

38147/2020/PE-SD-450 ME

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 278
		TECHNICAL SPECIFICATION	Rev. No. 00
		MS THREADED RODS	Page 1 of 2

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MS THREADED RODS

1.0 INTRODUCTION & SCOPE

- 1.1 The intent of this document is to indicate minimum specification requirements for procurement of **MS threaded Rods** (metric ISO standard thread).
- 1.2 The purpose of these MS Threaded Rods is to support the HVAC ducts/ Pipe supports/ Cable tray supports and other service utilities by screwing into the Flush Anchor fastener.
- 1.3 All the codes/standards mentioned in this specification shall be of latest issue.

2.0 DESIGN & MATERIAL

- 2.1 MS Rods shall be Threaded for full length.
- 2.2 MS Threaded Rod Size & Length shall be as per variant table / BHEL enquiry.
- 2.3 Each MS Threaded Rod shall be supplied along with suitable Hexagonal nuts (3 nos) & Washers (2 nos).
- 2.4 Rods, Washers and Nuts shall be HOT-DIP Galvanized.
- 2.5 Rod material shall be - IS2062, Grade E250 Sub-quality A.
- 2.6 Nut and Washer material shall be - CS 5.8 Grade.
- 2.7 The thread should enable the fixing of rods into the flush anchor of the same size.
- 2.8 No damage should happen to the thread when fastening.

3.0 INSPECTION

Scope of inspection shall be as called for in the data sheets enclosed / specified in the purchase order / approved quality plan. Inspection agency shall be BHEL / BHEL Third Party Inspection agency.

4.0 TEST CERTIFICATES

Three copies of the test certificates covering results of the Chemical analysis and the Mechanical tests as per the material standard, shall be furnished.

5.0 PACKING AND MARKING

- 5.1 All the items shall be packed suitably in closed wooden cases / hard cardboard boxes, enclosed in a moisture resistant wrapping in order to avoid damage, ingress of moisture & corrosion during transit and storage. Suitable supports shall be provided inside the cases in order to avoid internal movement. Each packing case must contain 2 copies of the shipping list giving details of all the contents of the case.
- 5.2 The following marking shall be done on each packing case minimum on two sides and also at the top:
 - Complete address of the consignee and destination as per BHEL Purchase Order.
 - BHEL Purchase Order Number (c) Number of pieces in each packing case
 - Net Weight
 - Gross Weight
 - Packing case number and total number of packing
 - Arrow indicating top of the packing case.

Form No:	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
	PROJECT ENGINEERING & SYSTEMS DIVISION	 PARAMESH	 V UDAY	 SRIKANTH	02.11.19

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RECORD OF REVISIONS				
Rev. No.	Date	Revision Details	Revised	Approved
00	02.11.2019	First Issue	--	--

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EXPORT PACKING

(PACKING INSTRUCTIONS FOR GENERAL COMPONENTS / ASSEMBLIES / EQUIPMENT)

1 GENERAL

This standard lays down packing instructions for export packing of components/assemblies/equipment to be dispatched against Customer's contracts, for which there are no special instructions issued by the Engineering Departments.

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

2 SCOPE

This procedure gives minimum guidelines for export packing to be complied with for packing of components/assemblies/equipment. This packing shall be suitable for different handling operations and for the adverse conditions during transportation and during indoor / outdoor storage for periods more than one year.

3 WOOD SPECIFICATION FOR PACKING:

- a) The wood shall conform to specification AA51401.
- b) Ply Wood planks as per specification IS:303 Gr. "MR" Type A,B are used for the sides, top & bottom of the packing cases.
- c) Ply Wood of marine grade as per IS:710 for packing of control equipment and for support batten pinewood to be used as per specification AA51401.

4 TYPE OF PACKING:

The following types of packings have been standardized for packing of general components/assemblies.

4.1 Open Type:

Packing subjected to BHEL approval.

