

1.0 SCOPE

- 1.1 This Technical Delivery Conditions specify the requirements in addition to IS:3589 for electrically welded (ERW \ SAW) steel pipes.
- 1.2 The pipes are intended for water services (under Non-IBR piping system only).
- 1.3 The pipes shall conform to the size, grade and quantity as specified in the purchase order.

2.0 MATERIAL

- 2.1 The plates / coils used for pipe shall meet the requirements as per IS: 3589 Grade Fe 410 MPa including mechanical test requirements.

3.0 DIMENSIONAL TOLERANCES

- 3.1 The tolerances limits are:

OD:- Upto NB 1600 mm: ± 4 mm; Above NB 1600 mm: ± 6 mm
Thickness:- Upto 14mm : $+1.3$ mm / -0.8 mm; Above 14 mm : $+1.4$ mm / -0.8 mm.

Length:- for OD upto 1300 mm : $+10$ mm/ -0 mm;
for OD above 1300 mm : ± 50 mm

Ovality (Difference between major and minor inside diameter) : 0.5% maximum

Squareness of ends: The ends of pipe section shall not vary by more than 3 mm at any point from a true plane perpendicular to the axis of the pipe and passing through the center of the pipe at the end.

- 3.2 Other tolerances shall be as per IS: 3589

4.0 MANUFACTURING

- 4.1 The pipe shall be of longitudinally welded or spirally welded as indicated in the P.O.
- 4.2 The ends shall be edge prepared as indicated in the purchase order.
- 4.3 Circumferential seams shall be 1500 mm apart from each other and from ends.
- 4.4 All pipes shall be completely finished and free from surface, sub surface defects such as pits, cracks, weld spatters & laminations etc..

5.0 NDE



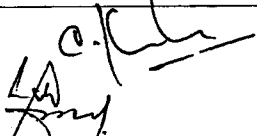
- 5.1 The spiral welds/butt welds of length 100 mm from both the ends of the pipe shall be radiographically tested.

6.0 HYDROSTATIC PRESSURE TEST

- 6.1 Each pipe shall be subjected to a hydraulic test pressure as per IS: 3589 .
(i.e., using the formula $P = 2ST / D$)

7.0 INSPECTION

- 7.1 All pipes shall be inspected by the vendor prior to BHEL / Customers' Inspection. BHEL or BHEL authorized inspector / Customer will select the pipes at random and carryout the inspection. The necessary Material Despatch Clearance Certificate is to be obtained by the vendor prior to the despatch of material.

P.Elangovan, QA  K.Ganeshan, MM 	Approved by	C. Karunakaran, Engg K. Vedaprasad, QC 
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8.0 PAINTING AND PACKING

- 8.1 Unless otherwise specified in the Purchase Order, all the pipes shall be coated with resin type translucent dry type rust preventive on the outside; pipes of diameter above NB 450 mm, shall be coated inside also.
- 8.2 Spiders are to be provided on both ends of the pipes as per the drawing - if indicated in the enquiry / Purchase Order.

9.0 MARKING

9.1 All pipes shall be paint stencilled, hard punched with the following details.

Paint Stencil

- > Specification
- > Heat number
- > Pipe number
- > Manufacturer's identification
- > Material Code
- > Size

Hard punch

- > Specification
- > Heat number
- > Pipe number
- > Manufacturer's identification

9.2 In addition to the above, for the pipes directly despatched to project site, the following details (furnished in the P.O. or separately) shall be paint stencilled & hard punched on both ends of the pipes

- | | | |
|-----------------|----------|----------------|
| > Work order No | > DU No | > Project name |
| > Quantity | > Weight | |

