

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm.)

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

E 8601290 VAR.00  
REF. DRG. NO.

SIGN. & DATE

INVENTORY No.

0100 3 50 885 3 0N 9N1W1R0D / 2b 12915

TABLE-1	
VAR.	EMBOSSING DETAIL (PICK-UP VALUE/RATING)
00	55/110
01	55/110
02	-
03	24/27
04	48/72

- NOTE :-
- MARKING IN LINE WITH PURCHASE SPECIFICATION CEE/TC/PC/853227 AND STYLE CODE NO. TO BE SCREEN PRINTED IN WHITE COLOUR AT THE PLACE SHOWN THUS \*.
  - FOR TESTS AND QUALITY CONTROL CHECKS, REFER PURCHASE SPEC. AND DRG. NO. 25890230036 FOR INTERNAL INSPECTION AT B.H.E.L.
  - ALL UNSPECIFIED RADII ARE TO BE 1.
  - E.S. NO., EMBOSSING DETAIL AS PER TABLE-1 AND SUPPLIER'S MONOGRAM TO BE EMBOSSED AT THE PLACE SHOWN THUS ★. LETTER HEIGHT TO BE 3mm.

EXAMPLE :-

ES 851023	SUPPLIER'S
55/110	MONOGRAM

FINISH :- GLOSSY.

001	-	-	-	-			007	COIL		ES 851215						
-	001	-	-	-			006	COIL		ES 851212						
-	-	001	-	-			005	COIL		ES 851183						
-	-	-	001	-			004	COIL		ES 851131						
-	-	-	-	001			003	COIL		ES 851023						
002	002	002	002	002			002	TERMINAL		4 583 13 3 0009	001					
001	001	001	001	001			001	BOBBIN		4 588 05 3 0018	001					
VAR.04	VAR.03	VAR.02	VAR.01	VAR. 00	REMARKS	VAR NO.	ITEM NO.	DESCRIPTION	STD.	DRAWING NO.	IT. NO.	MATL. CODE.	A C	UNIT	UNIT WT.	5
											VAR	MATL. SPCN.			QTY.	5

R/81/82

COMPUTER FILE  
35880530010SH01

ADDITIONAL INFORMATION	
STATUS OF DRAWING	M
DISTRIBUTION OF PRINTS	
O/C - 1	TCX(SWM) - 1
SWM - 4	

उत्पाद का प्रकार या ग्राहक/परियोजना का नाम		D.E. LOCO & AC/DC EMU	
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		INDIAN RAILWAYS	
बी.सच.ई.सल.	भारत हेवी इलेक्ट्रिकल्स लिमिटेड	बनारास DRN.	नाम /NAME
भोपाल		जॉयंका CKD.	P.K.S
BHEL	BHARAT HEAVY ELECTRICALS LTD.	स्वीकृत APD.	I.S.R
BHOPAL			Sd/-
			21.09.82
			24.09.82
			13.10.82
			04

REV	DATE	ALTERED	D.P.V.	Sd/-	REV	DATE	ALTERED	M. PRASAD	REV	DATE	ALTERED	R.C.BHOPLE		
06	30.11.06	CHECKED	A.S.A.	Sd/-	05	19.03.98	CHECKED	A.S.A.	04	01.08.96	CHECKED	A.S.A.		
		APPROVED	A.D.	Sd/-			APPROVED	R.ALI			APPROVED	S.K.R.		
TABLE-1 ADDED. NOTES MODIFIED. DRG. COMPUTERISED. SHT. 02 ADDED.					VAR.04 FOR COIL TO ES 851215 ADDED. STYLE NO. FOR VARS 00 TO 04 ADDED.					NEW ORIGINAL MADE. VAR.03 ADDED.				
F933					F130					E726				
विभाग DEPT. CEE													कोड CODE. 407	
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INDIAN RAILWAYS													INDIAN RAILWAYS	
बी.सच.ई.सल.													भारत हेवी इलेक्ट्रिकल्स लिमिटेड	
भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
शीर्षक/TITLE													OPERATING COIL (FOR MAGNET VALVE)	
उत्पाद का प्रकार या ग्राहक/परियोजना का नाम													उत्पाद का प्रकार या ग्राहक/परियोजना का नाम	
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बी.सच.ई.सल.													भारत हेवी इलेक्ट्रिकल्स लिमिटेड	
भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
शीर्षक/TITLE													OPERATING COIL (FOR MAGNET VALVE)	
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भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
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बी.सच.ई.सल.													भारत हेवी इलेक्ट्रिकल्स लिमिटेड	
भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
शीर्षक/TITLE													OPERATING COIL (FOR MAGNET VALVE)	
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भोपाल													भोपाल	
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BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
शीर्षक/TITLE													OPERATING COIL (FOR MAGNET VALVE)	
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INDIAN RAILWAYS													INDIAN RAILWAYS	
बी.सच.ई.सल.													भारत हेवी इलेक्ट्रिकल्स लिमिटेड	
भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
शीर्षक/TITLE													OPERATING COIL (FOR MAGNET VALVE)	
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भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
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भोपाल													भोपाल	
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BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
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भोपाल													भोपाल	
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BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
शीर्षक/TITLE													OPERATING COIL (FOR MAGNET VALVE)	
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INDIAN RAILWAYS													INDIAN RAILWAYS	
बी.सच.ई.सल.													भारत हेवी इलेक्ट्रिकल्स लिमिटेड	
भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
शीर्षक/TITLE													OPERATING COIL (FOR MAGNET VALVE)	
उत्पाद का प्रकार या ग्राहक/परियोजना का नाम													उत्पाद का प्रकार या ग्राहक/परियोजना का नाम	
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बी.सच.ई.सल.													भारत हेवी इलेक्ट्रिकल्स लिमिटेड	
भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
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भोपाल													भोपाल	
BHEL													BHARAT HEAVY ELECTRICALS LTD.	
BHOPAL													BHOPAL	
विभाग DEPT. CEE													कोड CODE. 407	
शीर्षक/TITLE													OPERATING COIL (FOR MAGNET VALVE)	
उत्पाद का प्रकार या ग्राहक/परियोजना का नाम													उत्पाद का प्रकार या ग्राहक/परियोजना का नाम	
TYPE														

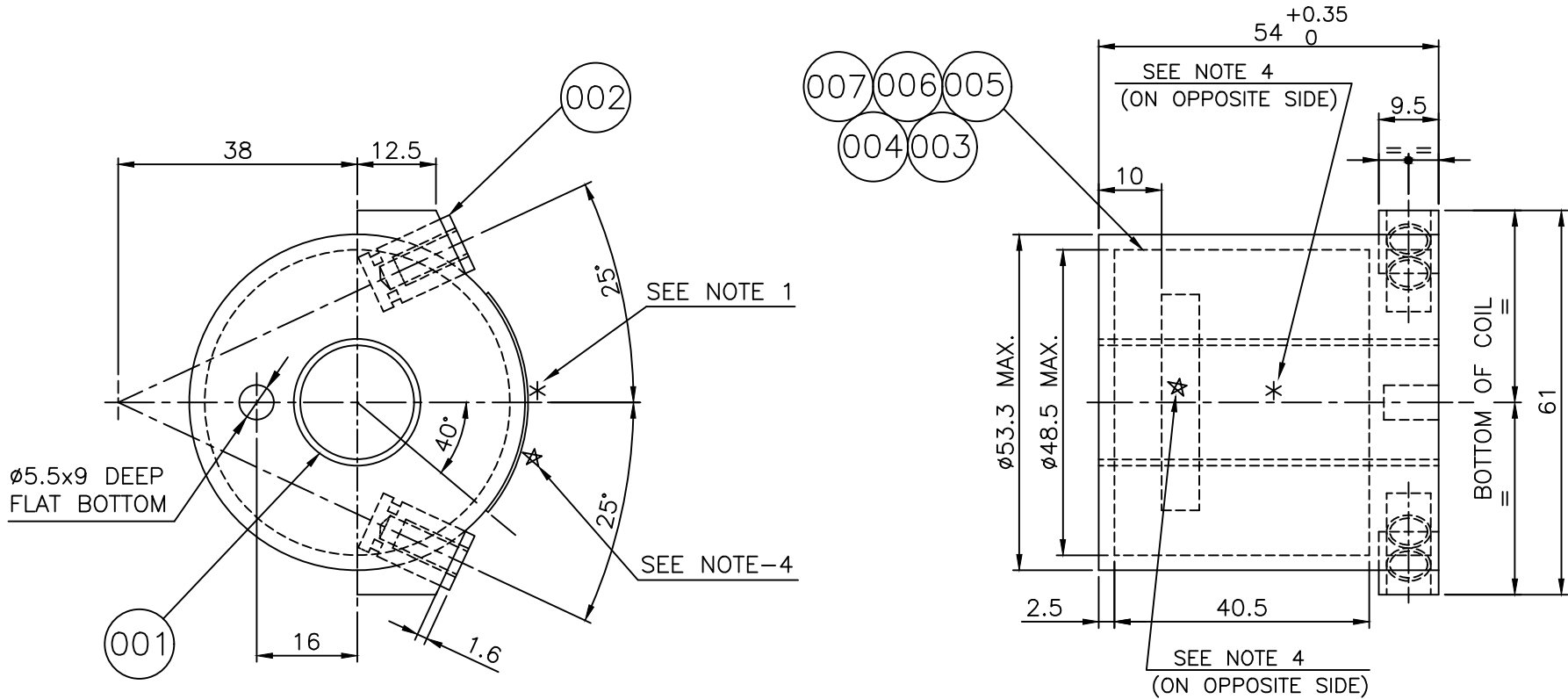
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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

