E

PRODUCT STANDARD

BUSDUCT ENGINEERING DIVISION

ANNEXURE-I
To PI:20210565

TECHNICAL SPECIFICATION & TESTING REQUIREMENTS OF LIGHTENING ARRESTOR

S. No.	DESCRIPTION	PARTICULARS
1	TYPE	STATION CLASS HEAVY DUTY METAL OXIDE, GAPLESS TYPE
2	RATED VOLTAGE	12 KV (RU9703101011)
3	No. OF PHASES	SINGLE
4	NOMINAL DISCHARGE CURRENT	10 KA
5	RESIDUAL VOLTAGE AT NOMINAL DISCHARGE [8 x 20 MICRO SEC]	AS PER IEC 60099.4 (VALUE TO BE FURNISHED BY BIDDER)
6	ONE MINUTE POWER FREQUENCY DRY WITHSTAND VOLTAGE [HOUSING]	35 KVrms
7	IMPULSE WITHSTAND VOLTAGE [1.2 x 50 MICRO SEC WAVE]	75 KVp
8	GOVERNING STANDARD	IEC 60099.4
9	DIMENSIONS & TERMINATIONS	TO BE FURNISHED BY BIDDER
10	DISCHARGE CLASS	CLASS III IEC: 60099.4
11	IMPULSE WITHSTAND HIGH CURRENT [4/10 MICRO SEC]	AS PER IEC 60099.4
12	TERMINAL CONNECTOR	MIN.200LG.WITH REQUIRED HOLES SUITABLE FOR CONNECTION TO 10x100 COPPER FLAT
13	WEIGHT	TO BE FURNISHED BY BIDDER
14	SILICON CREEPAGE	TO BE FURNISHED BY BIDDER
15	CHARACTERISTIC CURVE	TO BE FURNISHED BY BIDDER
17	INSTALLATION	INSIDE LAVT CUBICLE
18	HARDWARES	PROPERTY CLASS OF 8.8, ZPP
19	BASE INSULATOR	MIN. 50MM HEIGHT

REV.	00	PRINTS TO:-	APPROVED – PARUSH KUMAR (MGR-ENGG)/IT		
ALTD.					
APPD.			PREPARED	ISSUED	DATE
DATE.			ZAHID		23/02/22

TECHNICAL SPECIFICATION & TESTING REQUIREMENTS OF LIGHTENING ARRESTOR

S. No.	DESCRIPTION	PARTICULARS
1	TYPE	STATION CLASS HEAVY DUTY METAL OXIDE, GAPLESS TYPE
2	RATED VOLTAGE	24KV (RU9703101046)
3	No. OF PHASES	SINGLE
4	NOMINAL DISCHARGE CURRENT	10 KA
5	RESIDUAL VOLTAGE AT NOMINAL DISCHARGE [8 x 20 MICRO SEC]	AS PER IEC 60099.4 (VALUE TO BE FURNISHED BY BIDDER)
6	ONE MINUTE POWER FREQUENCY DRY WITHSTAND VOLTAGE [HOUSING]	55 KVrms
7	IMPULSE WITHSTAND VOLTAGE [1.2 x 50 MICRO SEC WAVE]	125KVp
8	GOVERNING STANDARD	IEC 60099.4
9	DIMENSIONS & TERMINATIONS	TO BE FURNISHED BY BIDDER
10	DISCHARGE CLASS	CLASS III IEC: 60099.4
11	IMPULSE WITHSTAND HIGH CURRENT [4/10 MICRO SEC]	AS PER IEC 60099.4
12	TERMINAL CONNECTOR	MIN.200LG.WITH REQUIRED HOLES SUITABLE FOR CONNECTION TO 10x100 COPPER FLAT
13	WEIGHT	TO BE FURNISHED BY BIDDER
14	SILICON CREEPAGE	TO BE FURNISHED BY BIDDER
15	CHARACTERISTIC CURVE	TO BE FURNISHED BY BIDDER
17	INSTALLATION	INSIDE LAVT CUBICLE
18	HARDWARES	PROPERTY CLASS OF 8.8, ZPP
19	BASE INSULATOR	MIN. 50MM HEIGHT

REV.	00	PRINTS TO:-	APPROVED – PARUSH KUMAR (MGR-ENGG)/IT		
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NOTES:

1. ALL ROUTINE AND ACCEPTANCE TESTS ARE TO BE CONDUCTED BY THE VENDOR AS PER IEC - 600994 & ATTACHED QAP.
2. ALL IDENTICAL VALID TYPE TEST REPORTS TO BE FURNISHED BY VENDOR AT THE TIME OF SUPPLY (NOT OLDER THAN 10 YEARS)
   ELSE, TYPE TEST TO BE CARRIED OUT BY SUPPLIER FREE OF COST TO BHEL.
3. INSPECTION SHALL BE DONE BY BHEL REPRESENTATIVE / BHEL END CUSTOMER /ANY OTHER THIRD PARTY AT VENDOR WORKS.
4. GTP & G.A. DRG. SHALL BE SUBMITTED BY THE VENDOR ALONG WITH THE OFFER, SHOWING ALL DIMENSIONS, BILL OF MATERIAL, TERMINAL CONNECTOR, EARTHING DETAILS, WEIGHTS AND OTHER RELEVANT DETAILS, IF REQUIRED.
5. VENDOR SHOULD SUBMIT ALL TEST CERTIFICATES OF RAW MATERIAL AND BUSHING ALONG WITH ROUTINE TEST REPORTS.
6. ALL OTHER HARDWARES SHALL BE OF 8.8 CLASS ZINC PLATED AND PASSIVATED, PLATING SHALL BE 14 - 18 MICRONS.
7. CONNECTING FLEXIBLE BETWEEN LA TO SURGE COUNTER SHALL BE IN THE SCOPE OF L.A.VENDOR.
8. BASE INSULATOR OF LIGHTENING ARRESTOR AND SURGE COUNTER TO BE SUPPLY ALONG WITH EACH UNIT OF LA AND SURGE COUNTER BY RESPECTIVE VENDOR OF LA AND SURGE COUNTER.
9. EACH UNIT SHALL BE PACKED IN COMPLETELY COVERED WOODEN BOXES. PROPER CUSHIONING IS TO BE PROVIDE TO AVOID DAMAGE DURING TRANSIT/STORAGE AS DONE FOR FRAGILE ITEMS.

REV.	00	PRINTS TO:-
ALTD.		
APPD.		
DATE.		

PARUSH KUMAR (MGR-ENGG)

PREPARED	ISSUED	DATE
ZAHID		23/02/22

DOMESTIC PACKING (PACKING INSTRUCTIONS FOR GENERAL COMPONENTS 1 ASSEMBLIES 1 EQUIPMENT OF BUSDUCT)

1 . GENERAL:

This standard lays down packing instructions for domestic packing of Busduct Components/ Assemblies/ Associated Equipment to be despatched against

Customer's contracts, for which there are no special instructions issued by the Engineering Departments. Bus duct shall be packed as per drawing issued (i.e. PACKING-002 REV-02, PACKING-004 REV-02 and PACKING-014 REV-OI). For Export and Seaworthy Packing refer standard CDC: WI: PACKING: 002 and CDC: WI: PACKING: 003 wherever applicable.

