

# E-TENDER SPECIFICATION

## E- TENDER SPECIFICATION NUMBER

BHE:PW:PUR:NTP-SITE FABRICATION:3210

FOR

<b>PACKAGE-A</b>	<b>Framework Agreement for detailed drawing preparation, approval from BHEL Engineering, issuance of raw steel from the BHEL storage yard, fabrication of the bolted-type structure as per approved detailed drawings, blasting, painting, and inspection as per the approved MQP, and handover of the structure to BHEL for the 3x800 MW PVUNL Project, Patratu. (Qty – 1500MT)</b>
<b>PACKAGE-B</b>	<b>Framework Agreement for detailed drawing preparation, approval from BHEL Engineering, issuance of raw steel from the BHEL storage yard, fabrication of the bolted-type structure as per approved detailed drawings, blasting, painting, and inspection as per the approved MQP, and handover of the structure to BHEL for the 3x800 MW PVUNL Project, Patratu: (Qty – 1000MT)</b>

## VOLUME I – TECHNICAL BID

**THIS TENDER SPECIFICATION CONSISTS OF:**

<b>Notice Inviting Tender</b>	<b>Topic</b>
<b>Volume-IA</b>	Technical Conditions of Contract
<b>Volume-IB</b>	Special Conditions of Contract
<b>Volume-IC</b>	General Conditions of Contract
<b>Volume-ID</b>	Forms & Procedures
<b>Volume-IE</b>	<b>Technical Specifications</b>
<b>Volume-II</b>	Price Bid



**Bharat Heavy Electricals Limited**  
(A Government of India Undertaking)  
Power Sector - Western Region  
345-Kingsway, Nagpur-440001

<b>CONTENTS</b>		
<b>Volume No</b>	<b>Description</b>	<b>Hosted in website ww.bhel.com (Briefly) and detailed in BHEL e-Procurement Portal as files titled</b>
NIL	Tender Specification Issue Details	Part of Vol-I-A-3210
NIL	Notice Inviting Tender	Part of Vol-I-A-3210
I-A	Technical Conditions of Contract	Vol-I-A-3210
I-B	Special Conditions of Contract	Part of Vol-I-BCD-3210
I-C	General Conditions of Contract	Part of Vol-I-BCD-3210
I-D	Forms & Procedures	Part of Vol-I-BCD-3210
<b>I-E</b>	<b>Technical Specifications</b>	<b>Part of Vol-I-E-3210</b>
II	Price Bid Specification as specified in E-Procurement Portal	Volume-II-Price Bid-3210



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### 1.0 PURPOSE

The purpose of this work instruction is to provide the uniform colour and coding scheme for the painting of the equipment and piping installed in our power plant by various vendors. This will help enhance the aesthetic ambience of an otherwise industrial environment. At the same time, for identification purpose, colour code/tags have been enumerated for labeling of articles; equipment, pipes, structures etc.

### 2.0 SCOPE

- 2.1. **The Colour and Coding Scheme** covers applications of Ground Colour and Colour Tags/ Bands on power plant equipment, piping & ducting as final coat over and above the protective coatings for the purpose of identification.
- 2.1. **The Surface Preparation** process and sequence of painting, Statutory requirements and other public Safety Regulations is beyond the scope of this standard.

### 3.0 DEFINITIONS AND ABBREVIATIONS

- 3.1. HOD – Head of the Department
- 3.2. MR – Management Representative
- 3.3. IS – Indian Standard

### 4.0 DESCRIPTION

- 4.1 ISO 9001 –2000, Clause 7.5.3
- 4.2 Quality Manual Section 7.5.3
- 4.3 QS-01-DIV-W-01. Guideline for drafting procedure / work instruction / guidelines.

### 5.0 PROCEDURE

#### 5.1 Colour Scheme for Equipment

Major Equipment in a Building or elsewhere shall be finished with main shade of a colour scheme, while the minor equipment, pipes, etc. shall be finished with secondary shade, as enumerated in accompanying annexures.

#### 5.2 Colour Scheme for Pipelines

The Ground Colour shall be as per the over all Colour Scheme. Generally it shall follow the secondary shade of Colour Scheme.

#### 5.3 Identification

In the case of pipelines, IS: 9404 – 1979 “Colour code for identification of pipelines used in Thermal Power Plants” is followed for LABELLING or TAGGING so that Identification of numerous pipelines in a Thermal Power Plant can be done by

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adopting a system of colour coding consisting of a Colour Band Tag with distinct legend for each system. Direction of flow with an arrow shall be marked near valves junction fittings etc. To indicate flow & return flow pipes, words F&R will be written in the legend respectively.

### 5.4 Colour Band

Colour band is superimposed on the ground colour Fig 2A & 2B [Appendix C](#) to distinguish one kind or condition of the fluid it carries: for example, condensate from boiler feed, clarified water from drinking water etc.

### 5.5 Application

5.5.1 Ground colour may be applied in one of the following ways :-

- a. The ground colours shall be applied throughout the entire length of pipe line :-
- b. The Colour Code Band/ Tag as an identification mark shall be applied as follows:
  - i) At Start and finish of the pipes.
  - ii) At Inlet and at outlet of valves.
  - iii) Near junction and fittings.
  - iv) Before & after Walls and floors where pipe is crossing them.
  - v) It shall also be applied at intermediate points. But in no case, the distance between two consecutive colour bands shall exceed 5 meters.
- c. Colour bands shall have a minimum width of 75 mm. Where hazardous materials are carried in the pipes the colour bands shall be slant as shown in Fig.-3.
- d. The recommended colour bands for the pipe lines with their ISC/RAL nos. are given in Appendix – B.

### 5.6 Addition Identifications

#### 5.6.1 Lettering

- a) For identification purpose, Colour Code/Tags have been enumerated for labeling of articles; equipment, pipes, structures.
- b) The recommended size of lettering for pipes of different diameters is given below:

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Outside Dia of pipe of Covering	Size of Legend
mm	mm
20 to 100	10
100 to 250	40
250 & above	60

The lettering shall be given on a bordered rectangular patch background, which has been designated as Colour Code Tags/ Bands.

### 5.6.2 Direction of Flow

Where it is required to be indicated the direction of flow arrow may be painted near the valves fittings, junctions, walls etc. and at suitable intervals along the pipeline in a manner best suited to local conditions. These shall be black in colour. If a label or badge with a codified indication is attached to the pipe the direction of flow may be indicated by the painted end of the label or badge or a painted arrow.

### 5.6.3 Visibility of Markings

Consideration should be given to the visibility of the letters from the Working platforms. For example where the pipelines are located above the normal line of vision of the operator, the lettering should be placed below the horizontal line of the pipeline.

## 6.0 ASSOCIATED DOCUMENTS

- NIL -

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### APPENDIX A

### EQUIPMENT

		<i>Ground Colour</i>		<i>Identification Tag/Band</i>			
<i>Sl. No.</i>	<i>Equipment</i>	<i>Colour</i>	<i>RAL</i>	<i>Colour</i>	<i>ISC No.</i>	<i>Equivalent RAL No.</i>	<i>Remarks</i>
<b>MAIN PLANT</b>							
1.	Main Turbine	Blue	5012	White		9010	Legend in black letters
2.	Main generator	Blue	5012	White		9010	Legend in black letters
3.	Condenser	Blue	5012	White		9010	Legend in black letters
4.	Ejectors & Vacuum Pumps	Blue	5012	White		9010	Legend in black letters
5.	Heat exchangers (eg. Deaerator LP & HP heaters, gland steam condenser, lube oil cooler, stators water cooler etc.	Blue	5012	White		9010	Legend in black letters
6.	Flash tanks (HP, LP, etc.)	Blue	5012	White		9010	Legend in black letters
7.	<b>Pumps</b>						
	i) Boiler feed pumps	Blue	5012	White		9010	Legend in black letters
	ii) Condensate	Blue	5012	White		9010	Legend in black

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### EQUIPMENT

Sl. No.	Equipment	Ground Colour		Identification Tag/Band			Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
	extraction pumps						letters
	iii) Lube oil	Grey	9002	White		9010	Legend in black letters
8.	Valves, gates, filters	Grey	9002	White		9010	Legend in black letters
9.	<b>Turbine oil system</b>						
	i) Main oil tank	Grey	9002	White		9010	Legend in black letters
	ii) Central oil tank	Grey	9002	White		9010	Legend in black letters
	iii) Oil purifier & Polishing filter	Grey	9002	White		9010	Legend in black letters
10.	Boiler steel supporting	Grey	9002	White		9010	Legend in black letters
11.	Boiler coating	Grey	9002	White		9010	Legend in black letters
12.	Superheaters (exposed portions if any)	Grey	9002	White		9010	Legend in black letters
13.	Metal structures						
	i) Primary Members	Blue	5012				Columns & Beams

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### EQUIPMENT

Sl. No.	Equipment	Ground Colour		Identification Tag/Band			Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
	ii)Secondary Members	Grey	9002				Tie/ Bracing's/ Struts etc.
14.	Hand rails	Blue	5012				Wherever required otherwise SS or GI
15.	Pipe supports	Black	9011				
16.	Gratings (non-galvanised)	Black	9011				
17.	Air ducts	Grey	9002	White		9010	Primary, secondary, rear, igniter, scanner air etc. with hot or cold indication to be identified in black letters.
18.	FANS/ PA/ Scanner (booster) air/ igniter air/ Seal air fan	Grey	9002	White		9010	Legend in Black Letters.
19.	Flue gas ducts	Grey	9002	White		9010	Legend in Black Letters.
20.	ID fans	Grey	9002	White		9010	Legend in Black Letters.
21.	Coal mills and associated feeders	Grey	9002	White		9010	Legend in Black Letters.
22.	Mill reject system grey green	Grey	9002	White		9010	Legend in Black Letters.

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### EQUIPMENT

Sl. No.	Equipment	Ground Colour		Identification Tag/Band			Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
23.	Paddle feeders below track hopper	Golden Yellow	1004	Signal Red	537	3001	For moving parts black strips should be superimposed over the base colour.
24.	Travelling Tripper	Golden Yellow	1004	Signal Red	537	3001	For moving parts black strips should be superimposed over the base colour.
25.	Stacker cum	Golden Yellow		Signal Red	537	3001	For moving parts black strips should be superimposed over the base colour.
26.	Belt feeder	Golden Yellow		Signal Red	537	3001	For moving parts black strips should be superimposed over the base colour.
27.	Drive frames, take-off units chutes, guards of conveyors	Grey	9002	White		9010	Legend in Black letters
28.	Stringer & stands, mouthpieces, tail end frames head end frames, other	Grey	9002	White		9010	Legend in Black letters

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### EQUIPMENT

Sl. No.	Equipment	Ground Colour		Identification Tag/Band			Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
	supporting structures of various other accessories and other equipments, not covered in this list.						
29.	Coal crushers	Grey	9002	White		9010	Legend in black letters
30.	Vibrating feeders	Grey	9002	White		9010	Legend in black letters
31.	a. Dust extraction system piping	Grey	9002	White		9010	Legend in black letters
	b. Ventilation system consisting of GI ducting	Grey	9002	White		9010	Legend in black letters
	c. Dust suppression system consisting of GI piping	Grey	9002	White		9010	Legend in black letters
32.	Steel gratings and grids over emergency hopper	Black					
33.	Conveyor system – idler frames	Grey	9002				
34.	Structural steel work fabricated at site	Grey	9002				

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### EQUIPMENT

		<i>Ground Colour</i>		<i>Identification Tag/Band</i>			
<i>Sl. No.</i>	<i>Equipment</i>	<i>Colour</i>	<i>RAL</i>	<i>Colour</i>	<i>ISC No.</i>	<i>Equivalent RAL No.</i>	<i>Remarks</i>

### FUEL OIL HANDLING SYSTEM

35.	HSD storage tank	Blue	5012	White		9010	Legend HSD to be displayed in Black letters
36.	Furnance oil storage tank	Blue	5012	White		9010	Legend FO to be displayed in Black letters
37.	Pumps, filters and valves	Blue	5012	White		9010	Legend in black letters

