CYLINDRICAL COMPRESSION SPRINGS
(FOR INTERNAL REFERENCE ONLY)

REMOVE THIS PREFACE SHEET BEFORE ISSUE TO SUPPLIER.

DESIGNATION: Cylindrical compression spring: SP-11-500
To this standard shall be designated as follows

ON DRAWINGS:

Material Spcn. Column	: TC51401
Description Column	: CYL. COMPRESSION SPRING SP-11-500
Material Code Column	: TC 9751401011

ON INDENTS:

Material Spcn. Column	: TC51401
Description Column	: CYL. COMPRESSION SPRING SP-11-500
Material Code Column	: TC 9751401011

ON ENQUIRIES AND PURCHASE ORDERS:

A copy of this standard shall be enclosed without preface sheet.

CYLINDRICAL COMPRESSION SPRINGS

1.0) **SCOPE:** This standard specifies the requirements of cylindrical compression springs used in steam turbine governing systems.

2.0) **TECHNICAL REQUIREMENTS:**

2.1) Design Spring calculations should be as per DIN 2089. Springs should be so designed that when compressed to solid length (L_B), the stressing of the material does not exceed the permitted limit.

2.2) SPRINGS ENDS: Ends are to be deburred externally and internally. Outer surface protection: Oil

2.3) DIMENSIONS: Springs should be supplied as per the dimensions and other conditions specified in the tables. Table I

2.4) TESTING: Spring testing as per DIN 2095/DIN 2096. Please refer table. Table I

2.5) TOLERANCES: For p2=cx 0.02 (L1-L2) in Load the spring up to length L1 and determine P1 on the balance and change length L2 and determine P2 (with that C can be tested). The dimensions marked thus are to be tested with spherical spring seats.

2.6) The deviations of the offer with respect to this standard should be clearly mentioned.

3.0) TEST & GUARANTEE CERTIFICATE:
3.1) TEST CERTIFICATE:

Three copies of test certificate indicating the test result shall be furnished along with each assembly of the consignment quoting BHEL standard No. (TC 5 1401), purchase order No. and manufacture's Sl. No., of the equipment.

3.2) GUARANTEE CERTIFICATE:

A guarantee certificate for 24 months of trouble free performance from the date of shipment or 12 months from date of commissioning whichever is earlier shall be furnished.

4.0) DOCUMENTS:

4.1) Technical literature shall accompany the offers.

5.0) MARKING:

5.1) A tag bearing relevant 12 digits material code of BHEL and purchase order No. shall be attached.

5.2) Following details shall be marked on packing case.

A) Manufacture's name/Supplier's name
B) BHEL purchase order No.
C) BHEL standard No. TC 5 1401

5.3) Execution and codification as per Table I and figures 1 to 6.

RECORD OF REVISIONS

REV. NO	DATE	REVISION DETAILS	REVISED	APPROVED
00	**07.1979**	**NEW**	**A.GUPTA**	**N. A.N**
01	**11.1985**	**REVISED**	**A.GUPTA**	**N. A.N**
02	**09.2011**	**REVISED**	**A.GUPTA**	**N. A.N**
03	**03.2014**	**REVISED**	**SG**	**KHS**
04	**07.2020**	**REVIEWED AND FOUND OK**	**SB**	**KHS**

DISC SPRINGS

(For internal reference only)

Remove this preface sheet before issuing to supplier

DESIGNATION(eg): Disc spring A250,
to this standard shall be designated as follows:
ON DRAWINGS:

Material specification column	: TC 5 1407
Description column	: DISC SPRING A250
Material code column	: TC 9751407290

ON INDENTS:

Material specification column	:TC 5 1407
Description column	:DISC SPRING A250
Material code column	: TC 9751407290

ON ENQUIRES & PURCHASE ORDERS: A copy of this standard shall be enclosed without preface sheet.

T & C ENGG		
Prepared:	Approved:	Date:
VNR	DGM(T & C)	09/95

DISC SPRINGS

1.0 : SCOPE: This standard specifies the requirements of disc springs as per DIN 2093. Used in supporting system of turbines.

2.0 : TECHINICAL REQUIREMENTS:

2.1 : DIMENSIONS AND GENERAL REQUIREMENTS: The dimensions, dimensional tolerances and quality properties of disc springs shall be as per table and as per DIN 2093.

2.2 : MATERIAL: Material of the disc springs shall be chrome vanadium spring-steel 50CrV4 according to DIN 17221 and DIN 17222.

3.0 : MATERIAL TEST AND GUARANTEE CERTIFICATE :

3.1 : MATERIAL CERTIFICATE: Three copies of the material certificate shall be supplied for each item of the consignment quoting BHEL Standard Number and purchase order number. Test certificates to be supplied as per DIN 2093.

3.2 : GUARANTEE CERTIFICATE: A guarantee certificate for 24 months of trouble free performance from the date of shipment or 12 months from the date of commissioning whichever is earlier shall be furnished along with consignment.

4.0 : DOCUMENTS: The descriptive leaflets and catalogues giving full details of the disc spring shall be furnished along with the offer and also with consignment.

5.0 : PRESERVATION AND PACKING:

5.1 : PRESERVATION: Before despatch, the entire surface of the disc spring shall be well covered with a good quality rust preventive material.

5.2 : PACKING PRESERVATION: The material shall be properly packed to ensure it is capable of withstanding transit risks without damage. For preservation manufacturer's standard practice to be followed.

6.0 : MARKING:

6.1 : A tag bearing the relevant 12 digit material code of BHEL and purchase order Number shall be attached to each item.

5.2 : Following details shall be marked on the packing case.

a) Manufacturer's Name.

b) BHEL Order Number.

c) BHEL Standard Number:

7.0 : SIZE AS PER TABLE.

S E R I E S - 'A'

Sl. No.	SIZE	Da	Di	s	h	Old Code / New Code
01.	A8	8	4.2	0.4	0.2	D111290140 / TC9751407010
02.	A10	10	5.2	0.5	0.25	D111290150 / TC9751407028
03.	A12.5	12.5	6.2	0.7	0.3	D111290160 / TC9751407036
04.	A14	14	7.2	0.8	0.3	D111290170 / TC9751407044
05.	A16	16	8.2	0.9	0.35	D111290180 / TC9751407052
06.	A18	18	9.2	1.0	0.4	D111290190 / TC9751407060
07.	A20	20	10.2	1.1	0.45	D111290230 / TC9751407079
08.	A22.5	22.5	11.2	1.25	0.5	D111290240 / TC9751407087
09.	A25	25	12.2	1.5	0.55	D111290250 / TC9751407095
10.	A28	28	14.2	1.5	0.66	D111290260 / TC9751407109
11.	A31.5	31.5	16.3	1.75	0.7	D111290270 / TC9751407117
12.	A35.5	35.5	18.3	2.0	0.8	D111290280 / TC9751407125
13.	A40	40	20.4	2.25	0.9	D111290290 / TC9751407133
14.	A45	45	22.4	2.5	1.0	D111290300 / TC9751407141
15.	A50	50	25.4	3.0	1.1	D111290310 / TC9751407150
16.	A56	56	28.5	3.0	1.3	D111290320 / TC9751407168

