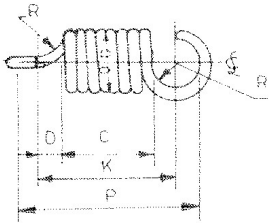


(ALL DIMENSIONS ARE IN mm)

DRG NO. 35831030014




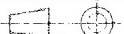
I.T.	GRADE	FREE LGTH. P	K	D	R	O/D	C LGTH.	MAX X MOVE MENT	TOTAL TURNS	FINISH	TEST LOAD IN KG.		STYLE NO.
											MIN	MAX.	
001	B	23.8	17.5	0.8	3.15	7.95 (IMP.)	13.1	15.9	15 1/4	Z.C	SCALE 0.78 KG/CM		BP9088566976
002	B	15.9	10.6	2.925	2.65	6.5 IMP.	4.75	9.5	8 1/2	Z.C	SCALE 0.545 KG/CM.		BP9088556925

MM		SPRING 0.56 DIA C.D.	002	AA 10 3400114 0.					
204		SPG S.WIRE (2.C)		AA 10 301					
MM		SPRING 0.80 DIA C.D.	001	AA 1034001175					
396 0		SPG S.WIRE (2.C)		AA 10 301					
66 54 63 62 53	52 51	UNIT OF QTY	22 18 20 22 23	34 35 36 39	50 58 59 64	65	73 79 80		
QTY	No.	UNIT OF	DESCRIPTION.	ITEM	DRAWING NO.	MATERIAL CODE	COMP	UNIT WEIGHT	
VARI	VARI	UNIT	ITEM	NO.			GROUP	QUANTITY	
ANT	ANT	QTY							
00		54							

CARD TYPE- 2

CARD TYPE-1

R/37/80

ADDITIONAL INFORMATION			TYPE OF PRODUCT OR		DE LOCO					
STATUS OF DRAWING M			CUSTOMERS NAME/PROJECT INDIAN RAILWAYS							
DISTRIBUTION OF PRINTS			<div></div> <div>BHARAT HEAVY ELECTRICALS LIMITED BHOPAL</div>							
OFFICE COPY 1										
SWGR SHOP 4										
TCX (T & G) 1										
T & G 4										
REV	DATE	ALTERED F.E.	DEPT.	CODE	SCALE	WEIGHT (Kg)	REF. TO ASSY. DRG. 001 & 002	ITEM NO.		
01	19-11-01	CHECKED <i>[Signature]</i> APPD <i>[Signature]</i>	CGE	410		N.T.S.	05 931030003	019		
TITLE			SPRING				DRAWN	NAME	SIGN.	DATE
STYLE NO. FOR ITEMS 001 AND 002 ADDED.							CHECKED <i>[Signature]</i>	<i>[Signature]</i>	31/1/82	
F 583			DIMENSIONS TO BE CONTROLLED WITHIN LIMITS AS SHOWN. MACHINING TOLERANCE $\pm .25$ mm. UNLESS OTHERWISE SHOWN. NON-MACHINING TOLERANCE $\pm$				CARD CODE	DRG. NO.	REV.	
							3 583-10 30014	1516	01	
							SHEET NO.	NO. OF SHEETS		
							01	01		

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm.)

DRAWING NO. 3 585 11 3 0004											
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D 8637926, ITEM-001 REF. DRG. NO.											
SIGN. & DATE											
INVENTORY No.											
REV	DATE	ALTERED	BY	REV	DATE	ALTERED	BY	REV	DATE	ALTERED	BY
03	12.09.14	CHECKED	वि.जॉन	02	27.1.96	CHECKED	एस.सी.व्ही.	01	29.11.84	CHECKED	एस.सी.व्ही.
		APPROVED	डी. दुबे			APPROVED	एस.सी.व्ही.			APPROVED	एस.सी.व्ही.
NOTE-7 ADDED. VIEW UPDATED.				STYLE CODE NO. WAS 850164. WT. ADDED.				NOTE 2 DELETED & NOTE 6 ADDED. O/D 40.4 ADDED.			
G376				G865							

STYLE LIST											
STYLE CODE No.		ITEM INCLUDED		DESCRIPTION OR REMARKS				RECORDED			
								SIGN.		DATE	
BP9088501645		001		SPRING				Sd/-		6.2.82	

O/D MAX	I/D MIN	ACTIVE TURNS	TOTAL TURNS	TEST LOAD KG.		COMPRESSED LENGTH
				MIN.	MAX.	
40.4	32.5	7.5	9.5	8.2	10	82.5
				20.4	24.9	54

103.5<sup>+1.5</sup>  
FREE LENGTH

NOTE:-											
1. GRADE C-THE NUMBER OF TURNS AND LENGTH ARE APPROX AND MAY BE VARIED PROVIDED LOAD AND COMPRESSION LIMITS ARE MAINTAINED.											
2. ENDS TO BE GROUND FLAT AND SQUARE WITH AXIS.											
3. SHARP CORNERS AT ENDS OF SPRING TO BE REMOVED.											
4. SPRING MUST BE CAPABLE OF BEING COMPRESSED TO 51 LONG, TO ENSURE THAT IT IS NOT SOLID AT WORKING LENGTH.											
5. SHOULD BE HEAT TREATED TO MAINTAIN HARDNESS WITHIN 420-480 HV.											
6. TOLERANCE ON SQUARENESS 3.5 TOLERANCES ON PARALLELISM 1.2											
7. ALTERNATIVELY SPRING OF MATERIAL 'TDSiCr TO IS:4454 PART 2:2001' IS ALSO ACCEPTABLE.											

FINISH:-											
LIGHT SHOT PEENED TO REMOVE SCALE ONLY AND THEN OILED.											