4.2 Closed packing cases:

- a) Export packing of the specific items requiring additional protection shall be covered with G.I. sheet covering as per customer/contractual/engineering requirements. G.I. shall conform to specification AA10166.
- b) Any other special or export seaworthy packing (improvement or equivalent to the above) shall be subjected to BHEL Engg & QC approval).

4.3 Special Packing

Components requiring special packing (as per customer/contractual/ engineering requirements) not included in this specification shall be covered by product standards.

5 TREATMENT OF WOOD AS PER ISPM-15

As per customer requirement for export packing, wood to be treated as per International Standards for Phytosanitary Measures ISPM:15.

Revisions:			APPROVED: PROCEDURAL GUIDELINES COMMITTEE – PGC (Packing)		
Rev. No. 01	Amd. No.	Reaffirmed	Prepared HEP, Bhopal	Issued Corp. R&D	Dt. of 1 st Issue 31-05-2018
Dt: 12-06-2018	Dt:	Year:			

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CORPORATE STANDARD**6 PREPARATION OF PACKING CASE:**

- 1) Export items are to be packed in sea worthy wooden/Ply board cases.
- 2) The base of the case shall be made of wooden battens for planks giving necessary reinforcement, such that the bottom of the equipment is at a height of 100 to 200mm from the ground level depending upon size & weight of equipment. However for packing cases of smaller size equipment can be at a height of 40mm from the ground level.
- 3) The four sides & top cover shall be lined, from inside with multi-layered cross-laminated polyethylene sheet of 90GSM as per AA51420 and tacked at suitable places.
Whenever specified the top cover will have a layer of multi-layered cross laminated polyethylene sheet of 90 GSM over the cover. This should project about 100 - 250mm on all sides.
It is preferable to have a single piece of the above Multi-layered cross laminated polyethylene sheet fixed on the four sides. In case jointing is unavoidable, it should be done by overlapping of approximately 100mm.
- 4) Put the job on the base and wherever necessary may be screwed / fastened.
- 5) In case of delicate component Packing Viz. Electrical & Electronic components for instruments/ assemblies, a rubber sheet, Self-expanded polyethene foam sheet as per AA51423, preferably 10mm thick, shall be fixed on to the base to act as cushioning to the equipment.
- 6) Place the Components/cartons with corrosion inhibitors duly applied wherever necessary for place suitably, thin muslin cloths bags containing 100grams (approx.) of activated Blue Silica Gel to AA55619, wherever necessary. Alternatively VCI Powder or Tablet may be used.
- 7) In case, depression is formed, at the top, after the equipment is lowered, provide ply board/wooden batons.
- 8) Whole Equipment shall be covered and sealed with Multi-layered cross-laminated Polyethylene sheet to AA51420.
- 9) For indoor panels/equipment, provide suitable packing batons with covering of Thermocole/ expanded soft polyethylene foam/polyethylene air bubble film wrapped with suitable cords, to avoid cutting of the polyethylene sheet so that finished surface is not damaged.
- 10) Empty space in the box shall be filled with adequate cushioning material e.g. Thermocole Chips, Wood Wool etc. to avoid movement for shocks. Alternatively put wooden blocks/batons wherever necessary.
- 11) The inner side of the top cover shall be lined with M.L.C. laminated polyethylene sheet of at least 90GSM, which shall project approximately 25 to 150mm depending upon the size of the case on all sides of the top cover shall be provided below the top cover. This projection, after nailing the top cover, shall be folded over, on the sides of the crates & tacked, to, prevent ingress of water from the top.
- 12) For specific applications requiring additional protection the packing cases are covered with GI sheet on outside for sides and top; inside for bottom as per specification AA10166, thickness of G.I. sheet shall be 0.25mm.
- 13) For specific applications requiring inspection, additional inspection window has to be provided for custom clearance for export jobs.

7 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 M.L.C. laminated poly film. 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.

Certain special precautions are required for seal tight packing of specific item have to be covered by product standard.