No.	SIZE	Da	Di	s	h	Old Code / New Code
17.	A63	63	31	3.5	1.4	D111290110 / TC9751407176
18.	A71	71	36	4.0	1.6	D111290020 / TC9751407184
19.	A80	80	41	5.0	1.7	D111290330 / TC9751407192
20.	A90	90	46	5.0	2.0	D111290090 / TC9751407206
21.	A100	100	51	6.0	2.2	D111290030 / TC9751407214
22.	A112	112	57	6.0	2.5	D111290340 / TC9751407222
23.	A125	125	64	8.0	2.6	D111290350 / TC9751407230
24.	A140	140	72)	8.0	3.2	D111290360 / TC9751407249
25.	A160	160	82	10.0	3.5	D111290370 / TC9751407257
26.	A180	180	92	10.0	4.0	D111290380 / TC9751407265
27.	A200	200	102	12.0	4.2	D111290390 / TC9751407273
28.	A225	225	112	12.0	5.0	D111290400 / TC9751407281
29.	A250	250	127	14.0	5.6	D111290410 / TC9751407290
			S E R I E S 'B'			
30.	B8	8	4.2	0.3	0.25	D111290420 / TC9751407303
31.	B10	10	5.2	0.4	0.3	D111290430 / TC9751407311
32.	B12.5	12.5	6.2	0.5	0.35	D111290440 / TC9751407320

Issued:	REV	DATE:
T & C ENGG HYD	03	30.06.2020
Prepared:	**Approved:**	**Date:**
VNR	DGM(T & C).	09/95

	SIZE	Da	Di	s	h	Old Code / New Code
33.	B14	14	7.2	0.5	0.4	D111290450 / TC9751407338
34.	B16	16	8.2	0.6	0.45	D111290460 / TC9751407346
35.	B18	18	9.2	0.7	0.5	D111290470 / TC9751407354
36.	B20	20	10.2	0.8	0.55	D111290480 / TC9751407362
37.	B22.5	22.5	11.2	0.8	0.65	D111290490 / TC9751407370
38.	B25	25	12.2	0.9	0.7	D111290500 / TC9751407389
39.	B28	28	14.2	1.0	0.8	D111290510 / TC9751407397
40.	B31.5	31.5	16.3	1.25	0.9	D111290520 / TC9751407400
41.	B35.5	35.5	18.3	1.25	1.0	D111290530 / TC9751407419
42.	B40	40	20.4	1.5	1.15	D111290540 / TC9751407427
43.	B45	45	22.4	1.75	1.3	D111290550 / TC9751407435
44.	B50	50	25.4	2.0	1.4	D111290560 / TC9751407443
45.	B56	56	28.5	2.0	1.6	D111290570 / TC9751407451
46.	B63	63	31.0	2.5	1.75	D111290580 / TC9751407460
47.	B71	71	36.0	2.5	2.0	D111290040 / TC9751407478
48.	B80	80	41.0	3.0	2.3	D111290590 / TC9751407486

Sl. No.	SIZE	Da	Di	s	h	Old Code New Code
49.	B90	90	46.0	3.5	2.5	D111290600 TC9751407494
50.	B100	100	51.0	3.5	2.8	D111290050 TC9751407508
51.	B112	112	57.0	4.0	3.2	D111290610 TC9751407516
52.	B125	125	64.0	5.0	3.5	D111290620 TC9751407524
53.	B140	140	72.0	5.0	4.0	D111290630 TC9751407532
54.	B160	160	82.0	6.0	4.5	D111290640 TC9751407540
55.	B180	180	92.0	6.0	5.1	D111290650 TC9751407559
56.	B200	200	102.0	8.0	5.6	D111290660 TC9751407567
57.	B225	225	112.0	8.0	6.5	D111290670 TC9751407575
58.	B250	250	127.0	10.0	7.0	D111290680 TC9751407583

RECORD OF REVISIONS

.No	Date	Revision Details	Revised	Approved
02	09/95	GEN. REVISED	AG	ACH
03	30.06.2020	REVIEWED & FOUND OK	MAMTA	RATHOD

Issued:	REV	DATE:
T & C ENGG HYD	03	30.06.2020

Prepared:	Approved:	Date:
VNR	DGM(T & C)	09/95

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

REV.	DATE	ALTERED SB	REV.	DATE	ALTERED	REV.	DATE	ALTERED
01	09.01.15	CHECKED SG/KHS			CHECKED			CHECKED
		REDRAWN IN AUTOCAD						

REF. DRG. NO. 3-9003-2302-00

SIGN. AND DATE

INVENTORY NO

GEN. DIM. LIMITS , FITS , & TOLERANCES AS PER P.S :- HY0230261

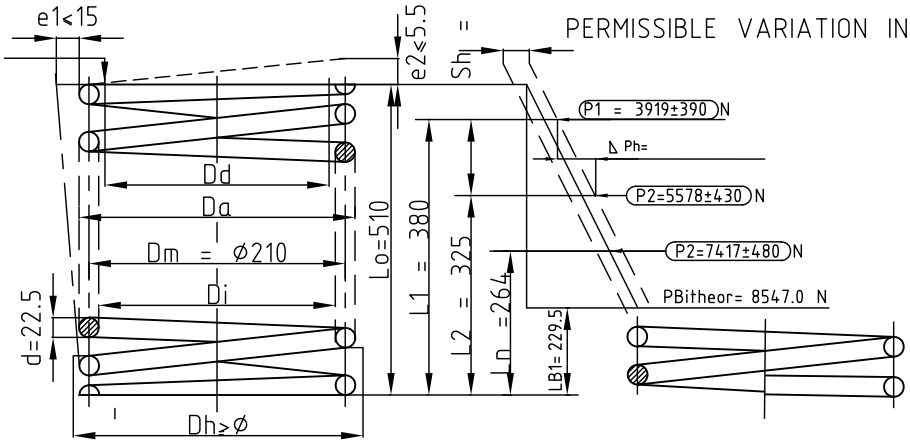


FIGURE 1: END COIL CLOSED AND GROUND ○

PERMISSIBLE VARIATION IN LOAD

Tp = + N
T1 = 184.0 N/mm2
Tc = +2.5%
T2 = 262.0 N/mm2
Tn = 348.0 N/mm2
TiBi =397.0 N/mm2

FIGURE 2: END COIL CLOSED (ONLY FOR d<1mm) ○

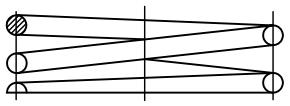


FIGURE 3:END COILS TAPERED CLOSED AND GROUND ⊗

1	NUMBER OF WORKING COILS TOTAL NUMBER OF COILS	if = 9 ig = 10.5
2	SPRING CONSTANT C= 30.15 N/mm ±2% SHEAR MODULUS (G=78450N/mm2)	
3	HAND OF COILING	RIGHT-HAND ⊗ LEFT-HAND ○
4	DEBURRING OF SPRING ENDS CHAMFER WIDTH = 1 mm CHAMFER ANGLE 45°	OMITTED ○ INTERNALLY ⊗ EXTERNALLY ⊗
5	WIRE OR BAR SURFACE	DRAWN ○ ROLLED ○ CENTRELESS GROUND ⊗ SPRING SHOT PEENED ○
6	MAX. WORKING TEMPERATURE	t=100°C
7	SURFACE PROTECTION	OILED
8	MATERIAL = 50Cr4 AS PER DIN 17225 T1 = N/mm2 AS PER DIN 2089	
9	MATERIAL: SPRING STEEL 22.5 AS PER DIN 2077 DEVELOPED LENGTH: 6950 mm	

