TENDER SPECIFICATION

NO. CLW/ES/S - 25/ABCDEFGH

DRAWING NOS. :-

1. CLW/ES/SK-1/S- 25/ABCDEFGH
2. CLW/ES/SK-2/S- 25/ABCDEFGH
3. CLW/ES/SK-3/S- 25/ABCDEFGH
4. CLW/ES/SK-4/S- 25/ABCDEFGH
5. CLW/ES/SK-5/S- 25/ABCDEFGH
6. CLW/ES/SK-6/S- 25/ABCDEFGH
7. CLW/ES/SK-7/S-25/ABCDEFGH
8. CLW/ES/SK-8/S-25/ABCDEFGH
9. CLW/ES/SK-9/S-25/ABCDEFGH

TOTAL NO. OF SHEETS & ALT. IN THIS SPECN.

SHEETS	12	15	15	16	16	20	20	20
ALT.	A	B	C	D	E	F	G	H I

SPECIFICATION
FOR
CABLE TERMINALS & SLEEVES
25 kV. AC ELECTRIC LOCOMOTIVES
CLASS : WAG-7 & WAP-4/6

ISSUED BY:

DY. CHIEF ELECTRICAL ENGINEER(D)
CHITTARANJAN LOCOMOTIVE WORKS
P.O.: CHITTARANJAN - 713331
DIST: BURDWAN, WEST BENGAL (INDIA)
DATE OF ISSUE:

NOTE:

THE SPECN. SUPERSEDES
EARLIER SPECN. NO. CLW/ES/S-9

SEE SHEET NO. 2

जाँचा CHKD	SPECIFICATION FOR CABLE TERMINALS & SLEEVES	चित्तरंजन रेल इंजन कारखाना, पश्चिम बंगाल, भारत CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA
स्वीकृत Approved	उप.मु.वि.अ. (अभि.) DY. CEE.(D) 30.X.97	क्रमांक/NO. CLW/ES/S-25/ABCDEFGH I दिनांक/DATE : 30-10-97

DETAILS OF ALTERATIONS

ALT.NO.	DATE	DESCRIPTION	SIGNATURE		REMARKS
A	16-05-98	CONDUCTIVITY VALUE AMENDED IN CLAUSE No. 4.2 & 4.3 AND TOLERANCES FOR J & B CHANGED IN SHEET 10 & 12.	Avijit 16.5.98		
B	24-10-98	SHEET NO. 13, 14 & 15 ADDED FOR THIN WALLED CABLE.	Avijit 02.11.98		
C	16-01-99	TERMINAL HOLE DIA OF TYPE-8 120SQMM REDUCED TO 18MM FROM 21MM VIDE L-NO. ELDD/ 3212/ACG dt. 12-1-99.	Avijit 16.1.99		
D	13-10-99	SHEET16 ADDED FOR 1.5 SQMM AND 'D' REVISED FOR TYPE 10 A IN SHEET 14.	Avijit 13-10-99		
E	06-03-01	SHEET No. 13 & 14 MODIFIED FOR ADDITION OF 185 SQMM AND 240 SQMM CABLE TERMINALS for thin walled cables.	6.3.01.	6/3/201	
F	11-03-02	SHEET NO. 17, 18, 19 & 20 ADDED FOR CABLE TERMINALS SIZE 2.5 & 300 SQMM FOR THIN WALLED CABLES	11/3/02		
G	10-04-04	SHEET NO. 20 MODIFIED FOR INCORPORATION OF CABLE SLEEVE TYPE-23C FOR SL CONNECTION WITH 240 Sq mm. CABLE.	Amita	HC	
H	12.07.04	Dimension of 23C modified to suit existing SL clamp & 240 sq. mm. thin walled Cable	Amita 12/7	HC	
I	21.04.14	Cable Terminal of Type-16B in Sheet No. 17 has been included;	21.4.14	21/4/14	Vide approval of Note No. ELDD/3221, dtd. 16.4.14 by CEE/LOCO. SEE SHEET NO. 3

जाँचा CHKD

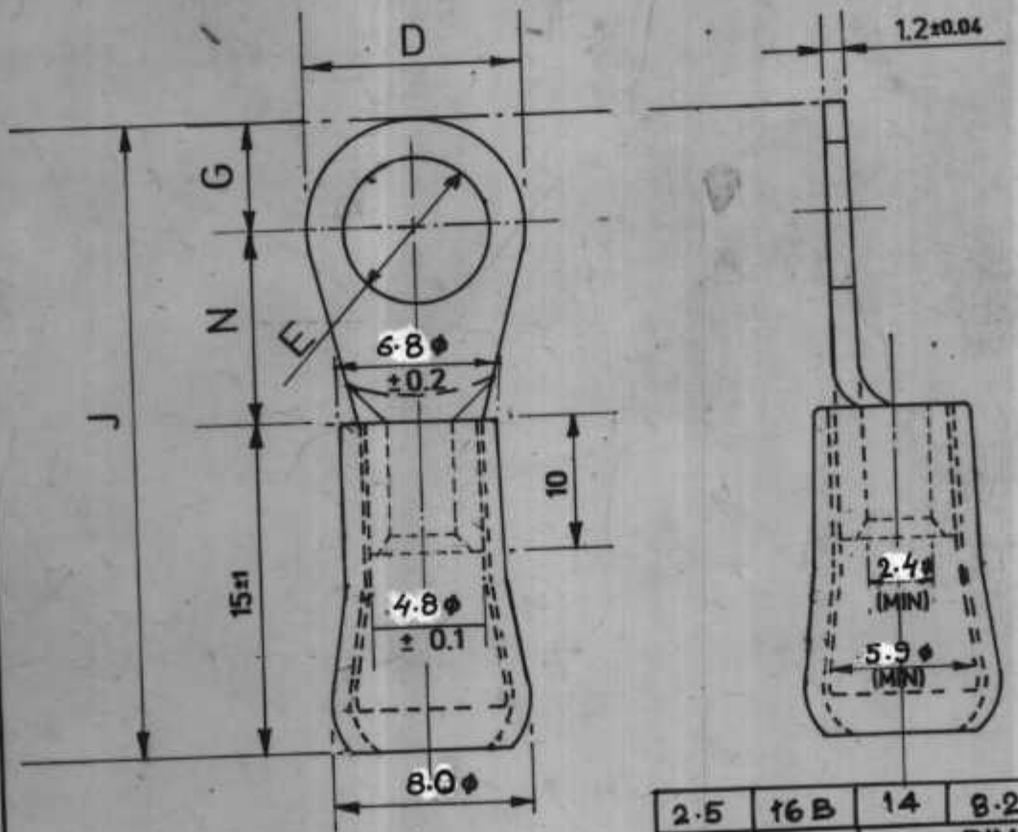
जारीकर्ता DRN. M. Mishra

SPECIFICATION FOR

CABLE TERMINALS & SLEEVES

30.X.97
उप.मु.बि.अ. (अभि.)
DY. CEE.(D)

चित्तरंजन रेल इंजन कारखाना
पश्चिम बंगाल, भारत
CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL, INDIA
क्रमांक/NO. CLW/ES/S-25/B C DEE
दिनांक/DATE : 30-10-97 Sht 1



2.5	16B	14	8.2	7	33	11
SIZE mm^2	TYPE	DIMENSIONS				
		D	E +0.1 -0	G ± 0.2	J ± 2	N
2.5	17B	10	6.2	5	29	9
2.5	18B	8	5.2	4	26	7
2.5	19B	8	4.2	4	26	7
2.5	20B	7	3.2	3	26	8

CABLE TERMINALS

TYPE-16B, 17B, 18B, 19B & 20B

FOR THIN WALLED CABLES

NOTE:

1. ALL DIMESIONS ARE IN MM
2. THE CABLE TERMINAL SHALL BE MANUFACTURED OUT OF FULLY ANNEALED ELECTROLYTIC COPPER SHEETS & ELECTRO-TINNED AFTER FORMATION.
3. PVC YELLOW NON-INFLAMABLE SLEEVE (WITH COPPER SLEEVE REINFORCEMENT) SHALL BE PROVIDED AS PRE-INSULATION.
4. BRAZING BY SILVER ALLOY TO IS:2927 BA CUP 5 ON THE CUT.
5. ELECTROLYTIC COPPER SLEEVE (UNTINNED/TINNED) OF NOMINAL THICKNESS OF 0.25±0.05MM. SHALL BE PROVIDED INSIDE PVC SLEEVE.
6. THE TENDERERS SHALL RECOMMEND SUITABLE CRIMPING TOOL FOR CRIMPIMG CABLE CORE & INSULATION IN ONE OPERATION (FOR DETAILS OF CABLES SEE NOTE NO. 9).
7. TOLERANCE ON DIMENSIONS WHERE EVER NOT SPECIFIED SHALL BE CONSIDERED AS ±0.5.
8. PVC SLEEVE SHALL NOT DEVELOP CRACKS DURING CRIMPING AND AFTER SIMULATING AGEING TEST.
9. THE CABLE TERMINAL SHALL BE USED FOR CRIMPING ON 3 mm2 ELASTOMERIC CABLES (CONDUCTOR DIA. 2.4±0.2 OVERALL DIA. ON INSULATION 5.5±0.5.