### ASH HANDLING SYSTEM

38.	Bottom ash hopper	Blue	5012	White		9010	Legend in black letters
39.	Scraper	Blue	5012	White		9010	Legend in black letters
40.	Clinker Grinder	Blue	5012	White		9010	Legend in black letters
41.	Flush mixer	Blue	5012	White		9010	Legend in black letters

### RAW WATER INTAKE EQUIPMENTS

42.	Intake gates						
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### EQUIPMENT

Sl. No.	Equipment	Ground Colour		Identification Tag/Band			Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
	- Above water parts	Grey	9002				
	- Sub merged parts	Grey	9002			9010	
	- Rotating Mechanism	Grey	9002				
	- Sub Merged beams	Grey	9002				
	- Travelling	Grey	9002				

### INSTRUMENT AND SERVICE / PLANT AIR SYSTEM

43.	Trash Rack						
	- Above water stationary parts	Grey	9002	White		9010	Legend in black letters
	- Above/Under water/moving parts	Grey	9002	White		9010	
44.	Metal structures						
	- External	Grey	9002				
	- Internal	Grey	9002				

### DEMINERALIZED WATER SYSTEMS

45.	Filter beds and Ion Exchange resin beds.	Grey	9002				To be Identified by suitable legends.
46.	Air blowers	Grey	9002	White		9010	

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### EQUIPMENT

Sl. No.	Equipment	Ground Colour		Identification Tag/Band			Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
							Legend in black letters
47.	Carbon dioxide exhausters.	Grey	9002	White		9010	Legend in black letters

### INSTRUMENT AND SERVICE/PLANT AIR SYSTEM

48.	Compressors with inter and after coolers	Blue	5012	White		9010	Identifying legends to be used.
49.	Heater/Drivers	Grey	9002	White		9010	-
50.	Air receivers	Blue	5012	White		9010	Legend in black letters

### MISCELLANEOUS EQUIPMENTS

51.	Cranes	Golden Yellow	1004	White		9010	Tower Cranes & Booms will have alternate sections for Signal Red/White for aviation requirement with diagonally painted sections in black.
	- Mono Rails & chain pulley systems	Golden Yellow	1004				
52.	Hooks	Signal Red	3001				
53.	Tanks	Grey	9002	white			Legend in Black letters

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### EQUIPMENT

Sl. No.	Equipment	Ground Colour		Identification Tag/Band			Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
54.	Doors industrial type	Blue	5012				
55.	Solid wastes processing equipment	Grey	9002				
56.	Hydraulic power unit	Golden Yellow	1004	Signal Red	537	3001	
57.	Fencing	Black					
58.	Lighting poles	Aluminium					
59.	Chimney						As per safety regulations Top two bands in Gulf Red & White 3000 mm each.

### ELECTRICAL COMPONENTS

60.	<b>MAIN GENERATOR</b>						
	- Lub oil system	Grey	9002	White		9010	Legend in Black Letters
	- Seal Oil System						
	- Hydrogen system	Grey	9002	White		9010	Legend in Black Letters
	- Stator Water Sys.						
61.	<b>DIESEL GENERATOR SET</b>						

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### EQUIPMENT

Sl. No.	Equipment	Ground Colour		Identification Tag/Band			Remarks
		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
	- Diesel Engine	Grey	9002	White		9010	
	- Generator	Grey	9002	White		9010	
62.	<b>L.T. TRANSFORMERS</b>						
	- Indoor	Blue	5012				Legend in Black Letters
	- Outdoor	Blue	5012				Legend in Black Letters
63.	33 KV class transformers	Blue	5012	Signal Red	537	3001	
64.	400 KV/33 KV tie transformers	Blue	5012	Signal Red	537	3001	
65.	<b>GENERATOR BUST DUCT</b>						
	- Inside of main plant building	Blue	5012	Signal Red	537	3001	
	- Outside of main plant building	Blue	5012	Signal Red	537	3001	
66.	Generator transformer	Blue	5012	Signal Red	537	3001	
67.	Battery charger	Grey	9002	White		9010	
68.	Mimic flow diagram						

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		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
	400 KV	Purpur Violett	4007	White		9010	
	220 KV	Signal Gleb	1003	White		9010	
	132KV	Tarkis Blau	5018	White		9010	
	33.0 KV	Oliv Grun	6003	White		9010	
	21.0 KV/15.75 KV	Beige-rot	3012				
	11.0 KV	Zink Gleb	1018	White		9010	
	6.6 KV	Enzian Blau	5010	White		9010	
	3.3 KV	Gras Grun	6010	White		9010	
	415 V	Lehm Braun	8003	White		9010	
	220V DC	Tief Orange	2011				
	Gen Fld.	Tiefsch wartz	9005				
69.	Unit Control board (Control Room)	Grey	9002				
70.	Control panel, PLC panel & UPS for	Grey	9002				

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		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
	CHP/AHP						
71.	<b>MOTORS</b>						
	- Indoor	Blue	5012				Enamel paint to be used
	- Outdoor	Blue	5012				
72.	<b>LT SWITCHGEAR (INDOOR)</b>						
	- LT Switchgear Exterior	Grey & Blue	9002 5012				Front & Rear Panels in Grey (RAL 9002). End Panels sides in Blue (RAL 5012)
	- MCC	Grey & Blue	9002 5012				Front & Rear Panels in Grey (RAL 9002). End Panels sides in Blue (RAL 5012)
	- D.C. Distribution board	Grey & Blue	9002 5012				Front & Rear Panels in Grey (RAL 9002). End Panels sides in Blue (RAL 5012)
	- L.T. busduct outside of enclosures	Blue	5012				

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		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
73.	<b>6.6 KV SWGR</b>	Grey & Blue	9002 5012				Front & Rear Panels in Grey (RAL 9002). End Panels sides in Blue (RAL 5012)
	- 6.6 KV busduct inside of main plant bldg.	Blue	5012				
	- 6.6 KV busduct outside of main plant building	Blue	5012				
74	<b>33 KV SWGR cubicle</b>	Grey & Blue	9002 5012				Front & Rear Panels in Grey (RAL 9002). End Panels sides in Blue (RAL 5012)
	- CR Panels	Grey	9002				
	- Surge protection cubicle	Grey	9002				
75.	Control and console inserts	Grey	9002				
76.	Electronic system cabinets, computer system cabinets, BMS, ATRS, EHC system etc. (Control equipment room)	Blue & Grey	5012 & 9002				Front & Rear Panels in Grey (RAL 9002). End Panels sides in Blue (RAL 5012)
77.	All locally mounted C&I systems panel cabinets local (External)	Blue & Grey	5012 & 9002				Front & Rear Panels in Grey (RAL 9002). End Panels sides in Blue (RAL 5012)

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		<i>Ground Colour</i>		<i>Identification Tag/Band</i>			
<i>Sl. No.</i>	<i>Equipment</i>	<i>Colour</i>	<i>RAL</i>	<i>Colour</i>	<i>ISC No.</i>	<i>Equivalent RAL No.</i>	<i>Remarks</i>
78.	Intercom	Equipment					
	- Hand sets unit	Grey	9002				
	- Hand sets plant	Grey	9002				
79	- Metal containers/ cable junction boxes	Grey	9002	White		9010	-
80.	<b>LIGHTING EQUIPMENT/PANELS</b>						
	- Exterior	Grey	9002				
81.	Unit Heaters	Grey	9002	Signal Red	537	3001	Legend in Black letters.
82.	<b>400 KW SWITCHYARD EQUIPMENTS</b>						
	I. Control and relay panels (control equipment room and switchyard control room)	Blue & Grey	5012 & 9002				Legend in Black letters. Ends in Blue. Front & Rear in Grey.
	II. PLCC	Blue & Grey	5012 & 9002				Legend in Black letters. Ends in Blue. Front & Rear in Grey
83.	Switchyard CB,	Grey	9002				

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		Colour	RAL	Colour	ISC No.	Equivalent RAL No.	
	Isolators, CTs, PTs, Lighting arrestors, Wave Traps, CVTs, Marshalling boxes, JBs, Local Panels						
84.	Porcelain parts like insulators	Brown	As per IS				Possibility of Using Grey Shade be explored.
85.	Generator Relay panels (GRP's)	Grey & Blue	9002				
86.	All other Structures and equipment.	Grey	9002				
87.	<b>INSTALLATION MATERIALS</b>						
	- Resin Tubes	Grey	9002				Legend in black letters.
	- Steel Tubes						Legend in black letters.
88.	Gang ways and trays	Grey	9002				Legend in black letters.
89.	Misc. steel structures (trellies, Portals, brackets)	Grey & Blue	9002 & 5012				Primary Structural in members (Columns & Beams) in Blue. Secondary members in Grey.
90.	Storage boxes	Grey	9002				Legend in black letters.

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91.	<b>INSULATING OIL TREATMENT PLANT</b>						
	- Tanks and the equipment	Grey	9002	White		9010	Legend in Black Letters
92.	<b>IDENTIFICATIONS PLATES</b>						
	Mechanical equipment's and piping						
	- Background	White	9010				
	- Border	Black	9011				
	- Lettering	Black	9011				

Note: 1) .For mechanical equipments ground colour indicated against each equipment shall be followed in case equipment is not insulated/cladded.

2). However if enclosure is provided for the mechanical equipments, then the indicated ground colour for mechanical equipment shall be followed.

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### APPENDIX-B

### PIPELINES

S. No.	Medium	Ground Colour		Identification Tag/ Band Colour			Legend	Remarks
		Colour	RAL	COLOUR	ISC No	RAL #		
<b>1.</b>	<b>WATER</b>							
a.	Untreated or Raw/service	Grey	9002	Sea Green	217		RW/S W	
b.	Treated/ Demineralised	Grey	9002	Sea Green	217		DMW	
c.	Condensate	Grey	9002	Sea Green	217		MC	
i.	LP bypass spray	Grey	9002	Sea Green	217		LPBA	
ii.	Condensate Makeup line to condenser from surge tank and from DM Supply header	Grey	9002	Sea Green	217		CCM	
d.	Boiler feed	Grey	9002	Sea Green	217		BFD	
i.	HP bypass attemperation	Grey	9002	Sea Green	217		HPBA	
ii.	Super heater attemperation	Grey	9002	Sea Green	217		SHA	
iii.	Reheater	Grey	9002	Sea	217		RHA	

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S. No.	Medium	Ground Colour		Identification Tag/ Band Colour			Legend	Remarks
		Colour	RAL	COLOUR	ISC No	RAL #		
	attemperation			Green				
iv.	Aux. PRDS attemperation	Grey	9002	Sea Green	217		APRD SA	
<b>2.</b>	<b>STEAM</b>							
a.	Main	Aluminium*		Signal Red	537	3001	MS	*Aluminium is to be used only in case Where the pipes are not already clad with aluminium sheets.
b.	Auxiliary	Aluminium*		Signal Red	537	3001	AS	
c.	Bled (Extraction)	Aluminium*		Signal Red	537	3001	1 EX 2 EX 6 EX	
d.	Hot reheat	Aluminium*		Signal Red	537	3001	HR	
e.	Cold reheat	Aluminium*		Signal Red	537	3001	CR	
f.	HP bypass	Aluminium*		Signal Red	537	3001	HPB	
g.	LP bypass	Aluminium*		Signal Red	537	3001	LPB	
h.	Exhaust/vent (open to atmosphere) and safety valve	Aluminium*		Light Brown	537	3001	V/SVE	Hazard mark may be given
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S. No.	Medium	Ground Colour		Identification Tag/ Band Colour			Legend	Remarks
		Colour	RAL	COLOUR	ISC No	RAL #		
<b>3. AIR</b>								
a.	Instrument	Grey	9002	Sky blue	101		IA	
b.	Service/Plant	Grey	9002	Sky blue	101		PA	
c.	Vacuum	Grey	9002	Sky blue	101		VC	
<b>4. AIR STEAM MIXTURE</b>								
a.	From turbine glands to gland steam condenser	Aluminium*		Sky Blue	101		ASM	*Aluminium is to be used only in cases where the pipes are not already clad with aluminium sheets.
b.	From condenser	Aluminium*		Sky Blue	101		ASM	*Aluminium is to be used only in cases where the pipes are not already clad with aluminium sheets.
c.	From heater shells to condenser	Aluminium*		Sky Blue	101		ASM	*Aluminium is to be used only in cases where the pipes are not already clad with aluminium sheets.
<b>5. GAS</b>								
a.	Natural gas	Grey	9002	Canary yellow	309		NG	*Hazard mark is given
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S. No.	Medium	Ground Colour		Identification Tag/ Band Colour			Legend	Remarks
		Colour	RAL	COLOUR	ISC No	RAL #		
b.	Other fuel gas	Grey	9002	Canary yellow	309			
c.	Hydrogen	Grey	9002	Canary yellow	309		H	
d.	Nitrogen	Grey	9002	Canary yellow	309		N	
e.	Chlorine	Grey	9002	Canary yellow	309		Cl	
f.	Carbon dioxide	Grey	9002	Canary yellow	309		CO2	
g.	Non condensable gas mixtures	Grey	9002	Canary yellow	309		NCG	
h.	Oxygen	Grey	9002	Canary Yellow	309		O	
<b>6.</b>	<b>OILS</b>							
a.	High speed diesel	Grey	9002	Light * brown	410		HSD	* Hazard Mark
b.	Furnance oil	Grey	9002	Light * brown	410		FO	* Hazard Mark
c.	Lubricating oil (including governing oil if lub oil is used for governing	Grey	9002	Light brown	410		LO	* Hazard Mark