10.0 CERTIFICATES

10.1 Three original test certificates typed in English shall be submitted along with the Inspection report.

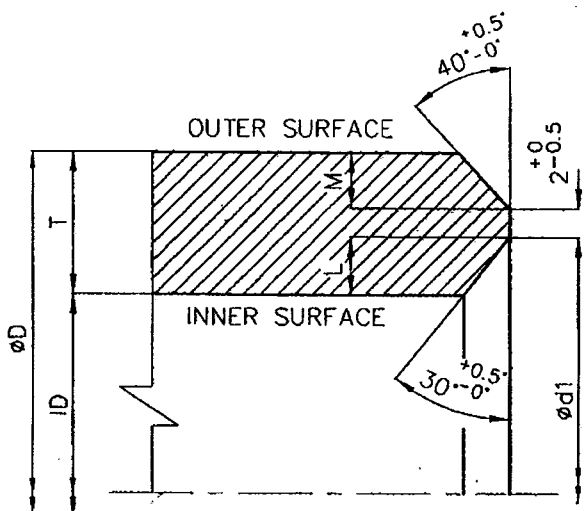
10.2 The test certificate shall furnish the following details.

- a. Purchase Order references.
- b. Test Certificate number.
- c. Specification, grade, size, quantity
- d. Heat number of plate (or pipe number with traceability to heat number)
- e. Chemical composition and mechanical properties
- f. Hydrostatic pressure test report
- g. RT Report.

P.Elangovan, QA K.Ganeshan, MM	Approved by C. Karunakaran, Engg K. Vedaprasad, QC
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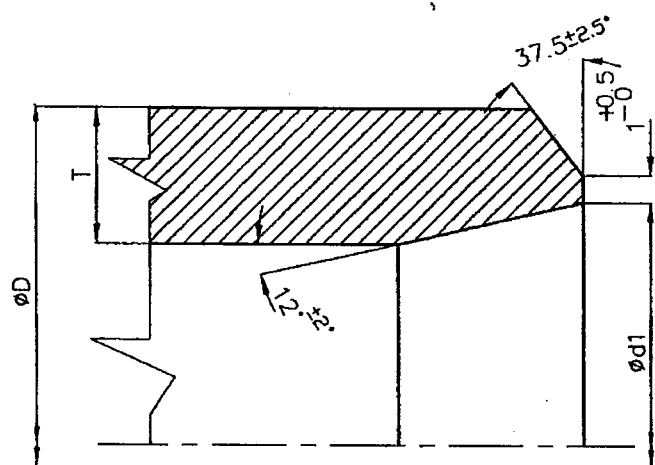
ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

REV	DATE	ALTERED	ALL DIMENSIONS ARE IN MILLIMETRES
		APPROVED	



PIPE SIZE	M	L	ID	$\phi d1$
$\phi D \times T$	5	T-7	D-2T	D-14

FIG-A E.P. DETAIL FOR PIPES OF THICKNESS
ABOVE 14mm



PIPE SIZE	$\phi d1$
$\phi D \times T$	D-2T

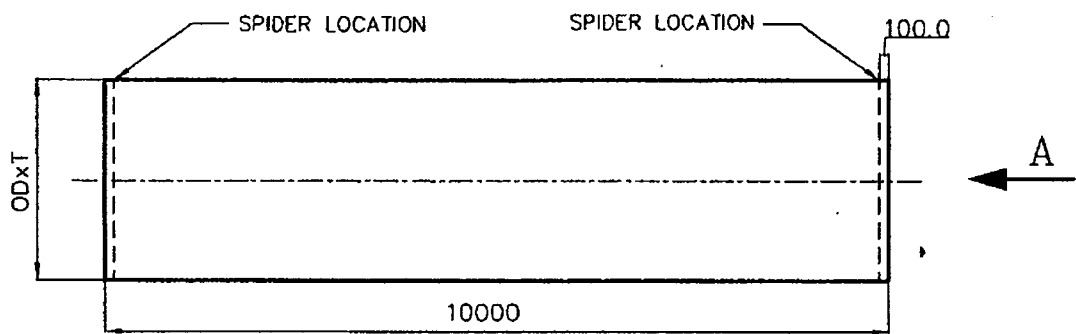
STYLE-D E.P. DETAIL FOR PIPES OF THICKNESS
14mm AND BELOW

	BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE CHENNAI 600 017		DRN	C.KUMAR		DATE	11.04.08	NO. OF VAR
	CHD	C.K.KARAN	11.04.08					
	APPD	C.K.KARAN	11.04.08					
DEPT	GRADE OF UNTOL DIM	SCALE	WEIGHT (KG)	REF. TO ASSY.	OLD DRG.	ITEM NO.	NO. OF ITEMS	
CODE	C / M / F	N.T.S						
TITLE EDGE PREPARATION DETAIL FOR PIPE DIA > 1000				CARD CODE U 01	DRAWING NO. 4-80-999-93079		REV 00	

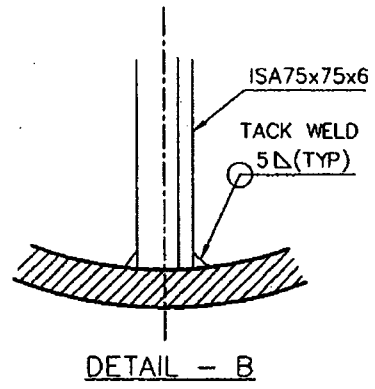
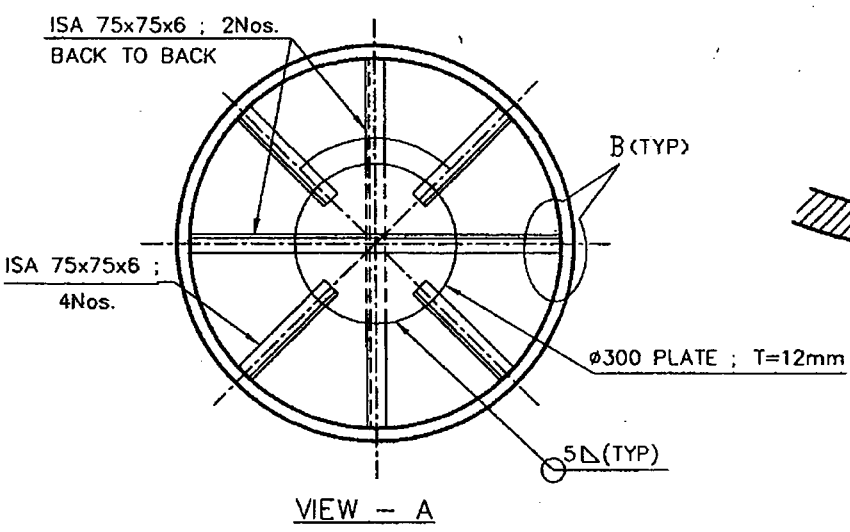
IN WITNESS WHEREOF, THE DIRECTOR HAS HEREUNTO SET HIS HAND AND SEAL AT CHENNAI ON 11.04.08
 BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

REV	DATE	ALTERED
		APPROVED

ALL DIMENSIONS ARE IN MILLIMETRES



SPIRAL/LONGITUDINAL WELDED PIPE
(2 LOCATIONS IN 10 MTR. PIPE)



		BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE CHENNAI 600 017		DRN	NAME	SIGN	DATE	NO. OF VAR
				CHD	C.K.KARAN	<i>[Signature]</i>	11.04.08	
				APPD	C.K.KARAN	<i>[Signature]</i>	11.04.08	
DEPT	GRADE OF UNTOLED DIM		SCALE	WEIGHT (KG).	REF. TO ASSY./OLD DRG.		ITEM NO.	NO. OF ITEMS
CODE	C / M / F		N.T.S.					
TITLE				CARD CODE	DRAWING NO.		REV	
SPIDER ARRANGEMENT FOR FOR PIPE DIA >1000				U 01	4-80-999-93078		00	



BHARAT HEAVY ELECTRICALS LIMITED.
 PIPING CENTRE CHENNAI - 17
 QUALITY DEPARTMENT.

