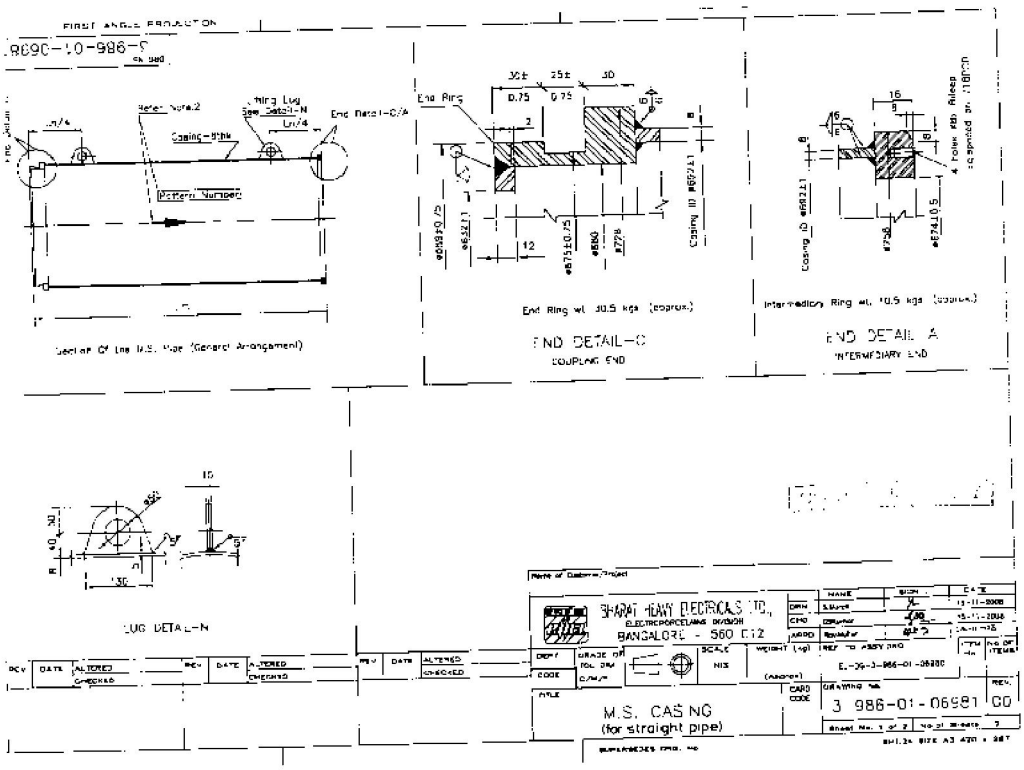
PACKAGE-A :(STRAIGHT PIPE, MOE AND BEND)-DRAWINGS,

SL. NO. 1

"CERALIN CASTINGS DRAWINGS"



A

00	3-986-01-06981
REV	DRG NO

Note

1. Casing, End Flange & Lug Materials of M.S. should conform to IS 2062 Gr.A/B
2. Pattern Number and Part Code to be weld deposited over casing as per CE:285.21
3. For Arrow head 3mm thick plate to be cut to form an arrow (Min.Size.200x30x3) and weld all around 3mm Fillet. Arrow head to be placed on each pipe part and it is in the direction of from one coupling end to another and ensure that coupling ends are at extreem ends after the assembly
4. For welding details refer AWS.D 1.1.
5. Indicated wt. excludes end ring wt. End Ring wt. are shown in sheet no.1 of the respective end details.
6. Casing to be cleaned & painted with 2 Coats of General purpose Aluminium paint conform to IS. 2339 and application procedure is as per CE:285.20
7. All supplies to conform to QP No. CLN QP-01.00.
8. Tolerances:– Arc shift : 2mm.
   Out of squareness : 1.5mm for C type rings
   – 1.5mm for A type rings
9. Refer TABLE– A for details of individual pipe parts and TABLE– B for combination of pipes.
10. If the pipe is formed by individual shorter pipes ,then these must be trial assembled before despatch and the intermediate joint between pipes should be welded only at Customer site
11. Lengths upto 1 Metre to be made in a single piece.
12. For lengths between 1 Metre & 2 Metres maximum one circumferential joint is allowed
13. For lengths > 2 Metres,maximum of two circumferential joints are allowed. Lengths between joints should not be less than 500mm
14. All over machining 6.3/ for End Rings & Intermediary rings.

ALL DIMENSIONS ARE IN mm.