SEE NOTE-7											
VAR. 00		REMARKS		VAR. NO.		ITEM NO.		DESCRIPTION		STD.	
						001		3.658 DIA CR VNDM SPRING ST WIRE			
								BP 10571			
								IT. NO.		MATL. CODE.	
								VAR		MATL. SPCN.	
								A		UNIT	
								UNIT WT.		QTY.	
								0.102		1080.0	

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

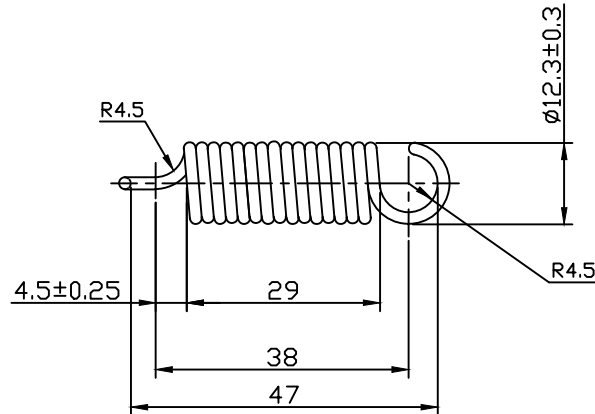
उत्पाद का प्रकार या ग्राहक/परियोजना का नाम											
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT											
INDIAN RAILWAYS											
भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल											
Bharat Heavy Electricals Ltd. Bhopal											
नाम /NAME											
विनोद जॉन											
हस्ता /SIGN.											
-हस्ता.-											
दि./DATE											
6.2.82											
बनाया DRN.											
मनी											
हस्ता.-											
15.5.82											
जांचा CKD.											
एम.के.टी.											
हस्ता.-											
19.8.82											
स्वीकृत APPD.											
-											

विभाग DEPT. CEE											
अनु.टाल.नाप की श्रेणी UNTOL. DIMS. GR.											
REF. CG06509											
कोड CODE. 407											
अनुपात SCALE 1:1											
भार कि या WEIGHT (K.G.)											
असे. ड्राइंग का संदर्भ REF. TO ASSY.											
2 585 11 3 0001											
ड्राइंग क्र. /DRAWING NO.											
3 585 11 3 0004											
शीट क्र. /SHT.NO 01											
शीटों की सं. /NO.OF.SHT. 01											

(ALL DIMENSIONS ARE IN mm)

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REV.	DATE	ALTERED	VJ	REV.	DATE	ALTERED	R.C.B	ADDITIONAL
03	17.05.14	CHECKED	VJ	02	28.11.05	CHECKED	R.K.S.	INFORMATION A.C./DC EMU
		APPROVED	DD			APPROVED	AG.	
ITEM 001 MATL. SPEC No. WAS AA 10301.				STYLE NO. WAS IN 6 DIGIT DRG. REDRAWN & COMPUTERISED.				STATUS OF DRAWING M
G363								DISTRIBUTION D/C - 1 SWM - 4
								OF PRINTS TCX (SWM) 1


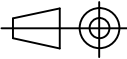


TEST LOAD IN Kg.		EXTENDED LGTH.
MIN.	MAX.	
7.3	8.6	58.5

MAX. MOVEMENT = 13  
TOTAL TURNS =  $14 \frac{3}{4}$

**NOTE** :- 1. NO. OF TURNS & LENGTH ARE APPROXIMATE & MAY BE VARIED PROVIDING LOAD & EXTENSION LIMITS ARE MAINTAINED.

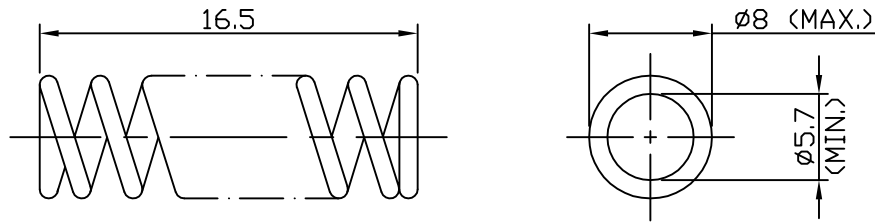
C 850010 IT.004  
REF. DRG. NO.

STYLE CODE No. BP 9098502552	001	1.80 DIA. CLD. DRN. SPRING ST. WIRE	3	IS 4454 PART 1:2001 GRADE SH		MM	600	
REMARKS	ITEM NO.	DESCRIPTION	STD	MATL. CODE	A/C	UNIT	UNIT WT.	
				MATL. SPECN.			QTY.	
R/136/83								
	BHARAT HEAVY ELECTRICALS LTD. BHOPAL				NAME	SIGN	DATE	NO.OF VAR.
				DRN.	L.M.OTARI	Sd/-	20.5.83	
				CKD.	ASA	Sd/-	4.9.83	
				APPD.	VPA	Sd/-	25.9.83	
DEPT. CEE	UNTOL. DIMS. GR.		SCALE	WEIGHT(KG)	REF.TO ASSY.DRG. 0 577 11 3 0001		ITEM NO. 013	NO.OF ITEM 001
CODE 407	CG.06503		1:1					
TITLE  SPRING					DRAWING NO. 4 577 11 3 0010			REV 03
					SHT.NO 01		NO.OF.SHT. 01	

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REV.	DATE	ALTERED	REENA	--	REV.	DATE	ALTERED	R.C.B	ADDITIONAL INFORMATION
03	16.08.16	CHECKED	MM	M.MODI	02	12.05.05	CHECKED	R.K.S.	AC/DC EMUS
		APPROVED	DD	<i>[Signature]</i>			APPROVED	A.G.	
TITLE WAS 'ROLLER' IN ERROR.					DRAWING REDRAWN & COMPUTERISED.				
					STATUS OF DRAWING M				
					DISTRIBUTION D/C - 1 SWM - 4				
					OF PRINTS TCX (SWM) - 1				



ACTIVE TURNS	TOTAL TURNS	DEFLECTION	TEST LOAD (IN KG)		COMPRESSED LENGTH	TOLE. ON SQUARENESS	TOLE. ON PARALLELISM
			MIN.	MAX.			
8	10	6.0	0.68	0.85	13.5	0.8	0.5

STYLE LIST				
STYLE NO.	ITEM INCLUDED	DESCRIPTION OR REMARKS	RECORDED	
			SIGN	DATE
BP 9098502563	001	SPRING	Sd/-	11.07.82

### NOTE :-

1. SHARP CORNERS TO BE REMOVED.
2. THE NO. OF TURNS & LENGTH ARE APPROXIMATE & MAY BE VARIED PROVIDING LOAD AND COMPRESSION LIMITS ARE MAINTAINED.

C 850004, IT-013  
REF. DRG. NO.

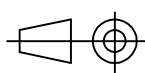
	001	0.90 DIA. CLD. DRN. SPRING ST. WIRE	1	AA 1034001183	Kg.	0.001
				AA 10301	MM.	250.0
REMARKS	ITEM NO.	DESCRIPTION	STD	MATL. CODE	A/C	UNIT WT.
				MATL. SPECN.		QTY.