SEE SHEET NO.18

आरेखित DRN.	SPECIFICATION FOR CABLE TERMINALS & SLEEVES	चित्तरंजन रेल इंजन कारखाना पश्चिम बंगाल, भारत CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA
जाँचा CHKD	उप.मु.वि.अ. (अभि.) DY. CEE.(D)	क्रमांक/NO. CLW/ES/SK-5/S-25/FGH/I दिनांक/DATE : 11-03-02

TENDER SPECIFICATION

NO. CLW/ES/S - 25/[illegible]

DRAWING NOS. :-

1. CLW/ES/SK-1/S-25/[illegible]
2. CLW/ES/SK-2/S-25/[illegible]
3. CLW/ES/SK-3/S-25/[illegible]
4. CLW/ES/SK-4/S-25/[illegible]
5. CLW/ES/SK-5/S-25/[illegible]
6. CLW/ES/SK-6/S-25/[illegible]
7. CLW/ES/SK-7/S-25/[illegible]
8. CLW/ES/SK-8/S-25/[illegible]
9. CLW/ES/SK-9/S-25/[illegible]

TOTAL NO. OF SHEETS & ALT. IN THE SPECN.

SHEETS	12	15	15	16	16	20	[illegible]	
ALT.	A	B	C	D	E	F	G	H

SPECIFICATION
FOR
CABLE TERMINALS & SLEEVES
25 kV. AC ELECTRIC LOCOMOTIVES
CLASS : WAG-7 & WAP-4/6

ISSUED BY:
DY. CHIEF ELECTRICAL ENGINEER(DES)
CHITTARANJAN LOCOMOTIVE WORKS
P.O.: CHITTARANJAN - 713331
DIST. BURDWAN WEST BENGAL (INDIA)
DATE OF ISSUE:

NOTE:
THE SPECN. SUPERSEDES
EARLIER SPECN. NO. CLW/ES/S-5

TOTAL SHEETS [illegible]

SPECIFICATION FOR CABLE TERMINALS & SLEEVES	[signature] [illegible] (विद्यु.) DY. CEE.(D)	[illegible] CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA [illegible]/NO. CLW/ES/S-25/[illegible] [illegible]/DATE 30-10-97

DETAILS OF ALTERATIONS

ALT. NO	DATE	DESCRIPTION	SIGNATURE		REMARKS
A	[illegible]	CONDUCTIVITY VALUE AMENDED IN CLAUSE NO. 4.2 & 4.3 AND TOLERANCES FOR [illegible] & [illegible] CHANGED IN SHEET 10 & 12.	[illegible]		
B	24-11-96	SHEET [illegible] IS ADDED FOR THIN WALLED CABLE	[illegible]		
C	16-01/95	TERMINAL HOLE DIA OF TYPE [illegible] REDUCED TO [illegible] [illegible] 7512/ACO [illegible] 12-1-95	[illegible]		
D	19-10-95	SHEET [illegible] ADDED FOR [illegible] AND 'D' REVISED FOR TYPE [illegible] IN SHEET 14	[illegible]		
E	[illegible]	SHEET NO. [illegible] MODIFIED FOR ADDITION OF 185 SQMM AND 240 SQMM CABLE TERMINALS for thin walled cable	[illegible]	[illegible]	
F	11-09-02	SHEET NO 17, 18, 19 & 20 ADDED FOR CABLE TERMINALS SIZE [illegible] SQMM FOR THIN WALLED CABLE	[illegible]	[illegible]	
G	[illegible]	SHEET NO. [illegible] MODIFIED FOR INCORPORATION OF CABLE SLEEVE TYPE-25C FOR SL CONNECTION WITH [illegible] MM CABLE.	[illegible]	[illegible]	
H	12-7-[illegible]	Dimension of 25C modified to suit [illegible] & clamp & [illegible] sq. mm. thin walled Cable	[illegible]	[illegible]	

SEE SHEET NO. 1

SPECIFICATION FOR CABLE TERMINALS & SLEEVES	[illegible] [illegible] (Elec.) BY CEE(D)	[illegible] CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL INDIA [illegible]/NO. CLW/ES/5-[illegible] [illegible]/DATE : 30-10-97

1. SCOPE OF SPECIFICATION

1.1 This specification covers the manufacture and supply of "crimping type" copper cable terminals of different sizes and shapes indicated in the drawing attached.

1.2 The cable terminals shall be made out of seamless high conductivity copper tubes with a minimum copper containing alloy content to be counted as copper of 99.90% electrical conductivity of the annealed copper tubes shall not be less than 99.25% when expressed as a percentage of the standard value for a standard annealed copper of 100% conductivity, as laid down by IEC. The chemical composition of the copper tube shall confirm to grade ETP of table of IS:191 of 1980/ISO-1977 of 1976.

1.3 The interior and exterior surfaces of the cable terminal shall be fully tinned by electro-tinning process. The thickness of the plating shall be uniform and not less than 0.010mm. The quality of the plating shall be such as to withstand crimping without peeling off.

1.4 The lugs on each side of the cable terminal shall be parallel and flat.

1.5 The manufacturer shall engrave/emboss/imprint or any other permanent identification marks as considered satisfactory, indicating their name, monogram and brand name. Type number of the terminal shall also be suitably marked.

2. STANDARDS

The raw material used for the terminals shall conform to BS 1977 of 1975: specification for seamless high conductivity copper tube for electrical purposes, and IS:191 of 1980: specification for electrolytic copper and IS:1897 specification for ■ copper strip for electrical purposes.

3. DRAWING

The following drawings are enclosed with this specification for each type of copper terminal proposed to be purchased. It may kindly be noted that all dimensions indicated in the drawing are in mm. ■■.■■.CAM/TS/DC-L/DWG to CAM/TS/DC-L/D-25.

SPECIFICATION FOR CABLE TERMINALS & SLEEVES	Prepared by (DY CEE)	CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA SPEC/NO: CAM/TS/D-25 ISSUE/DATE: 15-05-■■■■

4. TYPE TEST

4.1 Chemical composition - Chemical composition of the grade of copper used for cable terminals will be analysed in accordance with IS 440 - 1964 - methods of chemical analysis of copper.

4.2 Electrical conductivity test - Electrical conductivity of copper terminals shall be measured using conductivity meter and the value should not be less than 99.2% IACS electrical resistivity test as per clause 9.0 of IS:1897-1961.

4.3 Flattening and doubling over test - Flattening and doubling over test shall be carried out on tubular portion of the terminal in accordance with BS 1977 of 1975 clause 10.3 & 10.5.

4.4 Bend test - Bend test on the palm of the terminal shall be carried out in accordance with appendix A of BS 4579.

4.5 Crimping test - Crimping test shall be carried out by crimping cable terminal on their proper size and terminal with proper crimping tool. After crimping there should not be any crack or puncturing of the cable socket tubes. No flaring of the sides of the cable sockets should occur after crimping.

Crimping of joints shall be tested in accordance with BS 4579 pt.1 of 1970 for -

a) Measurement of initial resistance.
b) Temperature cycling.
c) Final resistance &
d) Tensile strength.

4.6 Quality of plating - Adhesion test to examine proper quality of plating shall be carried out in the following manner :-

i) The sample shall be bent through an angle of 180° on a diameter equal to the thickness of the sample. The sample shall now show any evidence of non-adhesion as may be revealed by lifting of the tin flakes from the base metal.

ii) The sample shall be rubbed rapidly and forcefully for 15 secs. with a smooth metal instrument like oxyer nail. The burnished area shall then be visually inspected and there should not be any indication of the deposit becoming detached.

4.7 Visual examination - Conformity to drawing for various dimensions, workmanship and provision of manufacturer's name, etc. shall be checked.

SPECIFICATION FOR CABLE TERMINALS & SLEEVES	sig & dt. (dr.) DY CE.(D)	Design to be approved by CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA SPN/NO. CLW/ET/0-25 Sub/DATE : 15.05.2006

		SIG & DATE
		AUTHOR DATE

4.0 Sampling for type tests

4.0.1 Suppliers who have not supplied any cable terminals in the past 5 years shall submit at least 10 percentage samples of each type for 3mm, 10mm & 25mm terminals and 5 samples for all other type of terminals.

4.0.2 All tests as detailed above in clause 4.1. to 4.7 shall be carried out on three samples and their conformity to specified limits shall be checked up.

4.0.3 Impregnated compound after injection and tests, shall be taken out by the manufacturer in the bulk supplies without affecting environment pollution or any other harm and conditions of the covers.

4.0.4 Manufacturer shall not go ahead with the manufacture of bulk production unless prototype has been finally approved by CLW.

4.0.5 The supplier shall provide adequate testing facilities at their factory premises for conducting necessary tests as per relevant standard specification.

