

Page 1 of 7	PANTOGRAPH DISCONNECTING + EARTHING DEVICE Specification No. CLW/ES/3/0008	ALT.- B
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**TECHNICAL SPECIFICATION FOR**  
**PANTOGRAPH DISCONNECTING + EARTHING DEVICE**  
**FOR 3-PHASE ELECTRIC LOCOMOTIVES.**

**SPECIFICATION NO : CLW/ES/3/0008**

**ISSUE DATE:15.04.2002**

**ENCLOSURES :**

**DRG. NOS.:-**

CLW/ES/3/SK-1/0008/B  
CLW/ES/3/SK-2/0008/B  
CLW/ES/3 /SK-3/0008/B  
CLW/ES/3 /SK-4/0008/B  
CLW/ES/3 /SK-5/0008/B  
CLW/ES/3 /SK-6/0008/B  
CLW/ES/3/SK-7/0008/B  
CLW/ES/3/SK-8/0008/B

**ISSUED BY:**

DY. CHIEF ELECTRICAL ENGINEER/D-II  
CHITTARANJAN LOCOMOTIVE WORKS  
P.O. CHITTARANJAN– 713331  
DIST.-BARDHAMAN (WEST), WEST BENGAL (INDIA)

PREPARED BY JE/SSE-Design	CHECKED BY AEE/SEE-Design	APPROVED BY Dy.CEE/D-II

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**ALTERATION RECORD SHEET**

Amendment No.	Date of Amendment	Page No.	Alteration No.	Reason	Authority
01	-----	-----	A	1) Contact Spring Material of one clamp changed to spring steel Ref.5. 2) Scope of supply, Details test programme, Drg. No. CLW/ES/3/SK-7/0008 for Spacer added. CLW/ES/3/SK-8/0008 for Tube clip outer & Inner part Added.	Sd/-
02	22/06/13	7	B	Incorporation of SS Hardware suppliers as per CLW approved Vendor List.	Sd/-

**Note: Specifications have been digitized and all alterations have been incorporated.**

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## SPECIFICATION FOR PANTOGRAPH DISCONNECTING + EARTHING DEVICEFOR THREE PHASE ELECTRIC LOCOMOTIVES

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## SPECIFICATION FOR PANTOGRAPH DISCONNECTING AND EARTHING DEVICE

### 1. SCOPE:-

This specification applies to Pantograph disconnecting + Earthing device for 3-Phase AC electric locomotive, 25KV 50 Hz System.

### 2. CLIMATIC AND ENVIRONMENTAL CONDITIONS:

- Maximum atmospheric temperatures : Under Sun : 70°C  
: In Shade : 50°C
- Humidity : 100% saturation during rainy season.
- Reference Site condition:
  - 1) Ambient Temp. : Max 55°C and min 0°C
  - 2) Humidity : 60%.
  - 3) Altitude : 100 m above mean sea level.
  - 4) Rainfall : Very heavy in certain areas. The locomotive will be designed to permit it's running at 10 km/hr in flood water level of 102 mm above rail level.
- Atmosphere during hot weather: Extremely dusty and desert terrain in certain areas.
- Coastal areas : Locomotive and equipment will be designed to work in coastal areas in humid and salt laden atmosphere.
- Vibration : The equipment, sub-system and their mounting arrangement will be designed to withstand vibrations and shocks encountered in service as specified in corresponding IEC publications unless otherwise prescribed.

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### 3. TECHNICAL DATA: -

Rated Voltage	: 25 KV AC, 50 Hz.
Max. Operating Voltage	: 30KV AC, 50 Hz.
Rated Current	: 500 A
Max. Operating Current	: 900 A

### 4. DOCUMENTS TO BE SUPPLIED BY THE TENDERER :

The tenderer shall interalia furnish the following along with the quotation:

- (i) Clause wise comments on the specification and test programme.
- (ii) Detailed drawings.
- (iii) Past experience with supporting papers ( if any. )
- (iv) Past test reports, (if any. )
- (v) Grade and type of Carbon Brush.