QUALITY PLAN FOR CW PIPING (STRAIGHT PIPES SIZE NB ≥ 1000 MM)

PROJECT: BOKARO-TPS-"A" (1 X 500 MW)
BHEL CUSTOMER Nos : 0666,7013

QP NO : 7013 ; QPC : 01
 REV. NO : 00
 DATE : 18.08.2008
 PAGE : 1 of 2

QA 03

SL No	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERANCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY		REMARKS
									M	B	
1	2	3	4	5	6	7	8	9	10		11
1.0	STRAIGHT PIPE: IS3589 (Longitudinal /spiral welded pipes)	Chemical Mechanical Soundness	Major Major Major	Verification Tensile test Hydraulic test or Radiography Measurement	One/ heat One/ heat 100%	IS 3589 IS 3589 IS 3589		TC TC TC	P P P	V W W	10% witness by BHEL & DVC.
2.0	Coating (intenal)	Dimension	Major		10% Random	IS 3589		TC	P	W	TC - Test certificate HC - History card / Register
(a)	Surface Preparation of pipes	Degree of cleanliness	Major	Visual	100%	Blast clean to near white metal.		HC	P	V	
(b)	PRIMER **	Epoxy Resin based Zinc Rich Primer.	Major	Visual & Elcometer measurement	Each pipe	Minimum DFT:50 microns		HC	P	V	** Brand Name as approved by. BHEL & DVC. Ref page 2
(c)	OVER COAT **	Coal tar epoxy finish Paint	Major	Visual & Elcometer measurement	Each pipe	2 coats. DFT:100 microns min		HC	P	W	
(d)	Inspection of Coating	Dry film thickness (DFT)	Major	Visual & Elcometer	Each pipe at 5 spots* min	Per coat .Total DFT: Primer + Over coat =250 microns min. Dry film thickness 250 microns min.		HC	P	W	*spots identification by BHEL.
		Holiday detection	Major	Visual	100%	No Holiday		HC	P	W	10% witness by BHEL

PREPARED BY

[Signature]

R. JANARTHANAN.

NAME & SIGNATURE

REVIEWED & APPROVED BY

[Signature]

G.PANNEER SELVAM

Legends

M : MANUFACTURER / SUBCONTRACTOR.
 B : BHEL/BHEL Authorized Inspection Agency
 P : Perform.
 W : Witness.
 V : Verification.

1	Approved	3	Approved with rework required
2	Approved except as noted resubmission not required	4	Not Approved

D.V.C. Letter ref. :
 MODAR VALLEY CORPORATION
 Electricity Department
 This approved is for general arrangement only and does not relieve the contractor of responsibility for conformity to specifications, dimensions, details and fittings of parts.

[Signature] 4/10/09



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PIPING CENTRE CHENNAI - 17
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									M	S	
1	2	3	4	5	6	7	8	9	10	11	
3.0	Coating(External) - Over ground piping.										
(a)	Surface preparation of out side surface	Power tool cleaning / Rotary wire brush	Major	Visual	100%	Free from all dirt, oil, grease, rust, scale, weldslag, fluxdeposit,foreign matters etc	Minimum DFT: 50 microns	HC	P	V	* Total DFT= Primer + Finish 125 microns min
(b)	Primer	Red oxide Zinc Phosphate primer to IS:12744	Major	Visual & Elcometer	100%			HC	P	V	
(c)	Finish paint	Synthetic enamel IS2932 smoke grey shade No.692 As per IS: 5	Major	Visual & Elcometer Measurement	100%			HC	P	W	
4.0	Coating (External) – Buried Piping No painting required for Pipes buried (under ground) – as Coal Tar Tape wrapping shall be carried out at site. Surface shall be cleaned with wire brush / power tool										
5.0	Marking & Identification	Work order NO, Du No, Length ,Makers Identification	Major	Visual	100%	Each pipe punched & stenciled As per P.O		HC	P	W	

APPROVED PAINT SUPPLIERS

- (1) BERGER PAINTS
- (2) SHALIMAR PAINTS
- (3) ASIAN PAINTS
- (4) JENSION & NICHOLSON
- (5) CDC CARBOLINE.

1	Approved	3	noted as required
2	Approved except as noted resubmission not required	4	Not Approved

D.V.C. Letter ref. :
MANDAR VALLEY CORPORATION
Electricity Department

This approved is for general arrangement only and does not relieve the contractor of responsibility for conformity to specifications, correct details and fittings of parts etc.

[Signature] Date: 4/8/08