		DIN 2095			DIN 2096	
10	PERNISSIBLE VARIATIONS TO	COARSE	MEDIUM	FINE	GROUND	ROLLED
	Da,Di,(Dm)	○	○	○	⊗	○
	P1 TO Pn	○	○	○	○	○
	e1, e2	○	○	○	⊗	○
	Lo	○	○	○	⊗	○
11	DURING MANUFACTURING CORRECTION THROUGH La iF ~~d~~ ~~dim~~					
12	SETTING LOAD FOR TESTING = (5 TIMES) OF P =8450 N HOT FORMED YES ⊗ NO ○					
13	SPRING TO BE CENTERED IN FORMED CONDITION Di = 185 + 5.0 mm Da = + 0.2 mm					
14	TO TEST THE LENGTH OF SPRING L2 = MM HPLD THE SPRING BETWEEN TWO PLATES SUCH THAT e2 ≥ mm					
15	SUPPLIER SHOULD SEND ALL SPRINGS WITH TAGS CLEARLY INDICATING THE DRG.NO,PURCHASE ORDER No.					

		SP-11-598		TC9751411050 TC51411		
REMARKS	ITEM NO	DESCRIPTION	STD	MATL. CODE MATL. SPEN.	A/C UNIT	UNIT Wt. QTY.

BHEL-HYD SAP

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	PRCHARY		27.01.78	-N.A-
CHD.				
APPD.				

RESTRICTED USE

DEPT.	UNTOL. DIM. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
I.T.D DEPT. CODE 415	~~C/M/F~~		NTS	22	-N.A-	-N.A-	-N.A-

TITLE
COMPRESSION SPRING

CARD CODE

DRAWING NO. 4-30549-0000101 REV.

SHT No. 1 NO OF SHT. 1

P_1 = 2.9 kg ± 7%

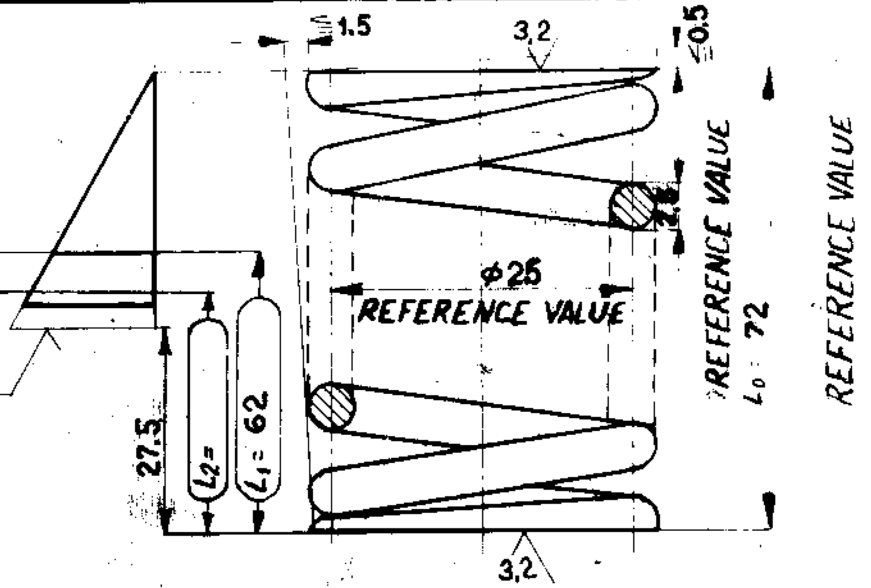
P_2 =

$\tau_1 B_1$ = 53.2 kg/mm²

TURN ONE OVER THE OTHER

INSIDE DIA = Di = $22.2^{+0.6}$

OUTSIDE DIA = Do = $27.8_{-0.6}$



SPRING ENDS :– TO BE CENTERED IN FORMATION CONDITION. SPRING TO BE COLD FORMED, DEBURRED, INNER & OUTER CHAMFER WIDTH IS 0.5 TO 1 mm. CHAMFER ANGLE 45°

MATERIAL : SPRING WIRE C = 2.5 DIN 2076 OUTER SURFACE PROTECTION : OIL MAXIMUM WORKING TEMPERATURE = 70°C CALCULATIONS CORRESPONDS TO DIN 2089 REPRESENTATION, EXECUTION & TESTING CORRESPONDS TO DIN 2095 TOLERANCE CORRESPONDS TO DIN 2095 5% FINE	SPRING CONSTANT : C = 0.294 kg/mm ± 7% SHEAR MODULUS G = 8300 kg/mm². NO. OF SPRING COILS i_f = 9 REFERENCE VALUE. THE END SHOULD BE FORMED BY BENDING ONE TURNS. TOTAL STRETCHED LENGTH = 900 mm. SPRING Wt = 0.04 kg

SPECIAL REQUIREMENTS ABOVE DIN 2095.

EXECUTION: SPRING SURFACE SHALL (e_1 ≤ 1.0) RIGHT ANGLE TO THE VERTICAL AND (e_2 ≤ 0.5) UNPARALLELITY TO ONE ANOTHER IN LOADED CONDITION.

TOLERANCES: FOR $P_2 = C \times 0.02(L_1 - L_2)$ IN kg (TO BE ROUNDED OFF).

TESTING :- LOAD THE SPRING UP TO LENGTH L_1 AND DETERMINE P_1 ON THE BALANCE AND CHANGE LENGTH TO L_2 AND DETERMINE P_2 (WITH THAT 'C' CAN BE TESTED). THE DIMENSION MARKED THUS ( ) ARE TO BE TESTED.

WINDING DIRECTION : SET TEST FOR SPRING TO BE CARRIED OUT FOR 5 TIMES UP TO P_2 = 5 kg. (AS PER DIN 2095 PARA 5.)

THE TEST CERTIFICATE SHOULD CORRELATE WITH DRAWING AND LOAD VALUES P_1 & P_2 AT LENGTHS L_1 & L_2 RESPECTIVELY.

SP – 11 – 566

00 XX VAR

DIMENSION	SEMIPRODUCT	FINAL MATERIAL	MATERIAL	SCRAP MAT	NET WEIGHT	GROSS WEIGHT	DRAWING NO.	ITEM
					0,04			

TOTAL NET WEIGHT (Kg)

CHECKED — STANDARDS OFFICER — PRODUCTION SETTLED — APPROVED — DATE 10/8/81

BLUE PRINT NO. — TRANSPAR COPY NO.

