	BIHAR STATE POWER TRANSMISSION COMPANY LIMITED					
	MANUFACTURING QUALITY PLAN -- Wave Trap					
Manufacturer's Logo	<u>Manufacturer, Name and Address</u>	Customer BSPTCL	<u>Vendor's Code</u>	<u>Item :</u> LINE TRAP -upto 400 kV	QP No. : 022 Rev. No. : 00 Date : 04.01.2016	Valid From : 15.01.2016 Valid Upto : Till Revision

INDEX SHEET

Sl. No.	CONTENTS	PAGE Nos.
1	Notes & Codes	1,2
2	Process Flow chart	3
3	Raw Material Inspection	04 -- 11
4	In-Process Inspection	12
5	Final Acceptance Inspection & Testing	13
6	Packing & Despatch	13
7	List of approved component manufacturers for which approval is envisaged	14
8	Revision History	15



MANUFACTURING QUALITY PLAN -- Wave Trap

Manufacturer's Logo	<u>Manufacturer, Name and Address</u>	Customer BSPTCL	<u>Vendor's Code</u>	<u>Item :</u> LINE TRAP - upto 400 kV	QP No. : 022 Rev. No. : 00 Date : 04.01.2016	Valid From : 15.01.2016 Valid Upto : Till Revision
----------------------------	--	-------------------------------	-----------------------------	--	---	---

Code 1 Indicates place where testing is planned to be performed i.e. Inspection location A At Equipment Manufacturer's works B At Component Manufacturer's works C At Authorised Distributor's place D At Independent Lab E At Turn Key Contractor's location F Not specified	Code 2 Indicates who has to perform the tests i.e. Testing Agency J The Equipment Manufacturer K The Component Manufacturer L The Third Party M The Turnkey Contractor
Code 3 Indicates who shall witness the tests i.e. Witnessing Agency P Component Manufacturer itself Q Component Manufacturer and Equipment Manufacturer R Component Manufacturer, Equipment Manufacturer and Contractor S Equipment Manufacturer itself T Equipment Manufacturer and Contractor U Equipment Manufacturer, Contractor and/or BSPTCL V Third Party itself	Code 4 Review of Test Reports/Certificates W By Equipment manufacturer X By Contractor during product/process inspection Y By BSPTCL during product/process inspection Z By Contractor and / or BSPTCL during product/process inspection
Code 5 Whether specific approval of sub-vendor / Component make is envisaged? E Envisaged N Not Envisaged	Code 6 Whether test records required to be submitted after final inspection for issuance of Dispatch Instructions & Clearance Y Yes N No

Notes:

- The MQP should be read in conjunction with BSPTCL specification and shall deem to include additional tests if any required as per the contract.
- BSPTCL specification shall include provisions of letter of Award , BSPTCL approved drawings /technical data sheet / BOM / test schedule / test procedure applicable to the specific contract.
- In case of any contradiction between the manufacturer's plant standards , this MQP and BSPTCL specification following precedence shall be followed :-
 - BSPTCL specification .
 - This Manufacturing Quality plan .
 - Manufacturer's plant standards .
- It is the responsibility of the manufacturer to ensure that this document is readily available at their works , as well as at the works of their sub vendors in order to avoid any delay at the time of inspection.
- The manufacturer shall ensure that their as well as their sub vendors control , metering & testing instruments are duly calibrated and should have calibration certificates traceable . to Indian / International standards . Calibration records should be available during inspection by BSPTCL . Key testing instruments will be calibrated only by NABL accredited laboratories .
- In case of any tests being carried out at third party lab , such lab / facility should be NABL accredited / accepted by BSPTCL.



MANUFACTURING QUALITY PLAN -- Wave Trap

Manufacturer's Logo	<u>Manufacturer, Name and Address</u>	Customer BSPTCL	<u>Vendor's Code</u>	<u>Item :</u> LINE TRAP - upto 400 kV	QP No. : 022 Rev. No. : 00 Date : 04.01.2016	Valid From : 15.01.2016 Valid Upto : Till Revision
----------------------------	---------------------------------------	-------------------------------	----------------------	---	---	---

7. The manufacturer shall maintain the proper co-relation of test certificates from raw material stage to finished product stage and the records should be available during inspection by BSPTCL.