The Components/Assemblies need to be packed suitably to avoid physical damage & corrosion during transit & storage. For specific applications the concerned engineering department shall issue a product standard. Reference of this product standard, must appear in the Shipping list/Packing List.

2 SCOPE:

This specification gives guidelines to be complied with for domestic packing of Busduct Components/ Assemblies/ Associated Equipment. This domestic packing shall be suitable for different handling operations and for the adverse conditions during transportation and during indoor / outdoor storage of materials. Workmanship and Material used, shall be of Standard, meeting the Technical requirements and in accordance with the best Commercial Domestic Packing practices and shall be capable of performing all necessary functions, primarily prevention of damages to

the contents, sufficient to support frequent handling and prolonged out-door storage in adverse weather conditions.

3. WOOD SPECIFICATION:

Based on availability, the wood shall conform to specification AA51401 or AA51402.

TYPES OF PACKING:

The following 5 types of packing have been standardized for packing of General Components/ Assemblies.

1) 'OP - open Type.
2) 'PP' - Partially Packed.
3) 'CP ' — Crate/Box Packing - Components/Equipment requiring physical protection.

4) 'CQ' - Case Packing — Machined Components-Small & Medium Components/ Assemblies/ Equipment which require corrosion & physical protection.
5) 'CR^{Y} - Case Packing — Electrical/Electronic Components/ Assemblies, which require special packing viz. Water Proof, Shock Proof etc.

5. DESCRIPTION OF TYPES OF PACKING:

The various types of packing, as standardized above, are described below.

5.1 'OP - open Type

In case, of components which are not affected by water & dust and do not require special protection, are generally not machined, shall be sent as open packages. However, these components may be sent in crates, wherever necessary.

5.2 'PP - Partially Packed

Components which need special protection at selected portions only shall be despatched partially packed. Machined surfaces should not be allowed to come directly in contact with the wood. Such surfaces should be protected with IOOGSM (Colourless) Multi Layered Cross Laminated Polyethylene Film to Specification No. AA51420. All sharp corners and edges shall be protected by rubber mats to prevent damage to the polyethylene film.

5.3 'CP - Crate Packing

Assemblies/Components which need only physical protection from the point of view of handling shall be despatched duly packed in crates.

5.4 'CQ' - Case Packing - Machined Components/Assemblies/Equipment

Small and medium sized components/assemblies/equipment due to size/weight and to avoid handling and pilferage problems shall be packed in Case/Containers. Wherever required adequate quantity of silica gel to AA55619 or VCI Powder/Tablets, packed in thin muslin cloth cotton bags shall be suitably placed. Small machines/components of less weight shall be provided with suitable cushioning by Rubberised coir. The components inside the case shall be entirely covered withl OOGSM(Colourless) Multi Layered Cross Laminated Polyethylene Film Specification No. AA51420, wherever required. This may be prescribed for electronic parts/critical machined components/surfaces. The requirement of individual component wrapping shall be exempted.

5.5 'CR' - Case Packing - Electrical & Electronic Components/Assemblies

Delicate components likely to be damaged e.g. Gauges, Instruments etc. are to be wrapped in waxed paper or polyethylene air bubble film and packed in cartons. Adequate quantity of Silica gel to AA55619 packed in cotton bags of 100grams each are to be suitably placed in the cartons. The cartons shall be entirely covered with 1 OOGSM(Colourless) Multi Layered Cross Laminated Polyethylene Film Specification No. AA51420 before being packed in the cases. VCI Powder/Tablets can be used as an alternative to Silica Gel to AA55619.

Empty space in the cartons shall be filled with rubberized coir to get proper cushioning effect. The cartons shall be manufactured from corrugated Fiber Board, meeting requirements of AA51414.

6. PREPARATION OF PACKING CASES

6.1 DIMENSIONS:

a) Thickness of planks for Front, rear, top and bottom sides and binding, jointing battens shall be 25/20mm +2/-3 mm as per applicable drawings of the respective units.

b) Width of all planks including the tongue shall be more than 125mm and after plaining it shall be minimum 100mm.

c) Minimum number of planks shall be used for a shook.

d) Horizontal, vertical, diagonal planks shall be given for binding (number of such planks depend on the dimension of panel.

e) Width of binding planks shall be minimum 100mm.

f) Distance between any 2 binding planks shall be less than 750mm.

g) diagonal planks shall be used in between vertical binding planks when distance between inner to inner of vertical planks is more than 750mm

h) Distance of the outer edges of these planks from the edge of case shall be less than 250mm-

i) Diagonal planks are not required for top planks and width side, if the width of pallet is less than 750mm.

6.2 JOINTING OF PLANKS

Single length planks shall be used for cubicles whose overall length is less than 2400mm. For cubicles of length more than 2400mm, jointing is permitted. The jointing shall be done with one single or maximum of 2 planks of wood same as other planks of width 250 mm (minimum) with two rows of nails on either side of the joint in zigzag manner. From the joint along height side, it shall be of lap joint with

overlap of at least the width of plank.

6.3 TONGUE AND GROOVE JOINTS

Two consecutive planks shall be joined by tongue and groove joint. Depth of tongue shall be 12+1 mm, thickness of tongue shall be 8 +1 mm. The groove dimensions shall be such that the tongue fits tightly into the groove to make a good joint. This type of joint can be done based on the product requirement wherever required.

6.4 PERMISSIBLE DEFECTS

Wood shall be free from knots, bows, visible sign of infection and any kind of decay

caused by insects, fungus, etc.

End splits: Longest end splits at each end shall be measured and lengths added together. The added length shall not exceed 60mm per meter run of shook's. Wood pins shall be used to prevent further development of split.

Surface cracks: Surface cracks with a maximum depth of 3mm are permissible. A continuous crack of any depth all along the length is not allowed.

6.5 OTHER MATERIALS

6.5.1 NAILS

The dia. of the nails shall be 3.15mm. The length of the nails shall be 65mm wherever two planks of 25mm thickness are joined and 75mm wherever a 25mm

planks is joined to a 50mm plank.

6.5.2 BLUE NAILS

These are used for nailing bituminized Kraft paper/hessian cloth to the planks. The length of the nails shall be 16mm.

6.5.3 HOOP IRON STRIPS

These are used for strapping the boxes. The width of the strips shall be 19+1mm and thickness 0.6+0.01 mm. The material shall be free from rust. If sufficient nailing is done for bigger boxes, strapping need not to be done.

6.5.4 CLIPS

These shall be used for strapping the hoop iron strips on the boxes.