R/136/83

COMPUTERISED DRAWING	CKD.	APPD.	R.K.S.	DATE	DEPT.	UNTOL. DIMS. GR.	SCALE	WEIGHT(KG)	REF. TO ASSY.DRG.	ITEM NO.	NO. OF ITEM
				10.10.2011	CEE	CG 06503	NTS	-	0 577 11 3 0001	014	001
				03.10.2011	CODE 407				4 577 11 3 0011		03
					/TITLE				DRAWING NO.		REV
									SHT.NO 01	NO. OF SHT.	01



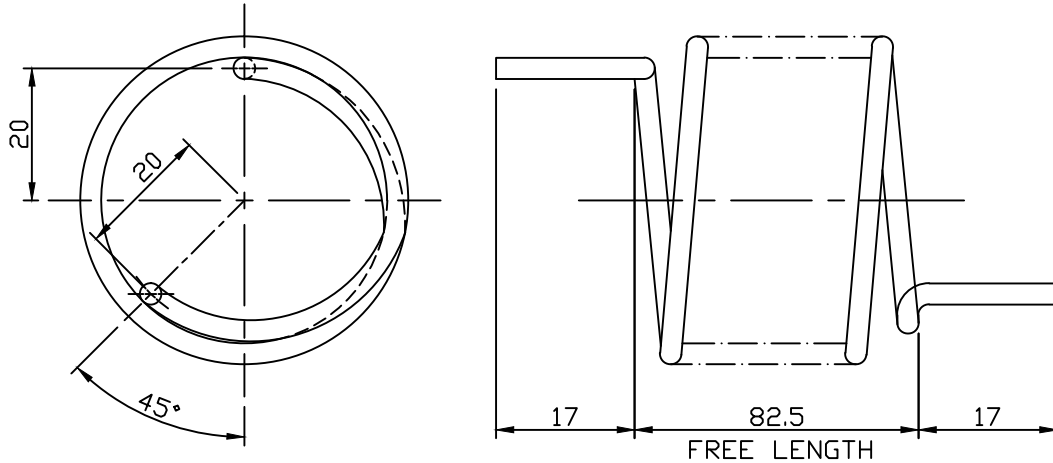
BHARAT HEAVY ELECTRICALS LTD.  
BHOPAL



(ALL DIMENSIONS ARE IN mm)

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REV.	DATE	ALTERED	T.R.D.	REV.	DATE	ALTERED	R.C.B	Sd/-	ADDITIONAL INFORMATION
02	12.12.16	CHECKED	D.D.	01	12.05.05	CHECKED	R.K.S.	Sd/-	AC/DC EMUS
		APPROVED	R.K.S.			APPROVED	A.G.	Sd/-	STATUS OF DRAWING M
WIRE DIA. 2.70 WAS 2.642.				DRAWING REDRAWN & COMPUTERISED.				DISTRIBUTION D/C - 1 SWM - 4 OF PRINTS TCX (SWM) - 1	



TEST LOAD		COMPRESSED LENGTH
MIN.	MAX.	
2.17 KG	2.94 KG	44.5
3.26 KG	4.42 KG	25.5

DETAILS OF SPRING

O/D MAX.	- 49.5
I/D MIN.	- 42
WINDING	- L.H.
NO. OF ACTIVE TURNS	- 7 5/8
SOLID LENGTH	- 24

NOTE :-

WHEN SPRING IS ROTATED 235°, LOAD = 8.88KG.

B 8700121 IT-001  
REF. DRG. NO. C-359

	001	2.70 DIA. HARD DRN SPG. S. WIRE	-	XA 1034001140 PS 10301	Kg.	- 1170.0
REMARKS	ITEM NO.	DESCRIPTION	STD	MATL. CODE MATL. SPECN.	A/C UNIT	UNIT WT. QTY.

R/136/83

COMPUTERISED DRAWING	APPD.	R.K.S.	-Sd-	10.10.2011	DEPT. CEE	UNTOL. DIMS. GR.	SCALE	WEIGHT(KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEM
CKD.	A.V.	-Sd-	04.10.2011	407	CG 06503		NTS	-	1 577 12 3 0004 G 8507630	009 015	001
NAME	SIGN.	DATE	/TITLE				DRAWING NO.		REV		
			SPRING				4 577 12 3 0004		02		
							SHT. NO	01	NO. OF SHT.	01	

BHARAT HEAVY ELECTRICALS LTD.  
BHOPAL

NAME	SIGN	DATE	NO. OF VAR.
DRN. P.K. SHARMA	Sd/-	18.06.83	
CKD. A.S.A.	Sd/-	19.06.83	
APPD. V.P.A.	Sd/-	02.07.83	-

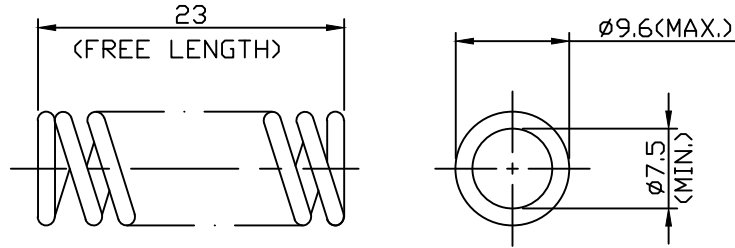
(ALL DIMENSIONS ARE IN mm)

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REV.	DATE	ALTERED	T.R.D.	REV.	DATE	ALTERED	RCB, Sd/-	ADDITIONAL INFORMATION	AC/DC EMUS
04	12.12.16	CHECKED	D.D.	03	21.06.05	CHECKED	RKS, Sd/-	STATUS OF DRAWING	M
		APPROVED	R.K.S.			APPROVED	AG, Sd/-	DISTRIBUTION OF PRINTS	TCX (SWM) - 1

WIRE DIA. 0.90 WAS 0.914.

DRAWING REDRAWN &amp; COMPUTERISED



ACTIVE TURNS - 7

TOTAL TURNS - 9

**NOTE :-**

1. SHARP CORNERS TO BE REMOVED.
2. TOLERANCE ON SQUARENESS - 1.2  
TOLERANCE ON PARALLELISM - 0.6

C 850004, IT-014  
REF. DRG. NO.