E 8601290 VAR.00  
REF. DRG. NO.

SIGN. & DATE

INVENTORY No.

0100 3 50 885 3 588 05 3 0010


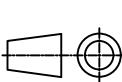


STYLE LIST				
STYLE CODE NO.	VAR	DESCRIPTION OR REMARKS	RECORDED	
			SIGN.	DATE
BP 9048586054	00	OPERATING COIL	M.P.	27.3.98
BP 9048582822	01	OPERATING COIL	M.P.	27.3.98
BP 9048610885	02	OPERATING COIL	M.P.	27.3.98
BP 9048563291	03	OPERATING COIL	M.P.	27.3.98
BP 9048563305	04	OPERATING COIL	M.P.	27.3.98

R/81/82

COMPUTER FILE  
35880530010SH02

ADDITIONAL INFORMATION				
STATUS OF DRAWING M				
DISTRIBUTION OF PRINTS				
OFFICE COPY - 1				
SWM - 4 TCX (SWM) - 1				

उत्पाद का प्रकार या ग्राहक/परियोजना का नाम				D.E. LOCO & AC/DC EMU				
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT				INDIAN RAILWAYS				
<div>बी.एच.ई.एल. </div>	भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल			बनाया DRN.	नाम /NAME	हस्ता/SIGN.	दि./DATE	चैरि की संख्या NO. OF VAR.  04
	BHARAT HEAVY ELECTRICALS LTD. BHPAL			जाँचा CKD.	A.S.A.	Sd/-	30.11.06	
				स्वीकृत APPD.	A.D.	Sd/-	30.11.06	
विभाग DEPT. CEE	अनु.टोल.नाप की श्रेणी UNTOL. DIMS. GR.		अनुपात SCALE	भार कि.ग्रा. WEIGHT (K.G.)	उत्से. ड्राईंग का संदर्भ REF. TO ASSY.		मद संख्या ITEM NO.	मद संख्या NO. OF ITEM
कोड CODE. 407	REF CG 06503		1:1		VAR.01 - 15880530003 VAR.00 - 15831030015		012 005	007
शीर्षक/TITLE					ड्राईंग क्र./DRAWING NO.			पुन./REV.
OPERATING COIL (FOR MAGNET VALVE)					3 588 05 3 0010			06
					शीट क्र /SHT.NO 02		शीटों की सं./NO.OF.SHT. 02	

F933

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm.)

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E820326/REV.5  
REF. DRG. NO.

SIGN. & DATE

INVENTORY No.

10211 01 584 10 11201  
DRAWING NO./क. /ड्राइंग नं.

SEE LABEL MARKING ON COILS  
AS PER POINT 5 OF PS CEE/TC/PC/853227

NOTE:- 1. COIL SHALL BE MANUFACTURED AS PER PURCHASE SPECIFICATION NO. CEE/TC/PC/853227  
2. FOR COIL SPECIFICATION AND DIMENSION DETAILS REF SHT.02.  
3. VAR 00 FOR MT-AL, VAR 01 FOR MT-AM AND VAR 02 FOR MT-AQ.  
4. TOLERANCE ON ALL DIM  $\pm 0.25$  EXCEPT DIM C.  
5. FOR QUALITY CONTROL CHECKS REFER DRG. NO. 25890230036.  
6. LABEL MARKING ON COILS SHOULD BE NEAR TO COIL TERMINAL FOR ENHANCE VISIBILITY.

002	002	002			008	WASHER MCD 5.3 - ST			AA7161001030				
002	002	002			007	WASHER SPG SC A5 - ST			AA7164001030				
002	002	002			006	SCRU HEX SLT PM5X10 - 4.8			BP7121105926				
002	002	002	ST.854933		005	TERMINAL	3 588 05 30005	00					
001	-	-			004	TUBE,EPOXY GLASS MAT. LAMINATED SHT. (MT-AQ.)			BP 22494				
-	001	-			003	TUBE EPOXY GLASS MAT. LAMINATED SHT. FOR (MT-AM)			BP 22494				
-	-	001			002	TUBE EPOXY GLASS MAT. LAMINATED SHT. FOR (MT-AL)			BP 22494				
001	001	001			001	COIL-POTTED							
VAR. 02	VAR. 01	VAR. 00	REMARKS	VAR NO.	ITEM NO.	DESCRIPTION	STD.	DRAWING NO.	IT. NO.	MATL. CODE.	A/C	UNIT	UNIT WT.
									VAR	MATL. SPCN.			QTY.

COMPUTERISED DRAWING

CKD.	APPD.
NAME VJ.	A.S.A.
SIGN.	
DATE 24.01.14	24.01.14

DISTRIBUTION OF PRINTS  
OFFICE COPY -1  
SWGR SHOP B IV -4  
TCX SWM B IV -1

REV 11 30.08.97  
DATE 30.08.97  
ALTERED MUKUND  
CHECKED P.M.D.  
APPROVED D.K.T.

REV 12 19.03.98  
DATE 19.03.98  
ALTERED R.JAIN  
CHECKED P.M.D.  
APPROVED R.C.D.

REV 13 20.07.98  
DATE 20.07.98  
ALTERED R.JAIN  
CHECKED P.M.D.  
APPROVED C.K.S.

P/U VOLTAGE 45 TO 55V WAS  
60 TO 79 FOR SL.NO 012.

LABEL DETAILS 'Y' DELETED.  
SHT.01 & 02 MODIFIED & REDRAWN.  
NOTE 6 ADDED.

(I) SL.NO. 009 COIL ES NO. DELETED.  
(II) SL.NO. 013 COIL B00233  
ADDED.  
(II) REY. FROM NOTE 5 DELETED.

F021

उत्पाद का प्रकार या ग्राहक/परियोजना का नाम  
RELAY  
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT  
TYPE MT-AL,MT-AM,MT-AQ.  
बी.रच.ई.एल. भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल  
BHARAT HEAVY ELECTRICALS LTD. BHOPAL  
विभाग DEPT. CEE अन. टोल. नाप की श्रेणी UNTOL. DIMS. GR. कोड 407 REF CG 06503  
शीर्षक/TITLE  
EPOXY POTTED COIL  
आरेख क. /DRAWING NO.  
3 584 10 11201  
प्रष्ठ क्र./ SHT.NO 01 प्रष्ठों की संख्या/ NO. OF.SHT. 02

नाम/NAME S.THAKARE हस्ता/SIGN. Sd/- दिनांक/DATE 14.12.86 वेरि. की संख्या/NO. OF VAR. 02  
जोधा CKD. S.K.J Sd/- 02.01.87  
अनुमोदित APPD. S.K.J Sd/- 02.01.87  
मद क्र. ITEM NO. मद संख्या/NO. OF ITEM 008  
पुन./REV. 13

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm.)