Variant No.	Length	Pattern No.	Part codes in combination
17	7912	3-01299-17	L11 +L8+L12+ L9
16	7732	3-01299-16	L11 +L8+L12+ L7
15	7062	3-01299-15	L11 +L8+L12+ L10
14	6882	3-01299-14	L11 +L8+L12+ L6
13	6712	3-01299-13	L11 + L12 + L9
12	6032	3-01299-12	L11 + L12 + L7
11	5362	3-01299-11	L5 + L8 + L9
10	5182	3-01299-10	L5 + L8 + L7
9	4332	3-01299-09	L5 + L8 + L6
8	3662	3-01299-08	L5 + L9
7	3482	3-01299-07	L5 + L7
6	2812	3-01299-06	L5 + L10
5	2632	3-01299-05	L5 + L6
4	1962	3-01299-04	L4
3	1782	3-01299-03	L3
2	1112	3-01299-02	L2
1	932	3-01299-01	L1

TABLE – B

Sl. No	Part Code	Indicative Length	End Rings Left	End Rings Right	Approx. Wt (kg)
12	L12	1969	A	A	255.0
11	L11	2281	C	A	321.5
10	L10	1112	A	C	140.0
9	L9	1862	A	C	257.5
8	L8	1700	A	A	223.0
7	L7	1782	A	C	233.0
6	L6	932	A	C	115.0
5	L5	1700	C	A	221.0
4	L4	1962	C	C	250.0
3	L3	1782	C	C	225.0
2	L2	1112	C	C	137.5
1	L1	932	C	C	108.0

TABLE – A

Name of Customer/Project

BHARAT HEAVY ELECTRICALS LTD.,
ELECTROPORCELAINS DIVISION
BANGALORE – 560 012

	NAME	SIGN	DATE
DRN			15-11-2008
CHD			15-11-2008
APPD			

DEPT | GRADE OF TOL. DIM | SCALE NTS | WEIGHT (kg) Refer Table (Approx.) | REF. TO ASSY DRG EL-30-3-986-01 06980 | TCM (No.OF ITEMS)

CODE C/A/B

TITLE

M.S. CASING
(for straight pipe)

CARD CODE | DRAWING No. 3-986-01 06981 | REV 00

Sheet No. 2 of 2 | No.of Sheets 2

SUPERSEDES DRG. No.

SHT SA SIZE A3 420 × 297

REV	DATE	ALTERED	CHECKED

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REF. DRG No.

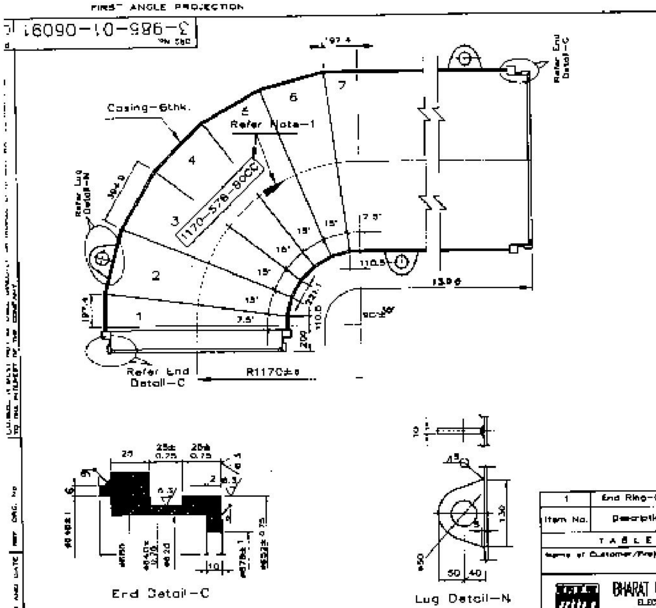
INVENTORY No.

B

SL. NO. 2

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN mm.