STYLE NO. BP 9088517045	001	0.90 DIA. PHSPHR. BZ. WIRE	AA 12143	0.002
REMARKS	ITEM NO.	DESCRIPTION	MATL. CODE	UNIT WT.
			MATL. SPECN.	QTY.

R/136/83

COMPUTERISED DRAWING	APPD.	R.K.S.	-Sd-	10.10.2011	DEPT.	UNTOL.	DIMS.	GR.	SCALE	WEIGHT(KG)	REF.TO ASSY.DRG.	ITEM NO.	NO.OF ITEM	REV
CKD.	A.V.	-Sd-	03.10.2011	407	CEE	CG	06503		NTS	-	2 577 21 3 0001	002	001	
NAME	SIGN.	DATE									DRAWING NO.			
											4 577 21 3 0006			04
											SHT.NO	01	NO.OF.SHT.	01



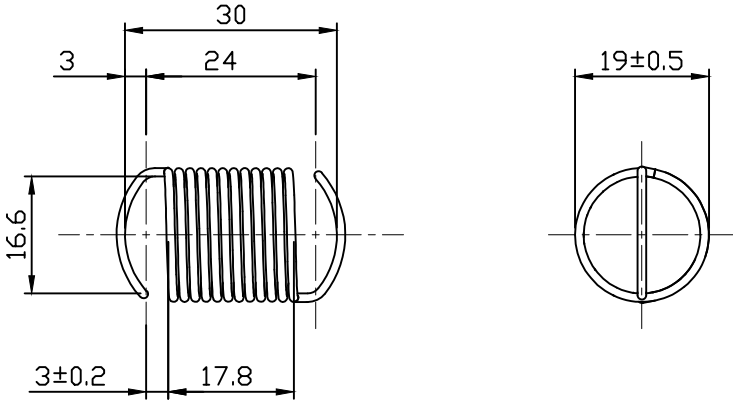
BHARAT HEAVY ELECTRICALS LTD.  
BHOPAL

SPRING

(ALL DIMENSIONS ARE IN mm)

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REV. 04	DATE 30.05.06	ALTERED RCB -Sd-	CHECKED OPS -Sd-	APPROVED AG -Sd-	REV. 03	DATE 22.10.96	ALTERED CKM -Sd-	CHECKED PTP -Sd-	APPROVED PTP -Sd-
DRG. COMPUTERISED.					DIMN. R8 WAS R3.				
					E778				
REV. 07	DATE 20.09.25	ALTERED M.M. <i>[Signature]</i>	CHECKED B.S.M. <i>[Signature]</i>	APPROVED R.K.S. <i>[Signature]</i>	REV. 06	DATE 04.10.18	ALTERED T.R.D. <i>[Signature]</i>	CHECKED D.D. <i>[Signature]</i>	APPROVED R.K.S. <i>[Signature]</i>
DIM. 3 WAS R3, DIM. 16.6 & SIDE VIEW ADDED.					DIM. 30, 24, 17.8 & R3 WERE 28.5, 22.2, 16 & R8. VIEW UPDATED.				
					BP CODE ADDED.				



**NOTE :-**  
GRADE 'C' SPRINGS :- NO. OF TURNS & LENGTH ARE APPROXIMATE & MAY BE VARIED PROVIDING LOAD & EXTENSION LIMITS ARE MAINTAINED.

OUT SIDE DIA.	TOTAL TURNS	FINISH	TEST LOAD (IN KG)			EXTENDED LGTH	STYLE NO.
				MIN.	MAX.		
19.0±0.5	12	ZINC COATED	1	0.50	0.75	41.5	850148
			2	1.1	1.54	66.5	

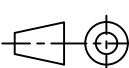
BP9088501483	001	1.2 DIA. CLD. DRN. SPRING ST. WIRE	1	AA 1034001205	MM.	-
				AA 10301		762.0
REMARKS	ITEM NO.	DESCRIPTION	STD	MATL. CODE	A/C	UNIT WT.
				MATL. SPECN.		QTY.

ISSUED:-

DRN. CKD. APPD	NAME	SIGN	DATE	NO.OF VAR.
	RCB	-Sd-	02.12.81	
	ASA	-Sd-	14.02.82	
	VPA	-Sd-	29.10.82	

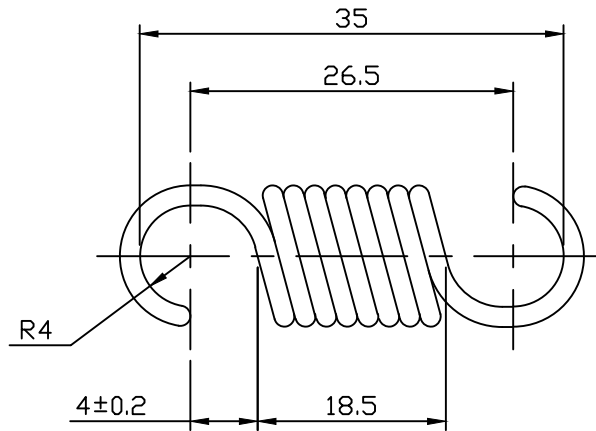
  

DEPT. CEE	UNTOL. DIMS. GR.		SCALE	WEIGHT(KG)	REF.TO ASSY.DRG.	ITEM NO.	NO.OF ITEM
CODE 407	CG.06503		NTS	-	001-15831130003 001-15831230001	019 019	
TITLE					DRAWING NO.		REV
SPRING					4 583 11 30011		07
					SHT.NO 01	NO.OF.SHT. 01	

(ALL DIMENSIONS ARE IN mm)

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REV.	DATE	ALTERED	REV.	DATE	ALTERED	CKM	-Sd-	ADDITIONAL INFORMATION
		CHECKED			CHECKED	SCV	-Sd-	AC/DC EMU
		APPROVED	01	20.02.85	APPROVED	SCV	-Sd-	STATUS OF DRAWING M
			STYLE NO. ADDED. DIMS. $4.0 \pm 0.2$ & $9.5 \pm 0.3$ WERE 4 & 10 RESP'Y. TEST LOAD IN KG & EXTENDED LGTH ROUNDED OFF.			C 986		DISTRIBUTION D/C - 1 SWM - 4 OF PRINTS TCX (SWM) - 1

**NOTE :-**

NO. OF TURNS & LENGTH ARE APPROXIMATE & MAY BE VARIED  
PROVIDING LOAD AND EXTENSION LIMITS ARE MAINTAINED.