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

10211 01 485 3 584 10 11201  
DRAWING NO. 3 584 10 11201

WINDING DETAILS					COIL DIMENSIONS											
S.NO.	COIL NO.	E.S. NO.	WIRE DIA BARE	DIA INSULAT.	NO.OF TURNS IN SERIES (APPROX)	A	B	C	D	E	COIL USED ON	WEIGHT OF CPR. BARE	STYLE NO.	OHMIC VALUE 20° C	RATED VOLTAGE	P/U VOLTAGE
001	800472		0.234	0.282	11340	68.3	61	22.6 22.8	11	30.5	MTAL/BC	0.55 KG.	BP-9048052041	574 ~ ±5%	110VDC	50 TO 55 V
002	800473		0.152	0.190	25420	68.3	61	22.6 22.8	11	30.5	MTAL/BC	0.52 KG.	BP-9048052025	3036 ~	240VDC	115 TO 120 V
003	800479		0.224	0.272	11284	68.3	61	22.6 22.8	11	30.5	MTAL/BC	0.486 KG.	BP-9048052017	607 ~	120VDC	50 TO 73 V
004	800477		0.193	0.236	15500	68.3	61	22.6 22.8	11	30.5	MTAL/BC	0.50 KG.	BP-9048052033	1131 ~	135VDC	65 TO 70 V
005	800505		0.417	0.483	1764	68.3	61	38.5 38.7	11	30.5	MTAM/BD	0.321 KG.	BP-9048099706	33.3 ~	24VDC	17 TO 22 V
006	800506		0.254	0.305	3168	68.3	61	38.5 38.7	11	30.5	MTAM/BD	0.206 KG.	BP-9048100917	154.4 ~	48VDC	44 TO 48 V
007	800507		0.200	0.245	7440	68.3	61	38.5 38.7	11	30.5	MTAM/BD	0.317 KG.	BP-9048052050	621 ~	110VDC	80 TO 91 V
008	800508		0.125	0.159	13020	68.3	61	38.5 38.7	11	30.5	MTAM/BD	0.207 KG.	BP-9048052068	2665 ~	230VDC	200 TO 205 V
009	800235		0.234	0.282	5200	68.3	61	38.5 38.7	11	30.5	MTAM/BD	0.300 KG.	BP-9048099200	313.7 ~	78VDC	60 TO 72 V
010	800525		0.203	0.249	12276	79.4	83.5	54.4 54.6	11	44	MT-AQ	0.754 KG.	BP-9048052092	1385.2 ~	200VDC	115 TO 155 V
011	800524		0.183	0.226	14880	79.4	83.5	54.4 54.6	11	44	MT-AQ	0.741 KG.	BP-9048052084	2070 ~	230VDC	140 TO 191 V
012	800523		0.284	0.338	6560	79.4	83.5	54.4 54.6	11	44	MT-AQ	0.787 KG.	BP-9048052076	376.9 ~	110VDC	45 TO 55 V
013	800233		0.315	0.371	2400	68.3	61	38.5 38.7	11	30.5	MTAM/BD	0.243 KG.	BP-9048021278	77.2 ~	44VDC	30 TO 38 V

NOTE:- 1. REF.SHEET 01 FOR BILL OF MATERIAL AND DRG. DETAILS.

COMPUTERISED DRAWING			ADDITIONAL INFORMATION			RELAY									
	CKD.	APPD.	STATUS OF DRAWING			TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT									
NAME	VJ.	A.S.A.	M			BHARAT HEAVY ELECTRICALS LTD. BHOPAL									
SIGN.			DISTRIBUTION OF PRINTS			Bharat Heavy Electricals Ltd. Bhopal									
DATE	24.01.14	24.01.14	OFFICE COPY 1			Bharat Heavy Electricals Ltd. Bhopal									
			SWM 4			Bharat Heavy Electricals Ltd. Bhopal									
			TCX (SWM) 1			Bharat Heavy Electricals Ltd. Bhopal									
REV 13	DATE 20.07.98	ALTERED R.JAIN Sd/- CHECKED PMD Sd/- APPROVED C.K.S. Sd/-	REV 12	DATE 19.03.98	ALTERED R.JAIN Sd/- CHECKED P.M.D. Sd/- APPROVED I.S.R. Sd/-	REV 11	DATE 30.08.97	ALTERED M.S.J. Sd/- CHECKED P.M.D. Sd/- APPROVED P.M.D. Sd/-	Bharat Heavy Electricals Ltd. Bhopal						
P/U VOLTAGE 45 TO 55 WAS 60 TO 79 FOR SL. NO. 012.			DRG. REDRAWN & MODIFIED. LABEL DATAIL 'V' DELETED.			(I) SL.NO. 009 COIL ES NO. DELETED. (II) SL.NO. 013 COIL ES NO. 800233 ADDED. REY. FROM NOTE 5 DELETED.			Bharat Heavy Electricals Ltd. Bhopal						
INVENTORY No.			SIGN. & DATE			REF. DRG. NO.			Bharat Heavy Electricals Ltd. Bhopal						

उत्पाद का प्रकार या ग्राहक/परियोजना का नाम

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

RELAY TYPE MT-AL, MT-AM, MT-AQ. MT-BC,MT-BD.

बनाया DRN. S.T.

हस्ता/SIGN. Sd/-

दिनांक/DATE 27.12.86

वेरि की संख्या NO. OF VAR. —

अनुमोदित APPD.

विभाग DEPT. CEE

अन. टोल. नाप की श्रेणी UNTOL. DIMS. GR.

कोड CODE. 407

REF CG 06503

अनुपात SCALE N.T.S.

भार कि.ग्रा. WEIGHT (K.G.) —

असे. डाइंग क. संदर्भ REF. TO ASSY. —

मद क. ITEM NO. —

मद. संख्या NO. OF ITEM 008

आरेख क्र./DRAWING NO. 3 584 10 11201

प्रष्ठ क्र./ SHT.NO 02

प्रष्ठों की संख्या/ NO. OF.SHT. 02

पुन./REV. 13

76.5



शीट क्र /SHT.NO 01 शीटों की सं/NO.OF.SHT. 01

6100 2 90 889 2 'ON 9NIMVAD/20 1295

## STYLE LIST

STYLE CODE NO.	VAR	DESCRIPTION OR REMARKS	RECORDED	
			SIGN.	DATE
BP 9048564891	00	OPERATING COIL	V.JHON	14.06.04
BP 9048564905	01	OPERATING COIL	V.JHON	14.06.04
BP 9048564913	02	OPERATING COIL	V.JHON	14.06.04
BP 9048570905	03	OPERATING COIL	R.Jain	30-01-07

- NOTE :-**
1. MARKING IN LINE WITH PURCHASE SPECIFICATION CEE/TC/PC/853227 AND STYLE CODE NO. TO BE SCREEN PRINTED IN WHITE COLOUR AT THE PLACE SHOWN THUS \*.
  2. FOR TESTS AND QUALITY CONTROL CHECKS, REFER PURCHASE SPEC. AND DRG. NO. 25890230036 FOR INTERNAL INSPECTION AT B.H.E.L.
  3. ALL UNSPECIFIED RADII ARE TO BE 1.
  4. DIM.46.8-0.5 IS CRITICAL TO QUALITY.
  5. E.S. NO., EMBOSING DETAIL AS PER TABLE-1 AND SUPPLIER'S MONOGRAM TO BE EMBOSSED AT THE PLACE SHOWN THUS \*. LETTER HEIGHT TO BE 3mm.

EXAMPLE :- ES 851028  
48/72  
SUPPLIER'S  
MONOGRAM

**FINISH :- GLOSSY.**

TABLE-1

VAR.	EMBOSSING DETAIL (PICK-UP VALUE/RATING)
00	48/72
01	55/110
02	24/27
03	36/36

001	-	-	-			009	COIL		ES 851216										
-	001	-	-			008	COIL		ES 851209										
-	-	001	-			007	COIL		ES 851137										
002	002	002	002			006	WASHER SPG SC A5-ST	1				AA 7164001030							
004	004	004	004			005	WASHER MCD 5.3-ST	1				AA 7161001030							
002	002	002	002			004	SCRU HEX SLT.A M5X10-4.8	2				BP 7121105926							
-	-	-	001			003	COIL		ES 851028										
002	002	002	002			002	TERMINAL		3 588 05 3 0005			00							
001	001	001	001			001	BOBBIN		4 588 05 3 0032			001							
VAR.03	VAR.02	VAR.01	VAR. 00	REMARKS	VAR NO.	ITEM NO.	DESCRIPTION	STD.	DRAWING NO.	IT. NO.	MATL. CODE.	A	UNIT	UNIT WT.	CS.				
										VAR	MATL. SPCN.	C		QTY.					