8. Terminal connectors to be inspected separately as per BSPTCL .

9. Manufacturer shall show the approval of BSPTCL Engineering for all contract specific type tests , including specific type tests if any as per the BSPTCL specification, at the time of final inspection

10. All packing cases should be marked with BSPTCL LOA details , name of project , item description and Dispatch Instructions & Clearance number (by which material has been cleared for dispatch) .

11. One copy of test report , Dispatch Instructions & Clearance shall also be sent along with consignment .

12. Inspection of spare items ordered by BSPTCL shall also be governed by the provisions of this MQP . Items if not governed under MQP shall be offered for inspection as per BSPTCL specifications / Relevant-Indian / International Specification .

13. The manufacturer shall align their quality system and that of their sub-vendors to the requirements of latest ISO 9000 quality standards in a time bound manner .

14. BSPTCL may review the effective implementation of the processes during the product-inspection / process-inspection.
In case any violation in process or process parameters are observed, the reason along with corrective & preventive measures shall be conveyed to BSPTCL within 2 weeks.

15. Any change in design / process / sub-vendors shall call for review by BSPTCL and revision of MQP, if necessary.

EM : Equipment Manufacturer

CM : Component Manufacturer

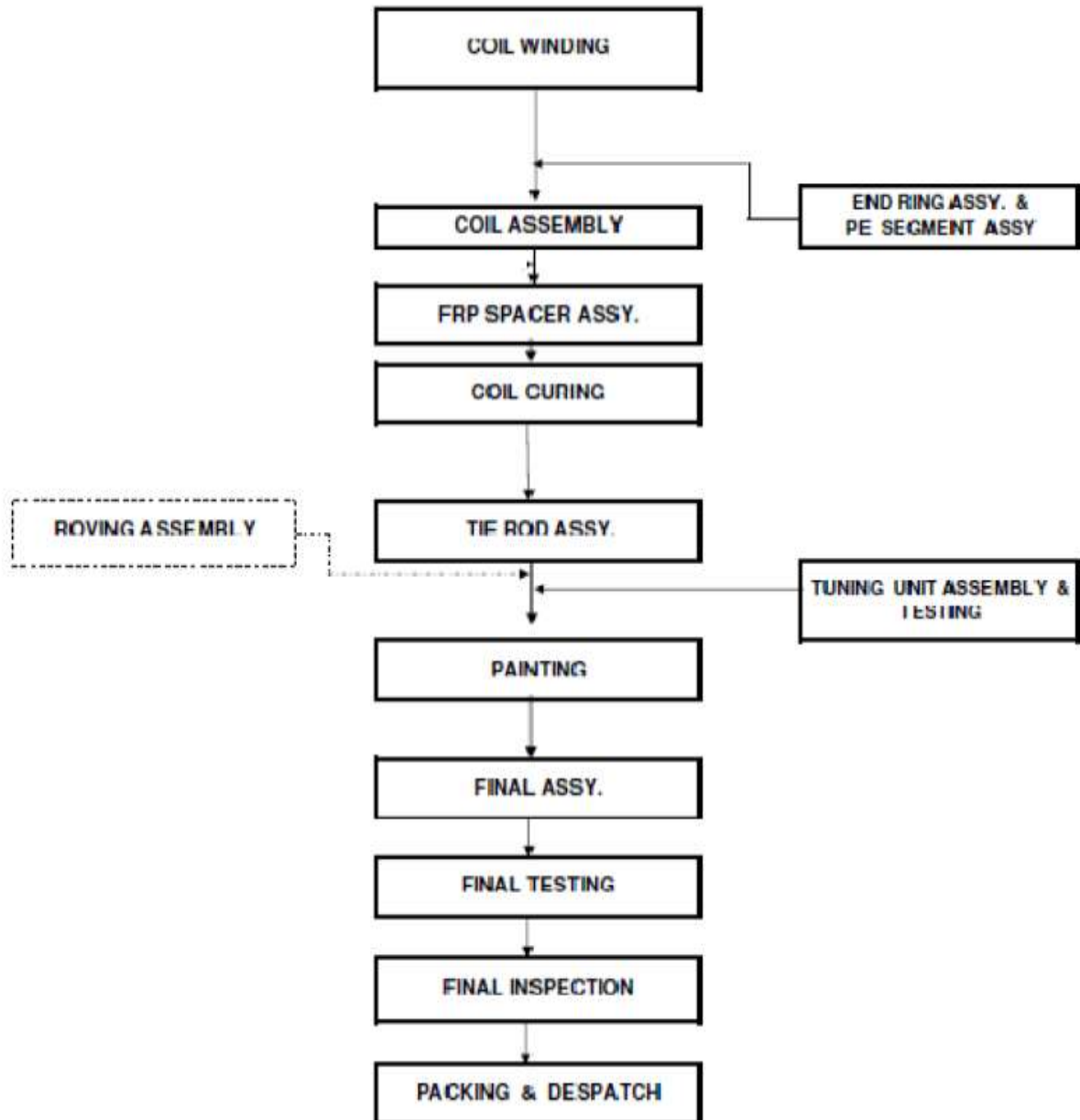
MPR : Manufacturing Process Record



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- Wave Trap

FLOW CHART upto 400 kV WT (MQP No. 022 , Rev.00)





BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- Wave Trap

Manufacturer's Logo	Manufacturer, Name and Address	Customer	Vendor's Code	Item :	QP No. : 022	Valid From : 15.01.2016	
					Rev. No. : 00		Valid Upto : Till Revision
					Date : 04.01.2016		
BSPTCL				LINE TRAP -upto 400 kV			

Sl. No	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference Document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
A	<u>Raw Material Inspection</u>												
1	ALUMINIUM CONDUCTOR												
1.1	Tensile Strength [min] [max]	Mechanical	1 Sample / lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn 23 Kg / mm ² 30 Kg / mm ²	Component Mfg's TC	B	K	P	W			N
1.2	Proof Stress [0.2%] [min] [max]	Mechanical	1 Sample / lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn 20 Kg / mm ² 27 Kg / mm ²	Component Mfg's TC	B	K	P	W			N
1.3	Electrical Conductivity [min] [max]	Electrical	1 Sample / lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn 48 % IACS 56 % IACS	Component Mfg's TC	B	K	P	W			N
1.4	Chemical Composition [max] [max] [max] [max] [max] [max]	Chemical	1 Sample / lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn Si : 0.45 - 0.7 % Mg : 0.45 - 0.7 % Fe : 0.4 % Cu : 0.05 % Mn : 0.1 % Zn : 0.1 % Ti : 0.1 % Cr : 0.05 % Balance - aluminium	Component Mfg's TC	B	K	P	W			N
1.5	Dimensional check	Physical	1 sample / lot	Plant Drg	Plant Drg	Eqpt. Mfg's TC	A	J	S	W			N



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- Wave Trap

Manufacturer's Logo	Manufacturer, Name and Address	Customer	Vendor's Code	Item :	QP No. : 022	Valid From : 15.01.2016	
					Rev. No. : 00		Valid Upto : Till Revision
					Date : 04.01.2016		
BSPTCL				LINE TRAP -upto 400 kV			