Notes –

1. Pattern Number & arrow head shall be weld deposited on casing as per CE: 263: 21.
2. Casing, End Ring & Lug material M.S. shall conform to IS:2062 Gr.A.
3. For Welding details Refer AWS D1.1
4. Casing to be cleaned & painted with red oxide as per CE. 260: 20.
5. During assy. longitudinal welding between adjacent segments to be staggered
6. All supplies to conform QP No.CLN:QP: 01/00.
7. Indicated wts. in Table–A excludes End ring wts.
8. Refer Table-B for End ring wts.
9. All over machining 6.3 for end Rings 'C' type

Item No.	Description	Qty	Approx. Unit Wt. (kgs.)
1	End Ring-C	1	15.0

TABLE – B

Item No.	Description	Approx. Unit Wt. (kgs.)
1	Casing	301.0

TABLE – A

Name of Customer/Project

BHARAT HEAVY ELECTRICALS LTD.,
ELECTROPORCELAINS DIVISION
BANGALORE – 560 012

	NAME	SIGN	DATE
DRN	[illegible]		20-12-2006
CHD	John Felix		20-12-2006
APPD	[illegible]		20-12-2006

DEPT / CODE	GRADE OF TOL. DIM	SCALE	WEIGHT (kg)	REF. TO ASSY. DRG	ITEM No.	No. OF ITEMS
		N.T.S	Refer Table (Approx)	[illegible]		

TITLE: Casing & End Ring

CARD CODE

DRAWING No. 3-986-01-06091 REV. 00

SHEET No. 1 No. OF SHEETS 1

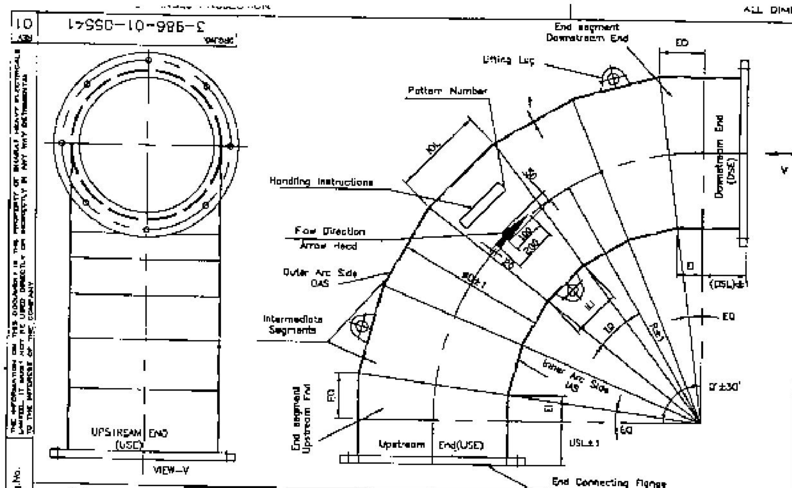
SUPERSEDES DRG. No.

SHT SA SIZE A3 420 × 297

A

SL. No. 2 - MOE. -

ALL DIMENSIONS ARE IN mm.



Symbols & Description

Q = Angle
R = Radius
ΦD = Casing I.D.
t = Casing thickness
DSL = Down Stream Length
USL = Up Stream Length
EQ = Total Angle of End Segment
IQ = Total Angle of Intermediate Segment
IQ1,IQ2 = Intermediate segment angles
EO = End Segment Outer Arc Length
EI = End Segment Inner Arc Length
IOL = Intermediate Segment Outer Arc Length
IIL = Intermediate Segment Inner Arc Length
OAS = Outer Arc Side
IAS = Inner Arc Side

Notes:-

1. List of casing/s & its details, refer Table 1
2. End connection dimensional details refer Table-2,3,4 & 5.
3. Casing segments dimensional details refer Table 6 & 7.
4. Casing, End Ring, & Lug Material is M.S. should conform to IS:2062 Gr.A/B
5. Casing to be cleaned & painted with Red Oxide as per CE:285:20.
6. All supplies to conform CLN:QP:01/00.
7. For welding details refer AWS:D 1.1.
8. Pattern Number to be weld deposited over casing as per CE:285:21. For Arrow head 3mm plate to be cut to form an arrow (Min.Size : 200x50x3) and weld all around 3mm fillet.
9. During assy. longitudinal welding between adjacent segments to be staggered.
10. Face angles to be matched during assembly.
11. Minimum length between weld joints in the straight portion should not be less than 500mm.

CONTROLLED COPY

NAME OF CUSTOMER/PROJECT: BHEL					
BHARAT HEAVY ELECTRICALS LTD., ELECTROPORCELAINS DIVISION, BANGALORE - 560 012			NAME	SIGN	DATE
		DRN	S.MURTHY	-Sd-	14-10-04
		CHD	Dhanananda Kumar.G	-Sd-	14-10-04
		APPD	V.G.Joshi	-Sd-	14-10-04
DEPT / CODE	GRADE OF TOL DIN C/M/F	SCALE N.T.S.	WEIGHT (KG) Refer Table-1 (Approx)	REF TO ASSY.DRG EL-DG-3-986-01-05540	ITEM No. / No.OF ITEMS
TITLE: BEND CASING		CARD CODE	DRAWING No. 3-986-01-05541		REV. 01
			SHEET No. 1 of 4	No.OF SHEETS 14	

SUPERSEDED DRG. No.