### 5. TECHNICAL DOCUMENTS TO BE SUPPLIED BY THE SUPPLIER :

The following documents shall be supplied by the supplier as a part of the contract:

- (i) Type test report.
- (ii) Routine test reports along with each set.
- (iii) Maintenance manual.
- (iv) Detailed drawings.

### 6. SCOPE OF SUPPLY :

One Number Pantograph Disconnecting + Earthing Device consists of following items:-

SN	QTY.	ITEMS	REF. NO.	DRG. NO.
1.	01	Lever, Isolating Switch	1	CLW/ES/3/SK-1/0008
2.	01	Contact Support (Ty-1)	4	- Do -
3.	01	Pivot Support	3	- Do -
4.	02	Contact Support (Ty-2)	2	- Do -
5.	01	Contact Support (Ty-3)	5	- Do -
6.	<b>HARDWARE LIST</b>			
Item No.	Qty.	Items	Identity Number	
101	04	Washer 6.4/18 ST/ZN	GMN 335 464 P3107	
4155	02	Hex. Bolt M6x55/18 SST	3EHP 416001 P0655	
4190	16	Hexagon Screw M6x90 SST	BN 622	
4500	14	Washer A 6.4/12.5 SST	NB 335050 P0607	

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Item No.	Qty.	Items	Identity Number
4601	18	HT Spring Washer 6 SST	NB 335805 P0509
4701	16	Hex Nut 0.8D M6 SST	NB 332600 P0511
7160	01	Hex Bolt M12x60/18 SST	NB 312350 P2123
7500	01	Washer A 13/24 SST	NB 335050 P0610
7601	01	HT Spring Washer 12 SST	NB 335805 P0513
7701	01	Hex Nut 0.8D M12 SST	NB 332600 P0514
NB- All Hardwares should be any one of the followings:- (i) Unbreako (Precision fastner),(ii) Laxmi Precision (LPS), (iii) Sundaram fastners (TVS). All spring washer of Forbes Gokak Ltd., Mumbai only.			

## 7. TESTS:

### i) Type Test :

- a) Dimensional Check.
- b) Temperature Rise Test:  
Maximum temperature rise of the complete fittings should not exceeds at  
900 Amps, 50 Hz, 45 deg.C and  
500 Amps, 50 Hz, 35 deg.C
- c) Millivolt drop test :  
In between two contact spring of the two ends of the lever should not exceeds at  
500 Amps, 50 Hz – 126 mV  
900 Amps, 50 Hz – 219 mV  
of its maximum temperature

### ii) Routine Test :

- a) Dimensional Check
- b) Millivolt Tests

## 8. QUALITY ASSURANCE :

Quality Assurance should be as per ISO 9000.

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## 9. REFERENCE:

The equipment used by M/s ABB for WAG-9 class (co-co) electric locomotives is supplied by :