Sl. No	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference Document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
3.3	Temperature Compatibility	Thermal	One Sample from each lot of 500 Nos or thereof	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn No Deformation when kept at 155 Deg C for 24 hrs	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W		N N	
3.4	Bending Strength [min]	Mechanical	One Sample from each lot of 500 Nos or thereof	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn 40 Kg / mm ²	Component Mfg's TC / Third Party Report	B D	K L	P V	W W		N N	
4	PRE PREG FOIL											N	
4.1	Visual Check	Visual	100%	EM Specn.	EM Specn.	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W		N N	
5	PERMA GLASS ROD (FRP ROD)											N	
5.1	Dimension	Physical	1 Sample / Lot	EM Plant Drawing	EM Plant Drawing Compliance to Plant Drg	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W		N N	
5.2	Visual Inspection	Visual	100%	EM Specn.	EM Specn.	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W		N N	
5.3	Tensile Strength [min]	Mechanical	1 Sample / Lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn	Component Mfg's TC	B	K	P	W		N	
15.4	Voltage Test	Electrical	1 Sample / Lot	EM Specn.	EM Specn. Min - 1.5 times of sparkover voltage of respective LA used	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W		N N	



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- Wave Trap

Manufacturer's Logo	Manufacturer, Name and Address	Customer	Vendor's Code	Item :	QP No. : 022	Valid From : 15.01.2016	
					Rev. No. : 00		Valid Upto : Till Revision
					Date : 04.01.2016		
BSPTCL				LINE TRAP -upto 400 kV			

Sl. No	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference Document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks		
							1	2	3	4	5	6			
11	CAPACITORS														
11.1	Capacitance	Electrical	5 samples / lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn + / - 10 %	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W				N N	
11.2	P. F. Voltage Test	Electrical	1 sample / lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn 1.5 kV for 5 Secs	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W				N N	
11.3	Loss Angle (Tan Delta) [max]	Electrical	1 sample / lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn 0.002	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W				N N	
12	BIRD BARRIER														
12.1	Dimension	Physical	1 sample / lot	EM Plant Drawing	EM Plant Drawing Compliance to Plant Drg	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W				N N	
12.2	Temperature Compatibility	Thermal	1 sample / lot	EM Specn. BSPTCL specn	EM Specn. BSPTCL specn No Deformation at 155 ⁰ C. for 24 hours	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W				N N	
12.3	Visual Inspection	Visual	100%	EM Specn.	EM Specn.	Component Mfg's TC / Eqpt. Mfg's TC	B A	K J	P S	W W				N N	



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- Wave Trap

Manufacturer's Logo	Manufacturer, Name and Address	Customer	Vendor's Code	Item :	QP No. : 022	Valid From : 15.01.2016	
					Rev. No. : 00		Valid Upto : Till Revision
					Date : 04.01.2016		
BSPTCL				LINE TRAP -upto 400 kV			

Sl. No	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference Document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks	
							1	2	3	4	5	6		
16.0	iii) Elongation [min]	[Stainless Steel - APL, KUN, LPS, SAI]	One sample / section / lot	EM Specn.	EM Specn. 23%	Component Mfr's TC / Third Party Report	B D	K L	P V	W W		N N		
	d) Chemical Composition [max] [max] [max]		Chemical	One sample / section / lot	EM Specn.	EM Specn. Carbon - 0.23 % Sulphur - 0.050 % Phosphorus - 0.050 %	Component Mfr's TC / Third Party Report	B D	K L	P V	W W		N N	
	e) Hot Dip Galvanising i) Thickness		Physical	On component	IS - 2633 , 2629 BSPTCL specn.	IS - 2633 , 2629 BSPTCL specn. 5mm thick & above - 85 micron 2mm thick to below 5mm - 64 mic	Component Mfr's TC / Eqpt. Mfg's TC	B A	K J	P S	W W		N N	
	ii) Adhesion Test [Pivot Hammer Test]		Mechanical	One sample / lot	IS - 2633 , 2629 BSPTCL specn.	IS - 2633 , 2629 BSPTCL specn. Coating should not peel off	Component Mfr's TC	B	K	P	W		N	
	ii) Strip Test [min] [Wt. Of Zinc coating] a) 5mm thick & above b) 2mm thick to below 5mm c) 1.2mm thick to below 2mm		Chemical	One sample / section / lot	IS - 2633, 2629, 4759 / BSPTCL specn.	IS - 2633, 2629, 4759 / BSPTCL specn. 610 gm / m ² 460 gm / m ² 340 gm / m ²	Component Mfr's TC	B	K	P	W		N	
	iii) Precece Test [Uniformity of Zn coating]		Chemical	One sample / lot	IS - 2633 , 2629 BSPTCL specn.	IS - 2633 , 2629 BSPTCL specn. No reddish deposit of copper after 6 dips in CuSo4 Solution	Component Mfr's TC	B	K	P	W		N	
														E
16.1	Verification of Make	Visual	10%	BSPTCL Approved List	BSPTCL Approved List	Eqpt. Mfg's TC	A	J	S	W		N		