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S. No.	Medium	Ground Colour		Identification Tag/ Band Colour			Legend	Remarks
		Colour	RAL	COLOUR	ISC No	RAL #		
	purposes)							
d.	Hydraulic power	Grey	9002	Light brown	410		HYD. O	
e.	Control fluid	Grey	9002	Light brown	410		CR.O	
f.	Transformer oil	Grey	9002	Light brown	410		TR.O	
7.	<b>PULVERIZED FUEL</b>	Grey	9002	Silver grey	628		PF	
8.	<b>FIRE INSTALLATIONS</b>	Fire Red	536 (ISC) 3001 (RAL)	White		9010	FIRE	Legend in Red Letters over White Background
9.	<b>CHEMICAL FEED</b>							
a.	HP dosing to boiler (Phosphate)	Grey	9002	Dark admiralty grey	632		HCF	Legend in Black Letters
b.	LP dosing to condensate (Hydrazine/ Ammonia)	Grey	9002	*Signal Red	537	3001	LCF	*Hazard mark is given
10.	<b>ACID PIPING</b> (in water treatment plant)	Grey	9002	*Signal Red	537	3001	+	+Name of the chemical (formula) to be used as legend for identifying the individual acids & alkalies

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S. No.	Medium	Ground Colour		Identification Tag/ Band Colour			Legend	Remarks
		Colour	RAL	COLOUR	ISC No	RAL #		
11.	<b>ALKALI PIPING</b> (in water treatment plant)	Grey	9002	*Signal Red	537	3001		*Hazard mark is given
12.	<b>ASH PIPE</b>	Grey	9002	French Blue	166		ASH	
13.	<b>IMPULSE PIPING</b>	Grey	9002	Same as process piping				

Note : Ground colour indicated against each piping shall be followed in case piping is not insulated /cladded.

**NOTE: FOR PAGE 27, GO TO PAGE NO.3, CLAUSE NO.5.4 AND CLICK ON Appendix-C WHICH IS HYPERLINKED.**

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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS

## [1] SMAW ELECTRODES FOR STRUCTURES

1(A) E6013					
1	E6013	AARYA-13	Aarya Electrodes (P) Ltd.	Agra	Rutile electrode for welding non-pressure parts of mild and low carbon steels
2	E6013	SUNWELD	Abirami Electrodes	Coimbatore	
3	E6013	METALBOND	Ador Weiding Ltd.	Pune	
4	E6013	ACCURATE ARC E6013	Accurate Weldarc Pvt Ltd	Raipur	
5	E6013	ALPHA 6013	Alpha Arc (P) Ltd	Ghaziabad	
6	E6013	WELDER - G	Alpha Flux &Eletrodes	Trichy District	
7	E6013	SUNGOLD	Asokaa Alloys	Coimbatore	
8	E6013	AWT E6013	Atharve Welding Technologies (I)	Solapur	
9	E6013	B&H ULTRA	B&H Electrodes (P) Ltd	Mohali	
10	E6013	MONARC-S	Bagherwal Electrodes (P) Ltd.	Indore	
11	E6013	SONY ARC E6013	Balaji Electrodes	Coimbatore.	
12	E6013	A-ONE E6013	Bright Weld Technologies	Coimbatore.	
13	E6013	SHIVA-S	Calcutta Electrodes (P) Ltd.	Raipur	
14	E6013	CLASSIC 6013 PLUS.	Classic Electrodes ( India ) Ltd.	Kolkata	
15	E6013	ATLAS-13	Cosmos Electrodes (P) Ltd	Indore	
16	E6013	Standard	D&H India Ltd.	Indore	
17	E6013	Norma	D&H Secheron Electrodes (P) Ltd	Indore	
18	E6013	ELMARK 11	Elmarc Electrodes (P) Ltd.	Chennai	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
1(A)	E6013				
19	E6013	ESAB Ferrospeed Plus	ESAB India Ltd	Chennai	Rutile electrode for welding non-pressure parts of mild and low carbon steels
20	E6013	NUMBER ONE	Eureka Systems And Electrodes (P) Ltd	Coimbatore	
21	E6013	ELECTRA-6	Fusion Engg. Products Private Ltd.	Gamaria	
22	E6013	GEECON PINK	Gee Limited	Kalyan (W)	
23	E6013	Regular-S	Honavar Electrode Pvt Ltd	Mumbai	
24	E6013	IDEAL 40	Ideal Electrodes	Coimbalore.	
25	E6013	CROWN 13S	K.M.Crown Welding Consumables (P)	Dewas	
26	E6013	KELARC 6013	Kollipara Electrodes (P) Ltd.	Krishna Dist.	
27	E6013	MAGNARC 63	Magnarc Electrodes (P) Ltd.	Visakhapatnam	
28	E6013	MAILARC 13R	Mailam India Limited	Pondicherry	
29	E6013	MANGALAM E 6013	Malu Electrodes (P) Ltd.	Nagpur	
30	E6013	MANTEK GP-13.	MantekElectrods Private Ltd	Trichy	
31	E6013	MARUTHI 6013X-	Maruthi Electrodes (P) Ltd.	Bangalore	
32	E6013	Maruti-44	Maruti Weld Private Ltd.	New Delhi	
33	E6013	MEGA E6013	Mega Weld Technologies	Coimbatore	
34	E6013	MICRO-6013	Micro Weld (India)	Ludhiana	
35	E6013	MIGLANI ARK-X	Miglani Engineers	Haridwar.	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
1(A)	E6013				
36	E6013	STEELON STANDARD	Modi Arc Electrodes Co	Ghaziabad	Rutile electrode for welding non-pressure parts of mild and low carbon steels
37	E6013	GM 20	ModiHitech India Ltd.	New Delhi	
38	E6013	MEDAL ARC	Nivetha Electrodes	Tiruchirapally	
39	E6013	EKNOWELD	Nucor Weld(India)(P) Ltd.	Bangalore	
40	E6013	GALA WELD	Orange Electrodes Industries	Asangaon	
41	E6013	SUN ARC X - 19	Orion Wire Manufacturing Co.	Bharuch	
42	E6013	ANAND-13	P.R.Industries	Kota	
43	E6013	RATNA 6013X	Raajratna Electrodes Ltd	Ahmedabad	
44	E6013	RAJCORD-13S	Raj Kesari Electrodes	Udaipur	
45	E6013	RASI E6013	Rasi Electrodes Ltd.	Chennai	
46	E6013	ROYAL S	Royal Arc Electrodes (P) Ltd	Thane	
47	E6013	JACKSON 5	Royal Welding Wires (P) Ltd.	Kanchipuram	
48	E6013	BALAJI	Rukhmani Electrodes (P) Ltd.	Kolkata	
49	E6013	KAYNOZ 7S	Seth Electrodes (P) Ltd.	Khurai	
50	E6013	ESL' ARC-62	Shieldarc Equipments (P) Ltd	Kolkata	
51	E6013	VATSARC 19 PLUS.	Solarc Weld Rods	Chennai	
52	E6013	SUDO 6013	Spectra Super Alloys Ltd	Jamshedpur	
53	E6013	SUNSHINE E6013	Sri Renga Electrodes (P) Ltd	Trichy	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
1(A)	E6013				
54	E6013	SUNDEEP S	Sundeeep Electrodes (P) Ltd.	Hapur	Rutile electrode for welding non-pressure parts of mild and low carbon steels
55	E6013	OVERCORD S	Superon Schweissttechnik (I) Ltd	Haryana	
56	E6013	BEST ARC MS11-	V.N.C.Electrodees	Karur	
57	E6013	PRIMEARC-13	Valency Compounds Services Pvt Ltd	Ahmednagar	
58	E6013	PRIMA-6013S	Varun Electrodes (P) Ltd.	Panipat	
59	E6013	SPEEDARC E6013	Voltarc Electrode (P) Ltd	Tirupathi	
60	E6013	WA-6013-S	Weld Alloy Products Ltd.	G Noida	
61	E6013	WELDALL	Weldall Electrodes (India)	Nagpur	
62	E6013	NOVAX - 13	Weldcom Electrodes (P) Ltd.	Surat	
63	E6013	MAXIMA-6013X	Weldcraft Private Ltd.	Bangalore	
64	E6013	WELDFAST SUPER	Weldwell Electrodes	Nagpur	

<b>LOW HYDROGEN SMAW ELECTRODES FOR STRUCTURES</b>					
1(B)	E7018				
1	E7018	SUPABASE 7018	Ador Welding Ltd	Pune	Basic coated low hydrogen electrodes for welding of thick sections in structural steels
2	E7018	ALPHA 7018	Alpha Arc Pvt Ltd	Ghaziabad	
3	E7018	SUPER WELD 7018	Alpha Flux & Electrodes	Trichy District	
4	E7018	ANAND THERME	Anand Arc Ltd	Chennai	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS	
1(B)	E7018					
5	E7018	MONOTHERME	Bagherwal Electrodes (P) Ltd.	Indore	Basic coated low hydrogen electrodes for welding of thick sections in structural steels	
6	E7018	SHIVATHERME-18	Calcutta Electrodes (P) Ltd.	Raipur		
7	E7018	CLASSIC LH-7018	Classic Electrodes ( India ) Ltd.	Kolkata		
8	E7018	SUPRA MAX-18	Cosmos Electrodes Pvt Ltd	Indore		
9	E7018	SUPRATHERME	D&H Secheron Electrodes Pvt Ltd	Indore		
10	E7018	SUPER LH	D&H India Limited	Indore		
11	E7018	ESAB-36H	ESAB India Ltd	Chennai		
12	E7018	EUTHERME LH	Eureka Systems And Electrodes P.Ltd	Coimbatore		
13	E7018	BASICOTE 6	Fusion Engg Products Private Ltd	Gamaria		
14	E7018	GRICON GREEN	GEE Limited	Kalyan (W)		
15	E7018	ULTIMATE-18----	Honavar Electrodes Pvt Ltd	Mumbai		
16	E7018	KELARC-7018	Kollipara Electrodes Pvt Ltd	Krishna Dist.		
17	E7018	CROWN-18	K.M. Crown Welding Consumables Pvt	Dewas		
18	E7018	MAGNAARCH LH	Magnarc Electrodes (P) Ltd.	Visakhapatnam		
19	E7018	MAGNA-8	Magna Engineering	Vijaywada		
20	E7018	MAIL ARC 18	Mailam India Limited	Pondicherry		
21	E7018	MANGALAM E 7018	Malu Electrodes (P) Ltd.	Nagpur		
22	E7018	MANTEK LH 18	Mantek Electrods Private Ltd	Trichy		



