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties till the final completion of contract for successful Bidder, and for all other Bidders 6 months after the Contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

- 10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.
- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.
- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.


 अतुल कुमार / ATUL KUMAR
 वरिष्ठ अभियंता (क्रय) / Sr. Engineer (Purchase)
 For & On behalf of the Principal
 सी.एम.स्टील / CMM - Steel
 (Office Seal)
 पी.एम.ई.एल., भोपाल / B.H.E.L., BHOPAL

Place BHEL Bhopal
 Date 02.01.2025

Witness: 
 (Name & Address) Madhurendra Mondewal
CMM - BHEL Bhopal

For & On behalf of the Bidder/ Contractor
 (Office Seal)

Witness: _____
 (Name & Address) _____

Clause on IP in the tender

Integrity Pact (IP)

- (a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

SI	IEM	Email
1.	Shri Otem Dai, IAS (Retd.)	iem1@bhel.in
2.	Shri Bishwamitra Pandey, IRAS (Retd.)	iem2@bhel.in
3.	Shri Mukesh Mittal, IRS (Retd.)	iem3@bhel.in

- (b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.
- (c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below:

Details of contact person(s):

(1)

Name: ATUL KUMAR
Deptt: CMM-Steel
Address: BHEL Bhopal
Phone: (Landline/ Mobile)
7552505421
Email: atul.kumar@bhel.in
Fax: _____

(2)

Name: Madhurendra Manderwal
Deptt: CMM
Address: BHEL BHOPAL
Phone: (Landline/ Mobile)
07552505210
Email: madhurendra@bhel.in
Fax: _____