**Supplier- M/s ABB Transportation system Ltd.  
P.O. Box No.8384, CH 8050, ZURICH,  
SWITZERLAND.**

### Schematic Position :2

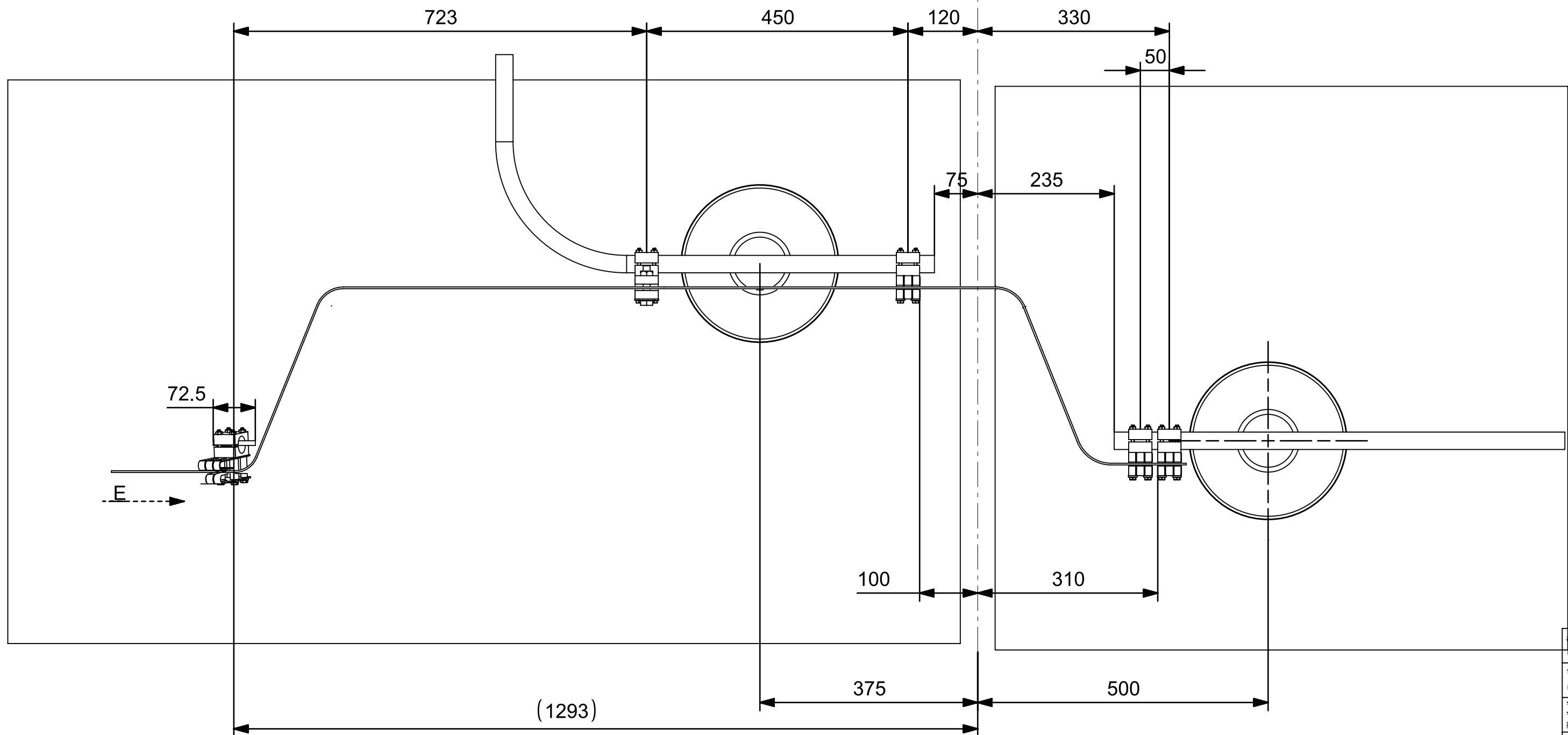
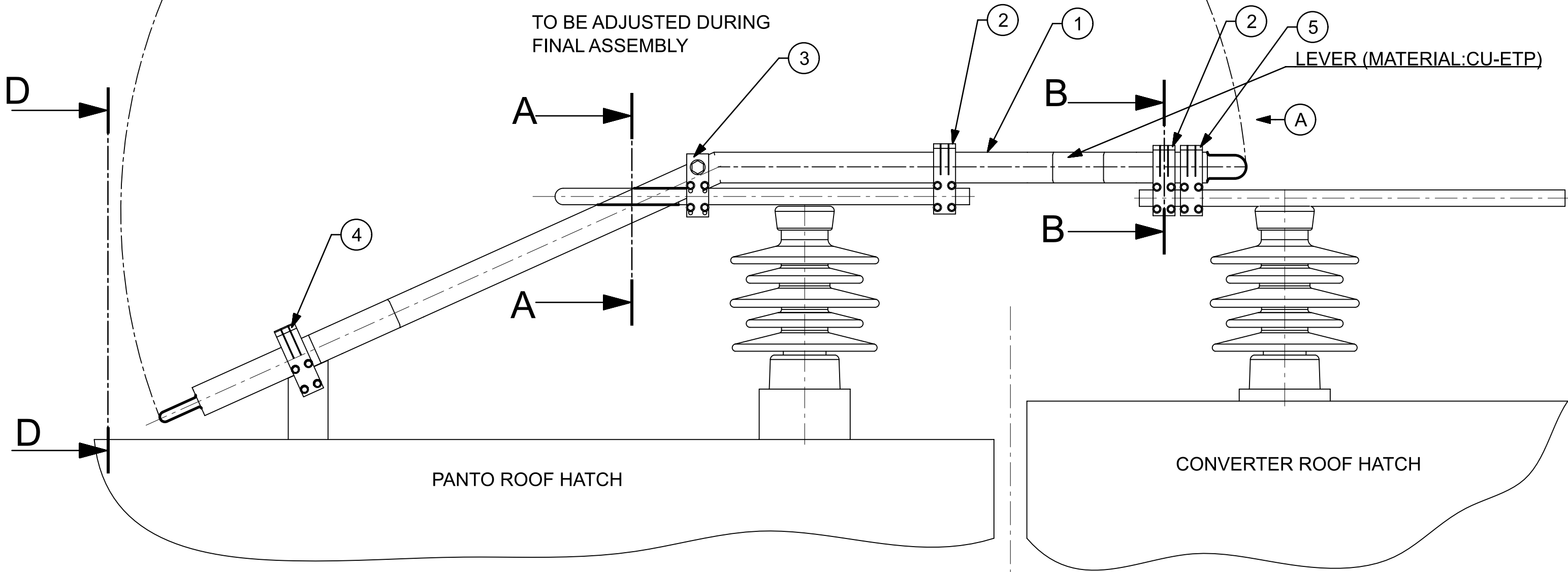
**Note:** 1)The Tenderer shall fix name plate on the equipment indicating –