6.5.5 BRACKETS

These brackets are used for nailing to the corners of cubicle boxes. The brackets shall be of mild steel of thickness min 2mm and width 25+1 mm. The brackets shall be of "L" shape, the length of each side being 100+2mm. Two holes shall be provided towards the end of each side for screwing hailing.

6.5.6 FASTENERS

Bolts, double nuts, spring washers will have to be used for packing of some special items like Neutral Grounding Transformers, Neutral Grounding Resistor, PTNT, etc., to hold the job to the bottom plank of the box. The bolts, nuts, washers will be provided by the vendor. Drilling of holes will have to be done using contractor's tools.

6.5.7 MULTI LAYERED CROSS LAMINATED POLYETHYLENE FILM

IOOGSM (Colourless) Multi Layered Cross Laminated Polyethylene Film Specification No: AA51420 are used to make covers to the jobs individually. The cross lamination gives qualities of extra toughness, together with flexibility and lightness coupled with good weather resistance to ultra violet rays.

6.5.8 RUBBERISED COIR:

The rubberized coir is used as cushioning material. For the packing of loose items, items are to be arrested by using rubberized coir. For the packing of cubicles rubberized coir of thickness 25mm and width 75mm shall be used.

6.5.9 FOAM RUBBER / 'U' FOAM:

This is used for covering the delicate items. This material is provided by the vendor.

6.5.10 MARKING PLATE:

This shall be of anodized aluminium sheet. Size of the marking plate shall be maintained minimum of size as per the details specified in the Figure 4.

6.5.11 PACKING SLIP HOLDER:

This shall be of galvanized iron tinned sheet /Aluminium sheet

6.5.12 SILICA GEL:

This shall be of indicating type to conform to IS: 3401/AA55619.Silical gel shall be used for such products only where moisture needs to be avoided.

6.5.13 COTTON BAGS:

These are used for holding silica gel. The bags shall have the following matter indicated on them:

BHEL-UNIT NAME PLACE-PINCODE

SILICA GEL	INDICATING TYPE
BLUE	ACTIVE
ROSE	REDUCED ACTIVITY
WHITE	NO ACTIVITY. TO BE REPLACED WITH FRESH SILICA GEL

-.1 1 0

6.5.14 COTTON/ PLASTIC TAPE:

This is used for tying small items. And also to prevent vibrations of moving parts within the cubicles.

6.5-15 MARKING INK:

The ink used normally is black in colour. In some special cases other colour also will have to be used. The ink shall be non-fading/indelible and non-washable by water.

6.5.16 POLYETHYLENE BAGS:

These are to be used for keeping the Packing slips. The bag shall be of size 70mm X 100mm (minimum).

6.5.17 Hessian cloth, twine thread, paint will have to be used in packing certain items.

6.5.18 STICKERS

The following stickers to be put by the vendor on cubicles/Boxes after packing.

1) Case No sticker: 2 nos. Size 25.Cm x 0.45Cm
2) BHEL Monogram sticker: 1 no. Size 1.75Cm x 2.3Cm
3) Address sticker: 2 nos. Size 3.8Cm x 3.0Cm
4) Direction sticker "Front" & "Back" - 4 nos. Size 2.0Cm x 0.75Cm
5) Chain Mark Sticker: 4 Nos. Size — 3.0Cm x 0.75Cm
6) "Fragile" sticker: 2 Nos. Size. 2.1 Cm x 1.5Cm
7) "DO NOT STACK" sticker - 2 Nos. Size 3.OCm x 2.2Cm

In place of stickers, writing all the details legibly with paint shall be allowed & respective units may take decision accordingly.

7. PACKING OF CUBICLES:

7.1 The packing is to be done as per clause 5 in all respects.

7.2 The cubicles are already fixed on wooden pallets. Hence the contractor need not arrange the bottom pallets normally.

7.3 The cubicles will be of different sizes both width wise and lengthwise. The cubicles may be made up of single suite, 2 Suite, 3 Suite, 4 Suite, etc., The width of the cubicles generally varies from 400 mm to 1650mm.The length of the cubicle, generally varies from 1500 mm to 4800 mm. The height is normally 2430 mm. In some cases, the height may be less/more.

7.4 MULTI LAYER CROSS LAMINATED POLY FILM

The inner surface of 4 sides of shook's shall be nailed with Multi-layer cross laminated poly film (as per 6.57) using blue nails (as per 6.52) wherever 2 pieces of Cross laminated poly film are used, the joint shall have an overlap of minimum 20mm.

The inner surface of top cover shall be nailed with Multi-layer cross laminated poly film (as per 6.5.7). This sheet shall project outside on 4 sides by at least 100mm and shall be nailed properly on sides. Joining of sheets should have overlap of minimum 20mm.

The cubicles shall be covered with Multi-la er cross laminated poly film (as per 6.5.7).

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7.5 SILICA GEL:

Silica gel (as per 6.5.12) packed in cotton bags shall be kept at different places inside the cubicle as per BHEL-Unit directions. Each suit of cubicle shall be provided with 1 kg of Silica gel (for a 4 suit cubicle 4 kgs of Silica Gel to be used. The bag containing silica gel to be as per 6.5.13).

7.6 LOOSE PARTS:

Any loose parts in the cubicles shall be tied using cotton/ plastic tape. Wooden battens shall be provided wherever necessary.

7.7 WOODEN BATTENS:

In case of cubicle which are not rectangular in shape, sufficient number of wooden rafters/battens of proper size shall be provided to give strength to the package.

7.8 RUBBERISED COIR:

Gap between the cubicle and the case shall be filled with rubberized coir (as per 6 5.8) with distance between consecutive layers less than 500mm.

7.9 CLAMPING:

Packing shall be bound at edges by nailing M.S. Clamps / Brackets (as per 6.55). Each vertical edge shall have minimum 3 clamps. Top horizontal edges will have one clamp for every meter length of package. However, minimum 4 clamps shall be nailed at the top for any cubicle.

7.10 PACKING SLIP:

Packing slip kept in the polyethylene bag (As per 6.5.16) shall be placed in the box at appropriate place. In addition, one more packing slip covered in polyethylene cover and packing slip holder (as per 6.5.11) shall be nailed to front / rear of case.

7.11 MARKING PLATE:

One no. (As per 6.5.10) shall be nailed to the front side of the case.

7.12 CASE MOUNTING:

After complete packing, stencil marking of various details and marking of symbols shall be done as per BHEL instructions using indelible / non washable marking ink.

7.13 Different types (Typical) of Cubicles with sizes for Packing

1. Single suite cubicle - 900 X 950
2. Two suite cubicle - 1650 x 950 x 2500
3. Three suite cubicle - 2400 x 950 x2500 etc.

8. PACKING OF LOOSE ITEMS/SPARES

1) Shape of cases shall be square, rectangular with single gabled roof or with double gabled roof depending on the nature of the job to be packed. Construction shall be as per drawings enclosed. Only gable will be additional as required.