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8 OTHER PACKING MATERIAL

8.1 Volatile Corrosion Inhibitor (VCI) Paper as per AA51406:

a) Un-protected surfaces of steel and cast iron components, tools bearing, shaft seals etc. are covered with VCI paper. VCI paper has been impregnated with corrosion inhibitors which by evaporation and chemical conversion protect metals in an enclosed area against corrosion.

b) 7m3 VCI paper is necessary for 1 m3 of packed item approximately as per AA51406.

Application Limitation:

VCI paper shall not be used for components made of aluminium, aluminium alloys as well as Zinc, copper, brass, cadmium and silver.VCI powder is sprinkled inside the piping components ends shall be protected with end cover as specified in plant standards, drawings.

8.2 Moisture Absorber:

Silica gel is used for this purpose to protect the contents over sufficiently long time from corrosion. At the time of use, silica gel should be so dried that its colour becomes dark blue. These shall be filled in small cotton bags. Before sealing the equipment, the silica gel bags should be kept inside the polyethylene film cover at different locations. The quantity of silica gel depends on the dimension of the polyethylene sheet as well as transit and storage time.

8.3 Sling Plate:

Sling plate shall be provided to prevent damage to the packing box during lifting. Size of the sling plate shall be selected depending upon the net weight of the consignment.

8.4 Packing Slip Holders:

Two nos. of packing list with suitable protecting cover shall be fixed one inside and the other outside of the packing box as per specification AA7240901.

8.5 Nails

The length and diameter of the nails depends upon the size of planks

8.6 Strapping Strips:

These are used for strapping the boxes. Suitable size of box strapping strip can be used as per size and weight of consignment. The material shall be free from rust.

8.7 Brackets:

These brackets are used for nailing to the corners of cubicle boxes.The brackets shall be of "L" shape, suitable holes shall be provided towards the end of each side for screwing /nailing.

8.8 Fasteners:

Bolts, double nuts, spring washers of suitable size will have to be used for packing of some special items like transformers, reactors, breakers, etc., to hold the job to the bottom plank of the box.

8.9 Polyethylene Sheet:

The polyethylene sheets are used to make covers to the jobs individually.multi-layered cross laminated polyethylene sheet as per AA 51420 can be used for packing of jobs.

8.10 Expanded Poly Foam Sheet and Air Bubble Film:

This item is used for covering the delicate items, Expanded Polyethylene Foam Sheet as per specification AA51423 and air bubble film as per specification AA51426

8.11 Thermocol (Expanded Polysterene) Sheets:

This is used for covering delicate items. This material shall be as per spec. no AA51416

8.12 Cotton Bags:

These are used for holding silica gel.

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CORPORATE STANDARD**8.13 Marking Ink:**

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

8.14 Polyethylene Bags:

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

8.15 Mechanical Latching Clamps:

For specific items self locking clamps can also be used on need basis in conjunction with or apart from regular bolt and nut fixing arrangement, if needed.

9 DESIGN OF PACKING BOXES

Design/drawing of packing boxes shall be prepared based on actual weight and size of the equipment and shall be covered by concern product standards.

10 GENERAL PRECAUTIONS:

- 1) While fixing nails during packing, necessary care shall be taken to ensure that materials used for protection inside the case e.g. paper, polyethylene sheet, coir etc. do not get damaged.
- 2) Sling protection brackets to be provided on cases wherever required.
- 3) It shall be ensured that all stencil marks external, front & rear sides of the casing shall be of water proof Material to prevent obliteration in transit.
- 4) For packing of small/delicate items - Item may be wrapped properly with M.L.C. laminated polyethylene and wrapped item may be further wrapped with air bubble film as per spec. AA51426, these curtains will be subsequently packed in wooden/ply boxes as at clause 8.0.
- 5) The various caution signs shall be marked with stencil on both sides of the packing box.
- 6) Instructions on handling, storage, preservation, represervation and transport of export order components at works and site shall be covered by product standards.

11 MARKING

The following details are to be marked on the packing cases.

- a) Address of consignee.
- b) Purchase Order No.
- c) Description of item or title of packing list.
- d) Case identification Number.
- e) Net Weight.
- f) Gross Weight.
- g) Dimensions of box
- h) Marking showing upright position.
- i) Marking showing sling position.
- j) Marking showing umbrella (i.e. for machines/components to be stored under covered storage).