OUT SIDE DIA.	MAX. MOVEMENT (FOR REF.)	TOTAL TURNS	FINISH	TEST LOAD (IN KG)			EXTENDED LGTH
					MIN.	MAX.	
$9.5 \pm 0.3$	31.8	22	ZINC COATED	1	0.4	0.50	51
				2	0.7	0.90	63.5

C 850010 IT.003  
REF. DRG. NO.

STYLE NO. ST 854843	001	0.8 DIA. CLD. DRN. SPRING ST. WIRE	1	AA 1034001175 AA 10301	Kg.	- 686.0
REMARKS	ITEM NO.	DESCRIPTION	STD	MATL. CODE MATL. SPECN.	A/C UNIT	UNIT WT. QTY.

R/111/83



**BHARAT HEAVY ELECTRICALS LTD.  
BHOPAL**

DEPT.	UNTOL. DIMS. GR.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO. OF ITEM
CEE	CG 06503	NTS	-	001-0 583 10 3 0009 001-1 583 13 3 0002 001-1 583 13 3 0003	012 012 011	001
CODE 407						
/TITLE				DRAWING NO.		REV
SPRING				4 583 13 3 0004		01
				SHT. NO 01	NO. OF SHT.	01

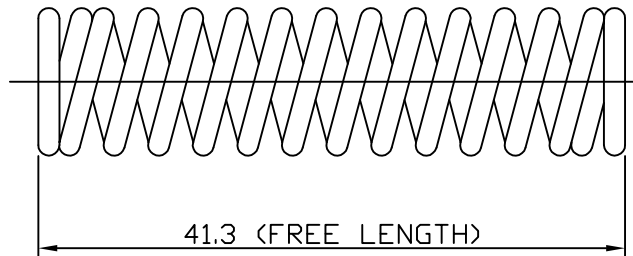
कम्प्यूटर ड्राइंग  
पाइल कमीक 45831330004

SIGN. &amp; DATE

INVENTORY NO.

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REV.	DATE	ALTERED	REV.	DATE	ALTERED	M. L. KHARE	ADDITIONAL INFORMATION	AC/DC EMU
		CHECKED	05	10.10.04	CHECKED			
		APPROVED			APPROVED			
			DRAWING REDRAWN & COMPUTERISED			STATUS OF DRAWING		
						M		
						DISTRIBUTION D/C - 1 SWM - 4		
						OF PRINTS TCX (SWM) - 1		



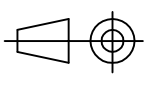
SPRING DATA	
INSIDE DIA.	8.0 MIN.
TOTAL TURNS	14.0
ACTIVE TURNS	10.0
COMPRESSED LENGTH	28.0
OUTSIDE DIA.	10.3 MAX.
SCALE	0.75 Kg/cm


**NOTE :-**

- TWO TURNS OF EACH END WOUND CLOSE TOGETHER & GROUND FLAT.
- TOLERANCE ON SQUARENESS = 2.1  
TOLERANCE ON PARALLELISM = 0.6

STYLE NO. BP 9088518327	001	1.01 DIA. PHOSPHOR BZ. WIRE	-	-	Kg.	-
			-	AA 12143		400.0
REMARKS	ITEM NO.	DESCRIPTION	STD	MATL. CODE	A/C UNIT	UNIT WT.
				MATL. SPECN.		QTY.

R/111/83

dEl;wVj Mz&Abax iQAby deAa#5831530001	<div><div>बी.सच.ई.एल. BHEL</div><div>BHARAT HEAVY ELECTRICALS LTD. BHOPAL</div></div>			NAME	SIGN	DATE	NO.OF VAR.	
			DRN.	R.C. BHOPLE	Sd/-	09.12.81		
			CKD.	A.S.A.	Sd/-	14.02.82		
			APPD	V.P.A.	Sd/-	29.10.82		-
DEPT. CEE	UNTOL. DIMS. GR.		SCALE	WEIGHT(KG)	REF.TO ASSY.DRG.		ITEM NO.	NO.OF ITEM
CODE 407	CG 06503		NTS	-	001- 2 583 15 3 0001		009	
					001- 1 583 15 3 0001		016	
					001- 1 583 15 3 0002		013	001
/TITLE  SPRING					DRAWING NO.			REV
					4 583 15 3 0001			05
					SHT.NO 01		NO.OF.SHT. 01	

	<h1 style="margin: 0;">CORPORATE PURCHASING SPECIFICATION</h1>	<div style="border-bottom: 1px solid black; padding: 2px;">AA10301</div> <div style="border-bottom: 1px solid black; padding: 2px;">Rev No.05</div> <div style="padding: 2px;">PAGE 1 of 4</div>			
<h2 style="margin: 0;">COLD DRAWN SPRING STEEL WIRE - ZINC COATED</h2>					
<p><b>1.0 GENERAL:</b></p> <p>This specification governs the quality of requirements of Zinc coated cold drawn carbon steel wire.</p> <p><b>2.0 APPLICATION:</b></p> <p>Suitable for the manufacture of cold formed helical springs, spring-rings and wire forms subjected to moderate load cycles-statically stressed.</p> <p><b>3.0 CONDITION OF DELEVERY;</b></p> <p>Wire shall be supplied in the form of coils in Zinc Coated, Cold drawn condition.</p> <p><b>4.0 Compliance with National Standards:</b></p> <p>The material shall comply, in general, with requirements of the following National standards and also meet the requirements of this specification.</p> <p>IS: 4454, Part 1- 2001, Gr.: SM : Steel wires for mechanical springs.</p> <p><b>5.0 DIMENSIONS AND TOLERANCES:</b></p> <p><b>5.1 Sizes:</b></p> <p>The material shall be supplied to the dimensions specified on BHEL order.</p> <p>Wires above 0.30 mm and upto and including 20.0 mm in diameter only shall be ordered to this specification</p> <p><b>5.2 Tolerances:</b></p> <p><b>5.2.1</b> The tolerances of the wire shall comply with Table-4 of IS: 4454, Part-1.</p> <p><b>5.2.2</b> The cross-section of the round wire shall be circular to within half the tolerance of the permitted diameter tolerance, specified above.</p>					
Revisions: Cl. 26.6.22 of MOM of MRC-S&GPS		<b>APPROVED:</b> INTERPLANT MATERIAL RATIONALISATION COMMITTEE – MRC(S&GPS)			
Rev No.05	Amd No.	Reaffirmed	Prepared HEP, Bhopal	Issued Corp.R&D	Dt. of 1 <sup>st</sup> Issue August, 1976
Dt:15-01-2004	Dt:	Year:2020			

# CORPORATE PURCHASING SPECIFICATION



## 6.0 MANUFACTURE:

Steel for springs shall be manufactured by the open heath, electric, basic oxygen or a combination of these processes. If any other process is employed, prior approval of BHEL shall be obtained.