5. Routine inspection

5.1 The sampling and criteria for conformity shall be as IS:4162, 1983 & IS-1977 of 1975.

5.2 The samples so picked up as detailed in clause 5.1 above shall be subjected to tests as stipulated in clause 4.0 above.

5.3 In addition to the samples from each lot or a part thereof, shall be picked up at random basis and subjected to tests stipulated at clause 4.1, 4.4 and 4.6.

6. Special instructions to the tenderer

6.1 The tenderers shall furnish complete dimensional drawing for the cable terminals along with relevant materials specification.

6.2 The suppliers shall also recommend suitable make and type of crimping tool for satisfactory performance of crimping of the terminals to meet the requirement of crimping test as laid down in clause 4.5

6.3 The tenderer shall provide a satisfactory evidence acceptable to CLW to who that.

Contd..6

Spec. for Cable terminals & Sleeves		Issued to (M/s ...) Chittaranjan Locomotive Works West Bengal, India. WORKS NO. CLW/ES/B-25 Issue DATE : 18.05.2006
	Prepared by (M/s.) DY CEE (D)	

a) He is a licensed manufacturer who regularly manufactures the item offered and has adequate technical knowledge and practical experience.

b) He has adequate financial establishment and wishes to undertake obligations under the contract for which he proposed to submit a tender from a recognised bank or financial institution.

c) He has adequate plant and machinery with the capacity to manufacture and supply the items offered by meeting the delivery schedule offered by him.

d) He has established quality control system and organisation to ensure that there is adequate control at all stages of manufacturing process.

In addition to the above, further information regarding his capacity/capability, if required by BEL, shall be promptly furnished.

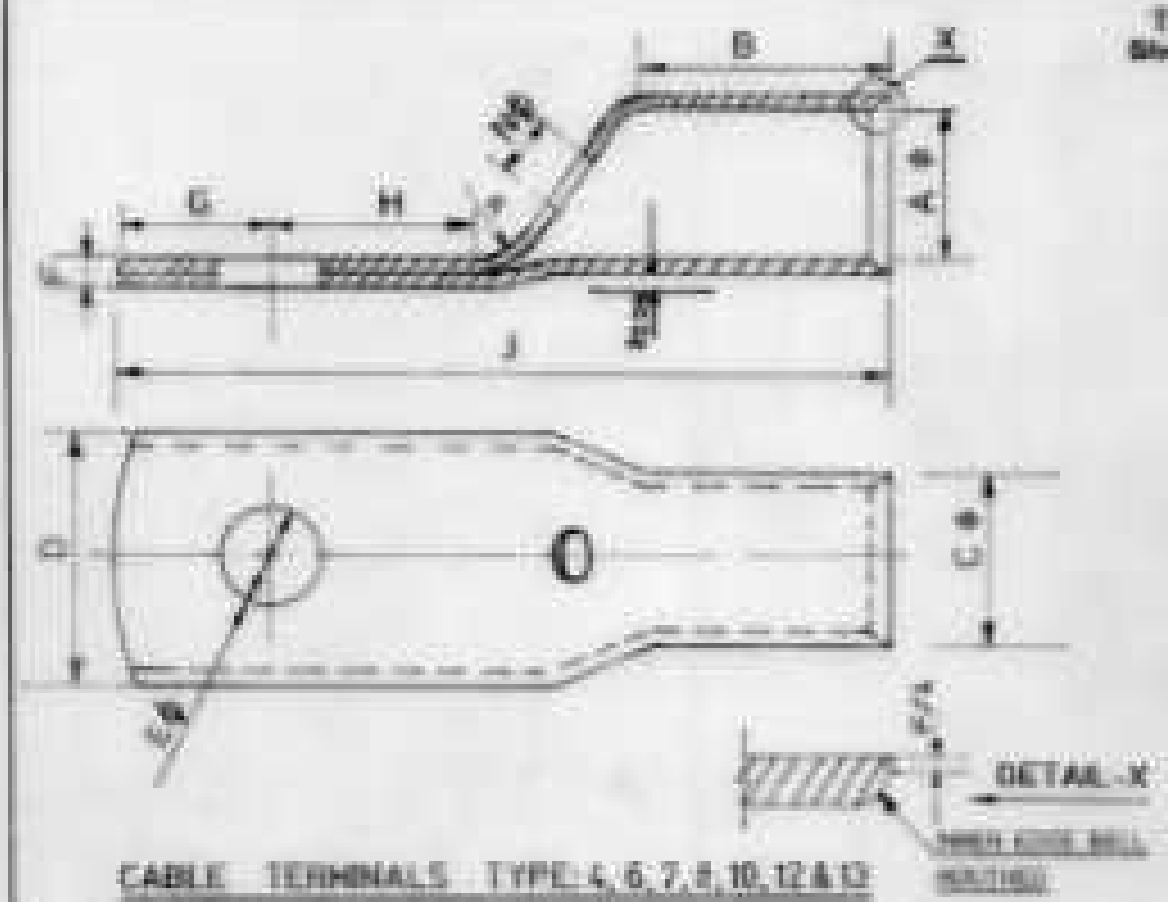
Tenderers not submitting the requisite information may note that their offer is liable to be ignored.

Guarantee

Material shall be guaranteed for 12 months from the date of commissioning or 18 months for the sake of reputed whichever satisfactorily performance due to design defect, bad workmanship and faulty material, etc. shall be replaced or repaired free of cost by the supplier.

BEL reserves the right to procure material either fully or partially as per actual need.

Specn. For Cable Terminals & Glands		Issued to the extent of use in CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL INDIA
	मुद्रित (सं.) BY CEE.(D)	सप्लाई/SPEC.NO. CLW/ES/B-15 Date/दिनांक 15.05.2006

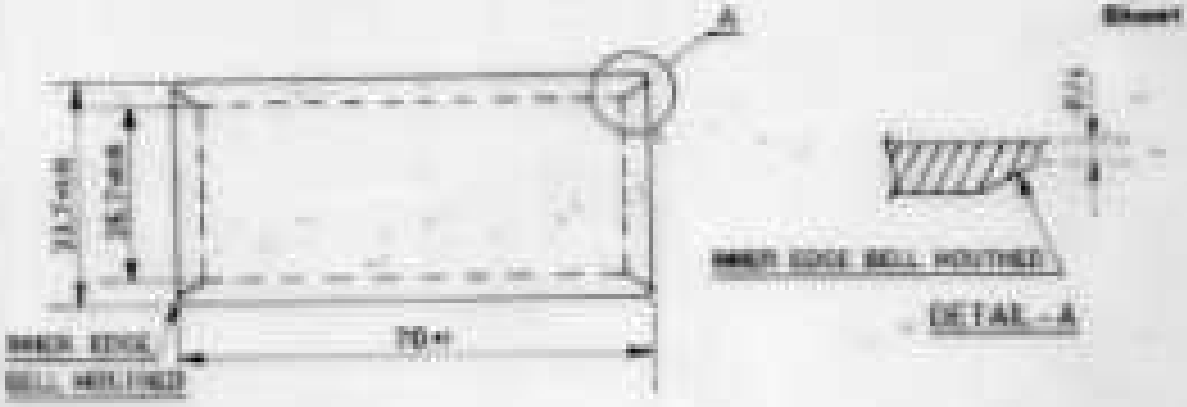


CABLE TERMINALS TYPE 4, 6, 7, 8, 10, 12 & 13

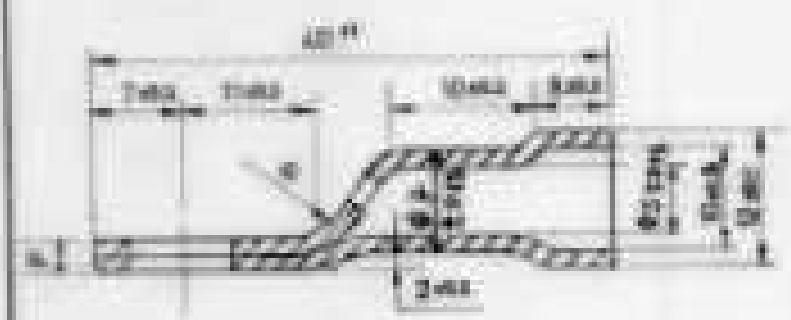
		DIMENSIONS IN MM.									
Size mm²	TYPE	A ±0.5	B ±0.5	C ±0.5	D ±0.5	E ±0.5	F ±0.2	G ±0.1	H ±0.5	J ±1.0	K ±0.2
300	4	33	41	28	48.0	18	8	14	35	150	3
150	6	19	35	24	36.0	18	8	14	25	88	3
120	7	17	30	22.2	32	16	6.3	10	27	88	4
60	8	17	30	22.2	32	16	6.3	10	27	88	4
50	10	15.8	26	16	28.2	13	3.2	14	20	88	3
35	12	9.8	20	12	17.5	8.2	3.6	14	21	83	3
25	13	8	16	10	16.2	8.2	3	10	14	43	3

