

TECHNICAL DATA

- BREAKING STRENGTH OF STRING : 120 KN. (WITHOUT SUSPENSION CLAMP)
- BREAKING STRENGTH OF SUSPENSION CLAMP : 70 KN.
- SLIP STRENGTH OF SUSPENSION CLAMP : 20-29 KN.
- BALL & SOCKET DESIGNATION 20mm. CONFORMING TO IS : 2485, PART- II.
- GALVANISING THICKNESS : 85 MICRONS/ 43 MICRONS FOR FASTENERS.
- MINIMUM NO. OF DIPS IN GALVANISING TEST TO WITHSTAND : 8 DIPS/4 DIPS FOR FASTENERS.
- SPECIFICATION TO WHICH HARDWARE FITTINGS CONFORM : I.S. : 2485, PART-I.
- ALL FERROUS PARTS EXCEPT SPRING WASHER SHALL BE HOT DIP GALVANISED CONFORMING TO I.S. : 2633.
- SPRING WASHER SHALL BE MADE OF SPRING STEEL ELECTRO-GALVANISED (SERVICE CONDITION 3).
- PROOF LOAD : 87% OF RATED U.T.S.
- GENERAL TOLERANCE : AS PER I.S. : 2485 (PART-I), UNLESS OTHERWISE SPECIFIED.
- TOLERANCE ON LENGTH OF STRING : $\pm 2\%$

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	DRG./CAT. NO.	MATERIAL	FINISH	U.T.S. (KN.)	QTY./SET
1.	ANCHOR SHACKLE	AMS-27F	FORGED STEEL (CL-M) (I.S. : 2004), FORGED	H.D.G.	120	1
2.	ANCHOR SHACKLE	AMS-3/1E	FORGED STEEL (CL-M) (I.S. : 2004), FORGED	H.D.G.	120	1
3.	H. H. BALL EYE	ABL-B	FORGED STEEL (CL-M) (I.S. : 2004), FORGED	H.D.G.	120	1
4.	ANCHOR HOORN	AMH/PRB-2W	WLD STEEL (I.S. 2002), FABRICATED	H.D.G.	-	1
5.	SOCKET CLEVIS	ASC-2	FORGED STEEL (CL-M) (I.S. : 2004), FORGED	H.D.G.	120	1
6.	YOKER PLATE	AYP-73	WLD STEEL (I.S. 2002), FABRICATED	H.D.G.	120	1
7.	GRADING RING	ACGR-1/AB	EXTRUDED AL. ALLOY 1800S, I.S. : 753	-	-	1
8.	CLEVIS EYE	ACE-78	FORGED STEEL (CL-M) (I.S. : 2004), FORGED	H.D.G.	70	2
9.	A.G.S. CLAMP	AS-42	AL. ALLOY (LM-8), CASTED & HEAT TREATED	-	70	2

NOTE:
 Release A : Part II 400KV D/C Transmission Line from 27000 MW Higher TPP to Spot with Good Moose ACSR Power Conductor 312mm.
 Part B : LRD from 400KV S/C Vinhyachol to Korba Transmission Line at it with Twin Moose ACSR Power Conductor 400KV D/C Line 207mm.
 Release B : 400KV D/C Transmission Line from Gandhar (Guj) in Haldi (Guj) with Twin Moose ACSR Power Conductor - 312mm.
 CONTRACT AGREEMENT NO. LTR NO. : EPCL/PCL/COI
 NAME OF CONTRACTOR : M/S KALPATARU POWER TRANSMISSION LIMITED.

LAHMEYER INTERNATIONAL (INDIA) PVT. LTD. CONSULTING ENGINEERS, KOLKATA, INDIA.

THIS APPROVAL STATUS SHALL NOT RELIEVE THE CONTRACTOR FROM HIS CONTRACTUAL OBLIGATIONS.

STATUS	APPROVED	REMARKS
Call I	<input checked="" type="checkbox"/>	APPROVED
Call II	<input checked="" type="checkbox"/>	APPROVED WITH COMMENTS. PLS SEE TECHN. APPROV.
Call III	<input checked="" type="checkbox"/>	NOT APPROVED
Call IV	<input checked="" type="checkbox"/>	NOTED FOR INFORMATION
Call V	<input checked="" type="checkbox"/>	LETTER TRANSMISSION (LTD) 11/10/09
Signature		Remarks

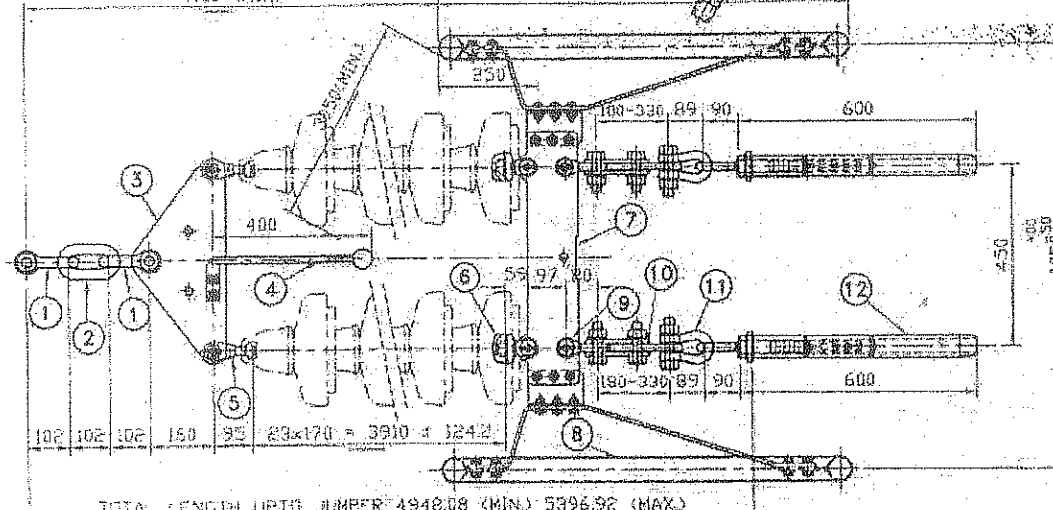
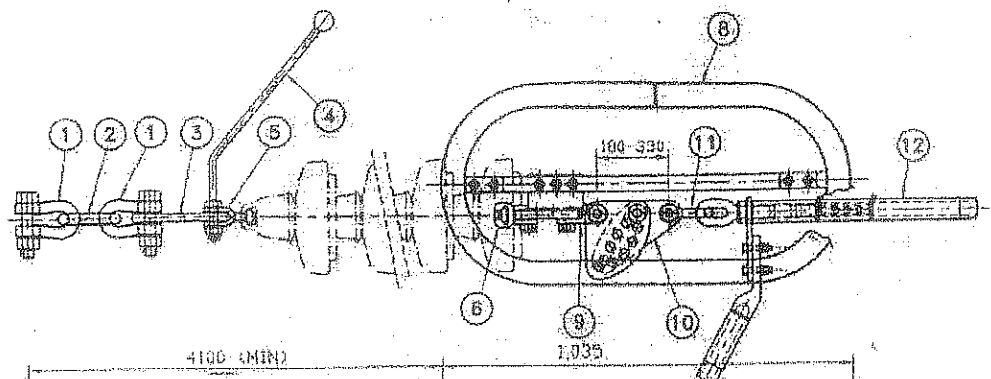
APPROVED FOR TESTING