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- Wave Trap

Manufacturer's Logo	Manufacturer, Name and Address	Customer	Vendor's Code	Item :	QP No. : 022	Valid From : 15.01.2016	
					Rev. No. : 00		Valid Upto : Till Revision
					Date : 04.01.2016		
BSPTCL				LINE TRAP -upto 400 kV			

Sl. No	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference Document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
B	<u>INPROCESS INSPECTION</u>												
1.0	WINDINGS												
1.1	Diameter	Physical	100%	APPROVED DRAWING	APPROVED DRAWING	Equip. Mfg's Log Book	A	J	S	W		N	
1.2	Number Of Turns	Physical	100%	PLANT DRAWING	PLANT DRAWING	Equip. Mfg's Log Book	A	J	S	W		N	
1.3	Weight	Physical	1 Sample / lot	APPROVED DRAWING	APPROVED DRAWING	Equip. Mfg's Log Book	A	J	S	W		N	
2.0	Assembly Of Coil												
2.1	Dimensions	Physical	1 Sample / lot	PLANT STANDARD	PLANT STANDARD	MPR Card	A	J	S	W		N	
3.0	CURING												
3.1	Gluing	Thermal	100%	PLANT STANDARD	PLANT STANDARD	MPR Card	A	J	S	W		N	
4	WELDING												
4.1	Welding Procedure Specification						A	J	S	W		N	
4.1	Welders Procedure Qualification						A	J	S	W		N	
5.0	TUNING UNIT (Before Foaming)												
5.1	Adjustment for R. min (Blocking Impedence)	Electrical	100%	BSPTCL Specn.	BSPTCL Specn.	Equip. Mfg's Log Book	A	J	S	W		N	
6.0	TUNING UNIT (After Foaming)												
6.1	Measurement of R. min (Blocking Impedence)	Electrical	100%	BSPTCL Specn.	BSPTCL Specn.	Equip. Mfg's Log Book	A	J	S	W		N	
6.2	DP Test On load bearing members	Chemical	1 Sample / lot		No Dye Penetration	Equip. Mfg's Log Book	A	J	S	W		N	



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

MANUFACTURING QUALITY PLAN -- Wave Trap

Manufacturer's Logo	Manufacturer, Name and Address	Customer	Vendor's Code	Item :	QP No. : 022	Valid From : 15.01.2016	
					Rev. No. : 00		Valid Upto : Till Revision
					Date : 04.01.2016		
BSPTCL				LINE TRAP -upto 400 kV			