REV. DATE ALT R.Jain  
09 30-1-07 CKD A.S.A.  
APPD

VAR-03 AND ITEM 009  
ADDED.

COMPUTER FILE  
35880530019SHD1

## ADDITIONAL INFORMATION

STATUS OF DRAWING M

DISTRIBUTION OF PRINTS  
O/C - 1 TCX(SWM) - 1  
SWM - 4

उत्पाद का प्रकार या  
प्रकार/परिवर्तन का नाम

TYPE OF PRODUCT OR  
NAME OF CUSTOMER/PROJECT

D. E. LOCO & AC/DC EMUS  
INDIAN RAILWAYS



भारत हेवी इलेक्ट्रिकल्स लिमिटेड  
भोपाल  
BHARAT HEAVY ELECTRICALS LTD.  
BHOPAL

क्रमांक DRN.	नाम /NAME	हस्ता/ SIGN.	दि./DATE	पिं की संख्या NO. OF VAR.
P.K.S		Sd/-	03.08.82	
I.S.R		Sd/-	10.08.82	
C.K.S		Sd/-	21.08.82	03

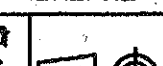
REV. DATE ALTERED DpV/Shivakumar  
08 30-11-06 CHECKED  
APPROVED

REV. DATE ALTERED V.JHON  
07 14.06.04 CHECKED A.S.A.  
APPROVED S.K.R

REV. DATE ALTERED R.C.B  
06 27.07.96 CHECKED A.S.A.  
APPROVED S.K.R

विभाग  
DEPT. CEE  
कोड  
CODE 407

उत्प. टोल. माप की त्रुटि  
UNTOL. DIMS. GR.



उत्पात  
SCALE

भारत की मा.  
WEIGHT (K.G.)

उत्प. ड्राइंग का संदर्भ  
REF. TO ASSY.  
VAR.00 -25880530001  
VAR.01  
सद संख्या  
ITEM NO.  
007  
019  
सद संख्या  
NO. OF  
ITEM  
009

TABLE-1 ADDED.  
NOTES MODIFIED.  
DRG. COMPUTERISED.  
SHT.02 ADDED.

DIM 46.8-0.5 WAS 46.8.  
NOTE-6 ADDED.  
DRG. RETRACED.  
STYLE LIST ADDED. MATL. CODE OF  
IT.006 ADDED.

VAR. 02 ADDED.  
NEW ORIGINAL MADE.

शीर्षक/TITLE

OPERATING COIL  
(MAGNET VALVE)

ड्राइंग क्र./DRAWING NO.

3 588 05 3 0019

शीट क्र./SHT.NO 01 शीटों की सं./NO.OF.SHT. 02

F932

E726



1474539/2023/HEP-SWM20915

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm.)

6100 3 50 885 3 588 05 3 0019

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED.  
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.E 8601286  
REF. DRG. NO. C114

SIGN. &amp; DATE

INVENTORY No.

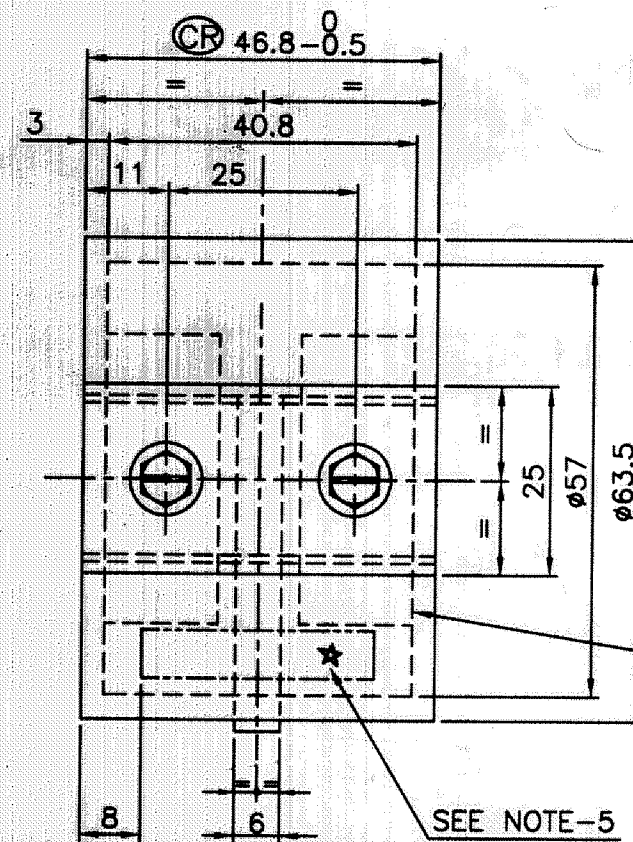
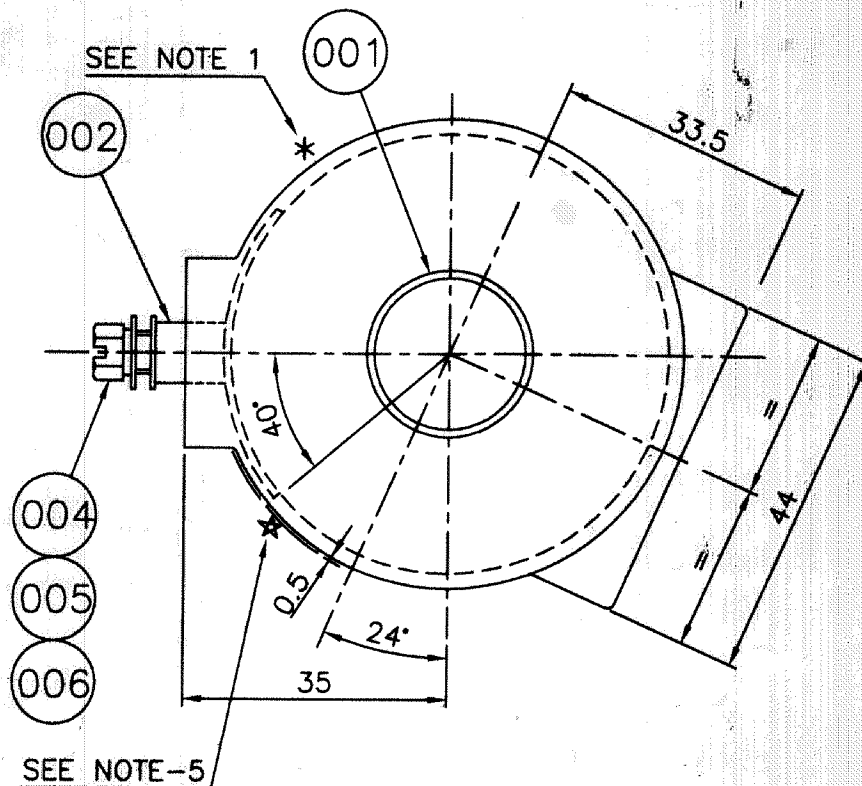
REV	DATE	ALTERED CHECKED APPROVED	REV	DATE	ALTERED CHECKED APPROVED
09	30-11-07	<i>R. Jain</i>	08	30-11-06	<i>DP Vishwakarma</i>
VAR. 03 AND ITEM 009 ADDED.			TABLE-1 ADDED. NOTES MODIFIED. DRG. COMPUTERISED. SHT.02 ADDED.		

COMPUTER FILE  
35880530019SH02

ADDITIONAL INFORMATION		STATUS OF DRAWING M		DISTRIBUTION OF PRINTS OFFICE COPY - 1 SWM - 4 TCX (SWM) - 1		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT D.E.LOCO INDIAN RAILWAYS <b>वी.एस.ई.एल. भारत हेवी इलेक्ट्रिकल्स लिमिटेड</b> <b>भोपाल</b> <b>BHARAT HEAVY ELECTRICALS LTD.</b> <b>BHOPAL</b>		खलावा DRN. DPV	जाम /NAME ASA	हस्ता/SIGN. <i>DP Vishwakarma</i>	दि./DATE 30-11-06	पेरि की संख्या NO. OF VAR. 03
विभाग DEPT. CEE		उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.		उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.		उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.		भार कि. ग्रा. WEIGHT (K.G.)	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.
कोड CODE 007		REF CG 06503		REF CG 06503		REF CG 06503		उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.
शीट/TITLE		OPERATING COIL (MAGNET VALVE)		OPERATING COIL (MAGNET VALVE)		OPERATING COIL (MAGNET VALVE)		उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.
F932		3 588 05 3 0019		3 588 05 3 0019		3 588 05 3 0019		उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.
शीट नं./SHT.NO 02		शीटों की सं./NO.OF.SHT. 02		शीटों की सं./NO.OF.SHT. 02		शीटों की सं./NO.OF.SHT. 02		उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.	उत्प. टोल. माप की त्रुटि UNTOI. DIMS. GR.