Material shall be manufactured form killed steel.

The wire shall be drawn in the galvanised condition.

## 7.0 FREEDOM FROM DEFECTS:

The surface of the wire shall be smooth and free from defects such as grooves, seams, pits, die marks, tears, rust, scale, scratches and any harmful defects which may have a noticeable adverse effect on application of the wire.

## 8.0 SAMPLING:

Unless otherwise agreed to method of drawing representative sample of material and criteria for conformity shall be as per Annex. C of IS: 4454, Part 1.

## 9.0 CHEMICAL COMPOSITION:

The melt analysis of steel and the permissible variation in the composition of the finished product form the melt analysis shall be as follows:

Element	Melt analysis		Permissible variation, percent, in product analysis
	% Min.	% Max.	
Carbon	0.35	1.0	± 0.02
Silicon	0.10	0.30	± 0.03
Manganese	0.30	1.20	+ 0.05
Sulphur	---	0.03	+ 0.005
Phosphorus	---	0.03	+ 0.005
Copper	---	0.20	--

### NOTE:

- i) P + S = 0.055%, max.
- ii) Cu + Ni + Cr = 0.35%, max

## 10.0 ZINC COATING:

Zinc Coating Process (Hot dip galvanising) shall be as per IS: 2629

The final weight of zinc coating shall not be less than 60 gm/m<sup>2</sup> on any size of wire when tested as per IS: 6745



# CORPORATE PURCHASING SPECIFICATION

AA10301

Rev No.05

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## 11.0 WRAPPING TEST:

The wire shall be bent or wrapped round a mandrel of appropriate diameter given below without cracking of the base wire, or cracking or flaking of the coating to such an extent that any zinc can be removed by rubbing with bare fingers.

Diameter of wire, mm	Minimum complete turns of wrap	Mandrel diameter
3.80 and under	6	4 D*
Over 3.80 up to and incl.7.5	6	5 D
Over 7.5	$\frac{1}{4}$ (one 90° bend )	5 D

\* Diameter of wire = D

## 12.0 MECHANICAL PROPERTIES:

### 12.1 Tensile:

The tensile test shall be carried out in accordance with IS: 1608.

The tensile strength and percentage reduction of area obtained from the test pieces shall comply with those given in Table 5 of IS: 4454, Part 1.

### 12.2 Wrapping:

The wrapping test shall be applicable to wires with nominal diameter less than 3mm. Wrapping test when carried out in accordance with IS:1755 shall not show on visual examination any sign of fracture upon closely coiled for at least four turn around a mandrel of diameter equal to diameter of wire.

### 12.3 Torsion:

For wires of diameter 0.5 mm and up to and including 10.0 mm.

The sample piece of length equal to 100 times the wire diameter, but not exceeding 500mm shall be twisted in accordance with IS: 1717. The test piece shall withstand, without failure, the minimum number of turns given in Table 6 of IS: 4454, Part I. The fracture shall be perpendicular to the wire axis and surface shall not split. Any secondary helical fracture shall be ignored.

### 12.4 Cast of Wire:

As per IS: 4454

# CORPORATE PURCHASING SPECIFICATION



## 13.0 INSPECTION AT SUPPLIER'S WORKS:

Whenever specified tests and inspection are to be conducted in the presence of BHEL's representative.

The supplier shall offer BHEL's representative all reasonable facilities, without charge to satisfy the latter that the material is being furnished in accordance with this specification

The supplier shall prepare and provide necessary test specimens for testing to be carried out at his premises. If facilities are not available at his works, the supplier shall make necessary arrangements for carrying out the prescribed test elsewhere. The supplier shall notify BHEL in advance about the readiness of the material for inspection and testing.

BHEL reserves the right to test the material at BHEL's works and the final acceptance of the material shall be based on these test results.

## 14.0 TEST CERTIFICATES:

Three copies of test certificates shall be supplied, unless otherwise stated on the order.

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

The test certificate shall bear the following information:

AA10301: Rev. No. 05: COLD DRAWN SPRING STEEL WIRE - ZINC COATED

BHEL order No:

Supplier's Reference:

Name:

Identification No:

Cast No./Lot No:

Results of Tests:

Results of chemical mechanical and Zinc coating tests.

## 15.0 PACKING AND MARKING:

The wires shall be supplied in coils having a maximum weight of 50kg. The wires shall be coiled in such a way that the coils remain flat when the ties are cut. The coils shall be suitably packed to prevent corrosion and damage during transit.

A metal label shall be securely attached to each bundle and shall bear the following information:

AA10301: COLD DRAWN SPRING STEEL WIRE - ZINC COATED

BHEL Order No:

Consignment/Identification No:

Size and Weight:

Supplier's Name:

## 16.0 REFERRED STANDARDS (Latest publications including amendments):

1) IS: 1608

2) IS: 1717

3) IS: 1755

4) IS: 2629

5) IS: 4454, Part1

6) IS: 6745



## CORPORATE PURCHASING SPECIFICATION

AA 121 43

Rev. No. 04

PAGE 1 OF 4

### PHOSPHOR BRONZE WIRE - EXTRA HARD, UNTINNED/TINNED

#### 1.0 GENERAL:

This specification governs the quality requirements of Cold Drawn Phosphor Bronze Wire, Extra Hard of sizes over 0.45 mm to 6.0 mm diameter.

#### 2.0 APPLICATION:

For the manufacture of springs and armature binding.

#### 3.0 CONDITION OF DELIVERY:

The wire shall be supplied in the cold drawn. Extra hard condition in continuous length in coils in the tinned/untinned condition as specified in BHEL order..

#### 4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply with the requirements of the following national standard and also meet the requirements of this specification.