SPECIFICATION FOR CABLE TERMINALS & SLEEVES

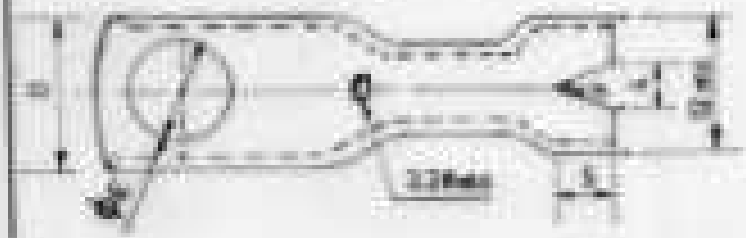
CHITTARANJAN LOCOMOTIVE WORKS



CABLE SLEEVE FOR TERMINALS OF TRACTION MOTOR TYPE - 33A



TYPE	A	B	C
14	40	6.5	3.8
15	32	5.5	1.5
16	25	4.5	1.5

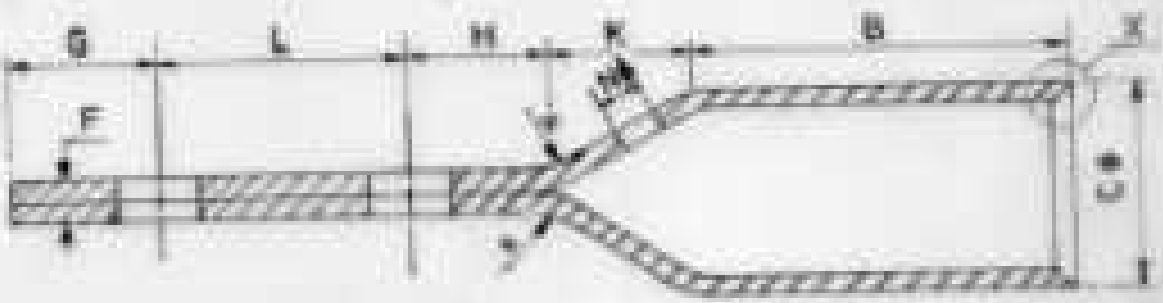


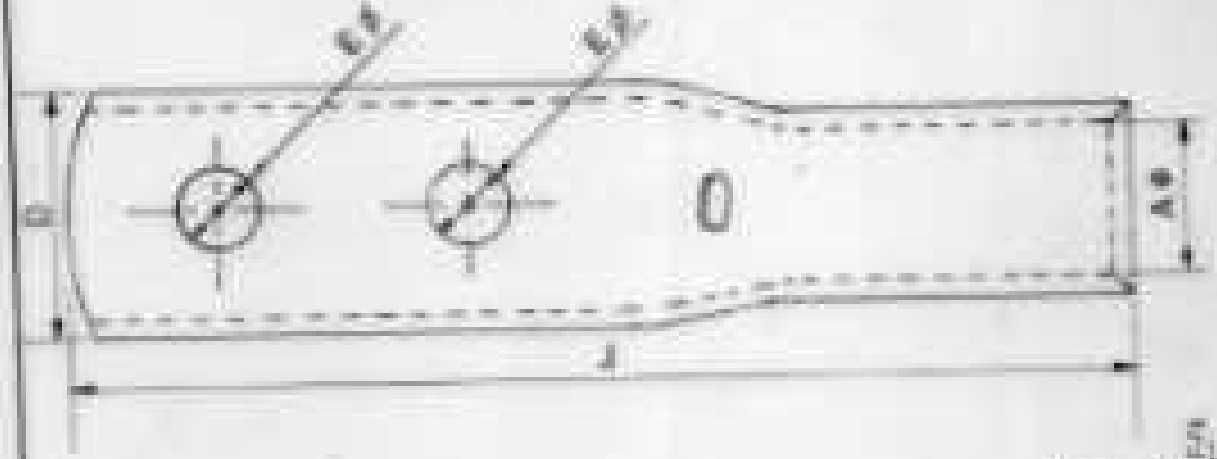
CABLE TERMINALS TYPE - 14, 15 & 16 (50mm²)

NOTE: DIMENSION 'A' SHOULD BE GREATER THAN 3/8"

SEE SHEET NO. 9

	SPECIFICATION FOR CABLE TERMINALS & SLEEVES		CHITTARANJAN LOCOMOTIVE WORKS





CABLE TERMINAL TYPE - 3 & 25

INNER EDGE SKILL ROUTINED

DETAIL - 'X'

SIZE mm²	TYPE	DIMENSIONS IN MM												REMARKS
		A ±0.5	B ±0.5	C ±0.5	D ±0.5	E ±0.5	F ±0.5	G ±0.5	H ±0.5	J ±1.0	K ±0.5	L ±0.5	M ±0.2	
270	3	28	33	32	40	11	6	15	24	142	12	34	3	SEE NOTE 2 BELOW
300	25	28.7	33	32.7	40	11	6	15	24	142	12	34	3	

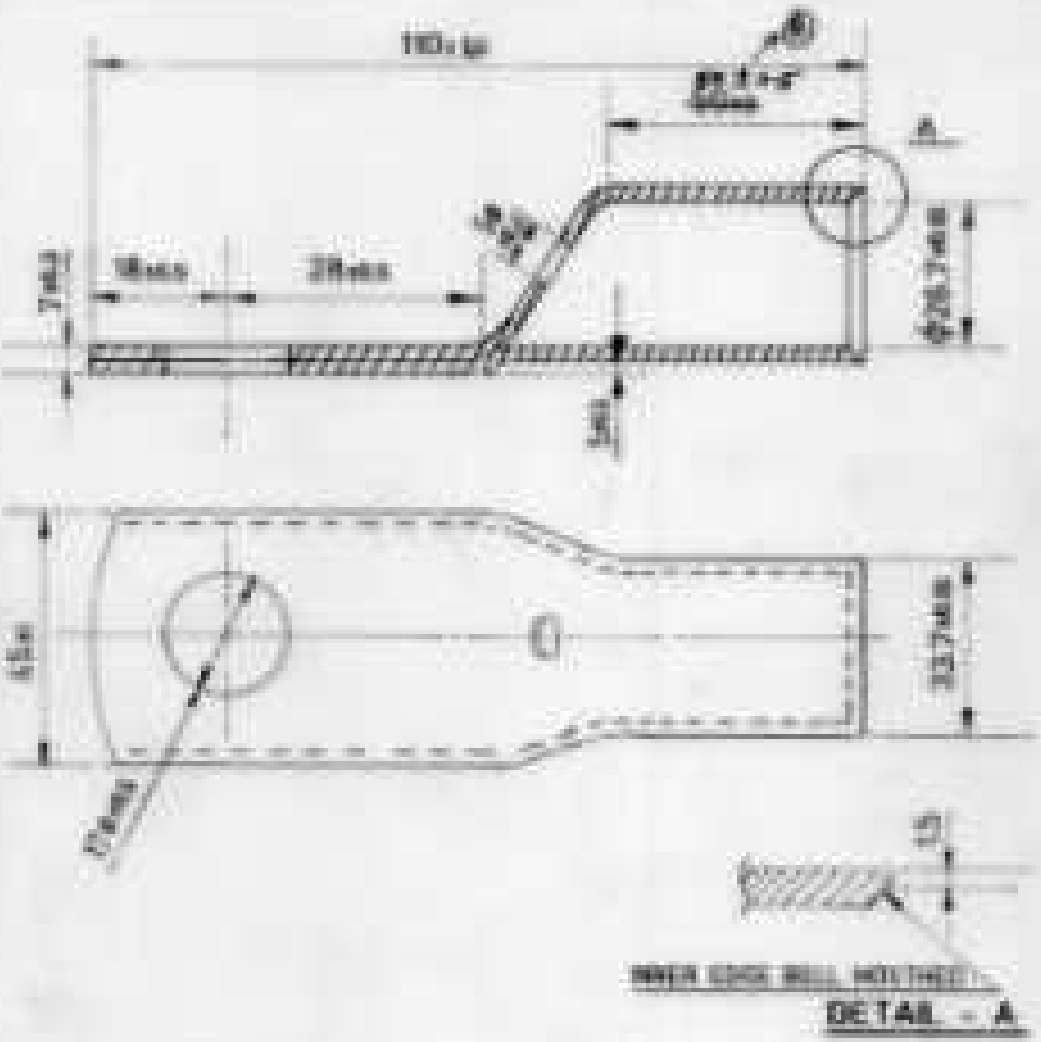
NOTE:

1. UNKNOWN IS SHOULD BE GREATER THAN 'J'

2. TYPE 25 OF 300 mm² IS ONLY FOR HEAVY TRACTION MOTOR & TYPE 3 OF 270 mm² IS ONLY FOR TAO 658 MOTOR.

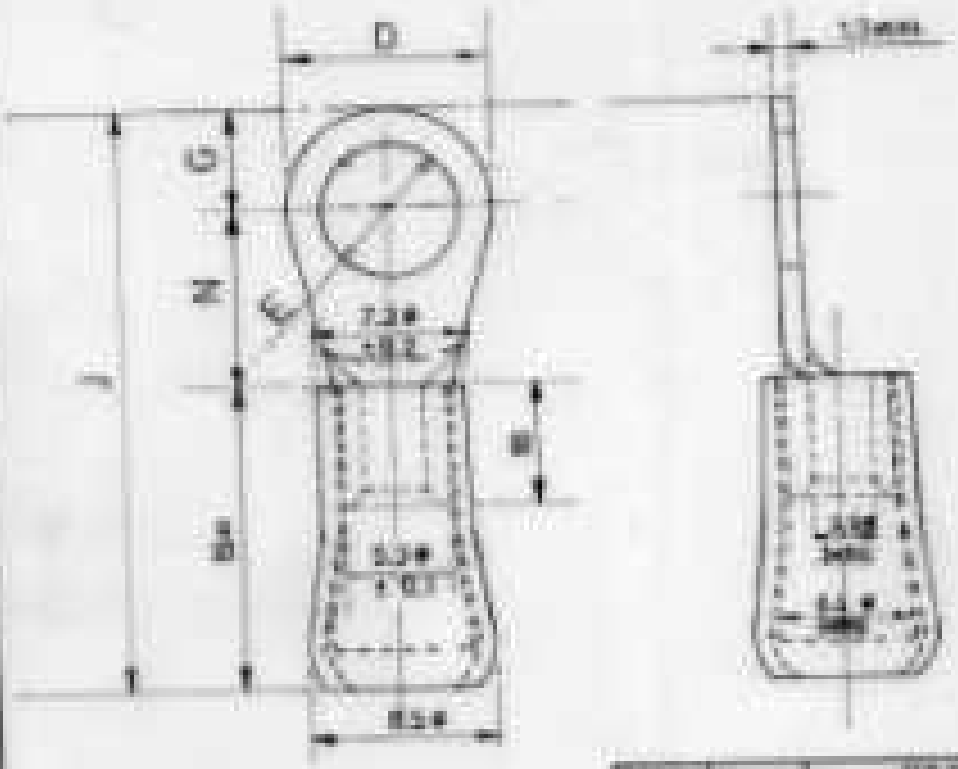
SEE SHEET NO. 3

	SPECIFICATION FOR CABLE TERMINALS & SLEEVES	Unspecified dimensions (mm) DY. DEE.(D)	Approved by (for Director) Chittaranjan Locomotive Works West Bengal, India. DRWG.NO. CLW/ES/PSA-3/5-1 (P.B) SCH/DATE : 30-10-77



CABLE TERMINAL TYPE - 22 (300 mm²)

SPECIFICATION FOR CABLE TERMINALS & SLEEVES		CHITTARANJAN LOCOMOTIVE WORKS



SIZE mm²	TYPE	DIMENSIONS				
		D	d ±0.1	B ±0.5	L ±1	M
3	17A	10	6.2	5	28	9
3	18A	8	5.2	4	26	7
3	19A	8	6.2	4	26	7
3	20A	7	5.2	3	26	6

CABLE TERMINALS
TYPE- 17A, 18A, 19A & 20A

NOTE:

1. ALL DIMENSIONS ARE IN mm

2. THE CABLE TERMINAL SHALL BE MANUFACTURED OUT OF FULLY ANNEALED ELECTROLYTIC COPPER SHEETS & ELECTRO-TINNED AFTER FORMATION.

3. PVC YELLOW NON-INFLAMMABLE SLEEVE WITH COPPER SLEEVE REINFORCEMENT SHALL BE PROVIDED AS PRE-INSULATION.

4. BRAZING BY SILVER ALLOY TO IS:2827 BA CUP 1 ON THE CUT.

5. ELECTROLYTIC COPPER SLEEVE SUITABLE/TINNED OF NOMINAL THICKNESS OF 0.25mm SHALL BE PROVIDED INSIDE PVC SLEEVE.

6. THE TENDERER SHALL RECOMMEND SUITABLE CRIMPING TOOL FOR CRIMPING CABLE CORE & INSULATION IN ONE OPERATION (FOR DETAILS OF CABLES SEE NOTE NO. 9).

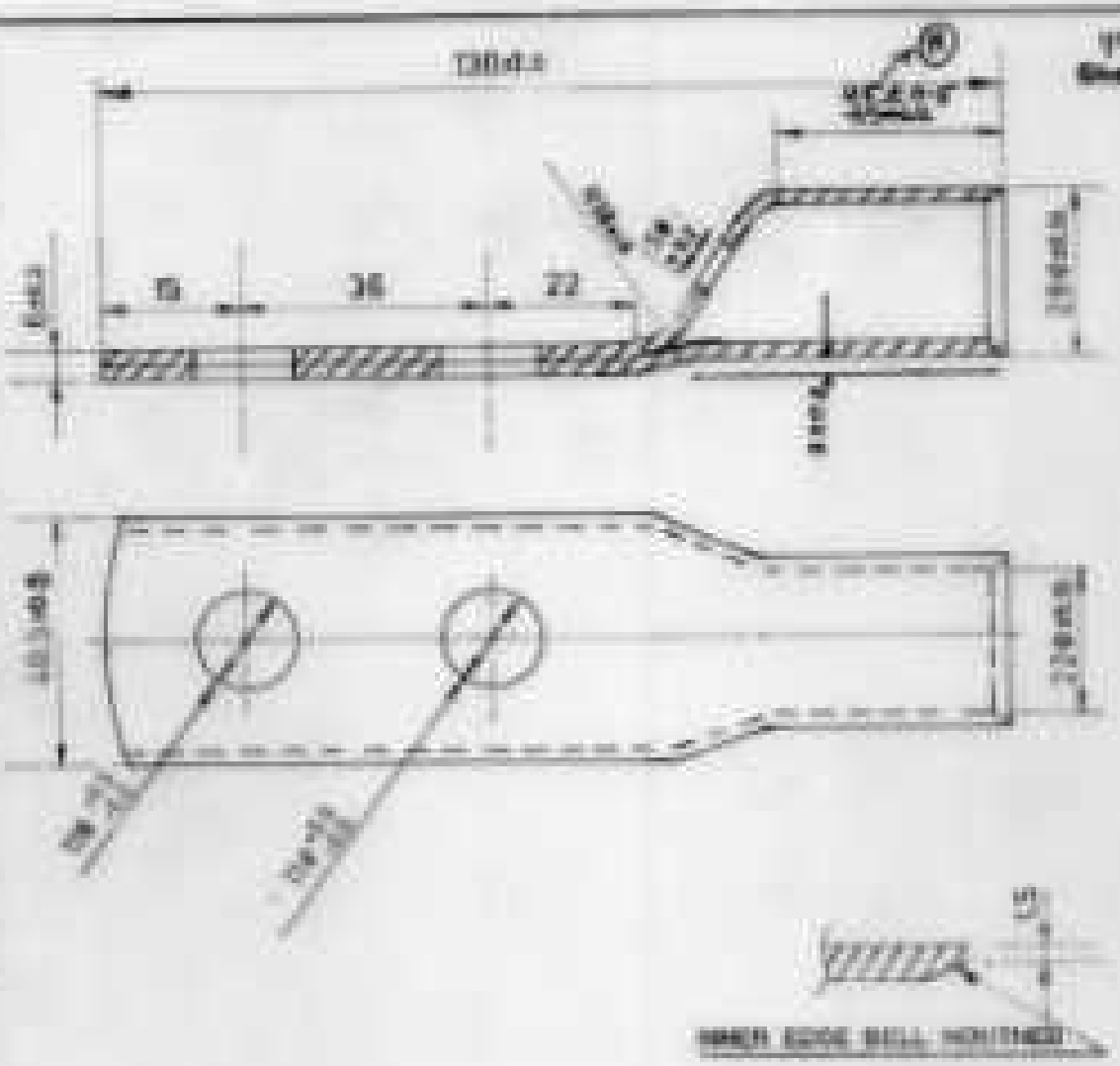
7. TOLERANCE ON DIMENSIONS WHERE EVER NOT SPECIFIED SHALL BE CONSIDERED AS ±0.5.

8. PVC SLEEVE SHALL NOT DEVELOP CRACKS DURING CRIMPING AND AFTER INSULATING ASSEMBLY TEST.

9. THE CABLE TERMINAL SHALL BE USED FOR CRIMPING ON 3 mm ELASTOMERIC CABLES CONDUCTOR DIA 2.5 mm OVERALL DIA ON INSULATION 5.5 mm.