- a) Manufacturers name andalso Monogram / Brand
- b) Range of electrical ratings in Watts
- c) Max. Rated Voltage
- d) Month & Year of Manufacture
- e) Sl. No. of equipment.

2) All Hardware are to be used should be of any of the following make.


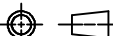
- a) M/s UN-BRAKO (Precision Fasteners)
- b) Laxmi Precision (LPS)
- c) Sundaram Fasteners (TVS).
- d) All spring washers of Forbes Gokak Ltd., Mumbai only.
- e) All SS Hardwares used as per CLW approved vendor list.
  - (i) M/s Kundan Ind. Ltd. &
  - (ii) M/s Agarwal Fastener Pvt. Ltd.

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## SCOPE OF SUPPLY

		REF. NO.	DETAILED DRG. NO.
1	LEVER	1	CLW/ES/3/SK-6/0008
2	CONTACT SUPPORT (TY-1)	4	CLW/ES/3/SK-2/0008
3	PIVOT SUPPORT	3	CLW/ES/3/SK-3/0008
4	CONTACT SUPPORT (TY-2)	2	-DO-
5	CONTACT SUPPORT (TY-3)	5	-DO-
6	ALL HARDWARES AS PER LIST AT SHEET 5 & 6		

अधिकृत DGN	 <p>चितरंजन रेलइंजन कारखाना CHITTARANJAN LOCOMOTIVE WORKS, INDIA</p>		
जॉब नं.अ. JOB NO.			
समीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE		प्रति भार कि. घा. WT. EACH IN KG	
अनुमोदित उ.मु.वि.अ. APPROVED DYCEE			
दिनांक DATE			
दृष्टिक अनुपात SCALE	N.T.S		
संदर्भ / REF. ALT.-			
आरेखण संख्या DRAWING NO.		CLW/ES/3/SK-1/0008 ALT.-B	
		परिवर्तन संख्या ALTERATION NO.	पृष्ठ SHEET 1 OF 1
		A2	