ASBESCO (INDIA) PVT. LTD. Kolkata

ITEM: SINGLE 'I' SUSPENSION H/WARE FITTINGS SUITABLE FOR TWIN ACSR MOOSE (400 KV).

DRAWN	REVISION
CHECKED	NO. DESCRIPTION BY APPD DATE
APPROVED	1 AS PER COMMENT R.S. 17.11.09
DATE 31.10.09	2 AS PER COMMENT R.S. 05.01.10
SCALE 1:8	3 AS PER COMMENTS R.S. 17.04.10

ALL DIMENSIONS ARE IN mm. CUSTOMER : BSSAR POWER TRANSMISSION CO. LTD.
 DRG. NO. ASS-602/E



TOTAL LENGTH UP TO JUMPER 4948.08 (MIN) 5396.92 (MAX.)

*** TECHNICAL DATA ***

1. U.T.S. OF HARDWARE FITTINGS (WITHOUT TENSION CLAMP) : 320 KN.
2. SLIP/MECHANICAL STRENGTH OF DEAD END ASSY. : 153.14 KN.
3. BALL & SOCKET DESIGNATION : 20 mm. CONFORMING TO I.S. 2486, PART-I.
4. SPECIFICATION TO WHICH HARDWARE FITTINGS CONFORMS TO I.S. 2486, (PART-I)/1993.
5. GALVANISING THICKNESS : 85 MICRONS/ 43 MICRONS FOR FASTENERS.
6. MINIMUM NO. OF DIPS IN GALVANISING TEST TO WITHSTAND : 6 DIPS/4 DIPS FOR FASTENERS.
7. ALL FERROUS PARTS EXCEPT SPRING WASHER SHALL BE HOT DIP GALVANISED.
8. SPRING WASHER SHALL BE MADE OF SPRING STEEL. ELECTRO-GALVANISED.
9. STAINLESS STEEL "R" TYPE SECURITY CLIP WILL BE PROVIDED WITH ALL SOCKET FITTINGS.
10. PROOF LOAD : 67% OF RATED U.T.S.
11. R.I.V. AT 305 KV. (R.M.S.) (DRY) BELOW 1000 MICRO VOLT.
12. MIN. CORONA EXTINCTION VOLTAGE (DRY) 320 KV. (R.M.S.).
13. SHORT CIRCUIT LEVEL : 40 KA.
14. GENERAL TOLERANCE : AS PER I.S. : 2486 (PART-I), UNLESS OTHERWISE SPECIFIED.
15. TOLERANCE ON LENGTH OF STRING : ±2%.

BILL OF MATERIALS

ITEM NO.	COMPONENTS	DRG./CAT NO.	MATERIAL/DESCRIPTION	U.T.S. (KN.)	QTY.
1.	ANCHOR SHACKLE	AAS-SF	F.S.(CL. IV, I.S. 2004), H.D.G., FORGED.	320	2.
2.	CHAIN LINK	AGL-1	F.S.(CL. IV, I.S. 2004), H.D.G., FORGED.	320	1.
3.	TOKE PLATE(S.)	AIP-1J	M.S.(I.S. 2062), H.D.G., FABRICATED.	320	1.
4.	ARCING HORN	AAR/HRN-AR	M.S.(I.S. 2062), H.D.G., FABRICATED.	-	1.
5.	BALL CLEVIS	ABC-2	F.S.(CL. IV, I.S. 2004), H.D.G., FORGED.	160	2.
6.	SOCKET CLEVIS	ASD-2R	F.S.(CL. IV, I.S. 2004), H.D.G., FORGED.	160	2.
7.	TOKE PLATE(S.)	AIP-27	M.S.(I.S. 2062), H.D.G., FABRICATED.	320	1.
8.	C.C. RING	ACCR-1R/2	EXTRUDED ALUMINIUM TUBE & N.S., H.D.G.	20	2 SETS.
9.	CLEVIS END	ACE-76T	F.S.(CL. IV, I.S. 2004), H.D.G., FORGED.	160	2.
10.	SAG ADJ. PLATE	ASA-58	M.S.(I.S. 2062), H.D.G., FABRICATED.	160	2 SETS.
11.	ANCHOR SHACKLE	AAS-160T	F.S.(CL. IV, I.S. 2004), H.D.G., FORGED.	160	2.
12.	DEAD END ASSY.	ADE/A-0012	EXTRUDED AL. TUBE (10500 I.S. 733) & N.S. (CL. IV, I.S. 2004), H.D.G., FORGED.	153.14	2 SETS.

LAHMEYER INTERNATIONAL
LAHMEYER INTERNATIONAL (INDIA) PVT. LTD.
CONSULTING ENGINEERS, KOLKATA, INDIA

THIS APPROVAL STATUS SHALL NOT RELIEVE THE CONTRACTOR FROM HIS CONTRACTUAL OBLIGATIONS.