2) Wood shall conform to specification AA51401 or AA51402 with Tongue and Groove joint as per clause 6.3.

3) Width of planks shall be at least 100 mm. Width of binding planks (battens) shall be at least 75mm.

4) External surface of planks on front and rear shall be plane 100% (except bottom

   plank).

5) Inner surfaces of all 6 sides shall be lined with Multi Layered Cross Laminated Polyethylene Film (as per clause 6.5.7) using blue nails.

6) Rubberized coir of minimum 25mm thickness and 100 mm width shall be nailed to inner surfaces of bottom and 4 sides of box.

7) Internal packing: Items that go into the box shall be packed using IOOGSM, (Colourless) Multi Layered Cross Laminated Polyethylene Film Specification No: AA51420. Any space left between the job and the sides and the top of the box

   shall be filled with rubberized coir to get proper cushioning effect

8) Certain items like Potential Noltage transformers, Surge Capacitor, Lightning Arrestor etc., shall be bolted to the bottom of the box using bolts, nuts and washers.

9) Silica gel as per clause 6.5.12 held in cotton bags as per clause 6.5.13 shall be kept at proper places in the box.

10) Packing slip kept in polyethylene bag (clause 6.5.16) shall be placed in the box.

11) Marking plate as per clause 6.5.10 shall be nailed to side of the box.

12) Two numbers of hoop iron strips as per clause 6.5.3 shall be strapped tightly on the case using clips.

13) Stencil marking of various details and marking of various symbols shall be done as per BHEL instructions using indelible/non-washable marking ink.

14) Loose items to be kept inside the cubicle

    - The components which are removed from cubicle for shipping purpose only, such as copper connection shall be kept inside the cubicle individually, kept in wooden box and tied firmly in bottom of Cubicle.

    - Other items which are given loose in addition to cubicle shall be packed in separate boxes.

Prepared	Approved	Rev	Date
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9. BOX SlZES

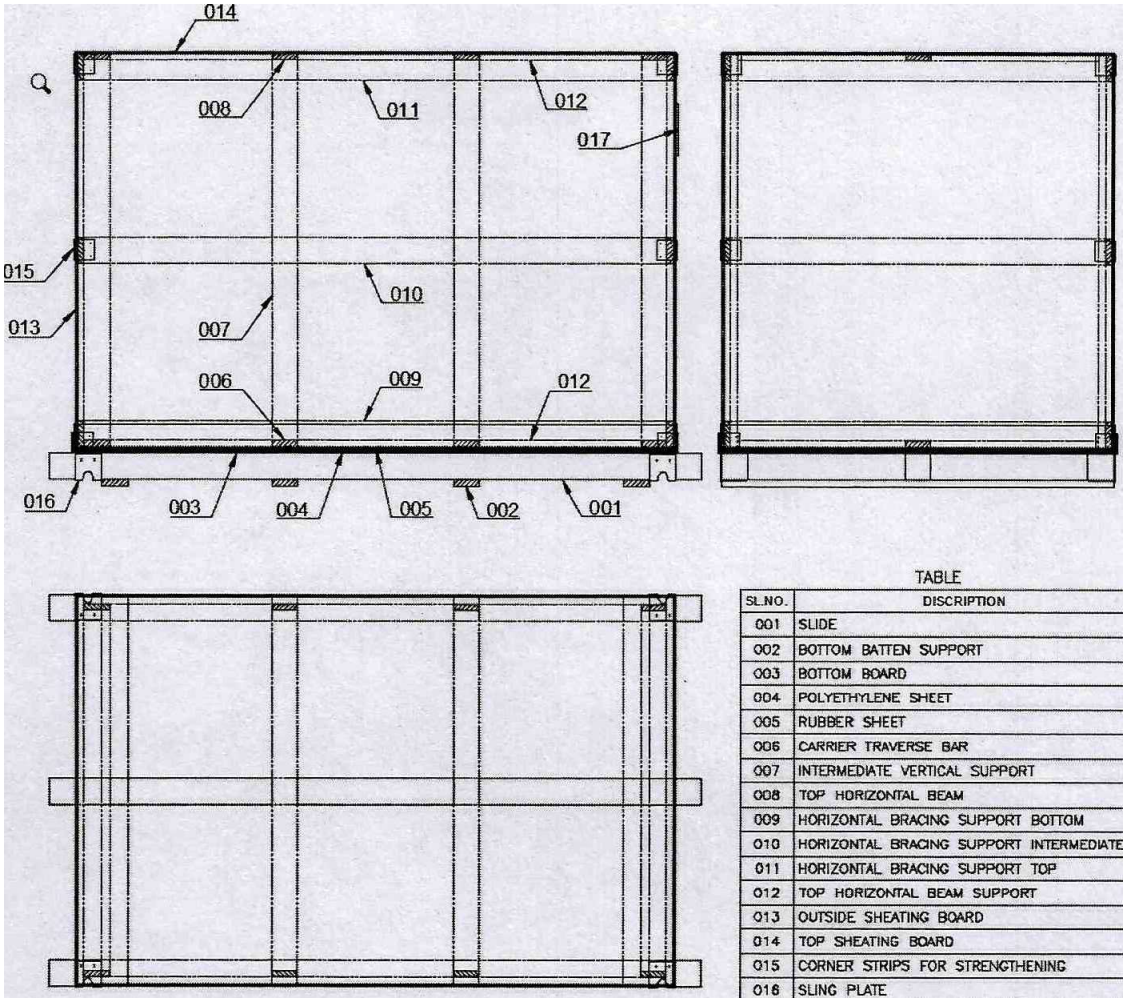
9.1 BOX SlZES

TAB|-E-2
WOODEN BOX DETAlLS

BOX TYPE	BOX SlZE оп тт)	BOX Wt оп kg)	Carrying Capacity
1	320 x 250 x 260	10	
2	320 x 250 x 430	15	
з	430 x 370 x 430	25	
4	670 x 670 x 470	65	
5	720 x 630 x 600	75	
6	1000 x 770 x 660	100	
7	1100 x 430 x 670	80	
8	1200 x 1200 x 900	80	
9	1300 x 770 x 1050	155	
10	2500 x 850 x 800	225	
11	2000 x 1500 x 1200	305	
12	1850 x 1050 x 1250	260	
13	2000 x 800 x 800	180	
14	2600 x 1500 x 1600	470	
15	250 x 250 x 600	20	
16	250 x 250 x 880	зо	
17	зоо x зоо x 700	25	
18	380 x 380 x 880	45	
19	510x510 x 1400	60	
20	570 x 570 x 1400	80	
21	575 x 575 x 1875	105	
22	3600 (1100 x1100	390	
23	900 x 500 x 800	110	
24	2000 x 950 x 740	225	
25	1600 x 1120 x 700	220	
26	2500 x 2000 x 1200	490	
27	2900 x 1900 x 1400	525	
28	3000 x 1000 x 900	370	
29	3200 x 2200 x 950	450	
зо	2150 x 1100 x 750	325	
31	2000 x 2000 x 700	130	
32	700 x 1200 x 1325	130	