F

E

D

C

B

A

F

E

D

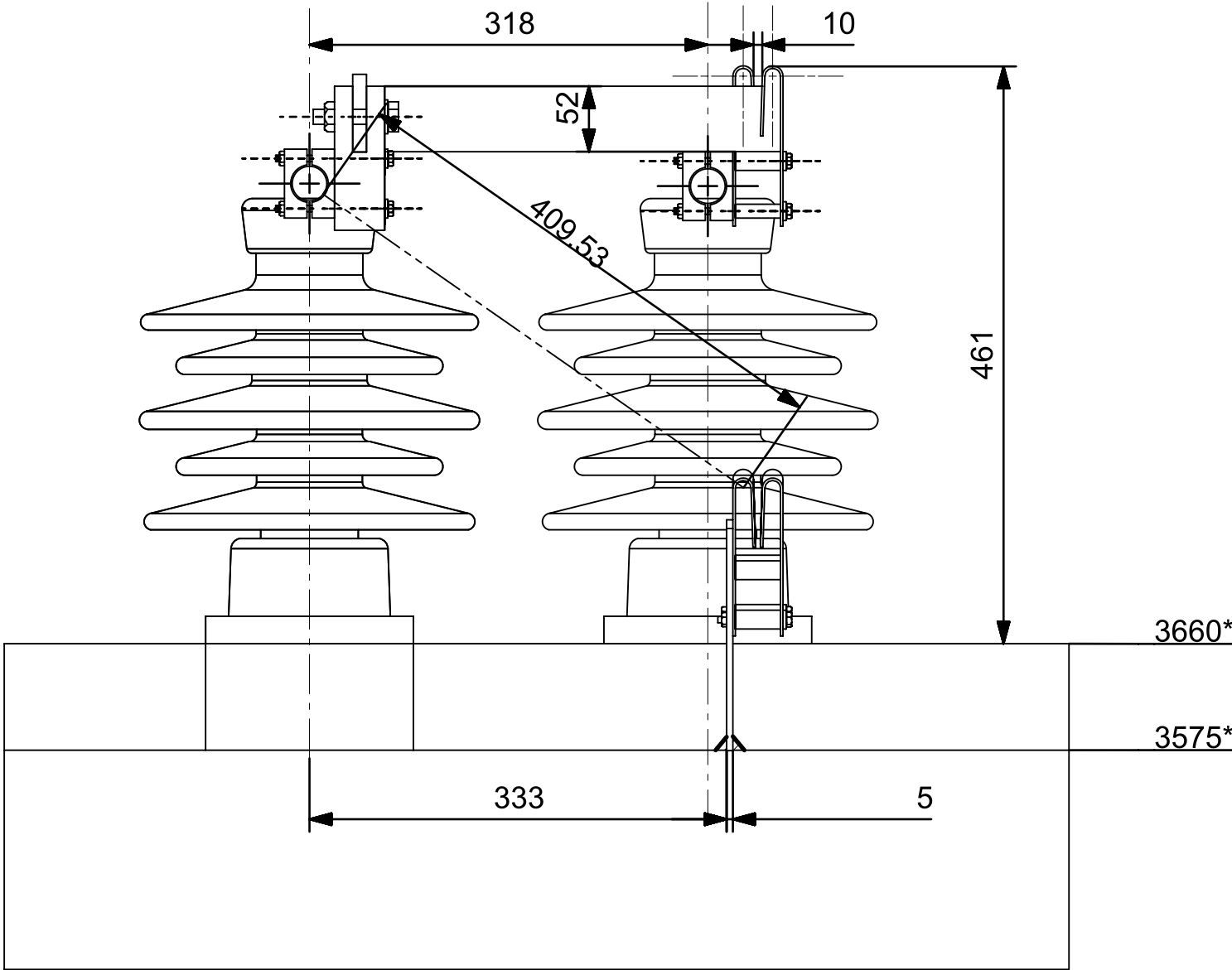
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B