STATUS	APPROVED
Call I	<input checked="" type="checkbox"/> APPROVED
Call II	<input checked="" type="checkbox"/> APPROVED WITH COMMENTS (NO SUBMISSION REQUIRED)
Call III	<input checked="" type="checkbox"/> NOT APPROVED
Call IV	<input checked="" type="checkbox"/> NOTED FOR INFORMATION

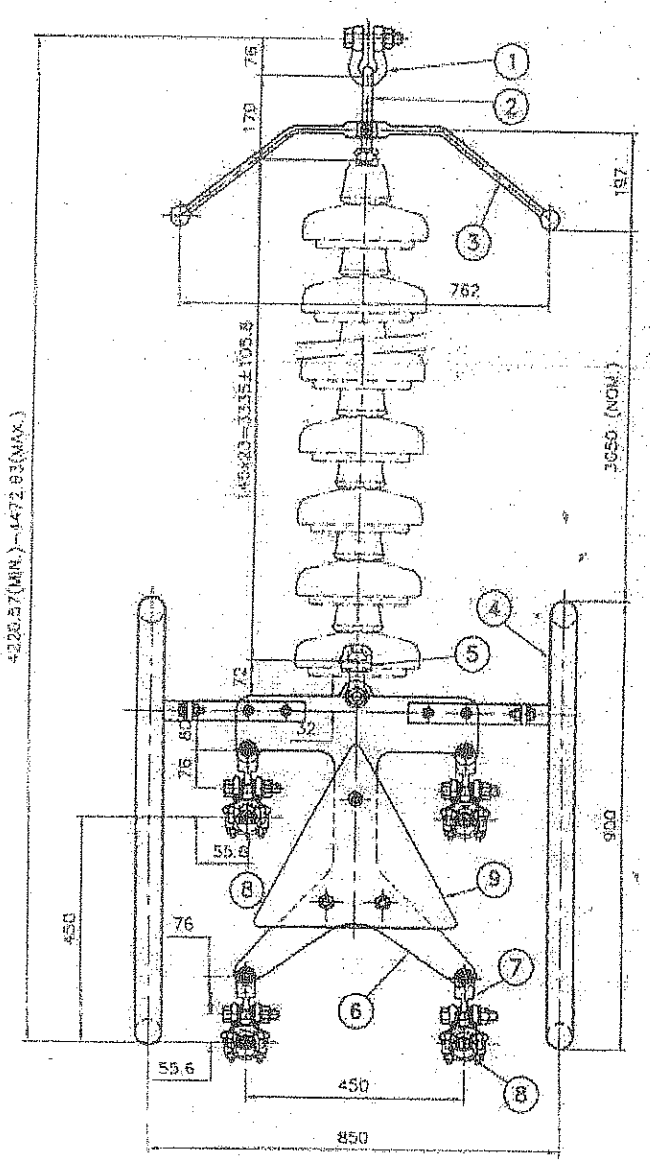
Line number: 10
 Scheme A: Part 1: 400KV D/C Transmission Line from 24800 MW, West Bengal to super with Quad Moose ACSR Power Conductor: 315kms. Part 2: Part 2: 400KV D/C Transmission Line from 24800 MW, West Bengal to super with Twin Moose ACSR Power Conductor: 400KV D/C Line: 20kms. Scheme B: 400KV D/C Transmission Line from Ganbarh (Guj.) to Hazira (Guj.) with Twin Moose ACSR Power Conductor - 97kms.
 CONTRACT AGREEMENT NO. LOI/NO: EPICL/KCL/EG1
 NAME OF CONTRACTOR: M/S KALPATARU POWER TRANSMISSION LIMITED.

ASBESCO (INDIA) PVT. LTD. Kolkata

ITEM: **DOUBLE TENSION H/WARE FITTINGS SUITABLE FOR TWIN ACSR MOOSE(400 KV).**

DRAWN	REVISION
R. Sarkar	NO DESCRIPTION BY APPD DATE
CHECKED	1 TOLERANCE OF INSULATOR CHANGED R.S. 31.10.09
APPROVED	2 AS PER COMMENTS R.S. 05.01.10
DATE 16.10.09	3 AS PER COMMENTS R.S. 17.04.10
SCALE 1:16	CUSTOMER :
ALL DIMENSIONS ARE IN mm.	ESSAR POWER TRANSMISSION CO. LTD.
DRG. NO. ADT-606/A	FORM-07/PT/ISSAR POWER TRANSMISSION CO. LTD. (REV. 27/01/2010)

C. C. Ring Part Missing



- * TECHNICAL DATA ***
- BREAKING STRENGTH OF STRING : 120 KN. (WITHOUT SUSPENSION CLAMP)
 - SLIP STRENGTH OF SUSPENSION CLAMP : 20-29 KN.
 - BALL & SOCKET DESIGNATION : 20 mm. CONFORMING TO I.S. : 2486, PART- II.
 - ALL FERROUS PARTS H.D.G. & SPRING WASHER E.G.
 - GALVANISING THICKNESS : 85 MICRONS/ 43 MICRONS FOR FASTENERS
 - MINIMUM NO. OF DIPS IN GALVANISING TEST TO WITHSTAND : 6 DIPS/4 DIPS FOR FASTENERS.
 - R.I.V. AT 305 KV. (R.M.S.) (DRY) BELOW 1000 MICRO VOLT.
 - MIN. CORONA EXTINCTION VOLTAGE (DRY) 320 K.V. (R.M.S.).
 - PROOF LOAD : 67% OF RATED U.T.S.
 - GENERAL TOLERANCE : $\pm 3\%$ UNLESS OTHERWISE SPECIFIED.
 - TOLERANCE ON LENGTH OF STRING : $\pm 2\%$.
 - BALANCING WT FOR TRANSPPOSITION TOWER ONLY.

BILL OF MATERIALS

SL. NO.	ITEM DESCRIPTION	DRG./CAT. NO.	MATERIAL	U.T.S. (K.N.)	FINISH	QTY./SET
1	ANCHOR SHACKLE	AS-3/1F	FORGED STEEL (CL-M) (I.S.2004), FORGED.	120	H.D.G.	1
2	1/4" BALL LINK	ABL-3	FORGED STEEL (CL-M) (I.S.2004), FORGED.	120	H.D.G.	1
3	ARCING HORN	AAH/TRB-1H/1	MILD STEEL FE-410 (I.S.2082), FABRICATED.	-	H.D.G.	1
4	G.C. BOLT	ACCR-1/DF	EXTRUDED AL ALLOY (19000, I.S.731) & M.S.; FE-410 (I.S. 2082)	-	-/H.D.G.	2
5	SOCKET CLEVIS	ASC-2	FORGED STEEL (CL-M) (I.S.2004), FORGED.	120	H.D.G.	1
6	YOKE PLATE	AYP-144A	MILD STEEL FE-410 (I.S.2082), FABRICATED.	120	H.D.G.	1
7	CLEVIS EYE	ACE-78/1	FORGED STEEL (CL-M) (I.S.2004), FORGED.	70	H.D.G.	4
8	SUSPENSION CLAMP	AR-08	AL ALLOY (A600/3B17) OR LMG. CASTED.	70	-	4
9	BALANCING WEIGHT (28x8-200 KGS.)	ALP-1	C.I., AS PER I.S. : 210 CASTED.	-	-	8