ALTERATION K172F 41

EXISTS IN RC VAULT

MICROFILMED

OLD DRAWING 4-11-8417 — NEW DRAWING

TYPE — GROUP

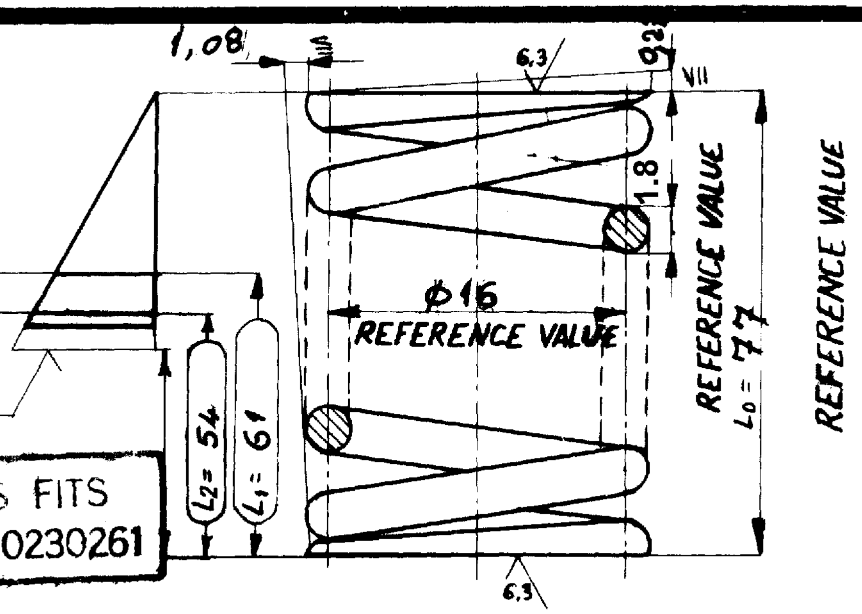
TITLE

COMPRESSION SPRING (COLD FORMED)

BHEL HYDERABAD

NO. OF SHEETS

4 – 306 – 19 – 00027 – XX – 00 VAR



$P_1 = 3.15$ kg ± 6 %

$P_2 = 4.5$ kg ± 6%

τ_1 BI = 68,2 kg/mm²

TURN ONE OVER THE OTHER

GENERAL DIMENSIONAL LIMITS FITS & TOLERANCES AS PER P.S., HY-0230261

SPRING ENDS:– TO BE CENTERED IN FORMATION CONDITION. D_i = 14+0,4 ϕD_0 = 18-0,4
SPRING TO BE COLD FORMED, DEBURRED, INNER & OUTER CHAMFER WIDTH IS 0,5 TO 1,0. mm. CHAMFER ANGLE 45°

MATERIAL : Spring Steel Class 'C' DIN 17223
OUTER SURFACE PROTECTION : OIL
MAXIMUM WORKING TEMPERATURE 100°C
CALCULATIONS CORRESPONDS TO DIN 2089
REPRESENTATION, EXECUTION & TESTING CORRESPONDS TO DIN 2095
TOLERANCE CORRESPONDS TO DIN 2095 5% FINE

SPRING CONSTANT : C = 0.197 kg/mm ± 6%
SHEAR MODULUS G = 8300 kg/mm². NO. OF SPRING COILS i_f = 13,5 REFERENCE VALUE.
THE END SHOULD BE FORMED BY BENDING 1 TURNS.
TOTAL STRETCHED LENGTH = 780 mm
SPRING Wt = 0,056 Kg

SPECIAL REQUIREMENTS ABOVE DIN 2095.

EXECUTION: SPRING SURFACE SHALL (e_1 ≤ 1,0) RIGHT ANGLE TO THE VERTICAL AND (e_2 ≤ 0,2) UNPARALLELITY TO ONE ANOTHER IN LOADED CONDITION.

TOLERANCES: FOR P_2 = C×0.02(L_1 − L_2) IN kg (TO BE ROUNDED OFF).

TESTING:– LOAD THE SPRING UP TO LENGTH L_1 AND DETERMINE P_1 ON THE BALANCE AND CHANGE LENGTH TO L_2 AND DETERMINE P_2 (WITH THAT 'C' CAN BE TESTED). THE DIMENSION MARKED THUS ( ) ARE TO BE TESTED.

WINDING DIRECTION : SET TEST FOR SPRING TO BE CARRIED OUT FOR 5 TIMES UP TO P_2 = 4,5 Kg. (AS PER DIN 2095 PARA 5.)

THE TEST CERTIFICATE SHOULD CORRELATE WITH DRAWING AND LOAD VALUES P_1 & P_2 AT LENGTHS L_1 & L_2 RESPECTIVELY.

00

EXISTS IN DRG. VAULT

SP-11-547

NO. PIECE	DIMENSION	SEMIPRODUCT	FINAL MATERIAL	MATERIAL	SCRAP MAT	NET WEIGHT	GROSS WEIGHT

REM. | TOTAL NET WEIGHT (KG)

SC. G. Hari K. — G. HARI KRISHNA — DSR — OFFICER — BLUE PRINT NO.

PRODUCTION SETTLED — APPROVED — TRANSPAR COPY NO.

DATE 8-12-75

ALTERATION — DATE — SIGNATURE — ALTER-INDEX

25

NTS

TYPE — GROUP 308 — OLD DRAWING 4053-15530/6 — NEW DRAWING

BHEL HYDERABAD

TITLE: COMPRESSION SPRING

4-307-67-00024 00

4-11-6363

NO. OF SHEETS 1 — SHEET 1

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. NO. 3-305-03-00008 | SH. 1 OF 1

1	NUMBER OF WORKING COILS TOTAL NUMBER OF COILS	if = 5.5 ig = 7.5	
2	SHEAR STRESS (G=8300N/mm2)	C=70 N/mm (7.1 Kp/mm)	
3	HAND OF COILING	RIGHT-HAND LEFT-HAND	⊗ ○
4	DEBURRING OF SPRING ENDS CHAMFER WIDTH ≂ 0.5 ÷ 1.0mm CHAMFER ANGLE 45°	OMITTED INTERNALLY EXTERNALLY	○ ⊗ ⊗
5	WIRE OR BAR SURFACE	DRAWN ROLLED CENTRELESS GROUND SPRING SHOT PEENED	○ ○ ⊗ ○
6	MAX. WORKING TEMPERATURE	t=100°C	
7	SURFACE PROTECTION	OILED	
8	MATERIAL = 50 Cr V4 T1 PER = N/mm2 AS PER DIN 2089	DIN 17225	
9	MATERIAL: spring steel 20 STRETCHED LENGTH: 3770 mm	DIN=2077	

10 PERNISSIBLE VARIATIONS TO

	DIN 2095			DIN 2096	
	COARSE	MEDIUM	FINE	GROUND	ROLLED
Da,Di,(Dm)	○	○	○	⊗	○
P1 TO Pn	○	○	○	⊗	○
e1, e2	○	○	○	⊗	○
Lo	○	○	○	⊗	○

11	DURING MANUFACTURING CORRECTION THROUGH La iF	
12	SETTING LOAD FOR TESTING = (5 CYCLES) p= N HOT FORMED YES ⊗ NO ○	
13	SPRING TO BE CENTERED IN FORMED CONDITION Di = 140±1.3 mm Da = 180±1.5mm	
14	TO TEST THE LENGTH OF SPRING L2 = 13.5 MM HPLD THE SPRING BETWEEN TWO PLATES SUCH THATØ2 ≦ 0.2 mm	
15	SUPPLIER SHOULD SEND ALL SPRINGS WITH TAGS CLEARLY INDICATING THE DRG.NO,PURCHASE & MATERIAL CODE.	