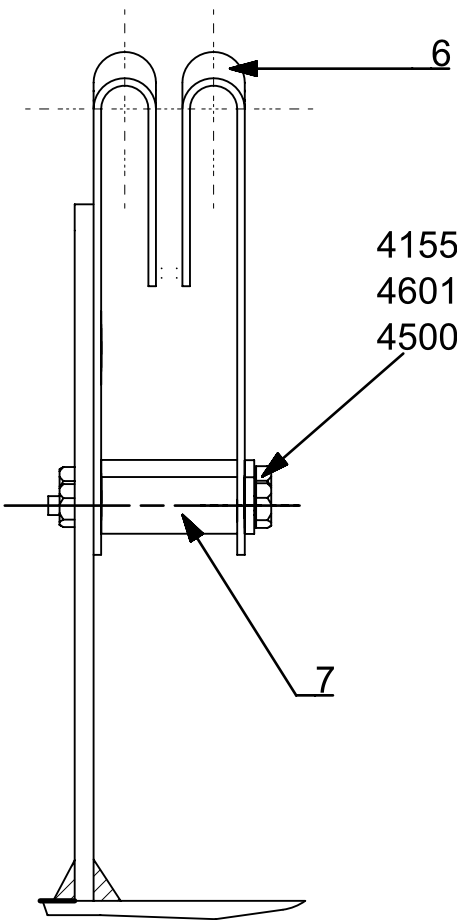
A

NOTICE \*: DIMENSIONS FROM TOP OF RAIL WITH NEW WHEELS

VIEW D-D M 1:5



VIEW E M1:2



REF:4 CONTACT SUPPORT (TY-1)  
CONSIST OF  
6. CONTACT SPRING CLW/ES/3/SK-4/008-2 NOS.  
7. SPACER 55X10 CLW/ES/3/SK-7/008-1 NO.

धातु-वेल्डन चिन्ह भा. मा. : 813 / अ. मा. सं.:2553 WELDING SYMBOLS TO IS:813 / ISO:2553	अनिर्दिष्ट सद्य — सीमा भा. मा. : 2102 / अ. मा. सं. : 2768 UNSPECIFIED TOLERANCE TO IS : 2102 / ISO : 2768												TOL. CLS.	
	पदांक GRADE NO.	सं1 N1	सं2 N2	सं3 N3	सं4 N4	सं5 N5	सं6 N6	सं7 N7	सं8 N8	सं9 N9	सं10 N10	सं11 N11	सं12 N12	
	Rz	0.16-0.3	0.5-0.7	0.9-1.1	1.5-2.0	2.5-3.8	5.0-6.3	9.0-12	16-25	30-40	50-63	75-100	160-250	
	Ra $\mu$ m	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2	6.3	12.5	25	50	
सतह — रुक्षता का मान भा. मा. 3073 / अ. मा. सं. 1302 SURFACE ROUGHNESS VALUE TO IS:3073 / ISO:1302	चिन्ह SYMBOL													

परिवर्तन संख्या	प्राधिकार	वर्णन	DESCRIPTION	दिनांकित आद्यक्षर
ALT. NO.	AUTHY			DATED INITIAL