CORPORATE STANDARD

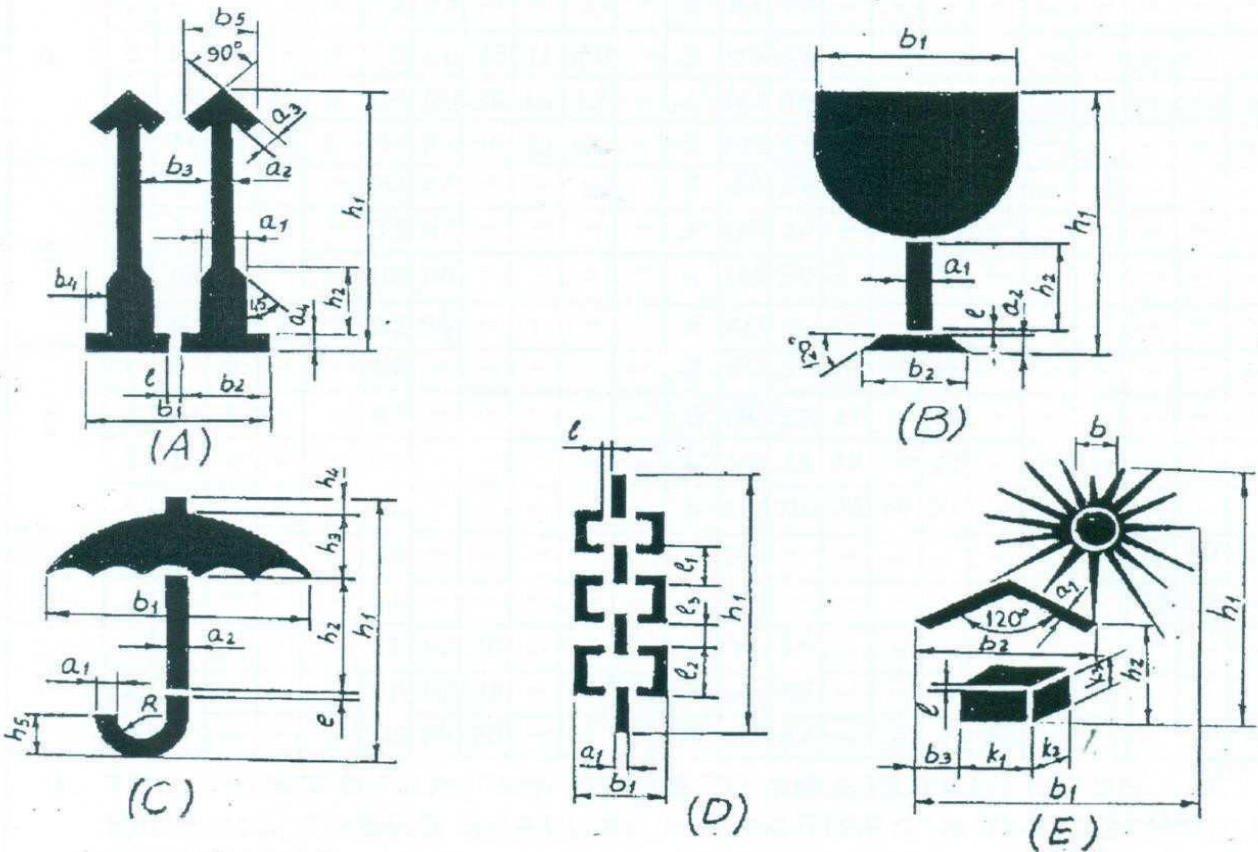
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MARKINGS ON PACKING CASES

- 1. THIS PLANT STANDARD PRESCRIBES THE VARIOUS CAUTION SIGNS AND OTHER MARKINGS ON PACKING CASES.
- 2. DIMENSIONS IN THE TABLE 1 SHALL BE USED FOR MAKING STENCILS ONLY.