SENO.	DESCRIPTION
oot	SLIDE
002	BOTTOM aATTEN SUPPORT
003	BOTTOM
004	POLYETHYLENE s-iEET RUBER
005	SHEET
006	TRAVERSE BAR
009	INTERMEDIATE VERTICAL SUPPORT
008	TOP HORIZONTAL BEAU
009	HORIZONTAL BRACING SUPPORT BOTTOM
010	HORIZONTAL SUPPORT INTERMEDIATE
011	HORIZONTAL SUPPORT TOP
012	TOP HORIZOBTAL BEAU SUPPORT
013	OUTSIDE SHEATING BOARD
014	ro.P SHEATING BOARD
015	CORNER STRIPS FOR STRENGTHENING
016	SUNG PLATE
017	OUT SIDE

FIGURE- 1



TABLE

SL.NO.	DISCRIPTION
001	SLIDE
002	BOTTOM BATTEN SUPPORT
003	BOTTOM BOARD
004	POLYETHYLENE SHEET
005	RUBBER SHEET
006	CARRIER TRAVERSE BAR
007	INTERMEDIATE VERTICAL SUPPORT
008	TOP HORIZONTAL BEAM
009	HORIZONTAL BRACING SUPPORT BOTTOM
010	HORIZONTAL BRACING SUPPORT INTERMEDIATE
011	HORIZONTAL BRACING SUPPORT TOP
012	TOP HORIZONTAL BEAM SUPPORT
013	OUTSIDE SHEATING BOARD
014	TOP SHEATING BOARD
015	CORNER STRIPS FOR STRENGTHENING
016	SLING PLATE

	Rupesh Kumar 	Arvind Nara an	01	20/09/2018

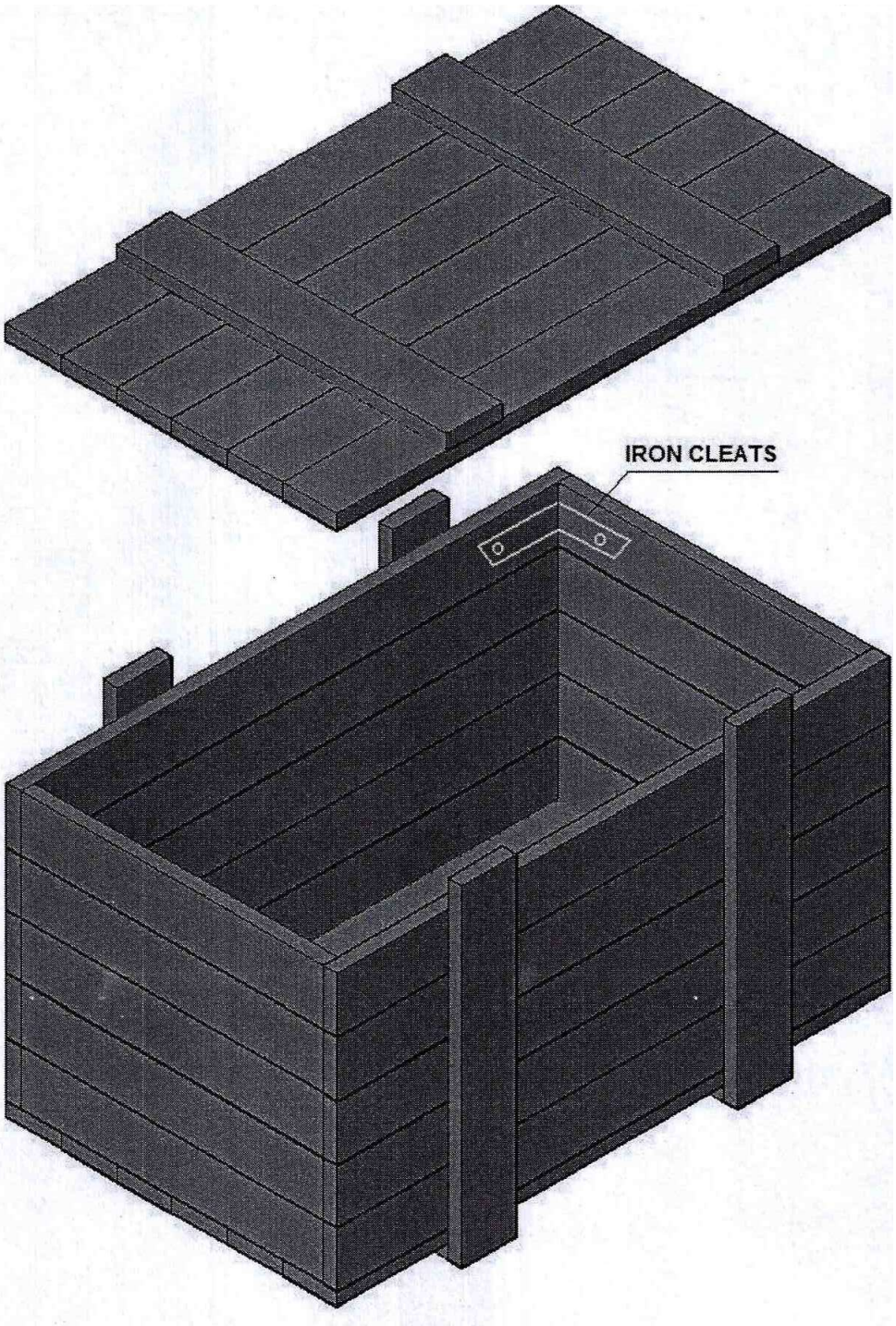


FIGURE – 2

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20/09/2018

9.2 SEALED PACKING:

Components sub-assemblies and assemblies' sensitive to climatic conditions shall be packed seal tight. All the openings of the sensitive components, sub-assemblies and assemblies shall be blanketed to prevent the ingress of dust and moisture. The components sub-assemblies and assemblies are completely covered with 2 layers of polyethylene sheet. All sharp corners and edges are to be protected by rubber mats to prevent the polyethylene sheet from damage. Top surface of the case shall be free from dents to prevent rain water pockets.