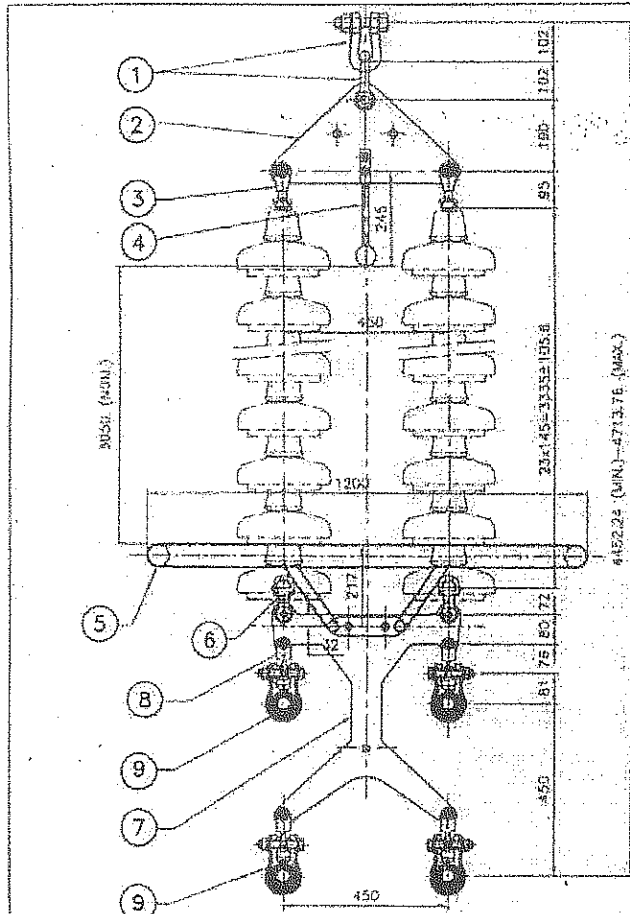
LINE DETAILS:
 Scheme A : Part I: 400KV D/C Transmission Line from 2*800 MW Mohan TPP to Sipat with Quad Moose ACSR Power Conductor: 315kms.
 Part II: LILD from 400KV S/O Vinhyachal to Korba Transmission Line of al with Twin Moose ACSR Power Conductor. 400KV D/C Line: 20kms.
 Scheme B : 400KV D/C Transmission Line from Gandhar (Guj.) to Hazira (Guj.) with Twin Moose ACSR Power Conductor: -97kms.

CONTRACT AGREEMENT NO.: LOI NO. EPTCL/ECIL/EDI

 LAHMEYER INTERNATIONAL INDIA	NAME OF CONTRACTOR: M/S. KALPATARU POWER TRANSMISSION LIMITED.
	CONSULTING ENGINEERS: KOLKATA, INDIA
THIS APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS CONTRACTUAL OBLIGATIONS.	PROJECT: 400 KV SINGLE SUSPENSION (PILOT) STRING FOR QUAD ACSR MOOSE CONDUCTOR
STATUS:	APPROVAL:
Cmt. I: <i>OK</i>	APPROVED BY: <i>B. Bhandari</i>
Cmt. II: <i>A2</i>	APPROVED WITH COMMENTS:
Cmt. III: <i>SI</i>	APPROVED NO. COMMENTS:
Cmt. IV: <i>OK</i>	APPROVED DATE: 01.03.00
Date: 18/5/10	CUSTOMER:
Signature:	ALL DIMENSIONS ARE IN mm.
PROJECT NO.: ASS-602P-Q/E	ESSAR POWER TRANSMISSION CO. LTD.

APPROVED FOR TESTING

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COMPONENT DETAILS						
ITEM NO.	ITEM DESCRIPTION	CAT. NO.	MATERIAL	FINISH	U.T.S. (K.N.)	QTY./SET
1	ANCHOR SHACKLE	AAS-6/4F	FORGED STEEL (CL-M) (I.S.2004), FORGED	H.D.G.	240	2
2	YOKE PLATE (I.S.)	AYP-7K	MILD STEEL FE-410 (I.S.2062), FABRICATED	H.D.G.	240	1
3	BALL CLEVIS	ABC-2	FORGED STEEL (CL-M) (I.S.2004), FORGED	H.D.G.	120	2
4	ARCING HORN	AAH-HRB-10E	MILD STEEL FE-410 (I.S.2062), FABRICATED	H.D.G.	-	2
5	C.C. RING	ACCR-53B	EXTRUDED AL. ALLOY, 19000, I.R. 733	-/H.D.G.	-	1
6	SOCKET CLEVIS	ASC-2	FORGED STEEL (CL-M) (I.S.2004), FORGED	H.D.G.	120	2
7	YOKE PLATE (I.S.)	AYP-168A	MILD STEEL FE-410 (I.S.2062), FABRICATED	H.D.G.	240	1
8	CLEVIS EYE	ACE-76/1	FORGED STEEL (CL-M) (I.S.2004), FORGED	H.D.G.	70	4
9	A.G.S. CLAMP	AS-42	AL. ALLOY, (LM-6), CASTED & NEOPRENE MOULDED	-	70	4