- A. UPRIGHT
- B. FRAGILE
- C. PROTECTION FROM FALLING OR CONDENSING MOISTURE.
- D. SLINGING POSITION
- E. PROTECTION FROM DIRECT RADIATIONS.

CENTER OF GRAVITY



Figure 1 – Markings

CORPORATE STANDARD



DESIGN- ATION		DIMENSIONS IN mm.																							
		α_1	α_2	α_3	α_4	b_1	b_2	b_3	b_4	b_5	b	ℓ	h_1	h_2	h_3	h_4	h_5	K_1	K_2	K_3	ℓ_1	ℓ_2	ℓ_3	R	
A	1	12	5	5	4	52	25	19	8	21	-	2	84	23	-	-	-	-	-	-	-	-	-	-	
	2	17	7	7	6	75	36	29	11	30	-	3	119	33	-	-	-	-	-	-	-	-	-	-	
	3	24	10	10	8	104	50	38	16	42	-	4	168	46	-	-	-	-	-	-	-	-	-	-	
	4	34	14	14	11	147	71	59	23	60	-	5	239	65	-	-	-	-	-	-	-	-	-	-	
B	1	5	5	-	-	50	33	-	-	-	-	2	84	25	-	-	-	-	-	-	-	-	-	-	
	2	7	7	-	-	71	47	-	-	-	-	3	119	36	-	-	-	-	-	-	-	-	-	-	
	3	10	10	-	-	100	66	-	-	-	-	4	168	50	-	-	-	-	-	-	-	-	-	-	
	4	14	14	-	-	142	94	-	-	-	-	5	239	71	-	-	-	-	-	-	-	-	-	-	
C	1	4	3	-	-	66	-	-	-	-	-	2	80	39	19	5	11	-	-	-	-	-	-	6	
	2	6	4	-	-	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	
D	1	6	-	-	-	30	-	-	-	-	-	4	148	-	-	-	-	-	-	-	30	30	10	-	
	2	9	-	-	-	42	-	-	-	-	-	5	209	-	-	-	-	-	-	-	42	42	14	-	
E	1	3	-	-	-	69	47	10	-	-	16	2	91	26	-	-	-	17	8	11	-	-	-	-	
	2	4	-	-	-	98	67	15	-	-	23	3	128	33	-	-	-	24	11	16	-	-	-	-	
	3	6	-	-	-	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.

Incase 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 higher 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, and then hand written letters/figures shall be allowed.

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.

- 1) Adequate care shall be taken in handling the material, and components to avoid damage during receipts, storage issue manufacture & despatch operations.
- 2) Appropriate material handling equipment like fork lifters, cranes etc. Shall be used where needed.
- 3) Lifting by crane and transportation by trolley of critical items and large components like rotors castings etc. Shall be done carefully.

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

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

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

7) Precision machined components like blades, catches, rollers etc. Shall be lifted using suitable wooden pallets.

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.

- The markings showing the upright position.
- The markings showing the sling position
- Markings showing the fragile contents.
- Other required markings as per Cl.No:11

a) 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°.

b) Handling and lifting should be done without jerks or impacts.

c) Immediately after receipt of the goods, the packing should be examined all-round 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.

d) 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 railway or 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.

e) 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.

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

13 PROVISION FOR INSPECTION:

This clause is applicable only where contractual requirement of customer is there. For other packings this is not applicable.

Each transportable packing's shall have provision for inspection by customer authority etc. during transport from origin of dispatched until destination. This inspection may require opening of the package and subsequently closing it again. For this purpose, suitable designed opening with bolted cover shall be provided. Such an opening shall be clearly marked as "OPENING" with clear instruction for opening & closing written on this cover. For large consignment, the size of the opening shall be suitable to facilitate entry of personnel.

14 REFERRED STANDARDS (Latest publications including amendments):

1) AA51401	2) IS:303	3)IS:710	4)AA10166
5)ISPM:15	6)AA51420	7)AA51423	8)55619
9)AA51406	10)AA51416	11)AA51426	12)AA56126