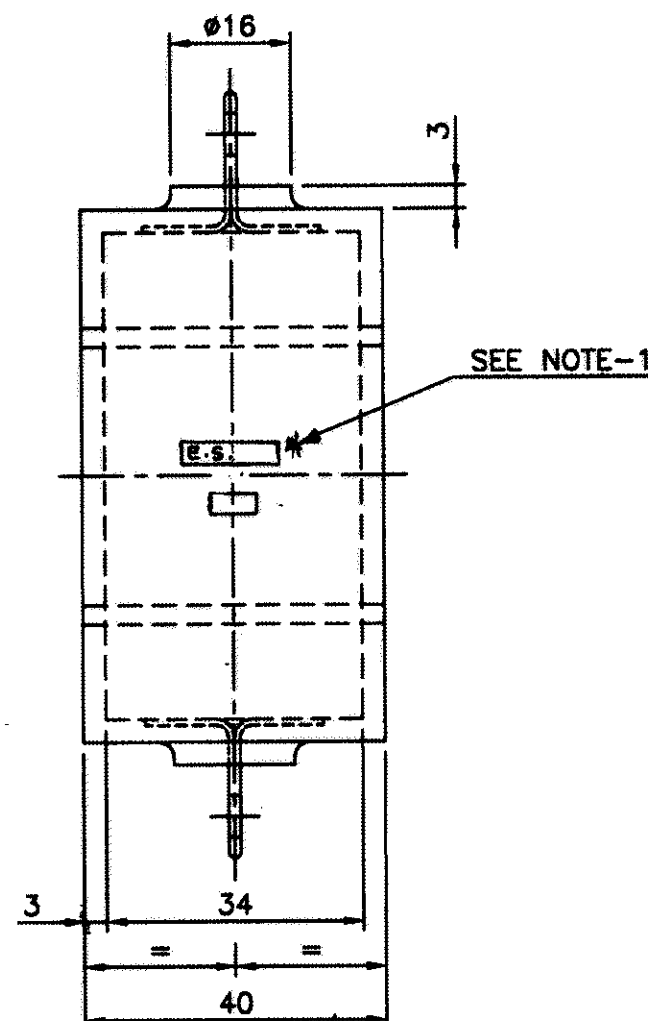
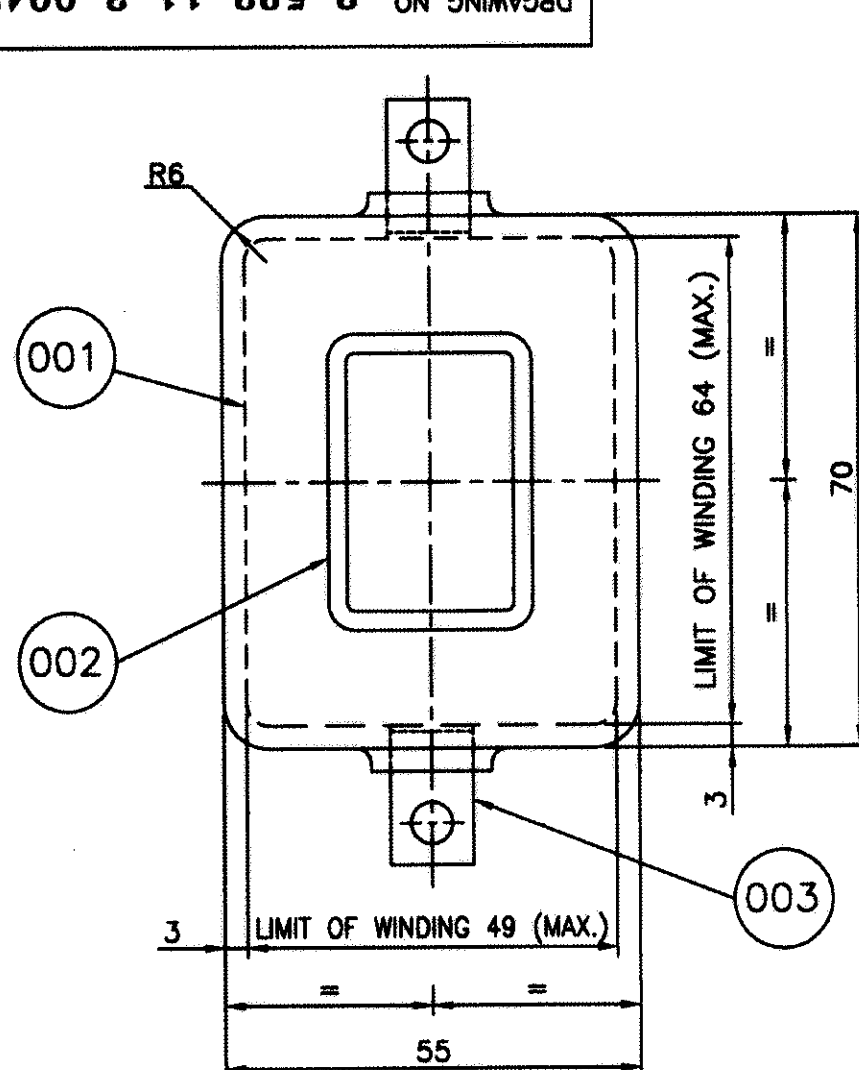
## TOOL LIST

ITEM	TOOL	DESCRIPTION
VAR. 00-03	1489132	MOULDING TOOL FOR POTTED COIL OF MAGNET VALVE



Bharat Heavy Electricals Ltd.




DRAWING NO. 3 583 11 3 0047



NOTE :-

1. MARKING AND EMBOSSING SHOULD BE MADE AS MENTIONED IN E.S., AT THE PLACE MARKED THUS \*. EMBOSSING DETAILS ARE GIVEN IN RESPECTIVE ELEC. SPEC.
2. FOR QUALITY CONTROL CHECKS REFER DRG. NO. 2 589 02 3 0036.

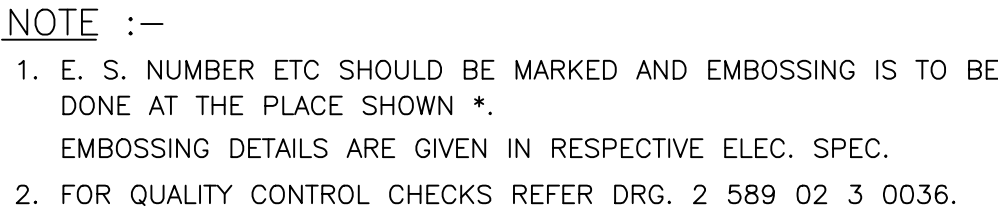
002			003	TERMINAL		4 583 11 3 0036	001				
001			002	TUBE		3-583 11 3 0033	001				
001			001	COIL		E.S. 853215					
VAR. 00	REMARKS	VAR NO.	ITEM NO.	DESCRIPTION	STD.	DRAWING NO.	IT. NO.	MATL. CODE.	A	UNIT	UNIT WT.
							VAR	MATL. SPCN.	C		QTY.

ADDITIONAL INFORMATION			उत्पाद का प्रकार या ग्राहक/परियोजना का नाम		AC EMU (BG) INDIAN RAILWAYS						
STATUS OF DRAWING			TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT								
DISTRIBUTION OF PRINTS			<div>बी.एच.ई.एल. </div> <div>भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल BHARAT HEAVY ELECTRICALS LTD. BHOPAL.</div>		काया DRN.	नाम /NAME	हस्ता/SIGN.	दि./DATE	पेरि की नं. OF		
OFFICE COPY - 1					जॉया C/O	C.K.M.	Sd/-	21.09.85	VAR.		
SWM - 4					स्वयं APPD.	A.S.A.	Sd/-	21.09.85			
TCX (SWM) - 1						V.P.A.	Sd/-	22.09.85	00		
REV	DATE	ALTERED R.C.B. / CHECKED R.K.S. / APPROVED A.G.	विभाग DEPT. CEE	उत्प. एल. नाथ की वेब UNTOI. DMS. GR.		उत्पात SCALE	भारत के रा. WEIGHT (K.G.)	उत्ते. ड्राइंग का संदर्भ REF. TO ASSY.	मद संख्या ITEM NO.	मद संख्या NO. OF ITEM	
02	14.11.08		कोड CODE 407	CG 06503		1:1	-	VAR-00, 15831130027	001	001	
NOTE-1 MODIFIED.			शीर्षक/TITLE <div>TRIP COIL (POTTED)</div> 					ड्राइंग नं./DRGAWING NO. <div>3 583 11 3 0047</div>		पुन./ REV. 02	
								शीट नं./SHT.NO 01		शीटों की सं./NO.OF.SHT. 01	

**KANSARA/BAJ**



INVENTORY NO.