SEE SHEET NO. 2

	SPECIFICATION FOR CABLE TERMINALS & SLEEVES	(e.g./Nos. (eff.) DY. CEE.(D))	Approved by (DY. MGR/ ADDL. DMW) CHITTARANJAN LOCOMOTIVE WORKS (WEST BENGAL, INDIA) DRG/NO. CLW/ES/SN-5/5-25/PVC FDRG/DATE: 30-10-87

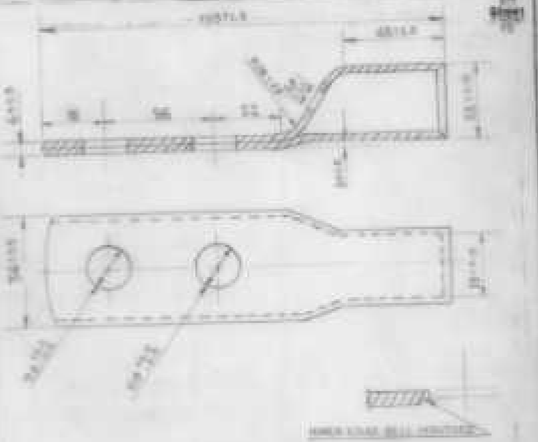


CABLE TERMINAL TYPE - 5(225mm²)
FOR T. M. JOINT BOX

NOTE:
TOLLERANCE ON DIMENSIONS UNLESS OTHERWISE SPECIFIED WILL BE ±0.5 mm.

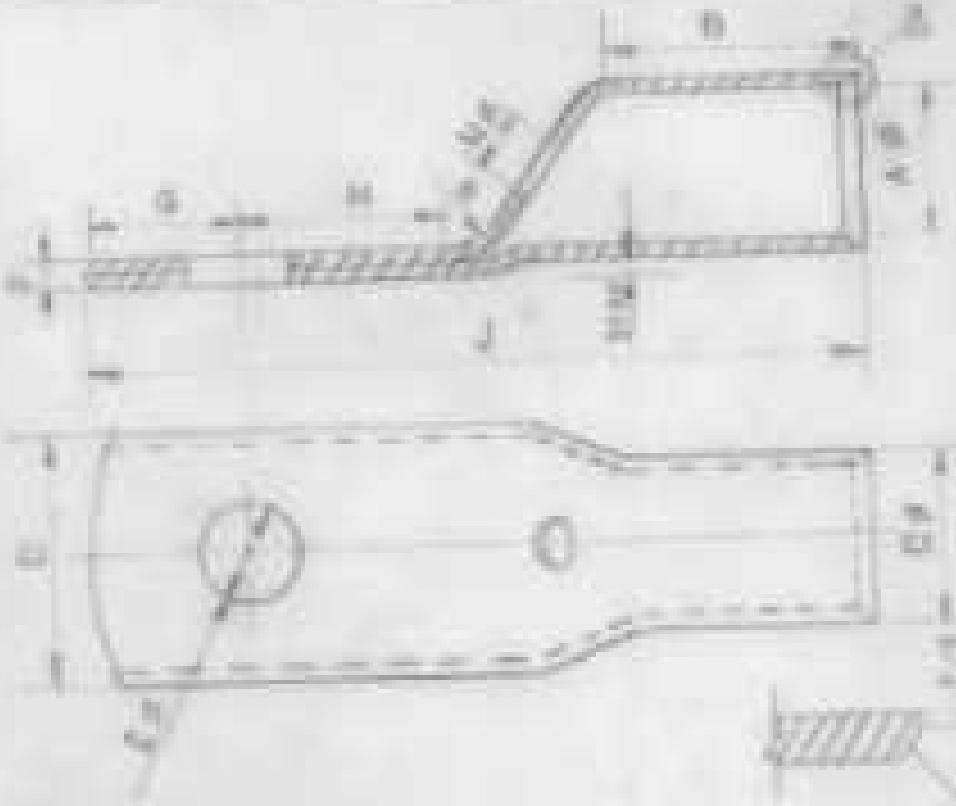
SEE SHEET No. 13

SPECIFICATION FOR CABLE TERMINALS & SLEEVES		DIESEL LOCO MODERNISATION DIESEL LOCOMOTIVE WORKS WEST BENGAL INDIA SPEC.NO. CLW/ES/GM-5/S-2/91 Type/DATE : 30-10-91



CABLE TERMINAL TYPE - 5A(185 mm²)
FOR T M JOINT BOX

SPECIFICATION FOR CABLE TERMINALS & SLEEVES FOR THIN WALLED CABLE	DY. CEE (D)	CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL INDIA DRG.NO. [illegible] DATE [illegible]

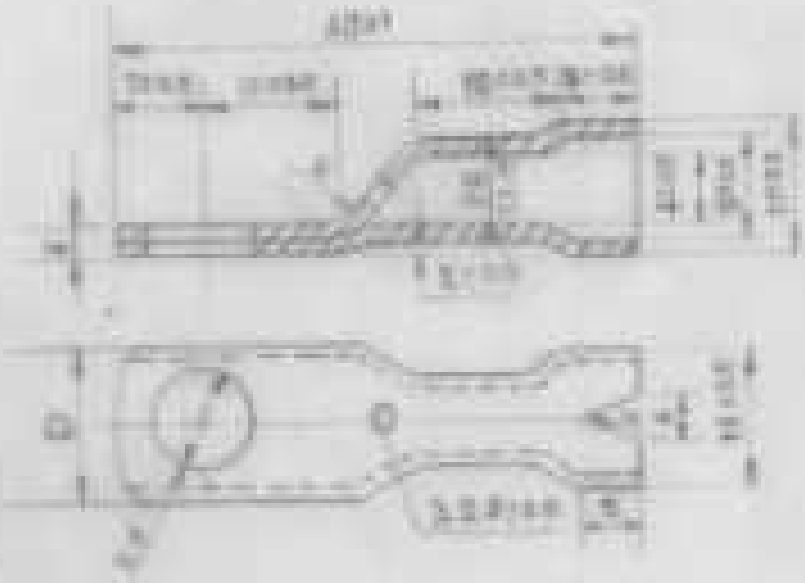


CABLE TERMINALS TYPE GA,GB,GC & GD

WITH OBTUSE & STRAIGHT SPLAYED ENDS.

SIZE mm²	TYPE	A	B	C	D	E	F	G	H	J	K	No.
10	GA	146	55	92	51	14	40	18	47	30	4	
16	GA	14	59	95	57	14	45	18	51	33	4	
25	GA	18	68	102	57	18	56	18	57	38	4	
35	GA	18	68	102	57	18	56	18	57	38	4	
50	GA	22	78	116	70	20	65	22	64	43	3	
70	GA	26	87	129	76	24	75	26	70	48	3	
95	GA	31	97	143	83	28	85	30	76	53	3	
120	GA	37.5	80	124.5	41	17	7	18	46	11.5	3	
150	GA	39.5	85	131.5	46	16	6	18	50	13.5	3	

SPECIFICATION FOR CABLE TERMINALS & SLEEVES FOR 11kV XLPE CABLES			



CABLE TERMINALS TYPE - 185,150 & 95A (4mm²)

TYPE			

SPECIFICATION FOR CABLE TERMINALS & SLEEVES

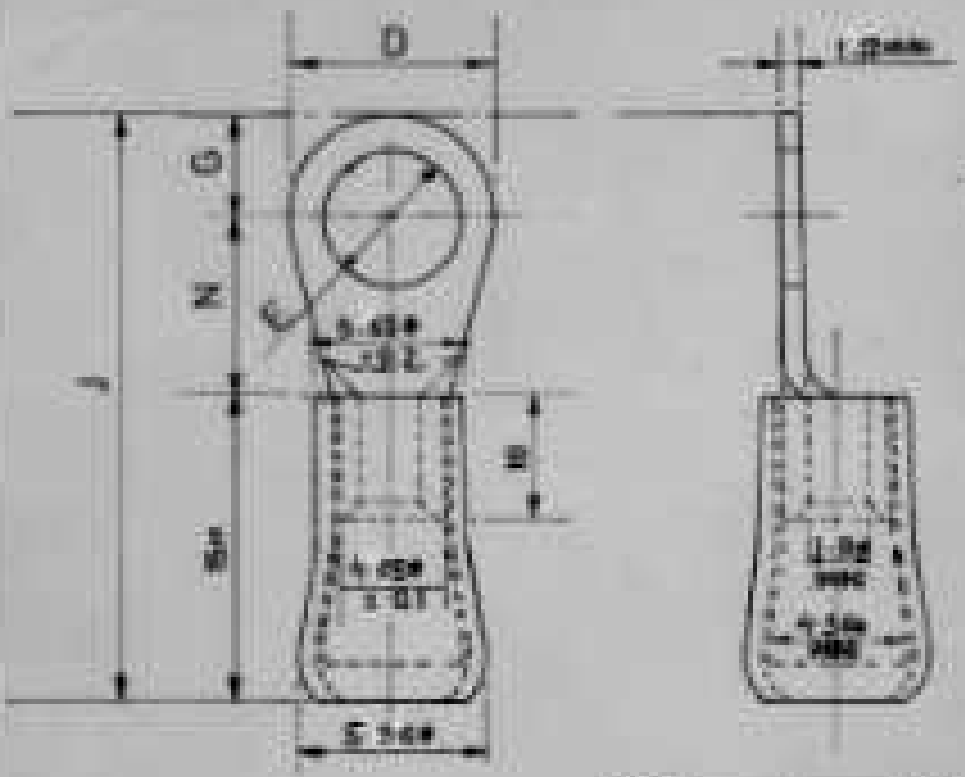
FOR 11KV XLPE CABLE

DY. CEE. (D)

CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL INDIA

DRAWING NO.