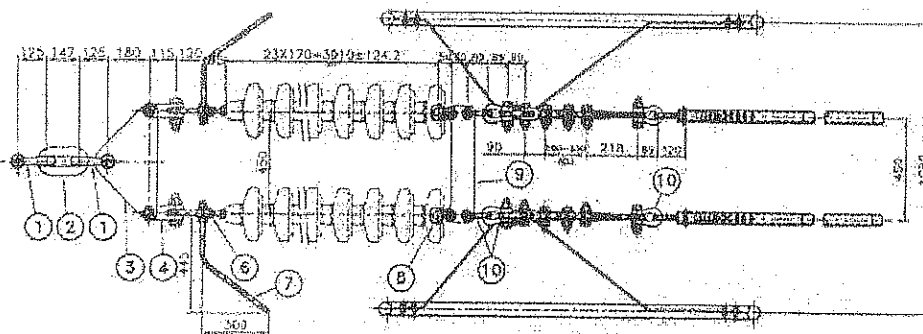
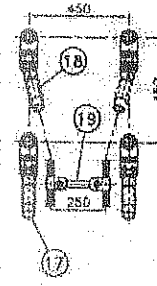
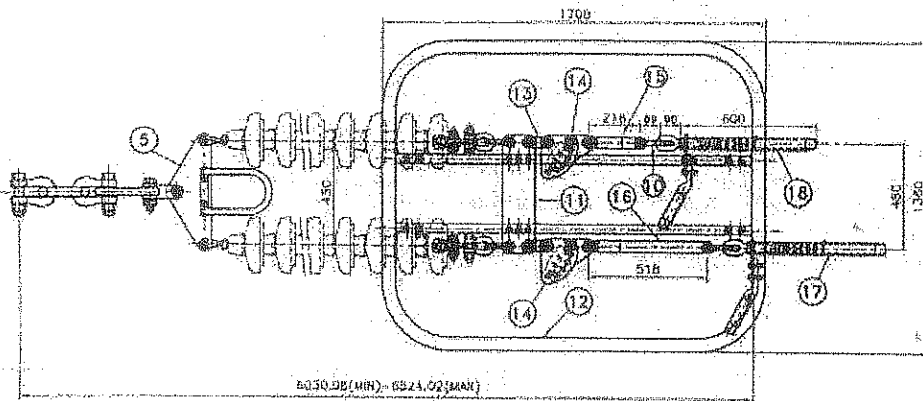
LINE DETAILS:
 Scheme A : Part 1: 400KV D/C Transmission Line from 21600 MW Mohan TPP to Sipat with Quad Moose ACSR Power Conductor 315kms.
 Part 2: LLD from 400KV S/C Vinhyachal to Korba Transmission Line of it with Twin Moose ACSR Power Conductor, 400KV D/C Line 20kms.
 Scheme B : 400KV D/C Transmission Line from Gandhar (Guj.) to Haziro (Guj.) with Twin Moose ACSR Power Conductor - 97kms.
CONTRACT AGREEMENT NO./LOI NO. : EPICL/ECIL/EOI
NAME OF CONTRACTOR : M/S KALPATARU POWER TRANSMISSION LIMITED.

- * TECHNICAL DATA ***
- BREAKING STRENGTH OF STRING : 240 KN. (WITHOUT SUSPENSION CLAMP)
 - SLIP STRENGTH OF SUSPENSION CLAMP : 20-20 KN.
 - BALL & SOCKET DESIGNATION : 20 mm. CONFORMING TO I.S. : 2485, PART - II
 - ALL FERROUS PARTS H.D.G. & SPRING WASHER E.G.
 - GALVANISING THICKNESS : 65 MICRONS/ 43 MICRONS FOR FASTENERS
 - MINIMUM NO. OF DIPS IN GALVANISING TEST TO WITHSTAND : 6 DIPS/4 DIPS FOR FASTENERS
 - R.I.V. AT 305 KV. (R.M.S.) (DRY) BELOW 1000 MICRO VOLT.
 - MIN. CORONA EXTINCTION VOLTAGE (DRY) 320 KV. (R.M.S.)
 - PROOF LOAD : 67% OF RATED U.T.S.
 - GENERAL TOLERANCE : ±3% UNLESS OTHERWISE SPECIFIED.
 - TOLERANCE ON LENGTH OF STRING : ±2%

LAHMEYER INTERNATIONAL INDIA	LAHMEYER INTERNATIONAL (INDIA) PVT. LTD. 400 V. D/C TRANSMISSION LINE		ASBESCO (INDIA) PVT. LTD. Kolkata	
	THIS APPROVAL STATUS SHALL NOT RELIEVE THE CONTRACTOR FROM HIS CONTRACTUAL OBLIGATIONS SUSPENSION STRING FOR QUAD ACSR MOOSE CONDUCTOR.			
STATUS:	DRAWN	APPROVED	NO.	REVISION
Call I	APPROVED	R. Datta	1	AS PER COMMENT
Call II	APPROVED	AS PER COMMENT	2	AS PER COMMENT
Call III	NOT APPROVED		3	
Call IV	NOT APPROVED		4	
Date	16/11/09	16/11/09	16/03/10	
Signature			CUSTOMER: ESSAR POWER TRANSMISSION CO. LTD.	
	DRS NO. ADS-8030/E		DRG-07 PVT. LTD. (ESSAR POWER) 400KV/A-678/ADS-8030/REV-2/ADS-8030/E	

APPROVED FOR CHECKING

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BILL OF MATERIALS					
ITEM NO.	COMPONENTS	QTY. NO.	MATERIAL	U.T.S. (KN.)	QTY. SET
1.	ANCHOR SHACKLE	AAS-13F	F.S.(CL. IV, I.S. 2004), H.D.G. FORGED.	640	2
2.	CHAIN LINK	ACL-E	F.S.(CL. IV, I.S. 2004), H.D.G. FORGED	640	1
3.	YOKE PLATE	AYP-1023	M.S.(I.S. 2002), FE-410, H.D.G. FABRICATED	640	1
4.	CLEVIS CLEVIS	ATCC-8	F.S.(CL. IV, I.S. 2004), H.D.G. FORGED.	320	2
5.	YOKE PLATE	AYP-85G	M.S.(I.S. 2002), FE-410, H.D.G. FABRICATED	320	2
6.	BALL CLEVIS	ABC-2	F.S.(CL. IV, I.S. 2004), H.D.G. FORGED	100	4
7.	ANCHOR HOEN	AMPHR-8N	M.S.(I.S. 2004), FE-410, H.D.G. FABRICATED	-	2
8.	ROCKET CLEVIS	ASC-2R	F.S.(CL. IV, I.S. 2004), H.D.G. FORGED	160	4
9.	YOKE PLATE	AYP-145A	M.S.(I.S. 2002), FE-410, H.D.G. FABRICATED	320	2
10.	ANCHOR SHACKLE	AAS-1801	F.S.(CL. IV, I.S. 2004), H.D.G. FORGED	160	12
11.	YOKE PLATE	AYP-118	M.S.(I.S. 2002), FE-410, H.D.G. FABRICATED	320	2
12.	C.C. RING	ACRR-63	EXTRUDED AL. ALLOY (18000, I.S. 733) & M.S.(I.S. 2002), H.D.G.	-	2
13.	CLEVIS EYE	ACE-80	F.S.(CL. IV, I.S. 2004), H.D.G. FORGED	100	4
14.	SPACER PLATE	AGA-59	M.S.(I.S. 2002), FE-410, H.D.G. FABRICATED	180	4
15.	EXTENSION STRAP	ACL-186	M.S.(I.S. 2002), FE-410, H.D.G. FABRICATED	160	2
16.	EXTENSION STRAP	ACL-187	M.S.(I.S. 2002), FE-410, H.D.G. FABRICATED	160	2
17.	DEAD END ASSY.	ACEA-0810	EXTRUDED AL. TUBE (18000, I.S. 733) & F.S.(CL. IV, I.S. 2004), H.D.G. FORGED	153.14	2
18.	DEAD END ASSY.	ACEA-0810H	EXTRUDED AL. TUBE (18000, I.S. 733) & F.S.(CL. IV, I.S. 2004), H.D.G. FORGED	153.14	2
19.	RING SPACER	ARR-0810/0820	EXTRUDED AL. ALLOY (6000, I.S. 817) CASTED	-	1