R/ /D0181

०. ०F



# CORPORATE STANDARD

AA7161001

Rev. No. 04

PAGE 1 of 3

## WASHERS, MACHINED, STEEL

### 1 DESIGNATION

A machined washer of size 8.4 mm made of steel shall be designated as:

#### 1.1 On drawings

- i) Material specification column: AA7161001
- ii) Description column: WASHER MCD 8.4-ST

#### 1.2 On indents

Washer Machined 8.4 – Steel: AA7161001

#### 1.3 For issuing enquiries and on purchase orders

While issuing enquiries and purchase orders, delete BHEL standard number from the above description and add the information given under clause 2.

### 2 COMPLIANCE WITH STANDARDS

#### 2.1 Dimensions, Tolerances and General requirements

As per IS: 2016-1967, Table-1

#### 2.2 Material

Steel as stated in IS: 2016

#### 2.3 Finish

Plated as specified in BHEL order.

### 3 NOTE

- 3.1 For machined washers of brass, refer to BHEL standard AA7161002
- 3.2 For machined washers of copper, refer to BHEL standard AA7161004
- 3.3 Washers to this standard would be unplated, divisions wishing to have plated washers would have
- 3.4 For general requirements of washers, refer BHEL standard AA0230408
- 3.5 Weights given in this standard are for general reference only and are not meant for commercial transactions.
- 3.6 When fasteners are to be tested with in BHEL, the following sampling and acceptance plan based on IS: 6821 (Table-2) shall be followed for physical properties.

LOT SIZE	SAMPELE SIZE	ACCEPTANCE NOS.
Up to 1000	5	0
1001-3000	8	0
3003-10000	13	0
10001-35000	20	0
Over 35000	32	1

Revisions: As per clause 29.4 of MOM of WG-F

**APPROVED:**

INTERPLANT MATERIAL RATIONALISATION  
COMMITTEE – MRC (F)

Rev. No. 04

Amd. No.

Reaffirmed

Prepared

Issued

Dt. of 1<sup>st</sup> Issue

Dt: 15-04-2011

Dt:

Year: 2019

HPEP, Hyderabad

Corp. R&D

01-01-1977

AA7161001

Rev. No. 04

PAGE 2 of 3

**CORPORATE STANDARD****4 REFERRED STANDARDS (Latest publications including amendment)**

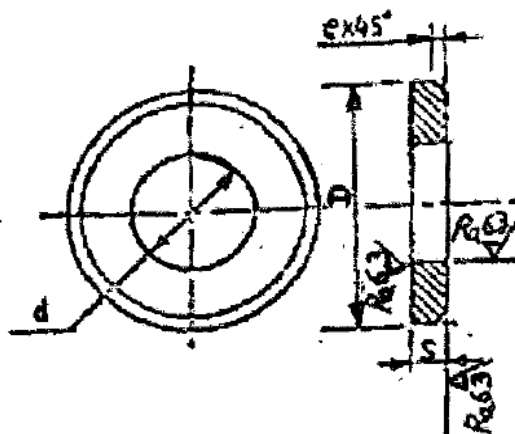
- 1) IS: 6821
- 2) AA0230408
- 3) AA7161002
- 4) AA7161004

**EXPLANATORY NOTE**

This standard was first issued in January 1977. The standard was based on IS:2016-1967 for dimensions, tolerances and general requirements. Subsequently many changes have been agreed upon at International & IPSC level and were reflected in IS: 2016-1967.

There is no change in IS: 2016-1967. This standard has been reviewed and brought up to date.

- Clause 3.6 “Sampling plan” for washers has been modified in line with IS: 6821
- Clause 4.0 has been modified accordingly.



	<b>CORPORATE STANDARD</b>	AA7161001
		Rev. No. 04
		PAGE 3 of 3

Note:

- 1) Corporate sub codes are shown in Table
- 2) Weights have been shown in kg per 1000 Nos.

**Table 1**

All dimensions in mm.

Size Nom. d h12	Outside diameter D		Thickness S		e nom	for bolt or screw size	Sub-code	Weight
	Basic	Tol.	Basic	Tol.				
1.7	4	+0 -0.3	0.3	±0.1	0.1	M1.6		
2.2	5	+0 -0.3	0.3	±0.1	0.1	M2	170	
2.7	6.5	+0 -0.3	0.5	±0.1	0.2	M2.5	161	
3.2	7	+0 -0.3	0.5	±0.1	0.2	M3	013	0.11
4.3	9	+0 -0.3	0.8	±0.1	0.3	M4	021	0.29
5.3	10	+0 -0.3	1	±0.1	0.4	M5	030	0.42
6.4	12.5	+0 -0.4	1.6	±0.2	0.6	M6	048	1.08
8.4	17	+0 -0.4	1.6	±0.2	0.6	M8	056	2.07
10.5	21	+0 -0.5	2	±0.2	0.6	M10	064	3.98
13	24	+0 -0.5	2.5	±0.3	0.6	M12	072	6.16
17	30	+0 -0.5	3	±0.3	0.6	M16	080	11.17
21	37	+0 -0.8	3	±0.3	1	M20	099	16.7
25	44	+0 -0.8	4	±0.3	1	M24	102	31.78
31	56	+0 -1.0	4	±0.3	1	M30	110	52.95
37	66	+0 -1.0	5	±0.6	1.6	M36	129	89.99
43	78	+0 -1.0	7	±1	1.6	M42	137	180.3
50	92	+0 -1.5	8	±1	1.6	M48	145	291.26
58	105	+0 -1.5	9	±1	1.6	M56	188	421.8
66	115	+0 -1.5	9	±1	2	M64	153	486.45

	<b>CORPORATE STANDARD</b>	AA7164001
		Rev. No. 05
		PAGE 1 of 3

## WASHERS, SPRING LOCK, SINGLE COIL, RECTANGULAR SECTION, TYPE - A (WITH BENT ENDS) STEEL

### 1 DESIGNATION

A single coil, rectangular section, spring lock washer, Type-A (with bent ends) for right hand threads, of nominal size 5 mm, and made of steel shall be designated as:

#### 1.1 On Drawings

- i) Material specification column: AA7164001
- ii) Description column: WASHER SPRING LOCK SC A 5-ST

#### 1.2 On Indents

Washer Spring Lock A 5- AA7164001

#### 1.3 For issuing enquiries and on purchase orders

While issuing enquiries and purchase orders, delete the corporate standard No, from the above description and add the information given under clause 2.

### 2 COMPLIANCE WITH STANDARDS

#### 2.1 Dimensions, Tolerances & General Requirements

To IS 3063-1994, Type A (Table-1A) Reaffirmed 2010

#### 2.2 Material

Spring steel Gr. 3 to Gr.6 as specified in IS 4072

#### 2.3 Heat Treatment and Hardness

Spring Lock washer after coiling shall be suitably heat treated, so as to result in the finished washer having a hardness in the range of 430 - 530 HV

#### 2.4 Finish

As specified in BHEL order.

Revisions: As per clause 33.5.a) of MOM of MRC-Fasteners			<b>APPROVED:</b> INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC (F)		
Rev. No. 05	Amd. No.	Reaffirmed	Prepared	Issued	Dt. of 1 <sup>st</sup> Issue
Dt: 14-03-2016	Dt:	Year:	HPEP, Hyderabad	Corp. R&D	01-04-1993



AA7164001

Rev. No. 05

PAGE 2 of 3

**CORPORATE STANDARD****3 NOTE**

- 3.1** For washers spring lock (Type-B) refer corporate standard AA7164002.
- 3.2** Lock washers to this standard would be un-plated, divisions wishing to have plated washers would have to get them plated.
- 3.3** Weights given in this standard are for general reference only and are not meant for commercial transactions.
- 3.4** When the fasteners are to be tested within BHEL, the following sampling plan shall be followed for physical properties.