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
1(B)	E7018				
23	E7018	MARUTHI 7018	Maruthi Electrodes (P) Ltd	Bangalore	Basic coated low hydrogen electrodes for welding of thick sections in structural steels
24	E7018	ULTRA - 7018	Maruti Weld Private Limited	New Delhi	
25	E7018	MODI 7018	Modi Arc Electrodes Co.	Ghaziabad	
26	E7018	GM18	Modi Hitech India Ltd	New Delhi	
27	E7018	SUPERIAL LH E7018	Murli Electrode (P) Ltd	Nagpur	
28	E7018	EKNOWELD	Nucor Weld(India) Ltd	Bangalore	
29	E7018	RATNA 7018	Raajratna Electrodes Ltd	Ahmedabad	
30	E7018	SUPERLET - 18	Raj Kesari Electrodes Pvt Ltd	Udaipur	
31	E7018	RASI 7018LH	Rasi Electrodes Ltd	Chennai	
32	E7018	ROYAL THERM	Royal Arc Electrodes Ltd	Thane	
33	E7018	JACKSON 18H	Royal Welding Wires Pvt Ltd	Kanchipuram	
34	E7018	REPL 7018	Rukhmani Electrodes (P) Ltd.	Kolkata	
35	E7018	SAITRON LH-7018	Saitron Engineers Pvt Ltd	Nagpur	
36	E7018	SUPRADYNE	Solarc Weld Rods	Chennai	
37	E7018	SUDO 7018	Spectra Super Alloys Ltd	Jamshedpur	
38	E7018	SUNSHINE - 18	Sri Renga Electrodes (P) Ltd	Trichy	
39	E7018	SUNDEEP 7018	Sundeep Electrodes Pvt Ltd	Hapur	
40	E7018	SUPERCITO OERLICON	Superon Schweisstechnik India Ltd	Haryana	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS	
1(B)	E7018					
41	E7018	ISWP SPARK 7018	The Indian Steel & Wire Products Ltd	Jharkand	Basic coated low hydrogen electrode for welding of thick sections in structural steels	
42	E7018	SEVEN ARCS-18	Thirumala Electrodes Co	Trichy		
43	E7018	PRIMA7018	Varun Electrodes Pvt Ltd	Panipat		
44	E7018	BESTARC-LH-18	V.N.C.Electrodees	Karur		
45	E7018	VJ-7018	Vijey Electrodes And Wires (P) Ltd.	Chennai		
46	E7018	SPEEDARC-7018	Voltarc Electrodes (P) Ltd	Tirupathi		
47	E7018	WA 7018	Weld Alloy Products Ltd	G Noida		
48	E7018	MAXIDURE-7018	Weldcraft Private Ltd.	Bangalore		
49	E7018	EXCEL - 18---	Weld Excel India Ltd	Ludhiana		
50	E7018	WELDFAST LH 18	Weldfast Electrodes Pvt Ltd	Nagpur		

[2] LOW HYDROGEN SMAW ELECTRODES FOR PRESSURE PARTS					
S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
2(A)	E7018				
1	E7018	AARYA-7018	Aarya Electrodes Pvt Ltd	Agra	Basic coated low hydrogen electrodes for welding of thick sections in structural steels and pressure parts
2	E7018	SUPABASE 7018	Ador Welding Limited	Pune	
3	E7018	ANAND THERME	Anand Arc Ltd.	Chennai	
4	E7018	B&H-7018	B&H Electrodes Pvt Ltd	Mohali	
5	E7018	SUPRA MAX-18	Cosmos Electrodes (P) Ltd	Indore	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
2(A)	E7018				
6	E7018	SUPER LH	D&H India Ltd.	Indore	Basic coated low hydrogen electrodes for welding of thick sections in structural steels and pressure parts
7	E7018	SUPRATHERME	D&H Secheron Electrodes (P) Ltd.	Indore	
8	E7018	ESAB-36H	ESAB India Ltd	Chennai	
9	E7018	BASICOTE 6	Fusion Engg. Products Private Ltd.	Gamaria	
10	E7018	GRICON GREEN	Gee Limited	Kalyan (W)	
11	E7018	ULTIMATE - 18.	Honavar Electrodes Pvt Ltd.	Mumbai	
12	E7018	CROWN-18	K.M.Crown Welding Consumables (P)	Dewas	
13	E7018	KELARC-7018	Kollipara Electrodes (P) Ltd.	Krishna Dist.	
14	E7018	MAIL ARC 18	Mailam India Limited	Pondicherry	
15	E7018	MANTEK LH 18	MantekElectrods Private Ltd	Trichy	
16	E7018	MARUTHI 7018	Maruthi Electrodes (P) Ltd.	Bangalore	
17	E7018	ULTRA - 7018	Maruti Weld Private Ltd.	New Delhi	
18	E7018	MODI 7018	Modi Arc Electrodes Co.	Ghaziabad	
19	E7018	GM 18	ModiHitech India Ltd.	New Delhi	
20	E7018	EKNOWELD	Nucor Weld(India)(P) Ltd.	Bangalore	
21	E7018	SUPERLET - 18.	Raj Kesari Electrodes	Udaipur	
22	E7018	RASI 7018LH	Rasi Electrodes Ltd.	Chennai	
23	E7018	ROYAL THERME	Royal Arc Electrodes (P) Ltd	Thane	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
2(A)	E7018				
24	E7018	JACKSON 18H	Royal Welding Wires (P) Ltd.	Kanchipuram	Basic coated low hydrogen electrodes for welding of thick sections in structural steels and pressure parts
25	E7018	SAITRON LH-7018	Saitron Engineers Pvt Ltd	Nagpur	
26	E7018	SUNSHINE - 18	Sri Renga Electrodes (P) Ltd	Trichy	
27	E7018	SUNDEEP 7018	Sundeep Electrodes (P) Ltd	Hapur	
28	E7018	SUPERCITO OERLICON E	Superon Schweisstechnik (I) Ltd	Haryana	
29	E7018	SEVEN ARCS-18	Thirumala Electrodes Co.	Trichy	
30	E7018	PRIMA7018	Varun Electrodes (P) Ltd.	Panipat	
31	E7018	VJ-7018	Vijey Electrodes and Wires Pvt	Chennai	
32	E7018	SPPEDARC E-7018	Voltarc Electrodes ( P ) Ltd	Tirupathi	
33	E7018	WELDALLH 7018	Weldall Electrodes(India)	Nagpur	
34	E7018	WA 7018	Weld Alloy Products Ltd.	G Noida	
35	E7018	EXCEL-18	Weld Excel India Ltd.	Ludhiana	
36	E7018	WELDFAST LH-18	Weldfast Electrodes Pvt Ltd	Nagpur	

2(B)		E7018-1			
1	E7018-1	TENALLOY-Z-PLUS	Ador Welding Limited	Pune	Low hydrogen iron powder electrode recommended for welding pr parts of carbon steels
2	E7018-1	SUPER-LH(SPL)	D&H India Ltd	Indore	
3	E7018-1	Supra ThermeSpl.	D&H Secheron Electrodes (P) Ltd.	Indore	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
2(B)	E7018-1				
4	E7018-1	GRICON GREEN SPL	Gee Limited	Kalyan (W)	Low hydrogen iron powder electrode recommended for welding pr parts of carbon steels
5	E7018-1	Ultimate-18 SPL	Honavar Electrodes Pvt Ltd.	Mumbai	
6	E7018-1	MAILARC-18PLUS	Mailam India Limited	Pondicherry	
7	E7018-1	MODI 7018 SPL	Modi Arc Electrodes Co.	Ghaziabad	
8	E7018-1	ROYAL THERME SPL	Royal Arc Electrodes Limited	Thane	
9	E7018-1	VJ 7018-1	Vijey Electrodes And Wires (P)	Chennai	

[3]	ALLOY STEEL SMAW ELECTRODE				
3(A)	E7018-A1				
1	E7018-A1	Molytherme	D&H Secheron Electrodes (P) Ltd	Indore	Low hydrogen iron powder electrode recommended for welding pr parts of carbon steels
2	E7018-A1	MODI-7018-A1	Modi Arc Electrodes Co.	Ghaziabad	
3	E7018-A1	ULTIMATE 18A1	Honavar Electrodes Pvt Ltd.	Mumbai	
4	E7018-A1	RAJWELD-18A1	Raj Kesari Electrodes	Udaipur	
3(B)	E8018-B2				
1	E8018-B2	Cromotherme - 1	D&H Secheron Electrodes (P) Ltd	Indore	Low hydrogen electrode used for welding pr parts of 1Cr 1/2 Mo
2	E8018-B2	GRIDUCT3	Gee Limited	Kalyan (W)	
3	E8018-B2	ULTIMATE-80-B2	Honavar Electrodes Pvt Ltd.	Mumbai	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
3(B)	E8018-B2				
4	E8018-B2	MAILARC 1CR	Mailam India Limited	Pondicherry	Low hydrogen electrode used for welding pr parts of 1Cr 1/2 Mo
5	E8018-B2	MANTEK CROMO 1	MantekElectrods Private Ltd	Trichy	
6	E8018-B2	ULTRA-CR-1	Maruti Weld Private Ltd.	New Delhi	
7	E8018-B2	MODI-8018-B2	Modi Arc Electrodes Co.	Ghaziabad	
8	E8018-B2	GM 80-B2	ModiHitech India Ltd.	New Delhi	
9	E8018-B2	RAJWELD-8018B2	Raj Kesari Electrodes	Udaipur	
10	E8018-B2	VJ-8018-B2	Vijey Electrodes And Wires (P)	Chennai	

3(C)	E9018-B3				
1	E9018-B3	SUPER - CR - 2	D&H India Ltd.	Indore	Low hydrogen 2 1/4Cr 1 Mo electrode used for welding pressure parts of similar material composition and 1/2 Cr 1/2 Mo 1/4 V steels
2	E9018-B3	Cromotherme - 2	D&H Secheron Electrodes (P) Ltd	Indore	
3	E9018-B3	GRIDUCT - 4	Gee Limited	Kalyan (W)	
4	E9018-B3	ULTIMATE-90B3	Honavar Electrodes Pvt Ltd.	Mumbai	
5	E9018-B3	MAILARC 2CR	Mailam India Limited	Pondicherry	
6	E9018-B3	ULTRA - CR-2	Maruti Weld Private Ltd.	New Delhi	
7	E9018-B3	MODI-9018B3	Modi Arc Electrodes Co.	Ghaziabad	
8	E9018-B3	GM 90 B3	ModiHitech India Ltd.	New Delhi	
9	E9018-B3	VJ-9018-B3	Vijey Electrodes And Wires (P)	Chennai	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
3(D)	E9015-B9				
1	E9015-B9	CROMO E91	Air-Liquide Welding France	France	Electrodes for T91 / P91 / F91 tubes, pipes & forgings as per ASME
2	E9015-B9	CM-95B9	Kanematsu Trading Corporation (Kobelco)	Japan	
3	E9015-B9	CHROMET 9MV-N	Metrode Products Ltd.	UK	
4	E9015-B9	THERMANIT MTS - 3	VoestalpineBohler Welding	Germany	

[4]	ALLOY STEEL FILLER RODS FOR GTAW (TIG WELDING)				
4(A)	ER80S-D2				
1	ER80S-D2	MnMo	Metrode Products Ltd.	UK	Used for weldig tubes for carbon & 1/2 Mo steels in pressure parts
2	ER80S-D2		Nippon Steel & Sumikin Bussan	Japan	
3	ER80S-D2	Union 1 Mo Mn	VoestalpineBohler Welding	Germany	