Sl. No	Components / Operations & Description of Test	Type of Check	Quantum of Check / Sampling with basis	Reference Document for Testing	Acceptance Norms	Format of Record	Applicable Codes						Remarks
							1	2	3	4	5	6	
C	<u>FINAL ACCEPTANCE & TESTING</u>												
	<u>ROUTINE TEST / ACCEPTANCE TEST</u>												
1.0	Dimensional & Visual Check	Physical	1 Sample / ;lot	BSPTCL specn / Approved Drawings	BSPTCL specn / Approved Drawings	Eqpt. Mfg's TC	A	J	S	W/Z		Y	
2.0	Measurement of Blocking Resistance & Impedence	Electrical	100%	IEC - 60353 / BSPTCL specn	IEC - 60353 / BSPTCL specn	Eqpt. Mfg's TC	A	J	S	W/Z		Y	
3.0	Measurement of rated inductance of the main coil [At 100 k Hz]	Electrical	100%	IEC - 60353 / BSPTCL specn	IEC - 60353 / BSPTCL specn	Eqpt. Mfg's TC	A	J	S	W/Z		Y	
4.0	Measurement of Power Frequency Inductance of the main coil [At 100 k Hz]	Electrical	100%	IEC - 60353 / BSPTCL specn	IEC - 60353 / BSPTCL specn	Eqpt. Mfg's TC	A	J	S	W/Z		Y	
5.0	Power Frequency voltage test on tuning device	Electrical	100%	IEC - 60353 / BSPTCL specn	IEC - 60353 / BSPTCL specn	Eqpt. Mfg's TC	A	J	S	W/Z		Y	
D	<u>PACKING & DESPATCH</u>												
i)	Verification of Completeness of Stage as appearing In MQP	Physical	100%	EM Packing Instruction	EM Packing Instruction	-	A	J	S	W		N	
ii)	Check for Finish	Visual	100%	EM Packing Instruction	EM Packing Instruction	-	A	J	S	w		N	
iii)	Check for Packing	Visual	100%	EM Packing Instruction	EM Packing Instruction	-	A	J	S	w		N	


BIHAR STATE POWER TRANSMISSION COMPANY LIMITED
MANUFACTURING QUALITY PLAN -- Wave Trap

VENDOR LIST

VENDOR LIST FOR RAW MATERIALS & BOUGHT OUT ITEMS

LINE TRAP [MQP NO. 022 ,Rev.00]

1 ALUMINIUM CONDUCTOR

M/S. JINDAL ALUMINIUM LTD.,
BANGALORE

M/S. HINDALCO
KALAMASSERY - 683 104, KERALA

2 CROSS ARM / AL. BOX SECTION

M/S. JINDAL ALUMINIUM LTD.,
BANGALORE

M/S. HINDALCO
KALAMASSERY - 683 104, KERALA

3 LIGHTNING ARRESTER

M/S. OBLUM ELECTRICAL IND
HYDERABAD

M/S. RAYCHEM RPG PVT LTD (TYCO)
NEAR HALOL GIDC, DIST PANCHMAHAL

4 TUNING UNIT CAPACITORS

M/S. FILICON ELECTRONICS PVT LTD.,
BANGALORE

M/S. REVATHI ELECTRONICS PVT LTD.,
HYDERABAD

M/S. CTR MANUFACTURING LTD
AURANGABAD

5 TERMINAL CONNECTORS

M/S. MEGHA ENGINEERING ENTERPRISES IND.
CHENNAI

M/S. KLEMMEN ENGG. CORPORATION
CHENNAI

M/S. VESUN TECHNOLINCKS PVT LTD.,
CHENNAI

6 SUSPENSION HARDWARES

M/S. TYCO ELECTRONICS SYSTEMS INDIA PVT. LTD
BANGALORE

M/S. ASBESCO (INDIA) PVT LTD.,
BALTIKURI, HOWARAH

M/S. INTERNATIONAL TRANSMISSION PRODUCTS P LTD
TAT : SHAHAPUR, DIST : THANE

M/S. EMI TRANSMISSION LTD.,
TAL : SINNAR, DIST. NASIK

M/S. RASTRAUDHYOG LTD
KOLKATA

M/S. TAG CORPORATION
CHENNAI

7 FASTENERS

GKW MAKE
NEXO MAKE BRK MAKE
REEMAX MAKE ASP MAKE

GARG MAKE
BHARATH INDUSTRIES
RAJ FASTENERS

APL MAKE
PI MAKE
LPS BOSSARD

KUN MAKE
FOREX MAKE
SAI MAKE

8 SUPPORT STRUCTURES

M/S. TRALA ELECTROMECH SYSTEMS PVT. LTD.,
BANGALORE