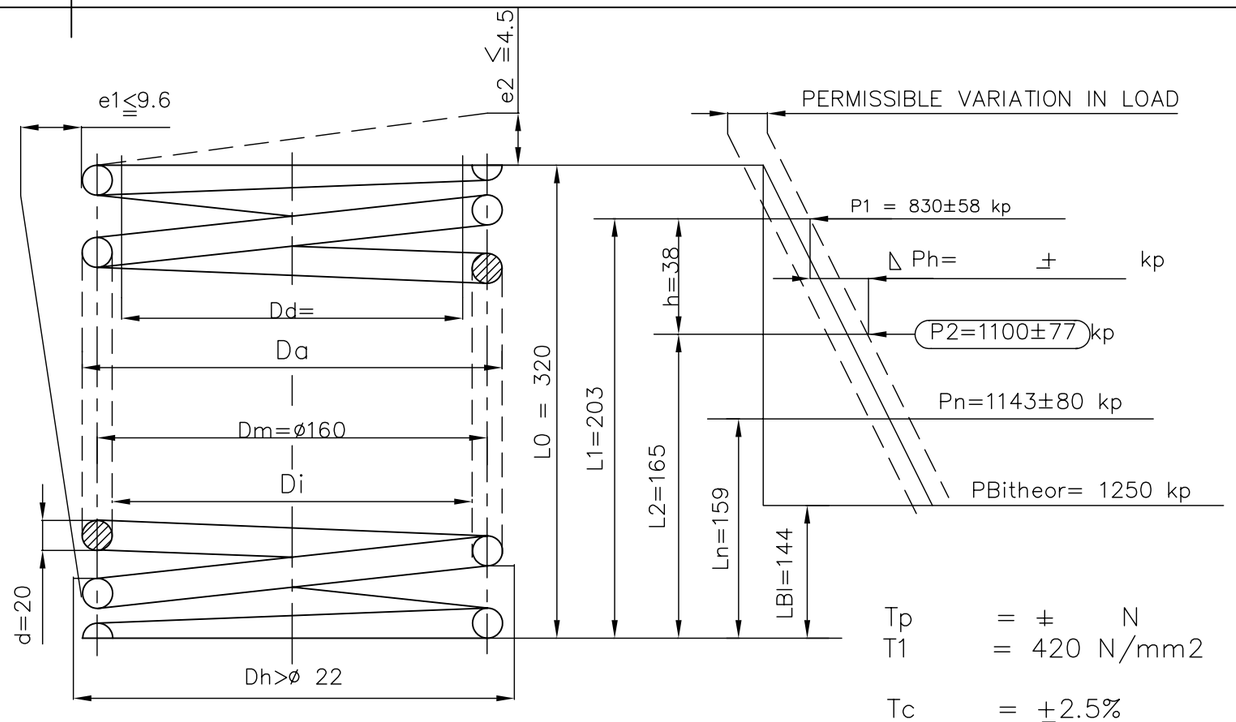


FIGURE 1: END COIL CLOSED ⊗ AND GROUND

Tp = ± N
T1 = 420 N/mm2
Tc = ±2.5%
T2 =550 N/mm2
Tn = 570 N/mm2
Tibl = 620 N/mm2

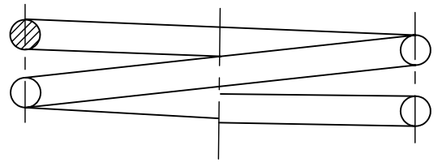


FIGURE 2: END COIL CLOSED ○ (ONLY FOR d<1mm)

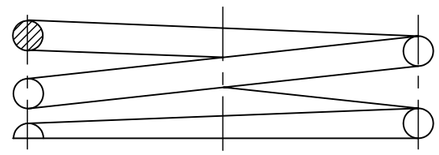


FIGURE 2: END COILS TAPERED ⊗ CLOSED AND GROUND

MATERIAL CODE: TC9717553130

TYPE OF PRODUCT OR
NAME OF CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN	DATE	NO.OF VAR.
DRN.	B.R.RAMESH		18.11.97	
CHD.	V.V.N.RAJU		18.11.97	
APPD.	B.V.S.N.S			-N.A.-

RESTRICTED USE

DEPT.	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
I.T.D.	~~C/M/F~~		NTS	9.3	-N.A.-	-N.A.-	-N.A.-
CODE 415							

TITLE
COMPRESSION SPRING
(SP-11-639)

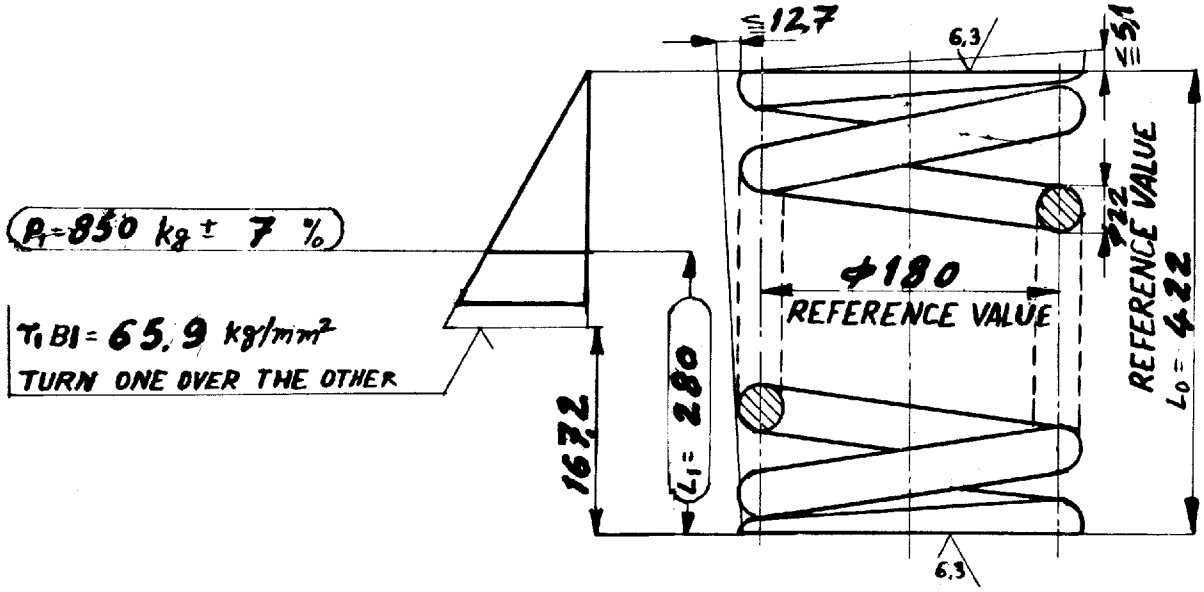
CARD CODE N.A.

DRAWING NO. 3-305-03-00008 REV. 00
SHT. No 1 NO. OF SHT. 1

REV.	DATE	ALTERED	REV.	DATE	ALTERED	REV.	DATE	ALTERED
		CHD/APPD			CHD/APPD			CHD/APPD
ZONE			ZONE			ZONE		

INVENTORY NO | SIGN. AND DATE | REF. DRG. NO. 3-9003-1801-00 | COMPUTER FILE NAME D3080051.DWG

GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261



GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER P.S., HY-0230261

SPRING ENDS :- TO BE CENTERED IN FORMATION CONDITION. SPRING TO BE COLD FORMED, DEBURRED. INNER & OUTER CHAMFER WIDTH IS 0.5 TO 1. mm. CHAMFER ANGLE 45°

MATERIAL :
OUTER SURFACE PROTECTION : OIL
MAXIMUM WORKING TEPMERATURE 70 °C
CALCULATIONS CORRESPONDS TO DIN 2089
REPRESENTATION, EXECUTION & TESTING CORRESPONDS TO DIN 2096
TOLERANCE CORRESPONDS TO DIN 2095 5% FINE

SPRING CONSTANT : C = 6. kg/mm ± 7%
SHEAR MODULUS G = 8300 kg/mm². NO. OF SPRING COILS i_f = 6,5 REFERENCE VALUE.
THE END SHOULD BE FORMED BY BENDING 3/4 TURNS.
TOTAL STRETCHED LENGTH = 4600 mm
SPRING Wt = 14.4 kg

SPECIAL REQUIREMENTS ABOVE DIN 2096.
EXECUTION: SPRING SURFACE SHALL ($e_1 \leq 8.4$) RIGHT ANGLE TO THE VERTICAL AND ($e_2 \leq 5.1$) UNPARALLELITY TO ONE ANOTHER IN LOADED CONDITION.