DATE : 24-12-96



SIZE mm²	TYPE	DIMENSIONS				
		D	C ±1/2	B ±0.5	A ±1	N
1.5	1.1A	7	3.2	3	24	5

CABLE TERMINALS
TYPE-1.1A.

NOTE:

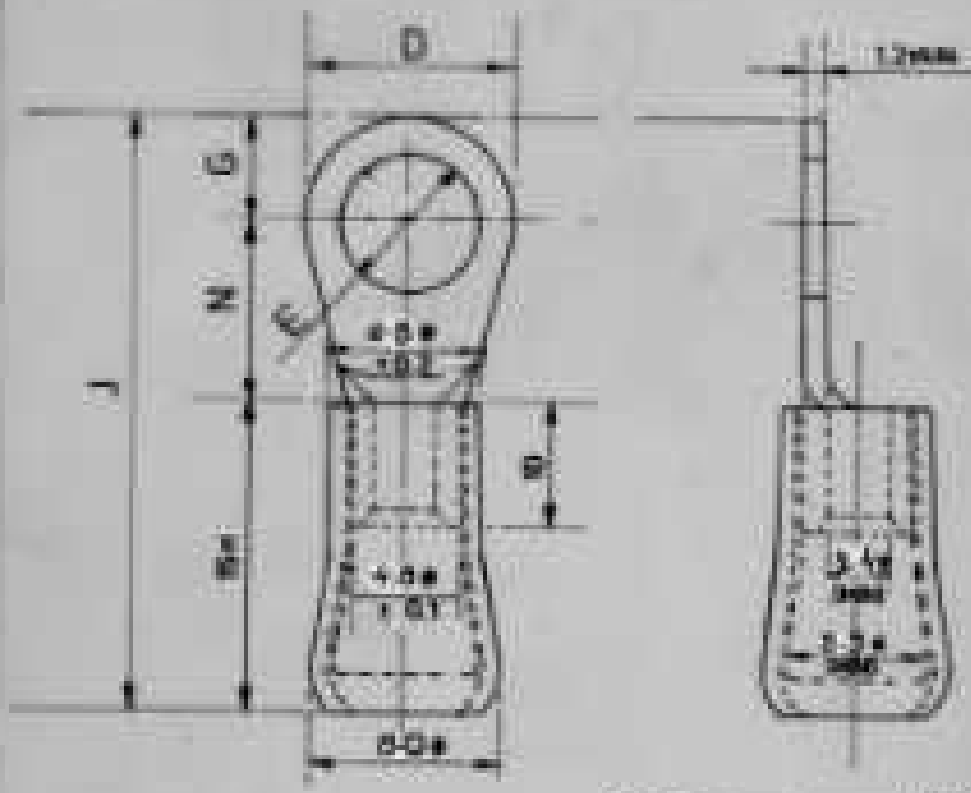
1. ALL DIMENSIONS ARE IN mm
2. THE CABLE TERMINAL SHALL BE MANUFACTURED OUT OF FULLY ANNEALED ELECTROLYTIC COPPER SHEETS & ELECTRO-TINNED AFTER FORMATION.
3. PVC YELLOW NON-INFLAMABLE SLEEVE (WITH COPPER SLEEVE REINFYCEMENT) SHALL BE PROVIDED AS PRE-INSULATION.
4. BRAZING BY SILVER ALLOY TO IS:2927 GR CUP 5 ON THE LUG.
5. ELECTROLYTIC COPPER SLEEVE (WITHOUT/THICK) OF NOMINAL THICKNESS OF 0.25mm SHALL BE PROVIDED INSIDE PVC SLEEVE.
6. THE TENDERERS SHALL RECOMMEND SUITABLE CRIMPING TOOL FOR CRIMPING CABLE CORE & INSULATION IN ONE OPERATION (FOR DETAILS OF CABLES SEE NOTE NO. 9)
7. TOLERANCE ON DIMENSIONS WHERE EVER NOT SPECIFIED SHALL BE CONSIDERED AS ±0.5.
8. PVC SLEEVE SHALL NOT DEVELOP CRACKS DURING CRIMPING AND AFTER INSULATING AGEING TEST.
9. THE CABLE TERMINAL SHALL BE USED FOR CRIMPING ON 1.5mm ELASTOMERIC CABLES (CONDUCTOR DIA 1.4mm OVERALL DIA ON INSULATION 4.5mm).

SEE SHEET NO.17

SPECIFICATION FOR CABLE TERMINALS & SLEEVES

DY. CEE.(D)

Approved by (for Engineer)
Chief Electrical Engineer
CHITTARANJAN LOCOMOTIVE WORKS
WEST BENGAL 713331
Spec/NO. CLW/ES/SR/10/S-20/[illegible]
Spec/DATE : 15-10-93 A



CABLE TERMINALS

TYPE- 17B, 18B, 19B & 20B

FOR THIN WALLED CABLES

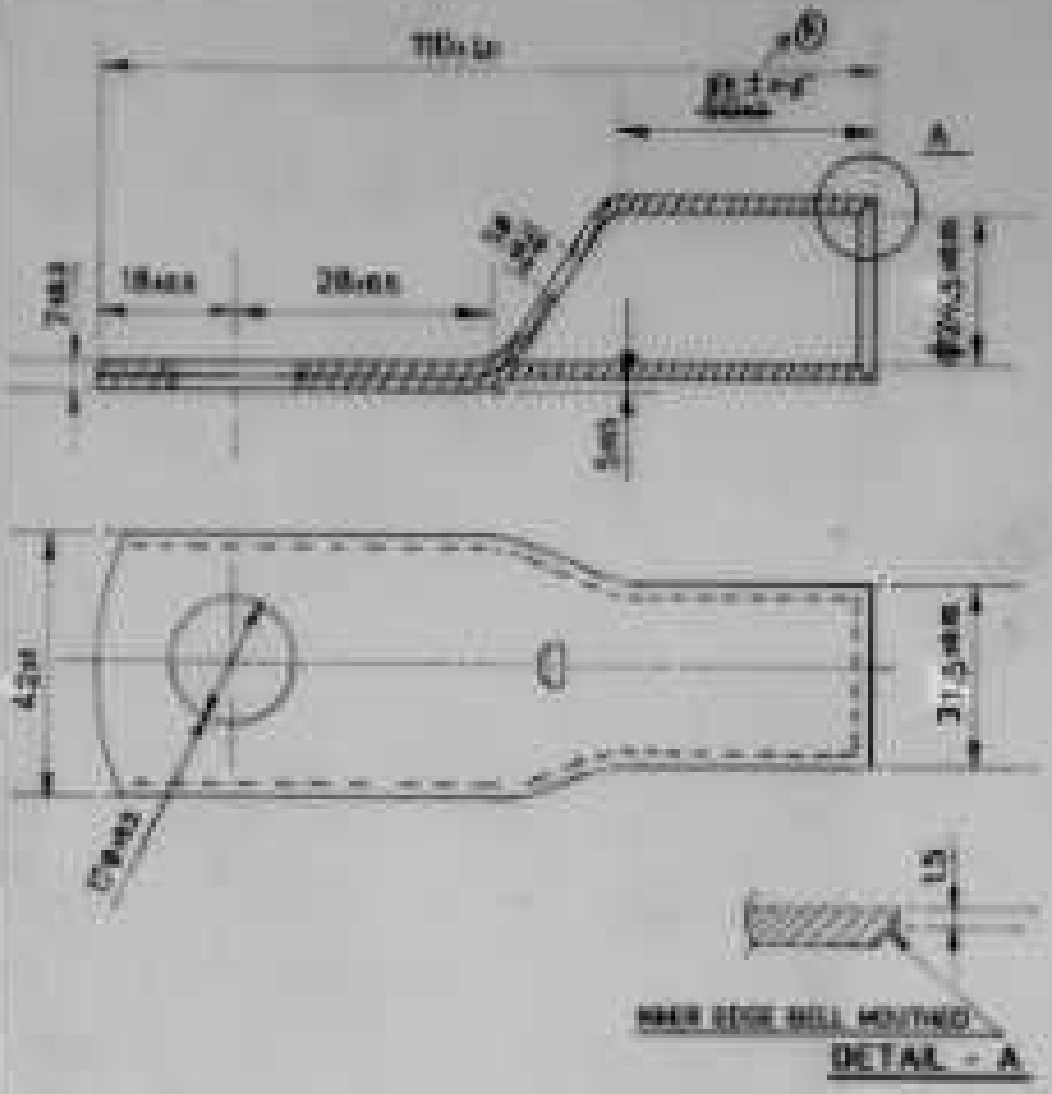
SIZE mm²	TYPE	DIMENSIONS				
		n	d ±0.2	D ±0.3	L ±1	W
3.5	17B	10	6.2	5	29	9
2.5	18B	8	5.2	4	26	7
3.5	19B	8	4.2	4	26	7
3.5	20B	7	3.2	3	26	6