IS: 7608-1987 | Phosphor Bronze Wires For General  
 Gr: I, Condition: Extra hard (HE) | Engineering Purposes.

#### 5.0 DIMENSIONS AND TOLERANCES:

##### 5.1 Sizes:

The diameter of the wire shall be as stated on BHEL order. Standard sizes are set forth in IS: 1136.

##### 5.2 Tolerances:

The diameter of round wire shall be determined by means of a suitable micrometer and by taking the mean of the two measurements at right angles made at the same cross section of the sample taken in part of a coil, roll, spool, or drum and shall be with in the tolerances specified as given below:.

#### Revisions:

CI.24.1 of MOM of MRC-NFCW+HE

#### APPROVED :

INTERPLANT MATERIAL RATIONALISATION  
COMMITTEE-MRC (NFCW+HE)

Rev. No. 04

Amd.No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt 07.06.2012

Dt :

Year :

BHOPAL

Corp. R&D

Sep., 1987

# CORPORATE PURCHASING SPECIFICATION



Diameter of wire, mm (Uncoated)		Tolerance, mm
Over	Upto & incld.	
0.45	1.0	± 0.01
1.0	2.0	± 0.02
2.0	4.0	± 0.03
4.0	6.0	± 0.04

## 6.0 FREEDOM FROM DEFECTS

The material shall be clean, smooth and free from harmful defects. There shall be no joints in the wire except those made in the rod or wire before final drawing.

## 7.0 CHEMICAL COMPOSITION

The chemical composition of the material, when analysed in accordance with IS: 4027 (Methods of chemical analysis of Bronzes) or any other conventional/instrumental methods shall be as follows:

Element	Percent, min	Percent, max.
Tin	4.2	5.5
Phosphorus	0.02	0.40
*Lead	-	0.05
Total impurities	-	0.20
Copper	Remainder	

- \* These elements need not be determined when the material supplied conforms with the mechanical properties specified in this specification. However, the supplier shall ensure that the composition of the materials lies within the limits specified above.

## 8.0 TEST SAMPLES:

One sample per heat shall be taken for chemical analysis.

One sample per heat per size shall be taken for mechanical testing.



## CORPORATE PURCHASING SPECIFICATION

AA 121 43

Rev. No. 04

PAGE 3 OF 4

### 9.0 MECHANICAL PROPERTIES:

#### 9.1 Tensile:

When tested in accordance with IS: 1608, the test samples shall show the following properties:

Diameter, mm		Tensile strength N/mm <sup>2</sup> , min.
Over	Upto & incld.	
0.45	2.5	850
2.5	6.0	800

#### 9.2 Wrapping test:

The wire shall be wrapped around a wire of its own diameter to form a close helix of eight turns. This shall then be unwrapped for six turns. The wire shall not break or show any crack when subjected to this test. Refer IS: 1755 for method of wrapping test.

### 10.0 TIN COATING: (When specified)


Tinned wire, when called for on BHEL order, shall have a coating of pure tin as per IS: 26, which shall be continuous, smooth and uniform in thickness. The thickness of the tin coating shall be 5 microns minimum when determined as per IS: 3203.

### 11.0 INSPECTION AT SUPPLIER'S WORKS:

Whenever specified, tests and inspection are to be conducted in the presence of BHEL's representative.

BHEL's representative shall have free access at all the times while the work on the contract is being performed to all the parts of the manufacturer's works. The manufacturer shall offer BHEL's representative all reasonable facilities without charge to satisfy the latter that the material is being furnished in accordance with this specification. The manufacturer shall prepare and provide necessary test specimens for testing to be carried out at his premises. If facilities do not exist at his works, the manufacturer shall make necessary arrangements for carrying out the prescribed tests elsewhere. The manufacturer shall notify BHEL's representative in advance about the readiness of the material for inspection and testing.

BHEL reserves the right to test the material at BHEL's works and the final acceptance of the material shall be based on these test results.

AA 121 43	<div> CORPORATE PURCHASING  SPECIFICATION </div> <div>  </div>
Rev. No. 04	
PAGE 4 OF 4	

12.0
TEST CERTIFICATES:

Three copies of test certificates shall be supplied unless otherwise stated on BHEL order.

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

The test certificate shall bear the following information:

BHEL order No  
AA 121 43 (Rev.No. 04)- Phosphor Bronze Wire - Extra Hard, Untinned/  
Tinned, Gr: I

Supplier's reference and name:  
Consignment/Identification No.:  
Dimensional inspection.  
Size and Weight  
Results of Chemical, Mechanical and Tin coating tests as called for in this specification.

13.0
PACKING AND MARKING

The wire shall be supplied in one continuous length per package without joints in coils/reels having a diameter of 250mm minimum. Each package shall not weigh more than 50kg. The material shall be packed to prevent damage during transit. Each package shall be marked with the following information:

AA 121 43:  
BHEL Order No.  
Consignment/Identification No.  
Size and Weight  
Supplier's Name and reference.

14.0
REFERRED STANDARDS (Latest Publications Including Amendments):

1. IS: 26  
5. IS: 3203

2. IS: 1136  
6. IS: 4027

3. IS: 1608  
7. IS: 7608

4. IS : 1755



## PLANT PURCHASING SPECIFICATION BHOPAL

BP 10571

Rev No. 06

PAGE 1 OF 3

**SUPERSEDES**  
BP 10571 Rev.05

### CHROMIUM VANADIUM SPRING STEEL WIRE BAR ANNEALED

**1. GENERAL :**

This specification governs the quality of alloy steel spring wires & bars above 2.5 and upto 25 mm diameter.

Reference BP 10570 for strips.

**2. APPLICATION:**

For the manufacture of cold form helical springs, volute springs etc. working under moderately elevated temperature, for statically stressed springs.

**3. CONDITION OF DELIVERY:**

The material shall be supplied in the annealed, un ground and shall be in the oiled conditions in coils.

**4. COMPLIANCE WITH NATIONAL STANDARDS:**

There is no Indian standards covering this type of material.

Material offered to IS:4454 part – II (reaffirmed 2015) Gr. VD Cr V-A in annealed condition is also acceptable.

**5. DIMENSION AND TOLERANCE:**

5.1 Sizes: : The nominal diameter of the material shall be a stated on the order. Material upto 25 mm diameter shall be ordered against this specification.