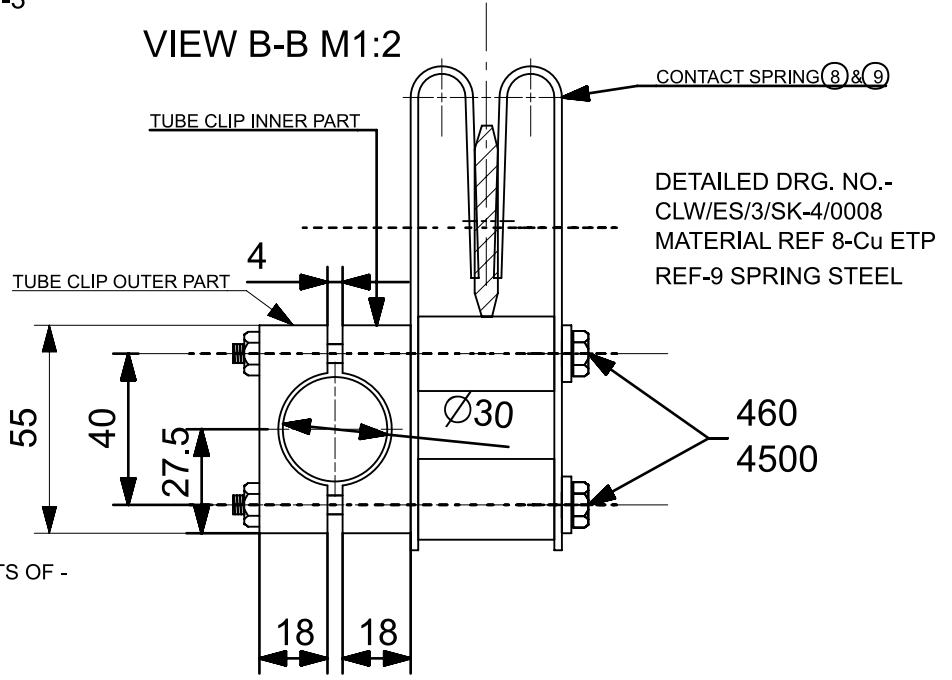
अधिकृत DGN		 चितरंजन रेलइंजन कारखाना CHITTARANJAN LOCOMOTIVE WORKS, INDIA	
जोचा व.अ.अ. CHD SSE			
समीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE		पदार्थ MTRL	प्रति भार कि. ग्रा. WT. EACH IN KG
अनुमोदित च.यु.वि.अ. APPROVED DYCEE		विशिष्ट SPECN	
दिनांक DATE		वर्णन DESCRIPTION	PANTOGRAPH DISCONNECTING + EARTHING DEVICE
रैखिक अनुपात SCALE	N.T.S	आरेखण संख्या DRAWING NO.	CLW/ES/3/SK-2/0008 ALT.-B
संदर्भ / REF. ALT-		परिवर्तन संख्या ALTERATION NO.	पूर्ण SHEET
			1 OF 1
			A3

3745709/2025/O/o WM/Design/DMW/PTA

REF-2-CONTACT SUPPORT TY-2

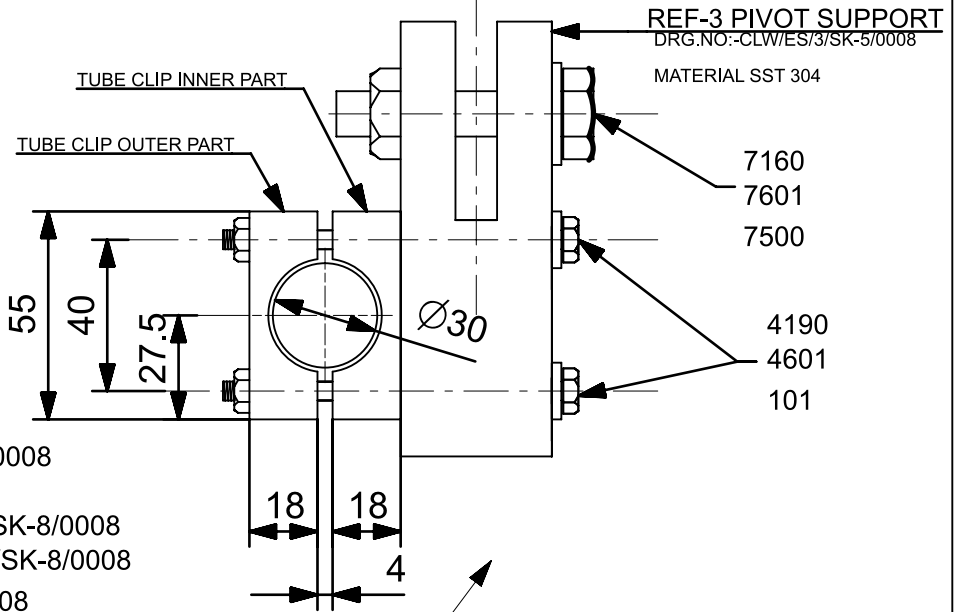
REF.5 -CONTACT SUPPORT TY-3

REF-2 CONTACT SUPPORT CONSISTS OF -  
CONTACT SPRING-04 NOS.(REF.8)  
SPACER-04 NOS.  
TUBE CLIP INNER PART-02 NOS.  
TUBE CLIP OUTER PART -02 NOS.