3-986-01-05541 01

3-986-01-05541 (DRG NO.) 01 REV.

CONTROLLED COPY

Var. No.	Radius R	Casing OD	θ	DSL	USL	End connection type: USE	End connection type: DSE	Pattern Number	End segment types for Assembly	Intermediate segment types for Assembly	Segment Order for Assembly	Tack Weld the joint/Detail. Segment/s NO."x" from USE	No. of Lugs	Lifting Lug Locations: On Segment No from USE – Lugs on DAS side	Lifting Lug Locations: On Segment No from USE – Lugs on IAS side	Unit weight kgs.
21	1080	590	90	1444	100	USEC	DSEC	90-1-01472-21	4E	6S	4E,6S,6S,6S,6S,6S,4E	NR	3	2,DSL	5	368.5
20	1080	590	90	1100	100	USEC	DSEW	90-1-01472-20	4E	6S	4E,6S,6S,6S,6S,6S,4E	NR	3	2,DSL	5	335.5
19	1080	590	90	1100	100	USEC	DSEC	90-1-01472-19	4E	6S	4E,6S,6S,6S,6S,6S,4E	NR	3	2,DSL	5	328.0
18	1080	590	90	1100	100	USEW	DSEC	90-1-01472-18	4E	6S	4E,6S,6S,6S,6S,6S,4E	NR	3	2,DSL	5	335.5
17	1080	590	90	1100	100	USEW	DSEW	90-1-01472-17	4E	6S	4E,6S,6S,6S,6S,6S,4E	NR	3	2,DSL	5	343.5
16	1060	590	76	1100	100	USEW	DSEW	76-1-01472-16	4E	3S,1S,6S	4E,3S,1S,3S,6S,6S,4E	NR	3	2,DSL	5	313.0
15	1060	590	65	1100	100	USEW	DSEW	65-1-01472-15	4E	3S,1S,6S	4E,3S,1S,3S,6S,4E	NR	3	2,DSL	5	288.0
14	1060	590	60	1100	100	USEW	DSEW	60-1-01472-14	4E	6S	4E,6S,6S,6S,4E	NR	3	2,DSL	4	273.5
13	1060	590	55	1100	100	USEW	DSEW	55-1-01472-13	4E	3S,6S	4E,3S,3S,6S,4E	NR	3	2,DSL	4	264.5
12	1080	590	50	1100	100	USEW	DSEW	50-1-01472-12	4E	3S,1S	4E,3S,1S,3S,4E	NR	3	2,DSL	4	253.5
11	1060	590	45	1100	100	USEC	DSEC	45-1-01472-11	4E	6S	4E,6S,6S,4E	NR	3	2,DSL	3	227.0
10	1060	590	45	1023	100	USEC	DSEC	45-1-01472-10	4E	6S	4E,6S,6S,4E	NR	3	2,DSL	3	218.0
9	530	590	45	244	100	USEC	DSEC	45-1-01472-09	5E	7S	5E,7S,7S,5E	NR	3	2,DSL	3	77.0
8	1080	590	45	1100	100	USEW	DSEW	45-1-01472-08	4E	6S	4E,6S,6S,4E	NR	3	2,DSL	3	242.5
7	1080	590	40	1100	100	USEW	DSEW	40-1-01472-07	4E	3S	4E,3S,3S,4E	NR	3	2,DSL	3	232.0
6	1060	590	39	1100	100	USEW	DSEW	39-1-01472-06	4E	2S	4E,2S,2S,4E	NR	3	2,DSL	3	230.0
5	1080	590	36	1100	100	USEW	DSEW	36-1-01472-05	1E	5S	1E,5S,5S,1E	NR	3	2,DSL	3	223.0
4	1060	590	35	1100	100	USEW	DSEW	35-1-01472-04	1E	3S	1E,3S,3S,1E	NR	3	2,DSL	3	220.5
3	1080	590	30	1100	100	USEW	DSEW	30-1-01472-03	4E	6S	4E,6S,4E	NR	3	2,DSL	DSL	207.5
2	1080	590	25	550	100	USEW	DSEW	25-1-01472-02	3E	4S	3E,4S,3E	NR	3	2,DSL	DSL	131.5
1	1080	590	24	550	100	USEW	DSEW	24-1-01472-01	2E	2S	2E,2S,2E	NR	3	2,DSL	DSL	129.0