LOT SIZE	SAMPLE SIZE	ACCEPTANCE No.
Up to 1000	5	0
1001 – 3000	8	0
3001 - 10000	13	0
10000 – 35000	20	0
Over 35000	32	1

**4 Referred Standards (Latest Publications including amendments)**

- 1) AA7164002
- 2) IS 4072

**EXPLANATORY NOTE**

The following changes have been made in this revision:

- Clause 2.1, year of Reaffirmation of **IS** changed as IS 3063-1994, Reaffirmed 2010



## CORPORATE STANDARD

AA7164001

Rev. No. 05

PAGE 3 of 3

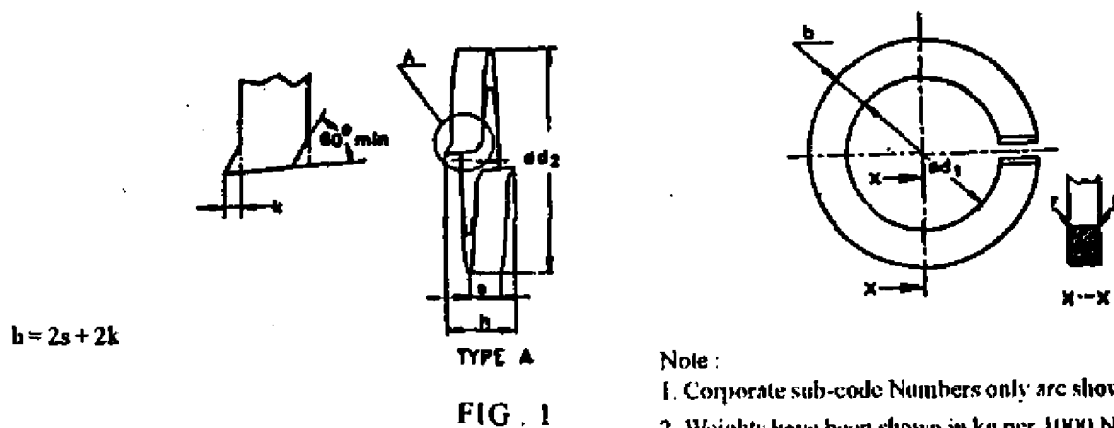


Table 1

All dimensions are in 'mm'

Nom. size	Internal Diameter $d_1$		Outside Dia $d_2$ Max.	Width $b$		Thickness $s$		Radius $r$ Nom.	Bent End $k^*$	For Bolt Nut or Screw Size	Sub code	Weight
	Basic	Tol. +		Basic	Tol. $\pm$	Basic	Tol. $\pm$					
2	2.1	0.3	4.4	0.9	0.1	0.5	0.1	0.1	-	M2		0.033
2.2	2.3	0.3	4.8	1.0	0.1	0.6	0.1	0.1	-	M2.2		0.050
2.5	2.6	0.3	5.1	1.0	0.1	0.6	0.1	0.1	-	M2.5		0.052
3.0	3.1	0.3	6.2	1.3	0.1	0.8	0.1	0.2	0.15	M3	014	0.11
4.0	4.1	0.3	7.6	1.5	0.1	0.9	0.1	0.2	0.15	M4	022	0.18
5.0	5.1	0.3	9.2	1.8	0.1	1.2	0.1	0.2	0.15	M5	030	0.36
6.0	6.1	0.4	11.8	2.5	0.15	1.6	0.1	0.3	0.2	M6	049	0.83
8.0	8.1	0.4	14.8	3.0	0.15	2.0	0.1	0.5	0.3	M8	057	1.60
10.0	10.2	0.5	18.1	3.5	0.2	2.2	0.15	0.5	0.3	M10	065	2.53
12.0	12.2	0.5	21.1	4.0	0.2	2.5	0.15	1.0	0.4	M12	073	3.82
16.0	16.2	0.8	27.4	5.0	0.2	3.5	0.2	1.0	0.4	M16	081	8.91
20.0	20.2	1.0	33.6	6.0	0.2	4.0	0.2	1.0	0.4	M20	090	15.2
24.0	24.5	1.0	40.0	7.0	0.25	5.0	0.2	1.6	0.5	M24	103	26.2
30.0	30.5	1.2	48.2	8.0	0.25	6.0	0.2	1.6	0.8	M30	111	44.3
36.0	36.5	1.2	58.2	10.0	0.25	6.0	0.2	1.6	0.8	M36		67.3
42.0	42.5	1.2	68.2	12.0	0.25	7.0	0.25	2.0	0.8	M42		111
48.0	49.0	1.5	75.0	12.0	0.25	7.0	0.25	2.0	0.8	M48		123
52.0	53.0	1.5	83.0	14.0	0.25	8.0	0.25	2.0	1	M52		182
56.0	57.0	1.5	87.0	14.0	0.25	8.0	0.25	2.0	1	M56		193
60.0	61.0	1.5	91.0	14.0	0.25	8.0	0.25	2.0	1	M60		203
64.0	65.0	1.5	95.0	14.0	0.25	8.0	0.25	2.0	1	M64	120	218

The bend "k" shall be made on the last length of the washer circumference without any sharp angle.



## PLANT PURCHASING SPECIFICATION BHOPAL

BP 22494

REV NO. 08

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SUPERSEDES

BP 22494 Rev 07

### EPDXY GLASS MAT LAMINATED SHEETS & COMPONENTS FIRE RETARDANT

#### 1. GENERAL:

This specification governs the quality of fire retardant epoxy based, press moulded chopped strand Glass Mat Laminated sheets & components. The material has good electrical & fire retardant properties, low water absorption high mechanical strength and the temperature index of at least 155.

#### NOTE :-

Sheets & Components of thickness 6 mm & above are covered in this specification. For lower thicknesses material to BP 22493 shall be used.

#### 2. APPLICATION:

Used for components of control gear etc.

#### 3. COMPLIANCE WITH NATIONAL STANDARDS:

There is no Indian Standard covering this type of material.

#### 4. DIMENSIONS AND TOLERANCES:

- 4.1 Thickness X width X length of the sheet shall be as stated on the order.  
Dimensions of components shall be as per drawing accompanying the order.

#### 4.2 Preferred Thickness

6, 8, 10, 12, 20, 25, 30, 40, 50, 60, 70 mm.

#### NOTE :-

For thickness below 6 mm refer "NOTE" in CI.1 above.

Revision :  
Reviewed & Brought up to date

Issued by :   
STANDARDS AND MATERIALS GROUP  
TECHNICAL SERVICES DEPARTMENT

Rev. 08

Date : 12.03.2022

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## PLANT PURCHASING SPECIFICATION BHOPAL

BP 22494

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### 4.3 Tolerance on nominal thickness:

Nominal Thickness (mm)		Tolerance (± mm)
Above	Up to and including	
-	6	0.6
6	10	0.8
10	20	1.0
20	30	1.2
30	40	1.5
40	50	1.8
50	-	2.1

### 4.4 Tolerance on Width & Length:

Size	Tolerance (±) mm
Below	35
Above	50

### 4.5 Flatness (For sheets 6 mm thick and above)

The flatness of sheets shall be such that when a sheet is placed without restraint on a flat surface, concave side, if present, up departure at any point of the surface from a light straight edge laid in any direction upon it shall not exceed the following:

- a) 1 mm under a 300 mm straight edge
- b) 4 mm under a 600 mm straight edge and
- c) 6 mm under a 1000 mm straight edge

## 5. TEST METHODS :

Unless otherwise specified, the tests shall be conducted in accordance with the relevant methods of Corporate Standard AA 085 1701.

## 6. SAMPLE FOR TEST:

### 6.1 Type Approval :

Three moulded sheets of size 300 x 300 x 6 mm thick shall be submitted for type approval.

### 6.2 Acceptance of Consignments

#### 6.2.1 Sheets :

Three sheets of ordered thickness & size 300 x 300 mm shall be supplied for testing.



## PLANT PURCHASING SPECIFICATION BHOPAL

BP 22494

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### 6.2.2 Components:

Two no. components shall be supplied for all possible tests and requirements should be met.

### 7. COMPOSITION:

#### 7.1 Resin:

Brominated Epoxy resin or Epoxy resin with suitable additives having excellent flame retardancy. Resin shall have an epoxy equivalent of 170 to 280.