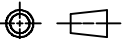
REF-5 CONTACT SUPPORT TY-3 CONSISTS OF -  
CONTACT SPRING-02 NOS.(REF.9)  
SPACER-02 NOS.  
TUBE CLIP INNER PART-01 NOS.  
TUBE CLIP OUTER PART -01 NOS.

VIEW A-A M1:2



DETAIL PART DRG. FOR REF. -2,3,5  
CONTACT SPRING-CLW/ES/3/SK-4/0008  
SPACER -CLW/ES/3/SK-7/0008  
TUBE CLIP INNER PART-CLW/ES/3/SK-8/0008  
TUBE CLIP OUTER PART-CLW/ES/3/SK-8/0008  
PIVOT SUPPORT-CLW/ES/3/SK-5/0008

## REF-3 PIVOT SUPPORT

<div>अभिकल्पित DGN</div> <div>जॉचा व.अ.अ. CHD SSE</div>												<div><div>चितरंजन रेलइंजन कारखाना CHITTARANJAN LOCOMOTIVE WORKS, INDIA</div></div>					
<div>परिवर्तन संख्या ALT.NO.</div>		<div>प्राधिकार AUTHY</div>		<div>वर्णन DESCRIPTION</div>				<div>दिनांकित आक्षेप DATED INITIAL</div>		<div>समीक्षित स.वि.अ. / व.वि.अ. REVIEWED AEE / SEE</div>		<div>पदार्थ MATL</div>		<div>प्रति भार कि. ग्रा. WT. EACH IN KG</div>			
<div>सतह — रूखा का मान भा. मा. 3073 / अ. मा. सं. 1302 SURFACE ROUGHNESS VALUE TO IS:3073 / ISQ:1302</div>		<div>अनिर्दिष्ट सक्ष — सीमा भा. मा. : 2102 / अ. मा. सं. : 2768 UNSPECIFIED TOLERANCE TO IS : 2102 / ISO : 2768</div>				<div>धातु-वेल्डन चिन्ह भा. मा. : 813 / अ. मा. सं. : 2553 WELDING SYMBOLS TO IS:813 / ISO:2553</div>		<div>TOL. CLS.</div>		<div>अनुमोदित उ.पु.वि.अ. APPROVED DYCEE</div>		<div>विशिष्ट SPECN</div>					
<div>पदांक GRADE NO.</div>		<div>सं1 N1</div>	<div>सं2 N2</div>	<div>सं3 N3</div>	<div>सं4 N4</div>	<div>सं5 N5</div>	<div>सं6 N6</div>	<div>सं7 N7</div>	<div>सं8 N8</div>	<div>सं9 N9</div>	<div>सं10 N10</div>	<div>सं11 N11</div>	<div>सं12 N12</div>	<div>वर्णन DESCRIPTION</div>			
<div>Rz</div>		<div>0.16-0.3</div>	<div>0.5-0.7</div>	<div>0.9-1.1</div>	<div>1.5-2.0</div>	<div>2.5-3.8</div>	<div>5.0-6.3</div>	<div>9.0-12</div>	<div>16-25</div>	<div>30-40</div>	<div>50-63</div>	<div>75-100</div>	<div>160-250</div>	<div>पANTOGRAPH DISCONNECTING EARTING DEVICE</div>			
<div>Ra <math>\mu</math>m</div>		<div>0.025</div>	<div>0.05</div>	<div>0.1</div>	<div>0.2</div>	<div>0.4</div>	<div>0.8</div>	<div>1.6</div>	<div>3.2</div>	<div>6.3</div>	<div>12.5</div>	<div>25</div>	<div>50</div>	<div>आरेखण संख्या DRAWING NO.</div>			
<div>चिन्ह SYMBOL</div>		<div></div>		<div></div>		<div></div>		<div></div>		<div></div>		<div></div>		<div>परिवर्तन संख्या ALTERATION. NO.</div>			
<div>संदर्भ / REF.</div>												<div>पुर्ण SHEET</div>		<div>1 OF 1</div>		<div>A4</div>	
<div>ALT. -</div>												<div></div>		<div></div>		<div></div>	
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