4(B)	ER80S-B2				
1	ER80S-B2	TIGFIL 80S -B2	Ador Welding Ltd.	Pune	Used for welding of pressure parts of similar materials
2	ER80S-B2	F CR MO 1	D&H Secheron Electrodes (P) Ltd.	Indore	
3	ER80S-B2	OK TIGROD 13.16	ESAB India Ltd	Chennai	
4	ER80S-B2	GM 80S-B2	I A Barnes & Co Ltd	UK	
5	ER80S-B2	INETIG B2	Industria Nazionale Elettrodi S.P.A	Italy	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS	
4(B)	ER80S-B2					
6	ER80S-B2	TG-S80B2	Kanematsu Trading Corporation (Kobelco)	Japan	Used for welding of pressure parts of similar materials	
7	ER80S-B2	GETIG 80S B2	GEE Limited	Kalyan (W)		
8	ER80S-B2	MARUTHI TB2	Maruthi Electrodes (P) Ltd.	Bangalore		
9	ER80S-B2	METRODE ER80S-B2	Metrode Products Ltd.	UK		
4(C)	ER90S-B3					
1	ER90S-B3	TIGFIL 90S - B	Ador Welding Ltd.	Pune	Used for welding pressure parts of 2 1/4Cr 1 Mo and 1/2 Cr 1/2 Mo 1/4 V steels	
2	ER90S-B3	FCRMO-2	D&H Sechron Electrodes Pvt Ltd	Indore		
3	ER90S-B3	GM90S-B3	I A Barnes & Co Ltd	UK		
4	ER90S-B3	INETIG B3	Industria Nazionale Elettrodi S.P.A	Italy		
5	ER90S-B3	TG-S90B3	Kanematsu Trading Corporation (Kobelco)	Japan		
6	ER90S-B3	MARUTHI TB3	Maruthi Electrodes (P) Ltd.	Bangalore		
7	ER90S-B3	METRODE ER90S-B3	Metrode Products Ltd.	UK		
8	ER90S-B3	UNION ER 90 S-B3	VoestalpineBohler Welding	Germany		



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
4(D)	ER90S-B9				
1	ER90S-B9	CARBOROD CrMo91	Air-Liquide Welding France	France	TIG welding rods for T91 / P91 / tubes and pipes as per ASME
2	ER90S-B9	TG-S90B9	Kanematsu Trading Corporation (Kobelco)	Japan	
3	ER90S-B9	9CRM0V-N TIG	Metrode Products Ltd.	UK	
4	ER90S-B9	THERMANIT MTS 3	VoestalpineBohler Welding	Germany	

[5]	<b>STAINLESS STEEL SMAW ELECTRODES</b>				
5(A)	E308-16				
1	E308-16	Rutox A	D&H Secheron Electrodes (P) Ltd	Indore	Stainless steel electrodes used for welding 304 and 308 materials
2	E308-16	OK 61.50	ESAB India Ltd	Chennai	
3	E308-16	MAILEX-A	Mailam India Limited	Pondicherry	
4	E308-16	SS-308	Modi Arc Electrode Co.	Ghaziabad	
5	E308-16	ROYAL-1A	Royal Arc Electrodes Limited	Thane	

5(B)	E308L-16				
1	E308L-16	Rutox-B	D&H Secheron Electrodes (P) Ltd	Indore	Stainless steel electrodes used for welding SS-409M to SS-409M
2	E308L-16	OK 61.30	ESAB India Ltd	Chennai	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
5(C)	E309-16				
1	E309-16	Cronitherme 25/12	D&H Secheron Electrodes (P) Ltd	Indore	25/12 stainless steel electrodes for welding stainless steel and ferritic steel combination and SS butter layers
2	E309-16	OK 67.67	ESAB India Ltd	Chennai	
3	E309-16	SILVERSHINE - 309	Honavar Electrodes Pvt Ltd	Mumbai	
4	E309-16	MAILEX-25/12	Mailam India Limited	Pondicherry	
5	E309-16	SS-309	Modi Arc Electrodes Co.	Ghaziabad	
6	E309-16	ROYAL-D2	Royal Arc Electrodes Limited	Thane	
5(D)	E309L-16				
1	E309L-16	D&H-309-L	D&H Secheron Electrodes (P) Ltd	Indore	SS electrode used for welding SS-409M and mild steel
2	E309L-16	OK 67.60	ESAB India Ltd	Chennai	
5(E)	E310-16				
1	E310-16	D&H 310-16	D&H Secheron Electrodes (P) Ltd	Indore	25/10 SS electrode for welding SS and ferritic steel combination
2	E310-16	OK 67.13	ESAB India Ltd	Chennai	
5(F)	E316-16				
1	E316-16	Rutox Mo	D&H Secheron Electrodes (P) Ltd	Indore	18/8 2% Mo type stainless steel electrode
3	E316-16	OK 63.50	ESAB India Ltd	Chennai	
	E316-16	ROYAL - 2A	Royal Arc Electrodes Limited	Thane	



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<b>S NO</b>	<b>TYPE</b>	<b>BRAND NAME</b>	<b>MANUFACTURER</b>	<b>LOCATION</b>	<b>REMARKS</b>
5(G)	E316L-16				
1	E316L-16	RUTOX-D	D&H Secheron Electrodes Pvt Ltd	Indore	
2	E316L-16	OK 63.30	ESAB India Ltd	Chennai	

5(H)	E347-16				
1	E347-16	Rutox A ( ST)	D&H Secheron Electrodes (P) Ltd	Indore	18/8 stabilised stainless steel electrode for welding 308, 321 and 347 stainless steel materials
2	E347-16	OK 61.80	ESAB India Ltd	Chennai	
3	E347-16	GRINOX 47	GEE Limited	Kalyan (W)	
4	E347-16	SILVERSHINE- 347 -16	Honavar Electrodes Pvt Ltd	Mumbai	
5	E347-16	MAILEX-ANB	Maitam India Limited	Pondicherry	
6	E347-16	SUPERALLOY 1A(S)	Maruti Weld Private Limited	New Delhi	
7	E347-16	SS-347	Modi Arc Electrodes Co.	Ghaziabad	
8	E347-16	GM 347	Modi Hitech India Ltd	New Delhi	
9	E347-16	ROYAL-1B	Roya Arc Electrodes Limited	Thane	

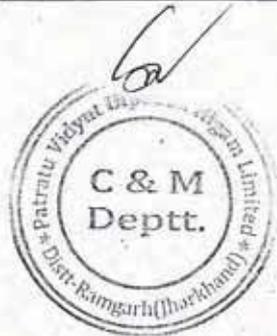
5(I)	ENiCrFe3				
1	ENiCrFe3	D&H 1212 NS	D&H Secheron Electrodes (P) Ltd	Indore	Inconel-182 electrodes for dissimilar welding and buttering
2	ENiCrFe3	GEMET 821N	GEE Limited	Kalyan (W)	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
5(I)	ENICrFe3				
3	ENICrFe3	CRYOMATE -3NS	Honavar Electrodes Pvt Ltd	Mumbai	Inconel-182 electrodes for dissimilar welding and buttering
4	ENICrFe3	INCONEL 182	Special Metals Welding Products	UK	
5	ENICrFe3	THERMANIT NICRO 182	VoestalpineBohler Welding	Germany	

[6]	STAINLESS STEEL FILLER RODS FOR GTAW (TIG WELDING)				
6(A)	ER308				
1	ER308	ER 308	D&H Secheron Electrodes (P) Ltd	Indore	Used for SS 304 & SS 308 materials

6(B)	ER347				
1	ER347	GETIG 347	GEE Limited	Kalyan (W)	Used for SS 304 and SS 308 materials
2	ER347	TG-S347	Kanematsu Trading Corporation (Kobelco)	Japan	
3	ER347	347S96	Metrode Products Ltd.	UK	
4	ER347	THERMANIT H347	VoestalpineBohler Welding	Germany	



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S NO	TYPE	BRAND NAME	MANUFACTURER	LOCATION	REMARKS
6(C) Super 304H					
1	Super 304H	TG-SUPER 304 H	Kanematsu Trading Corporation (Kobelco)	Japan	For TIG welding of super 304H
2	Super 304H	YT-304H	Nippon Steel & Sumikin Bussan	Japan	
3	Super 304H	THERMANIT 304 H CU	VoestalpineBohler Welding	Germany	

6(D) ERNiCr3					
1	ERNiCr3	TIG-521	Ador Fontech Limited	Bangalore	Inconel 82 TIG rods for pressure parts SS to alloy steel
2	ERNiCr3	TG-S70NCB	Kanematsu Trading Corporation (Kobelco)	Japan	
3	ERNiCr3	MARUTHY TNiCr3	Maruthi Electrodes (P) Ltd.	Bangalore	
4	ERNiCr3	20.70.NB	Metrode Products Ltd.	UK	
5	ERNiCr3	THERMANIT NiCrO 82	VoestalpineBohler Welding	Germany	

**NOTES**

1. In case of main plant equipment like boiler pressure parts and TG, special welding consumables, if any shall be used as per OEM recommendations.

2. If semi-automatic or automatic welding processes are used, welding consumables shall be used as per OEM recommendations.



**PATRATU STPP EPC PACKAGE**  
**COLOUR CODING SCHEME OF FABRICATED STEEL STRUCTURES – REV 01**

Colour coding scheme applicable for fabricated steel structures such as MPH structures, CHP structures, AHP structures, FGD structures, ESP CRB structures, Pipe/ cable Rack Structures etc in Patratu STPP EPC Package:

SL NO	DESCRIPTION	COLOUR	RAL	REMARKS
1	Primary members	Blue	5012	Columns & Beams
2	Secondary members	Grey	9002	All other members
3	Staircase	Blue	5012	
4	Gratings	GI		Galvanized as per spec
5	Hand-rails	GI / SS		GI or SS as per spec
6	Chequered/ seal plate flooring	Black	9011	For removable flooring extra grey border shall be provided.
7	Pipe Rack gallery / Conveyor gallery	Grey	9002	All members
8	Pipe Rack Trestle/ Conveyor Trestle			
a	Columns	Blue	5012	
b	All other members	Grey	9002	
9	Mono-rail beams	Golden Yellow	1004	This detail is already available in NTPC standard colour coding document. Mentioned here for more clarity.

For others including technological structures, refer NTPC standard colour coding document.





**BHARAT HEAVY ELECTRICALS LTD.**  
**BUSINESS SECTOR (FINANCE)- CORPORATE OFFICE**  
**ASIAD, NEW DELHI**

From : Kul Bhushan Aggarwal  
GM-Finance

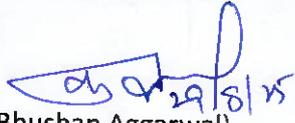
For : As Per Distribution List

No. PW:FM:FAX:T&P Hire :2025-27

Dated: 29th Aug, 2025

Subject : Revision of Hire Charges on Issue of Capital Tools & Plants

1. The rates of hire charges for capital Tools and Plants and Operator's charges circulated vide letter No. PWR:FM: T&P Hire 2023-25 dated 18.09.2023 were valid up to 31.08.2025. The Revised Rates effective from 01.09.2025 are enclosed as detailed below:
  - (i) Annexure C1 & T1: Rates of hire charges applicable to contractors working for BHEL
  - (ii) Annexure C2 & T2: Rates of hire charges applicable to outside agencies other than Contractors working for BHEL.
2. The Crane Operator's charges will be as follows:
  - A. **If BHEL operator is utilised Rs. 9500/- (Rupees Nine thousand five hundred only) per day of 8 hours.** For services less than 4 hours, half of per day rate will be charged. For services for 4 hours or more but up to 8 hours, full day rate will be charged. Overtime Allowance (OTA) will be charged at double the rate on hourly basis.
  - B. **If vendor sourced operator is provided, the rates shall be the actual cost to BHEL with 30% overheads.**
3. The hire charges of Capital Tools & Plants are exclusive of operating expenses e.g. fuel & consumables. **All Operating expenses are chargeable to User's account.**
4. All other terms and conditions / aspects governing the Issue of T&P on Hire "will remain the same as already circulated vide our letter of even number dated 22.1.1992 (copy enclosed).
5. **The revised rates will be effective from 01.09.2025 and shall remain valid up to 31.08.2027.** This will be subject to revision thereafter.
6. For any additional item, the rates of hire charges will be worked out jointly by PS-MSX & Corporate Finance (Business Sector) on specific request. All necessary details will be provided by the concerned Region.