TOLERANCES: FOR $P_2 = C \times 0.02 (L_1 - L_2)$ IN kg (TO BE ROUNDED OFF).

TESTING :- LOAD THE SPRING UP TO LENGTH L_1 AND DETERMINE P_1 ON THE BALANCE AND CHANGE LENGTH TO L_2 AND DETERMINE P_2 (WITH THAT 'C' CAN BE TESTED). THE DIMENSION MARKED THUS ( ) ARE TO BE TESTED.

WINDING DIRECTION : SET TEST FOR SPRING TO BE CARRIED OUT FOR 5 TIMES UP TO P_2 = kg. (AS PER DIN 2095 PARA 5.)

THE TEST CERTIFICATE SHOULD CORRELATE WITH DRAWING AND LOAD VALUES P_1 & P_2 AT LENGTHS L_1 & L_2 RESPECTIVELY.

00
XX
VAR

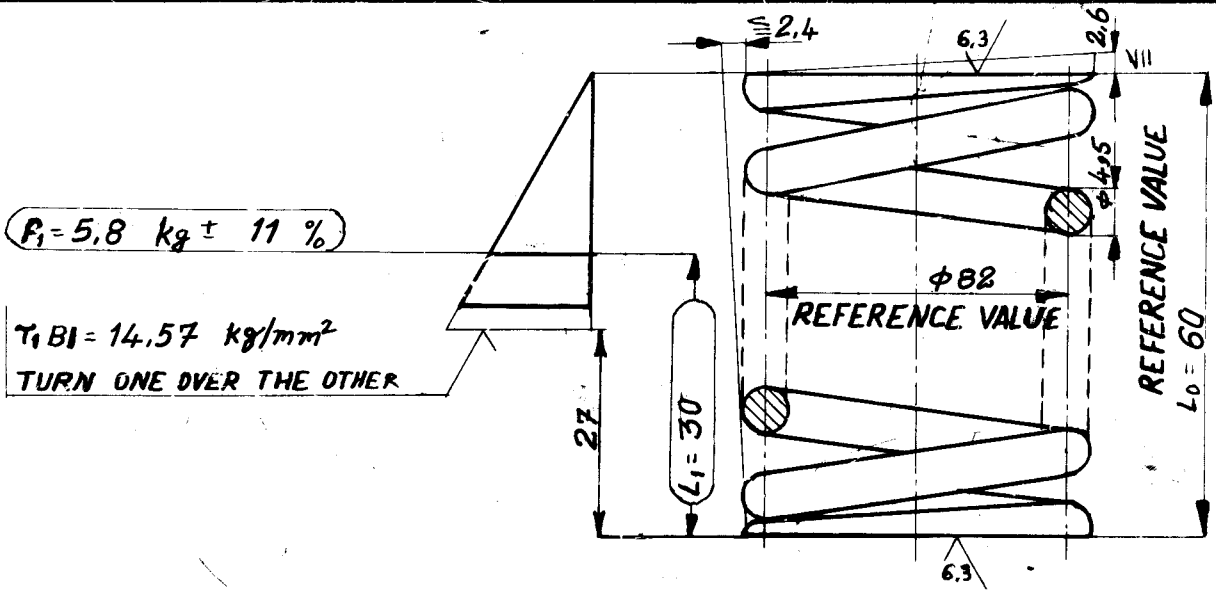
	SP-11-501								
NO. OF PIECES	TITLE DIMENSION	SEMIPRODUCT	FINAL MATERIAL	MATERIAL	SCRAP WT	NET WEIGHT	GROSS WEIGHT	DRAWING NO.	ITEM
REMARKS				TOTAL NET WEIGHT (KG)					

MICRO FILMED

SCALE	DRAWN BY G.Hari	G.HARI KRISHNA	BLUE PRINT NO.	ALTERATION	DATE	SIGNATURE	ALTER. NDEX
	CHECKED						
	STANDARDS OFFICER						
	PRODUCTION SETTLED	APPROVED	TRANSPAR COPY NO.	163 144			
		DATE 8-12-75					

TYPE	GROUP	OLD DRAWING 3-9003-2001-00 VAR	
TITLE: COMPRESSION SPRING		4-305-01-00051	00
		NO. OF SHEETS 4-11-6741	SHEET

HYDERABAD



SPRING ENDS :- TO BE CENTERED IN FORMATION CONDITION. D_1 = 76 +3 % D_a = %
SPRING TO BE COLD FORMED, DEBURRED. INNER & OUTER CHAMFER WIDTH IS 0,5 TO 1,0 mm. CHAMFER ANGLE 45°

MATERIAL :
OUTER SURFACE PROTECTION : OIL
MAXIMUM WORKING TEPMERATURE 100 °C
CALCULATIONS CORRESPONDS TO DIN 2089
REPRESENTATION, EXECUTION & TESTING CORRESPONDS TO DIN 2095
TOLERANCE CORRESPONDS TO DIN 2095 50% FINE

SPRING CONSTANT : C = 0,193 kg/mm ± 11 %
SHEAR MODULUS G = 8300 kg/mm². NO. OF SPRING COILS i_f = 4 REFERENCE VALUE.
THE END SHOULD BE FORMED BY BENDING 1 TURNS.
TOTAL STRETCHED LENGTH = 1550 mm
SPRING Wt = 0,19 kg

SPECIAL REQUIREMENTS ABOVE DIN 2095.
EXECUTION: SPRING SURFACE SHALL $e_1 \leqq$ % RIGHT ANGLE TO THE VERTICAL AND $e_2 \leqq$ % UNPARALLELITY TO ONE ANOTHER IN LOADED CONDITION.

TOLERANCES : FOR $P_2 = C \times 0.02 (L_1 - L_2)$ IN kg (TO BE ROUNDED OFF).
TESTING :- LOAD THE SPRING UP TO LENGTH L_1 AND DETERMINE P_1 ON THE BALANCE AND CHANGE LENGTH TO L_2 AND DETERMINE P_2 (WITH THAT 'C' CAN BE TESTED). THE DIMENSION MARKED THUS ( ) ARE TO BE TESTED.
WINDING DIRECTION : SET TEST FOR SPRING TO BE CARRIED OUT FOR 5 TIMES UP TO P_2 = kg. (AS PER DIN 2095 PARA 5.)

THE TEST CERTIFICATE SHOULD CORRELATE WITH DRAWING AND LOAD VALUES P_1 & P_2 AT LENGTHS L_1 & L_2 RESPECTIVELY.

GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER P.S., HY-0230261

EXISTS IN DRG

NO. OF PIECES	TITLE DIMENSION	SEMIPRODUCT	FINAL MATERIAL	MATERIAL	SCRAP MAT	NET WEIGHT	GROSS WEIGHT	DRAWING NO.	ITEM
	SP-11-520					0,19			

REMARKS

TOTAL NET WEIGHT (KG)

SCALE	DRAWN BY :	V.V.RAO.	BLUE PRINT NO.	
	CHECKED	6/12/80		
	STANDARDS OFFICER			
	PRODUCTION SETTLED	APPROVED	TRANSPARENCY COPY NO.	
		DATE : 06-12-80		

DESIGNATION	DATE	SIGNATURE	ALTER-INDEX
Bhel 74			

BHEL HYD SAP INFORMATION CENTRE

BHEL HYDERABAD

TYPE | GROUP

TITLE:

COMPRESSION SPRING

OLD DRAWING 4,5 NB 1501-320 NEW DRAWING

~~4 11 6401~~ VAR.

4-305 01-00052-XX-00

NO. OF SHEETS | SHEET

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

REV	DATE	ALTERED	REV	DATE	ALTERED	ADDITIONAL INFORMATION
0	1.4.92	CHECKED			CHECKED	STATUS OF DRAWING
MATL. code & SPCN added						DISTRIBUTION OF PRINTS

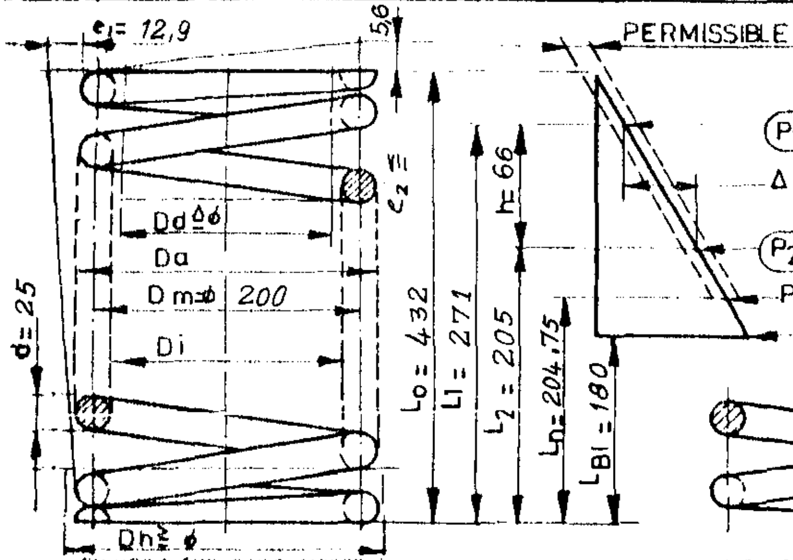


FIGURE 1: END COILS CLOSED AND GROUND ○

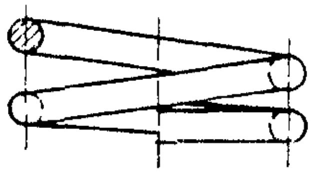


FIGURE 2: END COILS CLOSED (ONLY FOR d < 1 mm) ○

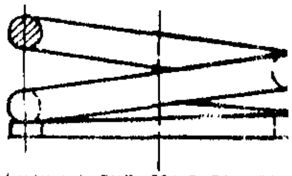


FIGURE 3: END COILS TAPERED CLOSED AND GROUND ⊗

1	NUMBER OF WORKING COILS i_f = 5,5 TOTAL NUMBER OF COILS i_g = 7,5	
2	SHEAR STRESS (G = 8000 kp/mm²) C: 8,87 kp/mm	
3	HAND OF COILING RIGHT - HAND	⊗
	LEFT - HAND	○
4	DEBURRING OF SPRING ENDS OMITTED	○
	CHAMFER WIDTH = 0,5÷1 mm INTERNALLY	⊗
	CHAMFER ANGLE 45° EXTERNALLY	⊗
5	WIRE OR BAR DRAWN	○
	SURFACE ROLLED	○
	CENTRELESS GROUND	⊗
	SPRING SHOT PEENED	○
6	MAX. WORKING TEMPERATURE t = 100 °C	
7	SURFACE PROTECTION	
8	MATERIAL = 50 CrV4 DIN 17221 τ PER = kp/mm² AS PER DIN 2089	
9	MATERIAL WIRE SIZE DIA 25 DIN: 2077 STRETCHED LENGTH: 4700 mm	

10	PERMISSIBLE VARIATIONS TO	DIN 2095			DIN 2096	
		COARSE	MEDIUM	FINE	GROUND	ROLLED
	Da, Di, (Dm)	○	○	○	⊗	○
	P_1, P_2, P_n	○	○	○	⊗	○
	e_1, e_2	○	○	○	⊗	○
	L_0	○	○	○	⊗	○
11	DURING MANUFACTURING CORRECTION THROUGH L_0 i_f d Dm					
12	SETTING LOAD FOR TESTING = TIMES OF P: 2234,8 HOT FORMED YES ○ NO ○					
13	SPRING TO BE CENTERED IN FORMED CONDITION Di = 175 ± 1,5 mm Da = 225 ± 1,8 mm					
14	TO TEST THE LENGTH OF SPRING L_2 = HOLD THE SPRING BETWEEN TWO PLATES SUCH THAT $e_2 \leq$ min					
15	SUPPLIER SHOULD SEND ALL SPRINGS WITH TAGS CLEARLY INDICATING THE DRG No. & PURCHASE ORDER No.					

* P_2 = P_1 :

TC 975140146 1
TC 51401

QTY VARIANT	BASIC VARIANT	UNIT OF QTY / RM. UNIT QTY	DESCRIPTION	ITEM No	STD	DRAWING NO.	ITEM NO VARIANT	MATERIAL CODE / MATERIAL SPECN.	A/C	COMP.	GROUP	UNIT WT (Kg) / QTY.

CARD TYPE-2 ← 21 | 21 → CARD TYPE-1

BHARAT HEAVY ELECTRICALS LIMITED
HYDERABAD

RESTRICTED USE

DEPT.	CODE		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG	ITEM NO.
LT'D	415		–/–	185		

TITLE

COMPRESSION SPRING
SP-11-545

	NAME	SIGN	DATE
DRAWN	V.V.RAO	[signature]	13-10-
CHECKED	V.S.B.	[signature]	12-11-
APPROVED	VSAK	[signature]	15-11

DIMENSIONS TO BE CONTROLLED WITHIN LIMITS AS SHOWN MACHINING TOLERANCE ± 25 mm UNLESS OTHERWISE ...

DRAWING NO. 4 30503 00007XX REV. 01

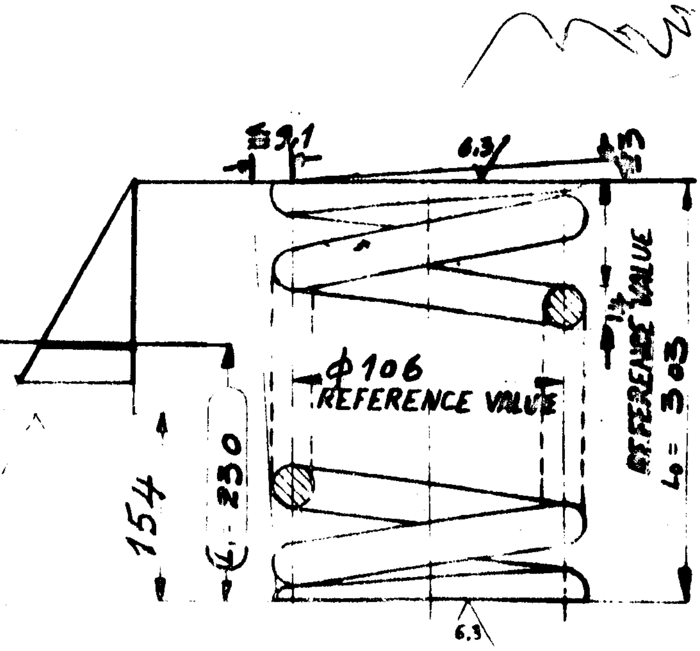
GENERAL DIMENSION LIMITS ... TOLERANCES AS PER ...