LINK DETAILS:
 Scheme A : Part 1: 400KV D/C Transmission Line from 2*600 MW Melnar TPP to Sipat with Good Moose ACSR Power Conductor: 315kms.
 Part 2: LILD from 400KV S/C Vadhyaol to Korba Transmission Line at of with Twin Moose ACSR Power Conductor: 400KV D/C Line: 20kms.
 Scheme B : 400KV D/C Transmission Line from Gondhar (Guj.) to Mairia (Guj.) with Twin Moose ACSR Power Conductor - 87kms.

- * TECHNICAL DATA ***
- U.T.S. OF HARDWARE FITTINGS (WITHOUT TENSION CLAMP) : 640 KN.
 - SLIP/MECHANICAL STRENGTH OF DEAD END ASSY. : 153.14 KN.
 - BALL & SOCKET DESIGNATION : 20mm. CONFORMING TO I.S. 2488, PART-II.
 - ALL FERROUS PARTS HDG & SPRING WASHER E.G.
 - GALVANISING THICKNESS : 85 MICRONS/ 43 MICRONS FOR FASTENERS
 - MINIMUM NO. OF DIPS IN GALVANISING TEST TO WITHSTAND : 5 DIPS/4 DIPS FOR FASTENERS.
 - STAINLESS STEEL "R" TYPE SECURITY CLIP WILL BE PROVIDED WITH ALL SOCKET FITTINGS.
 - R.I.V AT 30k KV. (R.M.S.)(DRY) BELOW 1000 MICRO VOLT.
 - MIN. CORONA EXTINCTION VOLTAGE (DRY) 320 K.V.(R.M.S.).
 - PROOF LOAD : 67% OF RATED U.T.S.
 - GENERAL TOLERANCE : ±3% UNLESS OTHERWISE SPECIFIED.
 - TOLERANCE ON LENGTH OF STRING : ±2%.

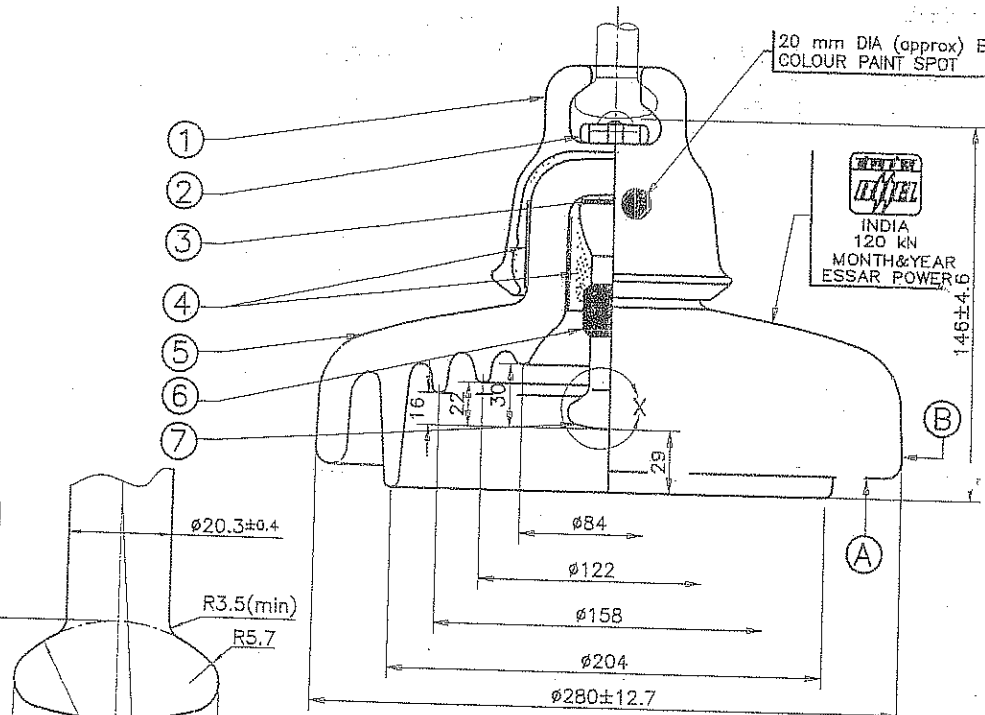
LAHMEYER INTERNATIONAL INDIA		LAHMEYER INTERNATIONAL (INDIA) PVT. LTD. CONSULTING ENGINEERS, KOLKATA, INDIA	
THIS APPROVAL SIGNATURE OF THE CONTRACTOR FROM THE CONTRACTUAL OBLIGATIONS.			
NAME OF CONTRACTOR: M/S KALPATARU POWER TRANSMISSION LIMITED.			
CONTRACT AGREEMENT NO.: LCH NO.: EPTCL/ECIL/EOT			
ITEM: 400 KV QUAD TENSION STRING FOR QUAD ACSR MOOSE CONDUCTOR			
STATUS	APPROVED	REVISION	
Call I	APPROVED	1	NO. OF INSULATOR CHANGED
Call II	APPROVED	2	REPLACEMENT OF INSULATOR CHANGED
Call III	NOT APPROVED	3	AS PER COMMENTS
Call IV	NOT APPROVED	4	AS PER COMMENTS
Date: 03/11/10	Signature: [Signature]	Signature: [Signature]	Signature: [Signature]
ALL DIMENSIONS ARE IN mm. ESSAR POWER TRANSMISSION CO, LTD.			
DRG. NO: AQT-608A		FLOOR-07, PPT, ESSAR POWER TRANSMISSION CO, 400KV, 876 VARI-608A, RDY-23/01-008A	