IO.MARKINGS/STENCILINGS

MARKINGSON PACKING CASE

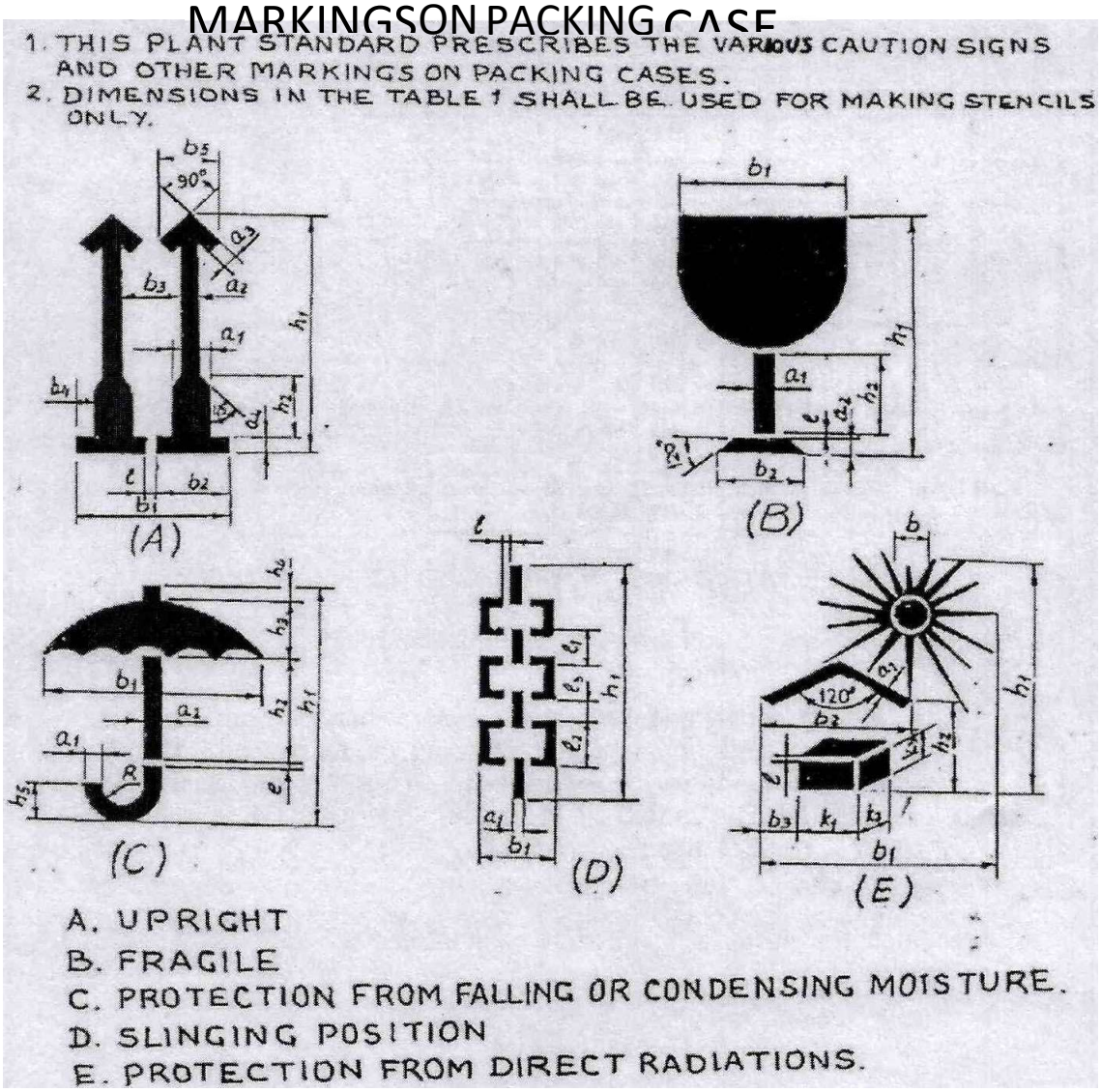

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FIGURE-3

Prepared	Approved	Rev	Date
Rupesh Kumar	Arvind Narayan	01	20/09/2018

BHEL-Rudrapur

TABLE-I

DESIGNATION		DIMENSION IN MM																					
		al	a2		a4			b3		b5	b			h2		h4	h5				11	12	13	
		12	5	5	4	52	25	19	8	21		2	84	23										
				7		75	36	29	11	30		3	119	33										
	3	24	10	10		104	50	38	16	42		4	168	46										
	4	34	14	14	11	147	71	59	23	60		5	239	65										
B	I	5	5			50	33					2	84	25										
						71	47					3	119	36										
	3	10	10			100	66					4	168	50										
	4	14	14			142	94					5	239	71										
	1	4	3			66						2	80	39	19	5	11							6
						85						3	114	55	27	7	16							9
	3	8	6			120						4	160	78	38	10	22							12
	4	11	9			170						5	227	110	54	14	31							17
												4	148								30	30	10	
	2	9				42						5	209								42	42	14	
						69	47	10			16	2	91	26				17	8	11				
						98	67	15			23	3	128	33				24	11	16				
						138	94	20			32	4	182	62				34	16	22				

Black and Red Marking Ink to IS:1234 "Ink, Stencil, Oil Base, For Marking Porous Surfaces" or duplicating ink stencilling, oil base for marking porous surfaces.

All cases containing fragile items are to be stencilled with red marking and stencilling paint/ink

"HANDLE WITH CARE", "FRAGILE DO NOT TURN OVER".

Besides the caution signs the product information's shall be stencilled of letters with 13mm to 50mm height.

In case of consignment consists of more than one package, each package shall carry its package no as given in shipping list. All caution signs shall be stencilled in high quality full glossy out door finishing paint red in colour (AA56126). All other markings shall be carried out in black enamel(AA56126).

Caution signs & other markings shall be stencilled on both the end shooks & the side shooks.

Caution sign (for slinging) shall be stencilled only on side shooks at the appropriate place.

Note: Incase the size of package is small for using the stencils, then hand written letters/figures shall be allowed.

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a4fzz	BHEL – <unit> - <location> - <pin>		
CONSIGNEE			
MATERIAL			
CUSTOMER REF.			MO. NO.
DESPATCH ADVICE NOTE NO	BHEL – <unit> - <location> - <pin> MO. NO. CASE NO NET WT –KGS / GROSS WT –KGS HANDLE WITH CARE - KEEP DRY DO NOT DROP - DO NOT TILT		CASE NO
DIMENSIONS(MM) LxBxH			NET WT -KGS
SPECIAL INSTRUCTIONS	HANDLE WITH CARE - KEEP DRY DO NOT DROP - DO NOT TILT		

FIGURE - 4 TYPICAL MARKING PLATE (225 X 170)

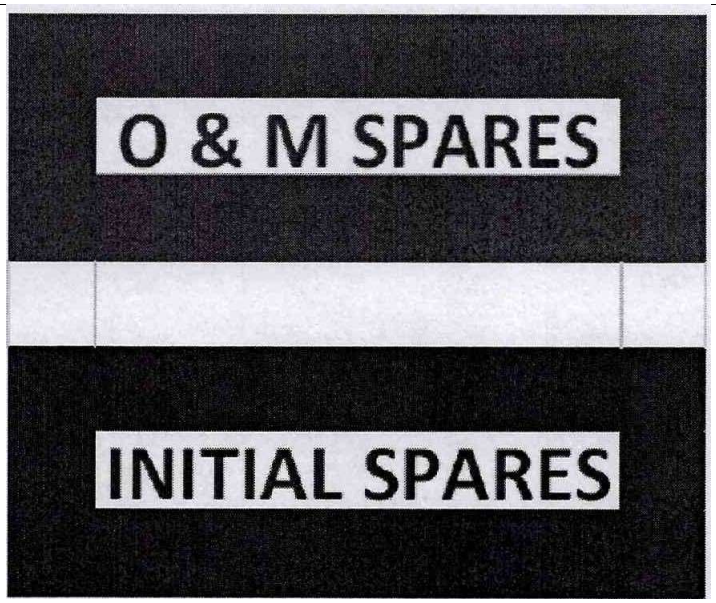

FIGURE -5

Easy spares [Initial and O&MI Traceability and Identification at units and as well as at

11. RECYCLING OF INCOMING WOODEN PACKING CASES OBJECTIVES

— To utilize useable wood of incoming packing cases, for manufacturing of new packing boxes.