NOTE:

1. ALL DIMENSIONS ARE IN mm
2. THE CABLE TERMINAL SHALL BE MANUFACTURED OUT OF FULLY ANNEALED ELECTROLYTIC COPPER SHEETS & ELECTRO-TINNED AFTER FORMATION.
3. PVC YELLOW NON-INFLAMABLE SLEEVE (WITH COPPER SLEEVE REINFORCEMENT) SHALL BE PROVIDED AS PRE-INSULATION.
4. BRAZING BY SILVER ALLOY TO ELIMINATE BA CUP S ON THE CUT.
5. ELECTROLYTIC COPPER SLEEVE (UNTINNED/TINNED OF NOMINAL THICKNESS OF 0.35mm) SHALL BE PROVIDED INSIDE PVC SLEEVE.
6. THE TENDERERS SHALL RECOMMEND SUITABLE CRIMPING TOOL FOR CRIMPING CABLE CORE & INSULATION IN ONE OPERATION (FOR DETAILS OF CABLES SEE NOTE NO 8).
7. TOLERANCE ON DIMENSIONS WHERE EVER NOT SPECIFIED SHALL BE CONSIDERED AS ±0.5.
8. PVC SLEEVE SHALL NOT DEVELOP CRACKS DURING CRIMPING AND AFTER SIMULATING AGEING TEST.
9. THE CABLE TERMINAL SHALL BE USED FOR CRIMPING ON 3 mm ELASTOMERIC CABLES (CONDUCTOR DIA 2.4 mm) OVERALL DIA. ON INSULATION 5.5mm.

SEE SHEET NO 18

SPECIFICATION FOR CABLE TERMINALS & SLEEVES	[illegible] DY. CEE.(D)	[illegible] CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL INDIA. [illegible]/NO. CLW/ES/SK-S/S-28/[illegible] [illegible]/DATE : 11-03-02

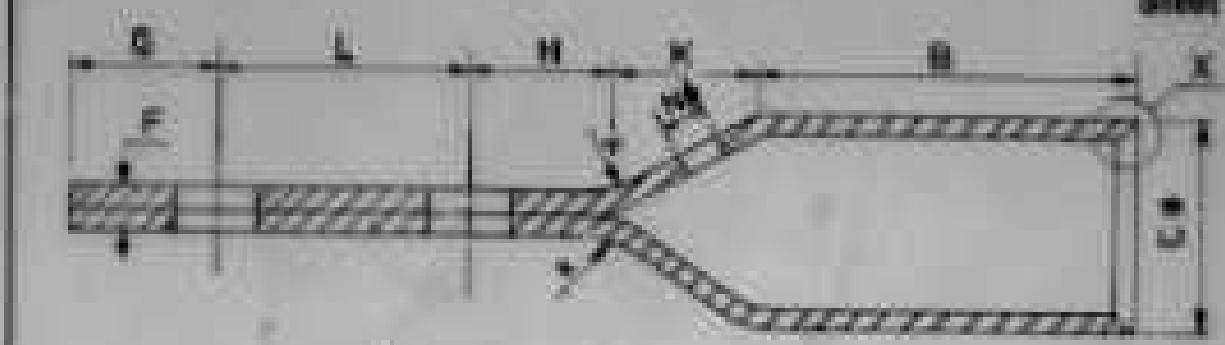


DETAIL - A

CABLE TERMINAL TYPE - 22(300 mm²)

FOR THIN WALLED CABLES

SPECIFICATION FOR CABLE TERMINALS & SLEEVES		Design to (per design) CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA spec.NO. CLW/ES/SK-4/S-25/Fd H from DATE : 17-03-02



CABLE TERMINAL TYPE - 3 & 25A

FOR THIN WALLED CABLES

INNER EDGE BELL MOUTHED

DETAIL - 'X'

SIZE mm²	TYPE	DIMENSIONS IN MM												REMARKS
		A ±0.13	B ±0.4	C ±0.13	D ±0.8	E ±0.5	F ±0.3	G ±0.8	H ±0.8	J ±0.8	K ±0.8	L ±0.8	X ±0.2	
170	3	26	56	32	10	11	8	18	24	142	12	36	5	SEE NOTE 1 BELOW
300	25A	24.5	56	30.5	10	11	8	18	24	142	12	36	5	

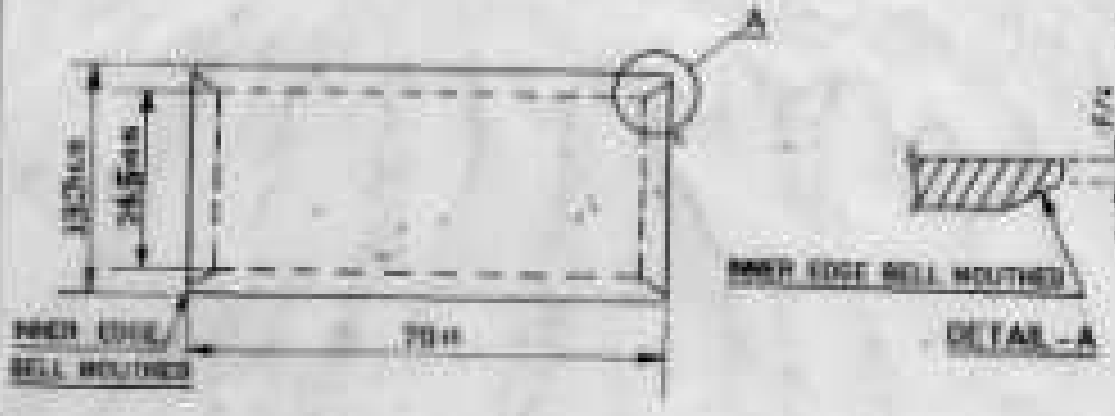
NOTE

1. DIMENSION A SHOULD BE GREATER THAN 'B'

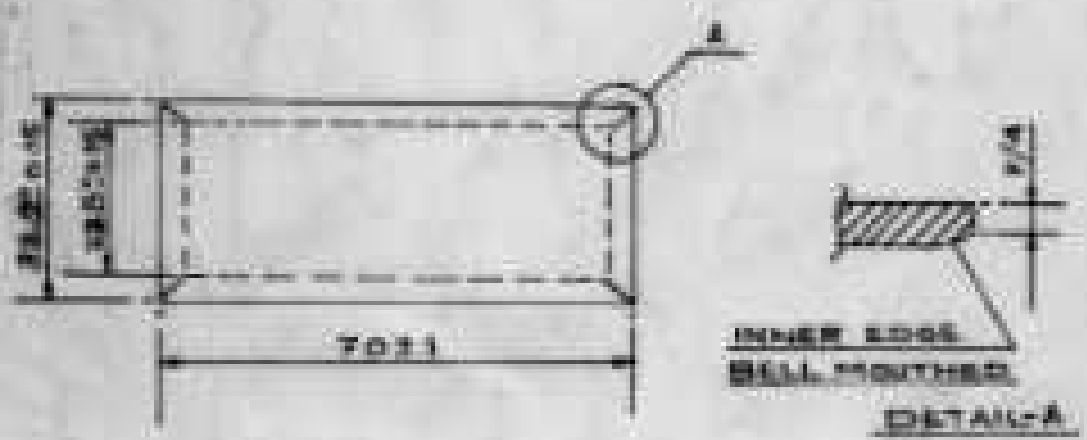
2. TYPE 25A OF 300 mm² IS ONLY FOR HITACHI TRACTION MOTOR & TYPE 3 OF 275 mm² IS ONLY FOR TAO 659 MOTOR.

SEE SHEET NO 2/2

SPECIFICATION FOR CABLE TERMINALS & SLEEVES		Diesel Loco Works, DIESEL LOCO MODERNISATION WORKS, CHITTARANJAN LOCOMOTIVE WORKS, PIN 713331, INDIA. DRG/NO: CLW/ES/TA-3/1-25/2 of 2 DRW/DATE: 11-03-02
	Yd.g/Sh.n. (with) DY. CEE.(D)	



CABLE SLEEVE FOR TERMINALS OF
TRACTION MOTOR, TYPE - 23B
FOR THIN WALLED CABLES



CABLE SLEEVE FOR TERMINALS
OF TRACTION MOTOR SEALING TYPE
TYPE - 23S, FOR 240 SQMM
THIN WALLED CABLE

SHEET END

SPECIFICATION FOR CABLE TERMINALS & SLEEVES		PREPD BY (DY. CEE.(D)) CHITTARANJAN LOCOMOTIVE WORKS WEST BENGAL, INDIA SPEC.NO CLW/ES/TSK-2/16-25 (F) type/DATE 11-03-02