  
(Kul Bhushan Aggarwal)

GM (Finance)

Encl : As above

**BUSINESS SECTOR (CORPORATE FIN.) ASIAD, NEW DELHI**

SUB: Rates of hire charges on issue of Capital Tools & Plants

Ref: GM(Fin) Letter No. Ref: PW:FM: FAX: T&P Hire :2025-27 dated 29<sup>th</sup> Aug, 2025

**Distribution:**

1. ED / PS SR, Chennai
2. GM & Head / PS-TS, Noida
3. GM & Head / PS ER, Kolkata
4. GM & Head / PS NR, Noida
5. GM & Head / PS WR, Nagpur
6. GM (Fin) / PS WR, Nagpur
7. AGM (Fin) / PS ER, Kolkata
8. AGM (Fin) / PS NR, Noida
9. AGM (Fin) / PS SR, Chennai

CC:

GM & SA to Director Power

**Annexure****C1**

Date: 29/08/2025

**REVISED RATES OF T&P HIRE CHARGES FOR CRANES & TRAILERS ETC. FOR  
SUB-CONTRACTORS WORKING FOR BHEL FOR DOING BHEL JOBS**

SL NO.	ITEM DESCRIPTION	USEFUL LIFE (IN YRS)	Revised rates (Rs./Hour) valid from 01/09/2025 to 31/8/2027 (WITHIN USEFUL LIFE)	Revised rates (Rs./Hour) valid from 01/09/2025 to 31/8/2027 (BEYOND USEFUL LIFE)
I.	<b>CRANES :-</b>			
1	Portal Gantry Crane 500T	15	26040.00	26020.00
2	100MT Crawler Crane ZOOMLION CRANE-QUY-100	10	11470.00	11460.00
3	Heavy Lift Crawler Crane 600MT Class DEMAG Model CC2800	15	56920.00	56880.00
4	PORTAL CRANE, 360T	15	14230.00	14220.00
5	600MT Class Crawler Crane- Manitowoc Model 18000-UPGRADED	15	56070.00	56030.00
6	600MT Class Crawler Crane- Liebherr Model LR1600-2 (Upgraded	15	69370.00	69320.00
7	CRAWLER CRANE FMC/LINKBELT 718, 250T (WITH RINGER)	15	33880.00	33850.00
8	CRAWLER CRANE FMC/LINKBELT 718, 250T (WITH-OUT RINGER)	15	21170.00	21160.00
9	MANITOWOC M-250T TRUCK CRANE	15	30490.00	30470.00
10	270 MT Class Crawler Crane- Manitowoc Model 2250	15	32010.00	31990.00
11	300MT Crane Crawler Crane LIEBHERR Model LR-1350/1	15	26680.00	26660.00
11.A	300MT Crane Crawler Crane LIEBHERR Model LR-1350/1 (UPGRADED)	15	36740.00	36710.00
12	250MT Class Mid range Crawler Crane- Kobelco Model CKE2500-2	15	15290.00	15280.00
12.A	250MT Class Mid range Crawler Crane- Kobelco Model CKE2500-2 (UPGRADED)	15	19180.00	19170.00
13	LINKBELT LS- 248H CRAWLER CRANE (180T)	15	16940.00	16920.00
14	MANITOWAC MODEL 888 CRAWLER CRANE (200 MT)	15	22020.00	22000.00
15	CRAWLER CRANE SUMITOMO, 150T	15	11010.00	11000.00
16	All Terrain Crane, 150MT- Liebherr Model LTM1150	15	13550.00	13540.00
17	CRAWLER CRANE, 120 T Fushun Model QUY120	10	10920.00	10920.00
18.A	CRAWLER CRANE 135MT Kobelco Model CK1350- 1F	15	10840.00	10830.00
18.B	CRAWLER CRANE 135MT Kobelco Model CK1350	15	8970.00	8970.00
19	CRAWLER CRANE 120MT - Tata-Sumitomo Model SCX1200-2	15	10160.00	10150.00
20	CRAWLER CRANE 100 T (KH 500)	15	10160.00	10150.00
21	Hydraulic Crawler Crane 80MT, Fushun Model QUY 80B	10	5460.00	5460.00
22	ROUGH TERRAIN CRANE 75T (RT880)	12	6200.00	6200.00
23	CRAWLER CRANE, 75T -Tata Model 955ALC/TFC280	12	5430.00	5420.00
24	Mobile Crane, 55MT (TIL)	12	4460.00	4450.00
25	CRAWLER CRANE, 25T -Tata Model TFC75	10	3050.00	3050.00
26	MOBILE CRANE, 20MT (TIL)	10	2290.00	2290.00
27	MOBILE CRANE, 20MT (ESCORTS)	10	2290.00	2290.00
28	MOBILE CRANE ESCORTS- 14MT	10	720.00	720.00
29	HYDAULIC PICK & CARRY CRANE, 8/9/10/11/12 MT	10	390.00	390.00



**Annexure**

**C1**

Date: 29/08/2025

REVISED RATES OF T&P HIRE CHARGES FOR CRANES & TRAILERS ETC. FOR  
SUB-CONTRACTORS WORKING FOR BHEL FOR DOING BHEL JOBS

SL NO.	ITEM DESCRIPTION	USEFUL LIFE (IN YRS)	Revised rates (Rs./Hour) valid from 01/09/2025 to 31/8/2027 (WITHIN USEFUL LIFE)	Revised rates (Rs./Hour) valid from 01/09/2025 to 31/8/2027 (BEYOND USEFUL LIFE)
30	FORK LIFT 5T	5	650.00	650.00
31	FORK LIFT 3T	5	540.00	540.00

*Qibed*

**REVISED RATES OF T&P HIRE CHARGES FOR CRANES & TRAILERS ETC. FOR  
OUTSIDE AGENCIES**

SL NO.	ITEM DESCRIPTION	USEFUL LIFE (IN YRS)	Revised rates (Rs./Hour) valid from 01/09/2025 to 31/8/2027 (WITHIN USEFUL LIFE)	Revised rates (Rs./Hour) valid from 01/09/2025 to 31/8/2027 (BEYOND USEFUL LIFE)
I.	CRANES :-			
1	Portal Gantry Crane 500T	15	28930.00	28910.00
2	100MT Crawler Crane ZOOMLION CRANE-QUY-100	10	12740.00	12730.00
3	Heavy Lift Crawler Crane 600MT Class DEMAG Model CC2800	15	63240.00	63200.00
4	PORTAL CRANE, 360T	15	15810.00	15800.00
5	600MT Class Crawler Crane- Manitowoc Model 18000-UPGRADED	15	62300.00	62260.00
6	600MT Class Crawler Crane- Liebherr Model LR1600-2 (Upgraded version)	15	77080.00	77020.00
7	CRAWLER CRANE FMC/LINKBELT 718, 250T (WITH RINGER)	15	37640.00	37610.00
8	CRAWLER CRANE FMC/LINKBELT 718, 250T (WITH-OUT RINGER)	15	23520.00	23510.00
9	MANITOWOC M-250T TRUCK CRANE	15	33880.00	33850.00
10	270 MT Class Crawler Crane- Manitowoc Model 2250	15	35570.00	35550.00
11	300MT Crane Crawler Crane LIEBHERR Model LR-1350/1	15	29640.00	29620.00
11.A	300MT Crane Crawler Crane LIEBHERR Model LR-1350/1 (UPGRADED)	15	40820.00	40790.00
12	250MT Class Mid range Crawler Crane- Kobelco Model CKE2500-2	15	16990.00	16980.00
12.A	250MT Class Mid range Crawler Crane- Kobelco Model CKE2500-2 (UPGRADED)	15	21310.00	21300.00
13	LINKBELT LS- 248H CRAWLER CRANE (180T)	15	18820.00	18800.00
14	MANITOWAC MODEL 888 CRAWLER CRANE (200 MT)	15	24470.00	24450.00
15	CRAWLER CRANE SUMITOMO, 150T	15	12230.00	12220.00
16	All Terrain Crane, 150MT- Liebherr Model LTM1150	15	15050.00	15040.00
17	CRAWLER CRANE, 120 T Fushun Model QUY120	10	12130.00	12130.00
18.A	CRAWLER CRANE 135MT Kobelco Model CK1350- 1F	15	12040.00	12030.00
18.B	CRAWLER CRANE 135MT Kobelco Model CK1350	15	9970.00	9960.00
19	CRAWLER CRANE 120MT - Tata-Sumitomo Model SCX1200-2	15	11290.00	11280.00
20	CRAWLER CRANE 100 T (KH 500)	15	11290.00	11280.00
21	Hydraulic Crawler Crane 80MT, Fushun Model QUY 80B	10	6060.00	6060.00
22	ROUGH TERRAIN CRANE 75T (RT880)	12	6890.00	6890.00
23	CRAWLER CRANE, 75T -Tata Model 955ALC/TFC280	12	6030.00	6030.00
24	Mobile Crane, 55MT (TIL)	12	4950.00	4950.00
25	CRAWLER CRANE, 25T -Tata Model TFC75	10	3390.00	3390.00
26	MOBILE CRANE, 20MT (TIL)	10	2540.00	2540.00
27	MOBILE CRANE, 20MT (ESCORTS)	10	2540.00	2540.00

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REVISED RATES OF T&P HIRE CHARGES FOR CRANES & TRAILERS ETC. FOR  
OUTSIDE AGENCIES

SL NO.	ITEM DESCRIPTION	USEFUL LIFE (IN YRS)	Revised rates (Rs./Hour) valid from 01/09/2025 to 31/8/2027 (WITHIN USEFUL LIFE)	Revised rates (Rs./Hour) valid from 01/09/2025 to 31/8/2027 (BEYOND USEFUL LIFE)
28	MOBILE CRANE ESCORTS- 14MT	10	800.00	800.00
29	HYDAULIC PICK & CARRY CRANE, 8/9/10/11/12 MT	10	430.00	430.00
30	FORK LIFT 5T	5	730.00	730.00
31	FORK LIFT 3T	5	600.00	600.00

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RATES OF T&P HIRE CHARGES FOR ITEMS OTHER THAN CRANES & TRAILERS ETC. FOR  
SUB-CONTRACTORS WORKING FOR BHEL FOR DOING BHEL JOBS

SL NO.	ITEM DESCRIPTION	Revised rates (Rs./Day) valid from 01/09/2025 to 31/8/2027
<b>I.</b>	<b>LIFTING EQUIPMENTS</b>	
1	Strand Jack System for Boiler Drum Lifting	21030
2	MULTI SHEAVE PULLEY BLOCK 40/50T/60T	310
3	MULTI SHEAVE PULLEY BLOCK 100T	630
4	MULTI SHEAVE PULLEY BLOCK 150T	1270
5	ELCTRIC WINCH 5T	1280
6	ELCTRIC WINCH 10T	2370
7	ELECTRIC WINCH 15 T	2170
8	PASSENGER CUM GOODS HOIST 1T	2290
9	FURNACE MAINTENANCE PLATFORM	5060
10	Gang Operated Hydraulic Jack (Set of 4 Jacks - 175 MT each)	2100
<b>II</b>	<b>WELDING &amp; HEAT TREATMENT EQUIPMENT</b>	
1	125KW, 3KHZ, AIR-COOLED INDUCTION HEATING EQUIPMENT	16460
2	75KW, 10 KHZ, COMPACT INDUCTION HEATING EQUIPMENT	8230
3	WELDING GENERATOR 320/300 A	300
4	WELDING RECTIFIER 400A/300A	300
5	WELDING RECTIFIER 600A	400
6	DIESEL WELDING GENERATOR 400A/300A	400
7	TRANSFORMER,600A	300
8	TRANSFORMER 300/400A	200
<b>III</b>	<b>SERVICE PLANTS &amp; ALLIED EQUIPT.</b>	
1	500KVA DIESEL GENERATOR	0
2	TRANSFORMER OIL FILTERATION EQUIPMENT 6000LPH CAPACITY WITHOUT STORAGE TANK	3830
3	-DO-, WITH STORAGE TANK	6400
4	OIL FILTERATION M/C, 250/500 LPH (OTHER THAN SILICON OIL)	7310
5	OIL FILTERATION M/C, 250GPH/1000LPH (OTHER THAN SILICON OIL)	910
6	OIL FILTERATION M/C, 500GPH/2500LPH (OTHER THAN SILICON OIL)	1370
7	OIL FILTERATION M/C, 1000GPH/5000LPH (OTHER THAN SILICON OIL)	1820
8	Portable Lube Oil Purification Unit (Centrifuge M/c) Capacity: 750 LPH	3650
9	Low Vacuum de-hydration unit	1280
10	DIESEL GENERATING SET,250 KVA	640
11	DIESEL GENERATING SET,25 KVA	1780
		510