Table-1: Casing Details

Notes :

Unit Weight is excluding End Connection Wt.
IAS : Inner Arc Side
OAS : Outer Arc Side
DSL : Down Stream Length
USL : Up Stream Length
USE : Up Stream End
DSE : Down Stream End

USEC : Up Stream End Coupling
USEW : Up Stream End Weldable
DSEC : Down Stream End Coupling
DSEW : Down Stream End Weldable
NR : Not Required.
Angles are in Degrees & Linear Dimensions are in MM.

NAME OF CUSTOMER/PROJECT: BHEL

BHARAT HEAVY ELECTRICALS LTD.,
ELECTROPORCELAINS DIVISION
BANGALORE - 560 012

	NAME	SIGN	DATE
DRN	S.Murali	-Sd-	14-10-04
CHD	ShivanandaKumar.G	-Sd-	14-10-04
APPD	V.G.Joshi	-Sd-	14-10-04

DEPT CODE | GRADE OF TOL DIM C/M/F | SCALE: N.T.S. | WEIGHT (kg): Refer Table-1 (Approx.) | REF TO ASSY.DRG: EL-DG-3-986-01-05540 | ITEM NO. | No.OF ITEMS

TITLE: BEND CASING

CARD CODE | DRAWING No. 3-986-01-05541 | REV. 01

SHEET No. 2 of 4 | No.OF SHEETS : 4

SUPERSEDED DRG. No.

SHT.24 SIZE A3 420 x 297

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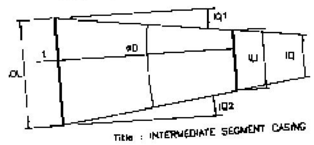
Ref.Drg.No. | Sign & Date | Inventory No.:-

FIRST ANGLE PROJECTION

DRG. NO. 3-986-01-05541

Title:- CASING SEGMENTS DIMENSIONAL DETAILS

IOL: Intermediate segment outer arc length
ILI: Intermediate segment inner arc length
IQ1: End Angle
IQ2: End Angle
IQ: Total Angle
ϕD: Casing ID
t: Thickness

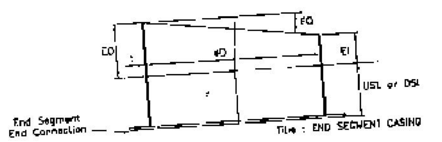


Title : INTERMEDIATE SEGMENT CASING

Segment Name	Radius	Casing Inner Dia.D	Thick.t	Total Angle IQ	End Angles IQ1	End Angles IQ2	Segment Lengths IOL	Segment Lengths ILI
8S	1080	590	8	13	5.5	7.5	310.5	172.5
7S	530	590	8	15	7.5	7.5	219.5	60
6S	1060	590	8	15	7.5	7.5	359	199.5
5S	1060	590	8	13	5	8	310.5	172.5
4S	1060	590	8	12.5	6.25	6.25	298.5	166
3S	1063	590	8	12.5	5	7.5	298.5	166
2S	1080	590	8	12	6	6	287.0	160.0
1S	1080	590	8	10	5	5	238.5	132.5

Table-7 , Intermediate Segment Details

EO: End segment outer arc length
EI: End segment inner arc length
EQ: Segment Angle
ϕD: Casing I.D
t: Thickness



Title : END SEGMENT CASING

Segment Name	Radius	Casing Inner Dia.D	Thick.t	Angle EQ	Segment Lengths EO	Segment Lengths EI
5E	530	590	8	7.5	110	30
4E	1060	590	8	7.5	180	100
3E	1060	590	8	6.25	149.5	83
2E	1060	590	8	6	143.5	80
1E	1060	590	8	5	119.5	66.5

Table-6 , End Segment Details

Note :1. Angles are in Radians and all other dimensions are in mm.