5.2 Tolerance: The tolerance on the nominal diameter shall be as per table 4 of IS : 4454 Part – II

**6. MANUFACTURE:**

Steel for wire/bars shall be manufactured by open – hearth, electric or basic oxygen process.

**7. FREEDOM FRM DEFECTS:**

The surface of the wire / bars for the manufacture of springs shall be smooth and free from defects such as, pits, die- marks and other harmful imperfections.

Revision : IS – Reaffirmed 2015

Issued by :

*[Signature]*  
**STANDARDS AND MATERIALS GROUP  
TECHNICAL SERVICES DEPARTMENT**

Rev.06

Date: 31/08/2019

Date of first Issue: OCT-1960

## 8. CHEMICAL COMPOSITION:

The melt analysis of steel and the permissible variation in the composition of the finished products from the melt analysis shall be as follows:

Element	Melt Analysis		Permissible variation over & under the specified Limit % Max
	% Min.	% Max	
Carbon	0.47	0.55	0.03
Silicon	0.10	0.40	0.03
Manganese	0.60	1.20	0.04
Chromium	0.80	1.10	0.05
Vanadium	0.10	0.25	0.02
Sulphur	-	0.25	0.005
Phosphorus	-	0.25	0.005
Copper	-	0.12	0.02

## 9. SELECTION OF TEST SAMPLES:

Test samples shall be cut from coils selected at random. One sample per heat per size per consignment shall be taken for test.

## 10. HARDNESS (Vickers): As received condition

When tested in accordance with IS : 1501, the test pieces shall show a Vickers hardness of 240 HV Maximum

## 11. RESPONSE TO HEAT TREATMENT :

Test pieces selected as per clause 9 shall be hardened in oil at a temperature between 850 – 880.C, followed by tempering at 420 – 440.C, air cooled, shall have a hardness of 420 – 475 HV.

## 12. TEST CERTIFICATE:

Three copies of test certificate shall be supplied unless otherwise stated on the order.

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

The test certificate shall bear the following information:

BHEL reference.

BHEL Order No.

BP 10571 Chrome – Vanadium spring steel wire bar – annealed.Rev.05



## PLANT PURCHASING SPECIFICATION BHOPAL

BP 10571

Rev. No. 06

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Supplier's Reference:

Supplier's Name

Process of Manufacture

Heat treatment details

Melt / Heat / Batch No.

Identification No.

Result of test:

Result of chemical analysis and hardness before & after heat treatment (CL.10&11).

### 13. PACKING AND MARKING:

The material shall be coiled flat such that coils remain flat when the ties are cut.

The material shall be packed suitably to prevent damage during transit.

Each bundle / coil shall be marked with the following information.

BP 10571: Chrome –Vanadium spring steel wire bar – Annealed.

BHEL order no.

No. of coils.

Size & length.

Weight.

Identification No.

Consignment No.

**Pre-Qualification requirements**  
**for Springs**

<b>S. No</b>	<b>Description of requirement</b>	<b>Document to be attached</b>
1	Quoted Items SL NO.	Mention SI No.
2	Bidder should submit a self-declaration stating that, "Offered item is same as per enquiry Specification and there is no deviation".	Self-declaration on letterhead of firm
3	In case Bidder is not be OEM but its Reseller then bidder to submit valid authorisation certificate from OEM with the bid.	Valid authorisation letter from OEM.
4	Contract shall be awarded to such vendors who have supplied same or similar of any Indented items of minimum 50 Nos in last 15 years to BHEL or any Central / State Govt. Organization / PSU /Private company/ Public Listed Company.	Purchase order copy /Invoice copy. (PO no for BHEL Bhopal PO)

**Terms Other than PQR to be compiled during Bidding:**

<b>Terms</b>	<b>Complied/Not Complied</b>
Tender Quoted item SL Nos.	
OEM Declaration/Authorization Certificate to be submitted by vendor	
Delivery accepted as per Tender	
Mobile no of concerned Person	
Email ID	

Note: Bidders providing above documents and not meeting above criteria essential for Offer Consideration

<b>ITEM SL NO</b>	<b>Quoted/ Not-Quoted</b>
1	
2	
3	
4	
5	
6	
7	
8	
9	

**NO DEVIATION CERTIFICATE**

**Reference:** Bid No. \_\_\_\_\_ Dated: \_\_\_\_\_

**Subject:** Self-Declaration for No Deviation

This is to certify that the items/services offered by us against the above-referred enquiry are **fully compliant** with the specifications, terms, and conditions mentioned in the bid document.

We hereby confirm that **there are no deviations** from the stipulated specifications, commercial terms, conditions, and other requirements of the enquiry.

For \_\_\_\_\_  
(Authorized Signatory)

Date: \_\_\_\_\_

Seal:

**OEM SELF-DECLARATION (FOR OEM)**

Date: \_\_\_\_\_

Subject: **OEM Self-Declaration**

Ref: Bid No. \_\_\_\_\_

We certify that:

1. The bidder **M/s** \_\_\_\_\_ is the OEM\*\* itself.
2. The product(s) offered are **new, genuine, and comply** with all specifications mentioned in the tender.
3. We shall provide full **warranty support, technical assistance, and spare parts** availability as required.

For **(Name of OEM)**

\_\_\_\_\_

**Authorized Signatory**

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Seal:

OEM address:

**\*\* OEM refers to (Original Equipment Manufacturer)**

**B. OEM AUTHORIZATION CERTIFICATE (FOR BIDDER AS DEALER)**

Date: \_\_\_\_\_

Subject: **OEM Authorization Certificate**

Ref: Bid No. \_\_\_\_\_

We, **(Name of Original Equipment Manufacturer – OEM)**, hereby authorize:

**M/s** \_\_\_\_\_

(Address: \_\_\_\_\_)

We confirm that:

1. Bidder is **authorized partner / dealer / distributor / bidder** for participating in the above-mentioned tender
2. The bidder is authorized to **quote, supply, install (if any), and support** our products.
3. The products offered will be **genuine, brand-new, and manufactured by us (OEM)**.
4. We will provide full **warranty support, technical support, and spare parts (wherever applicable)** for the supplied equipment throughout the warranty/AMC period.

For **(Name of OEM)**

---

**Authorized Signatory**

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Seal:

**\*\* OEM refers to (Original Equipment Manufacturer)**