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RATES OF T&P HIRE CHARGES FOR ITEMS OTHER THAN CRANES & TRAILERS ETC. FOR  
SUB-CONTRACTORS WORKING FOR BHEL FOR DOING BHEL JOBS

SL NO.	ITEM DESCRIPTION	Revised rates (Rs./Day) valid from 01/09/2025 to 31/8/2027
12	VACUUM PUMP(ABSOLUTE V.C.)	540
13	ACID CIRCULATING PUMP WITH MOTOR 120M HEAD, 150T/HR	1090
14	ACID TRANSFER PUMP 20/50 T/HR	540
15	DEWATERING PUMP (Kirloskar make,11KW/15HP)	80
16	HP Air compressor (32 Kg/Sq. Cm, 150 CFM)	4260
17	AIR COMPRESSORS 250/300/330/360/350 CFM	2740
18	AIR COMPRESSORS 140/150/190/210 CFM	910
19	ACID CIRCULATING PUMP WITH MOTOR & STARTER, 200T/HR, 150M, 220 HP	1820
20	Industrial Blower 2000CFM	1280
21	Air Leak Test Blower (Flow: 40000 m <sup>3</sup> /Hr)	1160
22	Air Blower (Flow: 20000 m <sup>3</sup> /Hr)	940
<b>IV METAL FORMING /CUTTING EQUIPMENT</b>		
1	TUBE EXPANDING M/C PNEUMATIC 60-100 MM	640
2	ELECTRO HYDRAULIC PIPE BENDING M/C 4"	1640
3	BOLTING MACHINE (ALCOA/AVLOCK/ HUCK)	1810
4	-do- Gun with nose Assembly only	540
<b>V TESTING/INSPECTION EQUIPMENT</b>		
1	DATA LOGGER for PG TESTING	37110
2	MOTORISED HYDRAULIC TEST PUMP 250kg/cmsq	800
3	MOTORISED HYDRAULIC TEST PUMP 400-450kg/cmsq	1090
4	MOTORISED HYDRAULIC TEST PUMP 600 KG/CMSQ	1280
5	HYDRAULIC TEST PUMP 800 KG/CMSQ	1340
6	HYDRAULIC TEST PUMP 1000 KG/CMSQ	2250
7	BOLT STRETCHING DEVICE	910
8	BOROSCOPE/FIBROSCOPE FLEXIBLE TYPE (FLEXUX) IMPORTED	3650
9	ULTRASONIC FLAW DETECTOR	2740
10	MPI TEST KIT	360
11	GAS LEAK DETECTOR	270
12	VIBRATION/SOUND LEVEL METER IRD-306	360
13	VIBRATION/SOUND LEVEL METER IRD-308	360
14	VIBRATION ANALYSER/DYNAMIC BALANCING M/C IRD 350	1460
15	VIBRATION ANALYSER/DYNAMIC BALANCING M/C IRD 360	2560
16	SHOCK PULSE METER	640
17	HV.DC TEST KIT UPTO 50 KV	540
18	HV.DC TEST KIT ABOVE 50 KV	1000
19	HV.AC TEST KIT UPTO 50KV	820
20	HV.AC TEST KIT ABOVE 50KV	2920
21	MOTORISED MEGGER 2.5KV	400
22	MOTORISED MEGGAR 5KV	450
23	OSCILLOSCOPE-DUAL BEAM INDIGENOUS	450
24	OSCILLOSCOPE-DUAL BEAM IMPORTED	1090
25	WAVEFORM ANALYSER	910
26	OSCILLOGRAPH/UV RECORDER 24 CHANNEL	1640
27	OSCILLOGRAPH/UV RECORDER 12 CHANNEL	1090
28	OSCILLOGRAPH/UV RECORDER 6 CHANNEL	910

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RATES OF T&P HIRE CHARGES FOR ITEMS OTHER THAN CRANES & TRAILERS ETC. FOR  
SUB-CONTRACTORS WORKING FOR BHEL FOR DOING BHEL JOBS

SL NO.	ITEM DESCRIPTION	Revised rates (Rs./Day) valid from 01/09/2025 to 31/8/2027
29	DIGITAL LOW RESISTANCE METER	640
30	DC POTENTIOMETER	180
31	PRECISION DEAD WEIGHT TESTER	1000
32	OPTICAL ALIGNMENT KIT	1370
33	BOROSCOPE/FIBROSCOPE(NON FLEXIBLE)	1200
34	VERNIER THEODOLITE,PRECISION	1200
35	VERNIER THEODOLITE,ORDINARY	200
36	ENGINEERS PRECISION LEVEL/DUMPY LEVEL	120
37	ISKAMATIC 'A'	3210
38	CALIBRATOR '03'	1000
39	48 POLE EXTENDER CARD	200
40	MULTIJET NPM	400
41	OSCILLOMETER	10240
42	VOC EQUIPMENT	1400
43	BINARY SIGNAL GENERATOR	290
44	ELECTRIC COUNTER	690
45	FREQUENCY GENERATOR	1000
46	DBF 3 VIBRATION RECORDER/ANALYSER	3290
47	L&T GOULD OSCILLOGRAPH 2-CHANNEL	490
48	L&T GOULD OSCILLOGRAPH 6-CHANNEL	1180
49	VIBROPORT 41/FFT ANALYSER	5480
50	ELCID kit	10060
51	UNIVERSAL CALIBRATION SYSTEM	2740
52	NATURAL FREQUENCY TESTER	2920
53	DIGITAL HARDNESS TESTER	360
54	ADRE 208 VIBRATION ANALYSER	7310
55	PCB DIAGNOSTIC REPAIR KIT	2010
56	SECONDARY INJECTION RELAY TEST KIT	5300
57	MICRO OHM METER	1460
58	DIGITAL MICRO OHM METER MEASURING RANGE: 200 $\mu\Omega$ TO 20K $\Omega$	3250
59	PMI Machine OLYMPUS make	3370
60	Mobile Lighting Mast - 9 metres (4X400 W)	870
61	10KVA RESISTANCE BRAZING MACHINE	140
62	RECURRENT SURGE OSCILLOGRAPH (RSO) TEST KIT WITH PORTABLE HANDHELD OSCILLOSCOPE.	460
63	HYDROGEN GAS LEAK DETECTOR	60
64	STATOR WEDGE ANALYZER KIT WITH COMPLETE ACCESSORIES	5020
65	WEDGE DEFLECTION KIT	80
66	TILE PRESSING MACHINE FOR GAS TURBINE	270
67	INDUCTION BRAZING MACHINE	4910
68	MAGNETIC COHESIVE FORCE (MCF) EQUIPMENT	3650
69	ULTRASONIC FLOW METER	180
70	PORTABLE VIBRATION ANALYSER (MODEL 811T)	40
71	CENTRIFUGAL PUMP SET FOR ACID CLEANING (WITH MOTOR AND PANEL) : PRESSURE -14KG/SQ CM. ; FLOW 60 M3/HR	470
72	CENTRIFUGAL PUMP SET FOR ACID CLEANING (WITH MOTOR AND PANEL) : PRESSURE -30KG/SQ CM. ; FLOW 15 M3/HR	430

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RATES OF T&P HIRE CHARGES FOR ITEMS OTHER THAN CRANES & TRAILERS ETC. FOR  
SUB-CONTRACTORS WORKING FOR BHEL FOR DOING BHEL JOBS

SL NO.	ITEM DESCRIPTION	Revised rates (Rs./Day) valid from 01/09/2025 to 31/8/2027
73	HI SPEED MEMORY RECORDER, MAKE -YOKOGAWA, MODEL DL850E-Q-HE/B5/HD1	1820
74	TROLLEY MOUNTED HYDRAULIC JACK (100 MT)	1260
75	5KV Insulation Tester	450
76	4 Channel Digital Oscilloscope /Fast Recorder	1720
77	4 Channel Oscillographic Recorder	590
78	Sound Level Meter	230
79	Thermal Imaging Camera	780
80	Videoscope (Video Boroscope)	1530
81	DO (Dissolve Oxygen) Meter (0 to 1500 ppb)	1320
82	Conductivity Meter	80
83	Core Flux Test Kit	7340
84	Primary Current Injection Kit (2000A)	870
85	3 Phase Secondary Injection Kit ( Relay Test )	3790
86	FRF Filtration Kit	1340
87	FFT Analyser	2310
88	Flue Gas Analyser	1030
89	Oil Test Kit ( Mineral Oil)-Transformer	1020
90	Winding Resistance kit ( R L C Load)	880
91	SFRA test Kit	1200
92	Tan Delta test Kit	4090
93	PF Meter	330
94	Ultrasonic Flow Meter	840
95	Oil Particle Counter	360
96	Plasma Cutting Machine (With complete accessories)	320
97	JCB make DG Set 80 KVA	690
98	Diesel Generating Set 82.5 KVA	640
99	Portable Jacking Oil Pump	1110
100	Alloy Analyser	1820



**RATES OF T & P HIRE CHARGES FOR ITEMS OTHER THAN CRANES & TRAILLERS  
ETC. FOR OUTSIDE AGENCIES**

SL NO.	ITEM DESCRIPTION	Revised rates (Rs./Day) valid from 01/09/2025 to 31/8/2027
<b>I.</b>	<b>LIFTING EQUIPMENTS</b>	
1	Strand Jack System for Boiler Drum Lifting	23370
2	MULTI SHEAVE PULLEY BLOCK 40/50T/60T	350
3	MULTI SHEAVE PULLEY BLOCK 100T	700
4	MULTI SHEAVE PULLEY BLOCK 150T	1410
5	ELCTRIC WINCH 5T	1420
6	ELCTRIC WINCH 10T	2640
7	ELECTRIC WINCH 15 T	2410
8	PASSENGER CUM GOODS HOIST 1T	2540
9	FURNACE MAINTENANCE PLATFORM	5620
10	Gang Operated Hydraulic Jack (Set of 4 Jacks - 175 MT each)	2340
<b>II</b>	<b>WELDING &amp; HEAT TREATMENT EQUIPMENT</b>	
1	125KW, 3KHZ, AIR-COOLED INDUCTION HEATING EQUIPMENT	18290
2	75KW, 10 KHZ, COMPACT INDUCTION HEATING EQUIPMENT	9140
3	WELDING GENERATOR 320/300 A	330
4	WELDING RECTIFIER 400A/300A	330
5	WELDING RECTIFIER 600A	440
6	DIESEL WELDING GENERATOR 400A/300A	440
7	TRANSFORMER,600A	330
8	TRANSFORMER 300/400A	220
<b>III</b>	<b>SERVICE PLANTS &amp; ALLIED EQUIPT.</b>	
1	500KVA DIESEL GENERATOR	4250
2	TRANSFORMER OIL FILTERATION EQUIPMENT 6000LPH CAPACITY WITHOUT STORAGE TANK	7110
3	-DO-, WITH STORAGE TANK	8130
4	OIL FILTERATION M/C, 250/500 LPH (OTHER THAN SILICON OIL)	1010
5	OIL FILTERATION M/C, 250GPH/1000LPH (OTHER THAN SILICON OIL)	1520
6	OIL FILTERATION M/C, 500GPH/2500LPH (OTHER THAN SILICON OIL)	2030
7	OIL FILTERATION M/C, 1000GPH/5000LPH (OTHER THAN SILICON OIL)	4060
8	Portable Lube Oil Purification Unit (Centrifuge M/c) Capacity: 750 LPH	1420
9	Low Vacuum de-hydration unit	710
10	DIESEL GENERATING SET,250 KVA	1980
11	DIESEL GENERATING SET,25 KVA	560
12	VACUUM PUMP(ABSOLUTE V.C.)	600
13	ACID CIRCULATING PUMP WITH MOTOR 120M HEAD, 150T/HR	1210
14	ACID TRANSFER PUMP 20/50 T/HR	600
15	DEWATERING PUMP (Kirloskar make,11KW/15HP)	90
16	HP Air compressor (32 Kg/Sq. Cm, 150 CFM)	4730
17	AIR COMPRESSORS 250/300/330/360/350 CFM	3040
18	AIR COMPRESSORS 140/150/190/210 CFM	1010

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**RATES OF T & P HIRE CHARGES FOR ITEMS OTHER THAN CRANES & TRAILLERS  
ETC. FOR OUTSIDE AGENCIES**