#### 7.2 Hardener:

Any suitable anhydride hardener.

#### 7.3 Diluents and Viscosity Reducers: Not to be used.

#### 7.4 Glass Mat:

Silane treated, bonded with epoxy compatible binder of 450 GSM (0.8 mm thick) or 300 GSM (0.5 mm thick). Mats shall be thoroughly dried to remove moisture. This shall be checked by burning the bond at 600 deg.0 for sufficient time depending on thickness.

### 8 PHYSICAL PROPERTIES:

#### 8.1 Finish:

The surface of the sheets shall be even, smooth, free from visible defects like blisters, loose fibers, resin concentration, wrinkles, local deformation and dents. The sheet shall be supplied with trimmed edges.

#### 8.2 Colour: Brick Red


#### 8.3 Specific Gravity: $1.8 \pm 0.15$ .

#### 8.4 Water Absorption at 20 deg.C for 24 hours:

Thickness (mm)		Water Absorption mg max.
Above	Upto & Includ.	
-	5	20
5	10	30
10	15	40
15	20	50
20	25	60
25	-	70

Note : Thickness above 25 mm shall be machined to 25 mm keeping one side intact.



	<b>PLANT PURCHASING SPECIFICATION BHOPAL</b>	<b>BP 22494</b> <b>REV NO. 08</b> <b>PAGE 4 of 5</b>
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8.5 Fire Retardant Test (IEC : 60695-11-10)

Shall meet requirement of "Flammability Category - VO"

When tested on 5 test specimens of size  $125 \pm 5 \times 13 \pm 0.5 \times 6.0 \pm 0.2$  mm Size.  
Thickness above 6mm shall be machined to 6mm keeping one side intact.

9. **MECHANICAL PROPERTIES:**

9.1 Tensile Strength: 230 N/mm<sup>2</sup>, Min.

9.2 Cross Breaking Strength: 320 N/mm<sup>2</sup>, Min.

9.3 Shear Strength: 100 N/mm<sup>2</sup>, Min,

9.4 Compression Strength-Proof: 360 N/mm<sup>2</sup>

9.5 Splitting Load - Edgewise (For sheet 10 mm and above): 2.25 kN, Min.

9.6 Machinability:

Shall be capable of being sawn, milled, drilled and tapped with a M 3.5 tap and being shaped in a shaping machine without showing any signs of splitting, cracking or chipping.

10. **ELECTRICAL PROPERTIES:**

10.1 Insulation resistance after 24 hours immersion in water at 20 deg.C: 2500 Megohms, Min.

10.2 Electric Strength-Edgewise (Proof) in oil at 90 deg.C: 30 kV

10.3 Comparative Tracking Index: 200, Min.

11. **TEST CERTIFICATE:**

Three copies of the test certificate, shall be supplied unless otherwise stated on the order.  
In addition, supplier shall ensure to enclose one copy of the test certificate alongwith their dispatch documents to facilitate quick clearance of the material,

The test certificate shall bear the following information.

BP 22494 (Rev.08) : Epoxy Glass Mat Laminated Sheets & Components- Fire Retardant

BHEL Order No.

Batch / Lot No.



## PLANT PURCHASING SPECIFICATION BHOPAL

BP 22494

REV NO. 08

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Test values obtained/certificates for compliance for clauses 4 & 7 to 10.

In addition, the supplier shall ensure to enclose one copy of test certificate along with their dispatch documents to facilitate quick clearance of the material.

### 12. PACKING AND MARKING:

Identification slips shall be pasted suitably on all four corners of each board giving the size of the board and manufacturer's code number / grade.

The boards shall be suitably packed in wooden cases lined with water proof Paper from inside. Each sheet shall be separated from other sheet by a thick paper or card-board.

Each package shall be marked with the following information:

BP 22494: Epoxy Glass Mat Laminated - Sheets & Components Fire Retardant

BHEL Order No.

Manufacturer's and / or Supplier's Name and Grade:

Batch / Lot No.

Thickness, Width and Length:

No. of Sheets

Net Weight and Gross Weight:

Test Certificate reference:



# PLANT STANDARD BHOPAL

BP 712 11 05

Rev. No. 09

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 SUPERSEDES  
BP 712 11 05 (Rev.08)

## SCREWS-SLOTTED, HEX HEAD, STEEL PRODUCT GRA. COARSE PITCH, PROPERTY CLASS 4.8 (M3-M5)

### 1.0 DESIGNATION :

A product Gr. A, hexagon head, steel screws of nominal diameter 4 mm, length 20 mm and conforming to property class 4.8 shall be designated as

### 1.1 On Drawings :

- i) Material Specification Column : BP 712 11 05.
- ii) Description Column : SCRUX HEX SLT A M4 x 20 – 4.8.

### 1.2 On Indents :

SCRUX HEX SLT A M4 x 20 – 4.8 – BP 712 11 05.

### 1.3 For issuing Enquiries and on Purchase Orders :

While issuing enquiries and purchase orders, delete the Plant Standard No. from the above description and add the information given under clause.2.

### 2.0 COMPLIANCE WITH STANDARDS :

#### 2.1 Dimension Tolerances & General Requirements

: To, IS : 1364(Pl.2) – 2002 , Reaffirmed 2007

#### 2.2 Slot

: As per IS : 1366 – 2002 , Reaffirmed 2007

#### 2.3 Mechanical Properties

: To, conform to property class 4.8 as specified in table-3 of IS : 1367 (pt 3) -2002 Permissible Hardness. 124-250 HB.

#### 2.4 Threads

: Pitch-Coarse to IS : 4218 (pt.2) – 2001,  
: Tolerance Quality – Medium.  
: Tolerance class – 6 g.

#### 2.5 Finish

: Plated as specified in BHEL order.

Revision : ● Reviewed & Brought Uptodate.

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# PLANT STANDARD BHOPAL

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## 3.0 NOTE :

- 3.1 Length and diameter combination (refer table on page-3) between the hold lines should only be used.
- 3.2 For screw threads, general (Metric) refer standard AA 0231800.
- 3.3 For tolerance grade, position and class refer to standard AA 0230201.
- 3.4 For Slotted Hex. Hd, Steel Screws to property class 8.8 refer to standard BP 7121125.
- 3.5 When fasteners are to be tested within BHEL, the sampling and acceptance plan shall be as per IS : 1367 part 17.

## 4.0 REFERRED STANDARDS (Latest Publications Including Amendments).

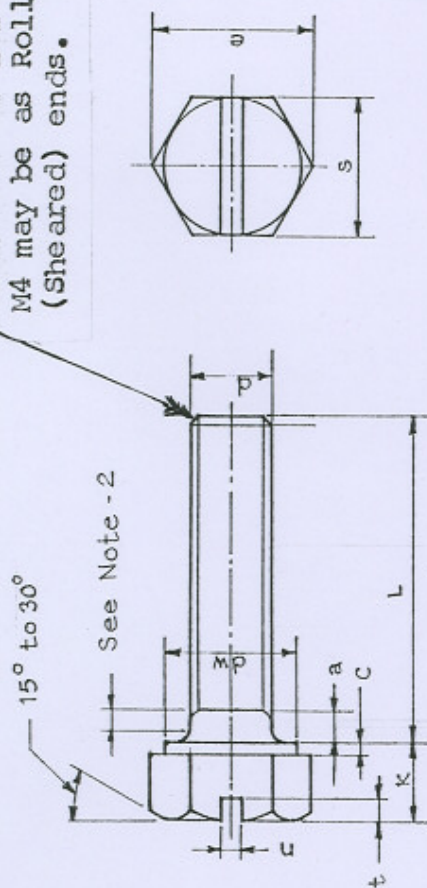
- |                     |                     |                     |
|---------------------|---------------------|---------------------|
| 1) IS : 1364 (pt.2) | 2) IS : 1366        | 3) IS : 1367 (pt.3) |
| 4) IS : 4218 (pt.2) | 5) IS : 1367(pt.17) | 6) AA 023 18 00     |
| 7) AA 023 02 01     | 8) BP 7121125       | 9) AA0231850        |



## NOTE

1. For thread run out refer AA0231850
2. The weight details are not given in the table, Since they are not available at present.

Chamfered or for thread  
M4 may be as Rolled  
(Sheared) ends.



TABLE

All dimensions are in mm.

[illegible]