— To recycle incoming wooden packing cases, as such, wherever possible

1) All incoming wooden packing cases received from suppliers [customers will be opened carefully, with the intention of reusing them, by Shop.

2) After carefully taking out the contents, the empty wooden packing cases will be shifted by Shop to the specified locations i.e. bin / nearly spaces, already earmarked in stores.

3) Material shifting contractor engaged by store, will collect all such wooden packing cases and scrap wood from specified points, on a regular basis.

4) After collecting / loading the empty packing cases/ scrap wood, contractor will take the carrier first to Weighment Bridge for weighment, thereafter; he will go to Carpentry, where Carpentry representative will identify the packing cases which can be used by Carpentry for manufacturing of New Packing Boxes. All such identified packing boxes will be unloaded and handed over to Carpentry by contractor.

5) These packing boxes will be made re-useable after necessary rectification and additional work.

Contractor will again take the carrier for weighment and this second reading will also be recorded on the same "Weighment Slip"

7) Weight of empty packing cases / scrap wood taken will be calculated on the basis of 1st and 2nd weighment readings recorded on the "Weighment Slip". A copy of "Weighment Slip" (where both the weighment readings are recorded) will be given by the contractor to the carpentry representative. Based on this "Weighment Slip" carpentry will maintain a register in which details of quantity received will be recorded.

All "Weighment Slips" will invariably be signed by carpentry representative (even when no boxes have been unloaded by carpentry). Store will accept the scrap wood only if "Weighment Slips" are signed by carpentry representative.

Balance empty packing cases / scrap wood will be handed over by contractor to Store, for storing in scrap yard.

10) A separate area in Scrap yard will be provided, for executing the work of denailing of wooden packing cases, under supervision of carpentry.

11) Carpentry contractor will identify packing cases / scrap wood for denailing, which will have behanded over to him by Store, at Scrap yard, for denailing and further operation.

12) Quality and Carpentry will jointly inspect the wood generated by de-nailing process and will prepare "INSPECTION CUM RECEIPT REPORT OF USEABLE WOOD RECEIVED FROM TPS - STORE BY CARPENTRY".

13) After acceptance of the wood by Quality and Carpentry, the same will be shifted to carpentry for receipt and its record will be maintained by carpentry.

14) This will be a Permanent Productivity Project executed by carpentry. "Productivity Savings "duly verified at the current Purchase Order rate of wood, will be sent every month to Resource Management Department, for highlighting it in their monthly progress report.

12. PROCEDURE FOR HANDLING OF COMPONENTS

The purpose of this procedure is to protect the quality of the components/equipment while handling in various stages of manufacturing, packing & despatching

12.1 Adequate care shall be taken in handling the material, and components to avoid damage during receipts, storage issue, manufacture & despatch operations.

12.2 Appropriate material handling equipment like fork lifters, cranes etc. shall be used where needed.

12.3 Lifting by crane and transportation by trolley of critical items and large components like rotors castings etc. shall be done carefully.

12.4 For critical items, where specified, special handling fixtures shall be used for lifting.

12.5 Slings and shackles used for lifting the components/equipment shall be checked for fitness and suitability before use.

12.6 Slings used on machined surfaces shall be suitably padded. No slings shall be used on journal surfaces.

12.7 Precision machined components like blades, catches, rollers etc. shall be lifted using suitable wooden pallets.

12.8 HANDLING OF COMPONENTS ON RECEIPT/DESPATCH

Before loading/unloading a packing case from the carrier look for the following shipping instructions painted on the packing case.

a) The markings showing the upright position.
b) The markings showing the sling position
c) Markings showing the fragile contents.
d) Other required markings as per clause no. 10

12.8.1 Appropriate cranes and slings should be used for different components/ cases. Slings should normally make an angle as minimum as possible (width wise) but in no case more than 15^0.

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12.8.2 Handling and lifting should be done without jerks or impacts.

12.8.3 Immediately after receipt of the goods, the packing should be examined allround for any sign of damage. If necessary, lift the cover or a number of boards of the case so as to make the contents visible. In the event of sealed packing being used the plastic sheeting should not be damaged. It is imperative that the packing material is restored in original condition after the inspection.

12.8.4 On receipt of the equipment it should be checked with the shipping list and missing or damage if any should be reported immediately. It is important to arrange for immediate examination to determine the extent of the damage, the cause of the damage and where applicable the person or persons responsible for the damage. According to general practice when transporting by road vehicle the carrier concerned should be immediately called upon (within specified periods) for jointly establishing a statement of the damage. This is essential as a basis for a subsequent claim and possible damage report to the insurance company.

12.8.5 Protective coating applied on machined surfaces should not be disturbed. The

plastic covering should be put back carefully so that it prevents ingress of dust and moisture. Some packing may have vapour phase inhibitor (VPI) paper enclosed inside the packing cases. This should be restored to its original place as far as possible.

12.8.6 Silica gel and such other chemicals kept in the box as desiccants and indicators should also be left in the box itself.

3.GUIDELINES FOR HANDLING/LOADING/LASHING

15.1 HANDLING

Before unloading the jobs Completely painted and neatly stenciled will be checked. Material to be lifted with Nylon belts. This protect painting, edges and attachments.

15.2 LOADING

All the components to be transported by putting inside the properly fabricated Crating.

Small components may fall down while transporting without closed crating and there are chances of missing of small parts. Hence, it is always better to transport small components in closed containers/crating. Loose to be being shipped in a closed crating. No component loaded over the crating. Spacers to be provided in between each assembly.

15.3 LASHING

Use Nylon belts only for lashing of all components. It prevents removal off painting and cut in the materials.

14. PRODUCT WISE SPECIAL INSTRUCTION

Additional instructions of packing not included in this standard shall be covered by individual product standard.