SL NO.	ITEM DESCRIPTION	Revised rates (Rs./Day) valid from 01/09/2025 to 31/8/2027
19	ACID CIRCULATING PUMP WITH MOTOR & STARTER, 200T/HR, 150M, 220 HP	2030
20	Industrial Blower 2000CFM	1420
21	Air Leak Test Blower (Flow: 40000 m <sup>3</sup> /Hr)	1290
22	Air Blower (Flow: 20000 m <sup>3</sup> /Hr)	1050
<b>IV</b>	<b>METAL FORMING /CUTTING EQUIPMENT</b>	
1	TUBE EXPANDING M/C PNEUMATIC 60-100 MM	710
2	ELECTRO HYDRAULIC PIPE BENDING M/C 4"	1820
3	BOLTING MACHINE (ALCOA/AVLOCK/ HUCK)	2010
4	-do- Gun with nose Assembly only	600
<b>V</b>	<b>TESTING/INSPECTION EQUIPMENT</b>	
1	DATA LOGGER for PG TESTING	41230
2	MOTORISED HYDRAULIC TEST PUMP 250kg/cmsq	890
3	MOTORISED HYDRAULIC TEST PUMP 400-450kg/cmsq	1210
4	MOTORISED HYDRAULIC TEST PUMP 600 KG/CMSQ	1420
5	HYDRAULIC TEST PUMP 800 KG/CMSQ	1490
6	HYDRAULIC TEST PUMP 1000 KG/CMSQ	2490
7	BOLT STRETCHING DEVICE	1010
8	BOROSCOPE/FIBROSCOPE FLEXIBLE TYPE (FLEXUX) IMPORTED	4060
9	ULTRASONIC FLAW DETECTOR	3040
10	MPI TEST KIT	400
11	GAS LEAK DETECTOR	300
12	VIBRATION/SOUND LEVEL METER IRD-306	400
13	VIBRATION/SOUND LEVEL METER IRD-308	400
14	VIBRATION ANALYSER/DYNAMIC BALANCING M/C IRD 350	1620
15	VIBRATION ANALYSER/DYNAMIC BALANCING M/C IRD 360	2840
16	SHOCK PULSE METER	710
17	HV.DC TEST KIT UPTO 50 KV	600
18	HV.DC TEST KIT ABOVE 50 KV	1110
19	HV.AC TEST KIT UPTO 50KV	910
20	HV.AC TEST KIT ABOVE 50KV	3250
21	MOTORISED MEGGER 2.5KV	440
22	MOTORISED MEGGAR 5KV	500
23	OSCILLOSCOPE-DUAL BEAM INDIGENOUS	500
24	OSCILLOSCOPE-DUAL BEAM IMPORTED	1210
25	WAVEFORM ANALYSER	1010
26	OSCILLOGRAPH/UV RECORDER 24 CHANNEL	1820
27	OSCILLOGRAPH/UV RECORDER 12 CHANNEL	1210
28	OSCILLOGRAPH/UV RECORDER 6 CHANNEL	1010
29	DIGITAL LOW RESISTANCE METER	710
30	DC POTENTIOMETER	200
31	PRECISION DEAD WEIGHT TESTER	1110
32	OPTICAL ALIGNMENT KIT	1520
33	BOROSCOPE/FIBROSCOPE(NON FLEXIBLE)	1340
34	VERNIER THEODOLITE,PRECISION	1340
35	VERNIER THEODOLITE,ORDINARY	220

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**RATES OF T & P HIRE CHARGES FOR ITEMS OTHER THAN CRANES & TRAILLERS  
ETC. FOR OUTSIDE AGENCIES**

SL NO.	ITEM DESCRIPTION	Revised rates (Rs./Day) valid from 01/09/2025 to 31/8/2027
36	ENGINEERS PRECISION LEVEL/DUMPY LEVEL	130
37	ISKAMATIC 'A'	3570
38	CALIBRATOR '03'	1110
39	48 POLE EXTENDER CARD	220
40	MULTIJET NPM	440
41	OSCILLOMETER	11380
42	VOC EQUIPMENT	1560
43	BINARY SIGNAL GENERATOR	320
44	ELECTRIC COUNTER	770
45	FREQUENCY GENERATOR	1110
46	DBF 3 VIBRATION RECORDER/ANALYSER	3650
47	L&T GOULD OSCILLOGRAPH 2-CHANNEL	540
48	L&T GOULD OSCILLOGRAPH 6-CHANNEL	1320
49	VIBROPORT 41/FFT ANALYSER	6090
50	ELCID kit	11170
51	UNIVERSAL CALIBRATION SYSTEM	3040
52	NATURAL FREQUENCY TESTER	3250
53	DIGITAL HARDNESS TESTER	400
54	ADRE 208 VIBRATION ANALYSER	8130
55	PCB DIAGNOSTIC REPAIR KIT	2230
56	SECONDARY INJECTION RELAY TEST KIT	5890
57	MICRO OHM METER	1620
58	DIGITAL MICRO OHM METER MEASURING RANGE: 200 $\mu\Omega$ TO 20K $\Omega$	3610
59	PMI Machine OLYMPUS make	3740
60	Mobile Lighting Mast - 9 metres (4X400 W)	970
61	10KVA RESISTANCE BRAZING MACHINE	160
62	RECURRENT SURGE OSCILLOGRAPH (RSO) TEST KIT WITH PORTABLE HANDHELD OSCILLOSCOPE.	520
63	HYDROGEN GAS LEAK DETECTOR	60
64	STATOR WEDGE ANALYZER KIT WITH COMPLETE ACCESSORIES	5580
65	WEDGE DEFLECTION KIT	90
66	TILE PRESSING MACHINE FOR GAS TURBINE	300
67	INDUCTION BRAZING MACHINE	5460
68	MAGNETIC COHESIVE FORCE (MCF) EQUIPMENT	4060
69	ULTRASONIC FLOW METER	200
70	PORTABLE VIBRATION ANALYSER (MODEL 811T)	50
71	CENTRIFUGAL PUMP SET FOR ACID CLEANING (WITH MOTOR AND PANEL) : PRESSURE -14KG/SQ CM. ; FLOW 60 M3/HR	520
72	CENTRIFUGAL PUMP SET FOR ACID CLEANING (WITH MOTOR AND PANEL) : PRESSURE -30KG/SQ CM. ; FLOW 15 M3/HR	480
73	HI SPEED MEMORY RECORDER, MAKE -YOKOGAWA, MODEL DL850E-Q-HE/B5/HD1	2020
74	TROLLEY MOUNTED HYDRAULIC JACK (100 MT)	1400
75	5KV Insulation Tester	500
76	4 Channel Digital Oscilloscope /Fast Recorder	1910
77	4 Channel Oscillographic Recorder	650

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**RATES OF T & P HIRE CHARGES FOR ITEMS OTHER THAN CRANES & TRAILLERS  
ETC. FOR OUTSIDE AGENCIES**

SL NO.	ITEM DESCRIPTION	Revised rates (Rs./Day) valid from 01/09/2025 to 31/8/2027
78	Sound Level Meter	260
79	Thermal Imaging Camera	870
80	Videoscope (Video Boroscope)	1700
81	DO (Dissolve Oxygen) Meter (0 to 1500 ppb)	1470
82	Conductivity Meter	90
83	Core Flux Test Kit	8160
84	Primary Current Injection Kit (2000A)	970
85	3 Phase Secondary Injection Kit ( Relay Test )	4210
86	FRF Filtration Kit	1490
87	FFT Analyser	2570
88	Flue Gas Analyser	1150
89	Oil Test Kit ( Mineral Oil)-Transformer	1130
90	Winding Resistance kit ( R L C Load)	980
91	SFRA test Kit	1330
92	Tan Delta test Kit	4550
93	PF Meter	370
94	Ultrasonic Flow Meter	930
95	Oil Particle Counter	400
96	Plasma Cutting Machine (With complete accessories)	350
97	JCB make DG Set 80 KVA	770
98	Diesel Generating Set 82.5 KVA	710
99	Portable Jacking Oil Pump	1230
100	Alloy Analyser	2030

*Ankash*

आर.एल. साहा  
R.L. SAHA  
General Manager (Fin.)

भारत हेवी इलेक्ट्रिकल्स लिमिटेड  
Bharat Heavy Electricals Limited  
शक्ति सेक्टर/Power Sector



REF: PWR:FAX:HIRE CHARGES  
DT : 22.1.92.

SUBJECT : ISSUE OF TOOLS AND PLANTS  
TO SUB-CONTRACTORS AND RECOVERY  
OF HIRE CHARGES THEREOF

The rates of hire charges for capital tools and plants last circulated vide Sr. Manager/Finance's letter reference PWA:SMQ:FAX:24.02 dated 20.5.88 have been revised. The revised rates have been worked out based upon the recommendations of the study team set up vide office order No. PW:SMQ:FAX:11.36 Dt. 1.10.88. The study team's/committee's recommendations relating to issue of T&P to sub contractors (Appendix I) are enclosed. Accordingly, the revised rates of hire charges have been worked out and are enclosed as follows :-

- i) Annexures 1.1, 1.2, 1.3, & 1.4  
Rates for hire charges as applicable to contractors working for BHEL.
- ii) Annexures 2.1 & 2.2  
Rates of hire charges as applicable to outside agencies other than contractors working for BHEL.
- iii) Annexure - III  
Crane operators charges.

The important conditions/aspects governing the issue of T&P on hire are as follows :-

- i) The tender documents shall specify :-
- a) List of T&P to be provided by BHEL free of hire charges
- b) List of T&P which may be given on hire, if available at site and the rate of hire charges recoverable for the same. For items and rates specified in the N.I.T. these charges shall not change during the currency of that contract. For items/rates not specified in N.I.T. the current rates shall be charged.
- ii) The rates given in Annexure 1.1, 1.2, & 2.1 are on hourly basis. The unit of recovery is an hour and for fraction of an hour, the chargeable unit will be an hour only. The rates given in Annexure 1.3, 1.4 & 2.2 are on day basis (day means a calendar day) and fraction of a day will be charged as full day/purpose of recovery of hire charges.

...2/-



- iii) Operator's charges are on per day basis considering average 8 working hours. For services of less than 4 hours, half the rates will be charged. For services of 4 hours upto 8 hours, full daily rates will be charged. Overtime will be charged at double the rates on hourly basis. ||
- iv) The hire charges are recoverable on the basis of out time and in time i.e. from the time a particular item is issued to the contractor from BHEL's store till the time it is returned. However, the hourly rate is applicable for T&P which cannot be frequently returned due to intermittent use, logging shall be done for actual use and charged accordingly. In case of cranes, matching time for onward and return shall be charged at 50% of the hire charges rates. ||

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- v) The rates do not include transportation charges from and to BHEL's store. Safe transportation of T&P from and to BHEL's store shall be the contractors responsibility. ||
- vi) Small T&P items i.e. items costing less than Rs. 10,000/- each shall not be issued to contractors on hire charges. Such items may however be issued to contractors on non-returnable basis at replacement cost plus 30% overheads reduced by depreciation as applicable or a certain reserve price whichever is higher. ||

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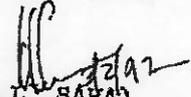
- vii) If a contractor commits certain T&P at the time of award of contract/L.O.I. and fails to actually deploy the same in time at site, then even for contractors working for BHEL, higher rates of hire charges as given in Annex 2.1 & 2.2 shall be applicable for such items. ||

~~The revised rates of hire charges and operators~~  
charges as enclosed, together with terms stated above and other aspects/conditions relating to issue of T&P to sub contractors as given in Appendix I shall be effective from 1.2.1992 till 31.10.93 and will be subject to revision thereafter.



For any additional item not appearing in the enclosed list, rates of hire charges may be calculated by TS HQ in consultation with PS-HQ (Finance) on receipt of necessary details from regions and communicated to the regions.

This issues <sup>with</sup> the approval of competent authority.

  
(R. L. SAHA)  
GENERAL MANAGER (F)  
PS-HQ  


Encl : As above.

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Advisor (Finance) Corporate Office, N.Delhi.

S.A. to Director (Power).

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