APPROVED FOR TESTING

REV A1 EL DG 3 980 22 00400

TECHNICAL PARTICULARS

- BALL & SOCKET COUPLING DESIGNATION (IS:2486 (Part-II)-1989) 20 mm
- CREEPAGE DISTANCE- TOTAL mm 470+30-0
- ELECTROMECHANICAL FAILING LOAD kN 120
- DRY POWER FREQUENCY FLASHOVER VOLTAGE kV (rms) 95
- DRY POWER FREQUENCY WITHSTAND VOLTAGE kV (rms) 85
- WET POWER FREQUENCY FLASHOVER VOLTAGE kV (rms) 55
- WET POWER FREQUENCY WITHSTAND VOLTAGE kV (rms) 50
- IMPULSE FLASHOVER VOLTAGE - DRY (+ve & -ve) kVp 150
- IMPULSE WITHSTAND VOLTAGE - DRY (+ve & -ve) kVp 140
- MINIMUM VISIBLE DISCHARGE VOLTAGE UNDER DRY CONDITION kV (rms) 18
- POWER FREQUENCY PUNCTURE VOLTAGE kV (rms) 130
- MAXIMUM RIV AT 10 kV(rms) microvolts 50
- PURITY OF ZINC USED FOR GALVANISING(MIN) % 99.95
- PURITY OF ZINC FOR ZINC SLEEVE % 99.8
- ZINC SLEEVE EXPOSED LENGTH(MIN) mm 10
- ZINC SLEEVE THICKNESS mm 5
- STANDARD TESTING SPEC. IS:731/IEC-383 (LATEST REVISION)



- NOTES :
- AXIAL AND RADIAL RUN OUT AS PER IEC :383
A) VARIATION AT 'A' 4 % OF NOMINAL DIA - 11.2 mm
B) VARIATION AT 'B' 3 % OF NOMINAL DIA - 8.4 mm
 - PERMISSIBLE LIMITS & VISUAL DEFECTS ON PORCELAIN WILL BE AS PER QA PLAN
 - UNTOLERANCED DIMENSIONS INDICATED ARE FOR REFERENCE PURPOSE ONLY AND NOT FOR INSPECTION
 - * CONFORMING TO GRADE O80M40 OF BSEN :10083-1:1996
** CONFORMING TO GRADE BM 320 OF IS:14329-1995
***CONFORMING TO GRADE 450/10 OF IS:1865-1991

DETAILS AT 'X'

REFER NOTE No. 1 OF TECHNICAL PARTICULARS

CONTROLLED COPY

ITEM No.	DESCRIPTION	MATERIAL	(No.) QTY
7	BALL PIN	FORGED STEEL*	1
6	SLEEVE	ZINC	1
5	SHELL	PORCELAIN	1
4	BINDING MATERIAL	PORTLAND CEMENT	-
3	CUSHION	CORK/SYN.FOAM	1
2	STANDARD SPLIT PIN	STAINLESS STEEL	1
1	SOCKET CAP	M.C.IRON**/S G IRON ***	1

NAME OF CUSTOMER : M/s ESSAR POWER TRANSMISSION COMPANY Ltd., (EPTCL)
 NAME OF PROJECT : 2 x 600 MW MAHAN THERMAL POWER PROJECT, MADHYA PRADESH
 SPECIFICATION NUMBER : L11-GE0E07284-503-T-068 R3
 LETTER OF INTENT No. & DATE : EPL/EPTCL/0128 Dtd. 04 01 2010

BHARAT HEAVY ELECTRICALS LTD., ELECTROPORCELAINS DIVISION BANGALORE - 560 012		NAME	SIGN	DATE
DRN	N K IDDLAGI	N K Idlagi		09 01 2010
CHD	B M H	B M H		09.01.10
APPD	Y B R	Y B R		09.01.2010

DEPT	GRADE OF TOL DIM	SCALE	WEIGHT (kg)	REF TO ASSY.DRG	ITEM No.	No. OF ITEMS
	C/M/F	N T S	7.7 (Approx)			
TITLE				CARD CODE	REV.	
ANTI FOG DISC INSULATOR FOR 120. kN EMS (WITH ZINC SLEEVE)				DRAWING No.	EL DG 3 980 22 00400 A1	
				SUB No. 04	No. OF SHEETS	

DESIGNED BY	DATE	APPROVED BY	DATE
CHECKED BY	DATE	APPROVED BY	DATE
INVENTORY	DATE	APPROVED BY	DATE

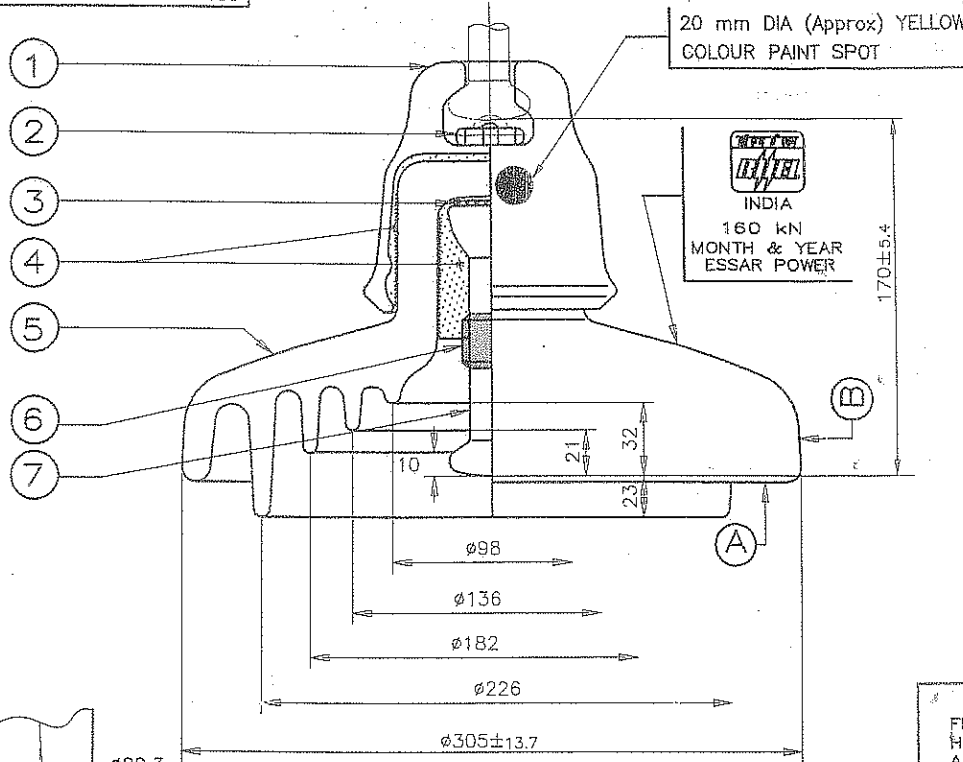
REV	DATE	ALTERED	REV	DATE	ALTERED
A1	9 1 10	CHECKED			