CONTROLLED CO

NAME OF CUSTOMER/PROJECT	BHEL		
	NAME	SIGN	DATE
DRN	S.Murali	-Sd-	14-10-04
CHD	Shivanandakumar G	-Sd-	14-10-04
APPD	V.G.Joshi	-Sd-	14-10-04

BHARAT HEAVY ELECTRICALS LTD.,
ELECTROPORCELAINS DIVISION
BANGALORE - 560 012

DEPT	GRADE OF TOL. DIM	SCALE	WEIGHT (Kg)
CODE	C/N/F	N.T.S.	Refer Table-1 (Approx)

REF TO ASSY.DRG: EL-DG-3-986-01-05540

ITEM NO. / No. OF ITEMS

TITLE: BEND CASING

CARD CODE

DRAWING NO. 3-986-01-05541

REV. 01

SHEET No. 3 of 4 No. OF SHEETS 14

SHT.24 SIZE A3 420 × 297

SUPERSEDES DRG. No.

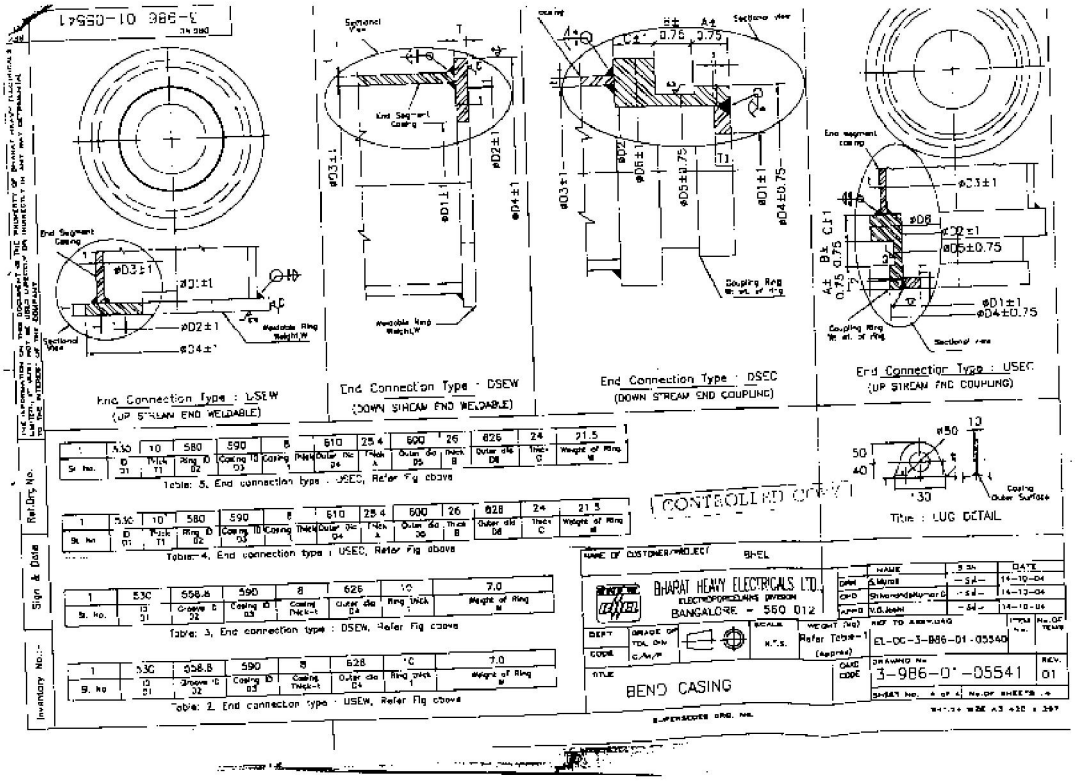
REV	DATE	ALTERED	G.S.R
01	8/9/09	CHECKED	R.N

Revision in CAD.NR. No. 1610

Ref Drg No.

Sign & Date

Inventory No.:-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(UP STREAM END WELDABLE)
End Connection Type : DSEW
(DOWN STREAM END WELDABLE)
End Connection Type : DSEC
(DOWN STREAM END COUPLING)
End Connection Type : USEC
(UP STREAM END COUPLING)
Table: 5, End connection type : USEC, Refer Fig above
Table: 4, End connection type : USEC, Refer Fig above
Table: 3, End connection type : DSEW, Refer Fig above
Table: 2, End connection type : USEW, Refer Fig above
Title : LUG DETAIL
CONTROLLED COPY
BHARAT HEAVY ELECTRICALS LTD.
ELECTROPORCELAINS DIVISION
BANGALORE - 560 012
BEND CASING
EL-DC-3-986-01-05540
3-986-01-05541
01

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