15. REFERRED STANDARDS (Latest publications including amendments):

1) Coniferous Timber for general packing purposes (Packing Wood) : AA51401
2) Non-Coniferous Timber for general packing purposes (Packing Wood) : AA51402
3) Polyethylene air bubble film : IS 12787 / AA51426 4) Multi-layered cross laminated plastic film : AA51420
5) Corrugated Fiber Board : AA51414
6) Silica gel : AA55619 / IS:3401
7) Specification for Ink, Stencil, Oil Base, for Marking Porous surface • IS:1234
8) Rubber sheet : AA59001 9) Packing slip holders : AA7240901
10) Structure Steel : AAI 0108

	Prepared	Approved	Rev	Date
	Rupesh Kumar	Arvind Narayan	01	20/09/2018

BHARAT HEAVY ELECTRICALS LIMITED

CFP RUDRAPUR

CUSTOMER: M/s BHEL
PROJECT: VARIOUS

QUALITY ASSURANCE PLAN(QAP) FOR LIGHTNING ARRESTORS

MATERIAL INSPECTION/INPROCESS INSPECTION/FINAL INSPECTION

SUB VENDORS/VENDORS WORKS

DOC NO: QP/BOI/SA
REV NO: 00
DATE: 05.04.2021
PAGE : 1 OF 1

SL. NO.	COMPONENT	CHARACTERISTICS	CATEGORY	METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY P	AGENCY W	AGENCY R	AGENCY H	REMARKS
1.0	Lightning Arrestors	ACCEPTANCE TEST											
		a) Measuring of PF Voltage	Major	Electrical	1 Sample	IEC 99.4	IEC 99.4	IR	3	2	1	1	
		b) Lighting Impluse residual voltage	Major	Electrical	1 Sample	IEC 99.4	IEC 99.4	IR	3	2	1	1	
		c) Partial Discharge test	Major	Electrical	1 Sample	IEC 99.4	IEC 99.4	IR	3	2	1	1	
		ROUTINE TEST											
		a) Visual examination & Dimension	Major	Electrical	100 %	BHEL Appd Drg	BHEL Appd Drg	IR	3	2	1	1	10% samples-Dimensions shall be witnessed by BHEL TPIA.
		b) Measurment of PF reference voltage	Major	Electrical	100 %	IEC 99.4	IEC 99.4	IR	3	2	1	1	
		c) Residual Voltage	Major	Electrical	100 %	IEC 99.4	IEC 99.4	IR	3	2	1	1	
		d) Partial Discharge	Major	Electrical	100 %	IEC 99.4	IEC 99.4	IR	3	2	1	1	
		e) Leakage test	Major	Electrical	100 %	IEC 99.4	IEC 99.4	IR	3	2	1	1	
		*TYPE TESTS											
		i) Lightning impulse voltage test	Major	Electrical	1 Sample	IEC 99.4	IEC 99.4	TR	3		2,1	1	
		j) Switching surge operating duty test	Major	Electrical	1 Sample	IEC 99.4	IEC 99.4	TR	3		2,1		
		k) Residual voltage test	Major	Electrical	1 Sample	IEC 99.4	IEC 99.4	TR	3		2,1	1	

NOTE: A : Ref. QAP no. : Engg-12 dated 11.09.17 & mail dated 03.04.2021(Not meant for vendor/supplier)

NOTE: B: Meant for Supplier

1. VALID TYPE TEST CERTIFICATES FOR '*' MARKED TESTS SHALL BE FURNISHED TO BHEL FOR THEIR ACCEPTANCE. IF VALID TYPE TEST CERTIFICATES ARE NOT AVAILABLE, VENDOR WILL CARRY OUT TYPE TESTING IN PRESENCE OF BHEL/CUSTOMER.
2. WHERE EVER R & W ARE BOTH MENTIONED , BHEL TO WITNESS TEST OR REVIEW TRs
3. TRs NOT MORE THAN FIVE YEARS OLD FROM DATE OF PURCHASE ORDER SHALL BE REVIEWED FOR ACCEPTANCE OTHEWISE SUB-VENDOR WILL CARRY OUT TYPE TEST
4. MINOR : THE CHARACTERISTICS OF A COMPOUND, PROCESS OR OPERATIONS WHOSE FAILURE NEITHER MATERIALLY REDUCE USABILITY OF THE PRODUCT IN OPERATION, NOR DOES IT AFFECT THE AESTHETIC ASPECTS
5. MAJOR : THE CHARACTERISTICS OF A COMPOUND , PROCESS OR OPERATIONS WHOSE FAILURE MAY CAUSE OPERATION FAILURE WHICH CAN NOT BE READILY CORRECTED AT SITE OR CAUSE SUBSTANDARD PERFORMANCE , INCREASE ERECTION OR MAINTENANCE , REDUCE LIFE OR SERIOUSLY AFFECT AESTHETICS OR AGRONOMICS

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05/4/21

6. CRITICAL : THE CHARACTERISTICS OF A COMPOUND , PROCESS OR OPERATIONS WHOSE FAILURE WILL SURELY CAUSE OPERATION FAILURE OR INTERMITTENT TROUBLES WHICH IS DIFFICULT TO RECTIFY AT SITE OR RENDER THE UNIT FOR USE
7. "FAILURE" OF A CHARACTERISTIC MEANS FAILURE TO MEET 'ACCEPTANCE NORMS'
8. SAMPLING: GENERALLY IN ACCORDANCE WITH IS 2500
9. ALL TESTING INSTRUMENTS SHOULD BE CALIBRATED BEFORE WITNESSING THE TEST & CALIBRATED INSTRUMENTS SHALL BE USED DURING INSPECTION, EXAMINATION & TESTING.
10. REFERENCE DOCUMENT / ACCEPTANCE NORMS SHALL BE AS PER BHEL APPROVED DRG / DATASHEET / SPECIFICATION.
11. ALL TYPE TESTING SHALL BE CARRIED OUT AT NABL APPROVED LABORATORIES.
12. BHEL RESERVES THE RIGHT TO MODIFY THE EXTENT OF CHECK & AGENCY TO WITNESS TO SUIT REQUIREMENTS OF BHEL'S END CUSTOMERS.

ABBREVIATIONS:

R= REVIEWED BY
P= PERFORMED BY
W= WITNESS BY

APPD DRG= APPROVED DRAWING
TR= TEST REPORT/ CERTIFICATE
IR=INSPECTION REPORT

3=BHEL SUB VENDOR/NABL APPROVED EXTERNAL LAB
2= BHEL/BHEL NOMINATED AGENCY
1=BHEL END CUSTOMER

H=HOLD POINT(UNLESS A WRITTEN CLEARANCE IS OBTAINED FROM NPCIL, MANUFACTURER SHALL NOT PROCEED TO NEXT STAGE--APPLICABLE FOR NPCIL PROJECTS ONLY)
IEC= INTERNATIONAL ELECTROTECHNICAL COMMISSION

PREPARED BY Ravindra 05/04/21

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05/04/21

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