1 DRAWING REVISED & REDRAWN
 2 LOI NUMBER ADDED
 3 PAINT COLOUR SPOT WAS YELLOW
 4 BALL PIN DETAILS ADDED
 REFER PH No. 5350

Page 1 of 5

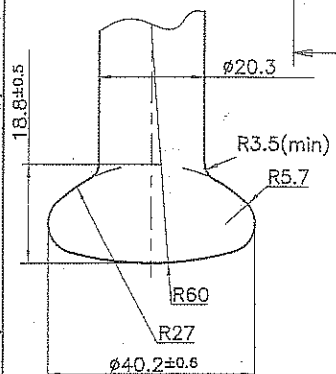
REV M 00200 33 980 3 90 13
DRG No.

TECHNICAL PARTICULARS



1. BALL & SOCKET COUPLING DESIGNATION (IS:2486 (Part-II)-1989)	mm	20 mm
2. CREEPAGE DISTANCE- TOTAL	mm	470+30-0
3. ELECTROMECHANICAL FAILING LOAD	kN	160
4. DRY POWER FREQUENCY FLASHOVER VOLTAGE	kV (rms)	95
5. DRY POWER FREQUENCY WITHSTAND VOLTAGE	kV (rms)	85
6. WET POWER FREQUENCY FLASHOVER VOLTAGE	kV (rms)	55
7. WET POWER FREQUENCY WITHSTAND VOLTAGE	kV (rms)	50
8. IMPULSE FLASHOVER VOLTAGE - DRY (+ve & -ve) kVp		150
9. IMPULSE WITHSTAND VOLTAGE - DRY (+ve & -ve) kVp		140
10. MINIMUM VISIBLE DISCHARGE VOLTAGE UNDER DRY CONDITION	kV (rms)	18
11. POWER FREQUENCY PUNCTURE VOLTAGE	kV (rms)	160
12. MAXIMUM RIV AT 10 kV(rms)	microvolts	50
13. PURITY OF ZINC USED FOR GALVANISING(MIN)	%	99.95
14. PURITY OF ZINC FOR ZINC SLEEVE	%	99.8
15. ZINC SLEEVE EXPOSED LENGTH(MIN)	mm	10
16. ZINC SLEEVE THICKNESS	mm	5
17. STANDARD TESTING SPEC. IS:731/IEC-383 (LATEST REVISION)		

CONTROLLED COPY



- NOTES :
- AXIAL AND RADIAL RUN OUT AS PER IEC :383
A) VARIATION AT 'A' 4 % OF NOMINAL DIA - 12.2mm
B) VARIATION AT 'B' 3 % OF NOMINAL DIA - 9.15mm
 - PERMISSIBLE LIMITS & VISUAL DEFECTS ON PORCELAIN WILL BE AS PER QA PLAN
 - UNTOLERANCED DIMENSIONS INDICATED ARE FOR REFERENCE PURPOSE ONLY AND NOT FOR INSPECTION
 - * CONFORMING TO GRADE O80M40 OF BSEN :10083-1:1996
** CONFORMING TO GRADE BM 320 OF IS:14329-1995
*** CONFORMING TO GRADE 450/10 OF IS:1865-1991

FERROUS PARTS ARE HOT-DIP GALVANIZED AS PER IS:2629 AND TESTS CONFORM TO IS:2633/IEC-383/BS EN ISO 1461(LATEST REVISION)	7	BALL PIN	FORGED STEEL*	1
	6	SLEEVE	ZINC	1
	5	SHELL	PORCELAIN	1
	4	BINDING MATERIAL	PORTLAND CEMENT	-
	3	CUSHION	CORK/SYN. FOAM	1
	2	STANDARD SPLIT PIN	STAINLESS STEEL	1
	1	SOCKET CAP	M.C.IRON**/S G IRON ***	1
ITEM No.	DESCRIPTION	MATERIAL	QTY	

CUSTOMER NAME : M/s ESSAR POWER TRANSMISSION COMPANY Ltd., (EPTCL)
 PROJECT NAME : 2 x 600 MW MAHAN THERMAL POWER PROJECT, MADHYA PRADESH
 SPECIFICATION NUMBER : L11-GEOED7284-503-T-068 R3
 LETTER OF INTENT No. & DATE : EPL/EPTCL/D128 Dtd. 04 01 2010

BHARAT HEAVY ELECTRICALS LTD. ELECTROPORCELAINS DIVISION BANGALORE - 560 012	DRN	N K IDDALAGI	N K Idalagi	09 01 2010
	CHD	B M H	B M H	09 01 10
	APPD	Y B R	Y B R	09/01/2010

DETAILS AT 'X'

REFER NOTE No. 1 OF TECHNICAL PARTICULARS

REV	DATE	ALTERED	REV	DATE	ALTERED
1	9 1 10	CHECKED	1	9 1 10	CHECKED

1 DRAWING REVISED & REDRAWN
 2 LOI NUMBER ADDED
 3 PAINT COLOUR SPOT WAS GREEN
 4 BALL PIN DETAILS ADDED

REFER PH No. 5350

DEPT	GRADE OF TOL DIM	SCALE	WEIGHT (kg)	REF TO ASSY.DRG	ITEM No.	No. OF ITEMS
	C/M/F	NTS	10 (APPROX)			
TITLE				CARD CODE	DRAWING No.	REV.
ANTI FOG DISC INSULATOR FOR 160 KN EMS (WITH ZINC SLEEVE)					EL DG 3 980 33 00200	A1
				SUB No. 18	No. OF SHEETS	