REF. DRG. No. 9003-2210-00

SIGN. INVENTORY NO.

P_1 250 kg ±5%

To BI - 50 kg/mm²
TURN ONE OVER THE OTHER



REFERENCE VALUE

SPRING ENDS :- TO BE CENTERD IN FORMATION CONDITION. D_i = 90.7 + 2.6 mm
SPRING TO BE COLD FORMED, DEBURRED, INNER & OUTER D_o = 121.3 − 2.6
CHAMFER WIDTH IS 0.5 TO 1 mm CHAMFER ANGLE 45°

MATERIAL 50 Cr V4 OUTER SURFACE PROTECTION : OIL MAXIMUM WORKING TEMPERATURE 100°C CALCULATIONS CORRESPONDS TO DIN 2089 REPRESENTATION, EXECUTION & TESTING CORRESPONDS TO DIN 2096 TOLERANCE CORRESPONDS TO DIN 2095 5% FINE	SPRING CONSTANT C = 3.41 kg/mm ±5% SHEAR MODULUS G = 8000 kg/mm² NO OF SPRING COILS IF 9.5 REFERENCE VALUE THE END SHOULD BE FORMED BY BENDING ONE TURNS. TOTAL STRETCHED LENGTH - 3850 mm SPRING Wt - 4.5 kg

SPECIAL REQUIREMENTS ABOVE DIN 2095.
EXECUTION SPRING SURFACE SHALL (e ≤ 6.9) RIGHT ANGLE TO THE VERTICAL AND (e₂ ≤ 3.0) UNPARALLELITY TO ONE ANOTHER IN LOADED CONDITION.

TOLERANCES : FOR P_2 ± 0.02(L_1 − L_2) IN kg (TO BE ROUNDED OFF)
TESTING : LOAD THE SPRING UP TO LENGTH L_1 AND DETERMINE P_1 ON THE BALANCE AND CHANGE LENGTH TO L_2 AND DETERMINE P_2 (WITH THAT 'C' CAN BE TESTED) THE DIMENSION MARKED THUS ( ) ARE TO BE TESTED.

WINDING DIRECTION : SET TEST FOR SPRING TO BE CARRIED OUT FOR 5 TIMES UP TO P_2 KP (AS PER DIN 2095 PARA 5)

THE TEST CERTIFICATE SHOULD CORRELATE WITH DRAWING AND LOAD VALUES P_1 & P_2 AT LENGTHS L_1 & L_2 RESPECTIVELY.

GENERAL DIMENSION LIMITS, FITS & TOLERANCES AS PER PS. BY ...

NO OF PIECES	TITLE DIMENSION	SEMIPRODUCT	FINAL MATERIAL	MATERIAL	SCRAP MAT	NET WEIGHT	GROSS WEIGHT	DRAWING NO	ITEM
						4.5 kg			

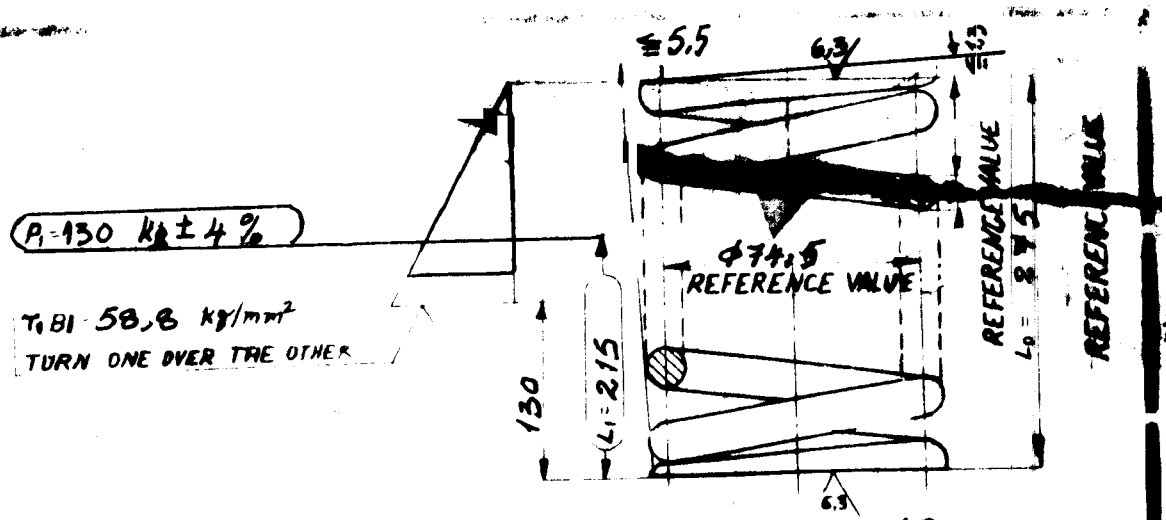
BY G. Hari
G. HARI KRISHNA
STANDARDS OFFICER
APPROVED
DATE 8-12-75
BLUE PRINT NO
SIMILAR COPY
ALTERATION
61 F 179
4505-0600/50
SIGNATURE

BHEL HYDERABAD

TITLE
COMPRESSION SPRING
SP-11-504

NO OF SHEETS
4-11-6410
SHEET

4 30519 00032 00



D_i = 63.9 ± 1.2 mm D_o = 85.1 ± 1.2

SPRING ENDS :- TO BE CENTERD IN FORMATION CONDITION. SPRING TO BE COLD FORMED, DEBURRED, INNER & OUTER CHAMFER WIDTH IS 0.5 TO 1 mm. CHAMFER ANGLE 45°

MATERIAL :
OUTER SURFACE PROTECTION : OIL
MAXIMUM WORKING TEMPERATURE 100°C
CALCULATIONS CORRESPONDS TO DIN 2089
REPRESENTATION, EXECUTION & TESTING CORRESPONDS TO DIN 2095
TOLERANCE CORRESPONDS TO DIN 2095 5% FINE

SPRING CONSTANT : C = 2,18 kg/mm ± 4%
SHEAR MODULUS G = 8300 kg/mm² NO OF SPRING COILS if = 11,5 REFERENCE VALUE
THE END SHOULD BE FORMED BY BENDING
6 NO TURNS.
TOTAL STRETCHED LENGTH = 320 mm
SPRING Wt = 1,9 kg

SPECIAL REQUIREMENTS ABOVE DIN 2095.
EXECUTION : SPRING SURFACE SHALL ($e_1 \leq 4,3$) RIGHT ANGLE TO THE VERTICAL AND ($e_2 \leq 1,3$) UNPARALLELITY TO ONE ANOTHER IN LOADED CONDITION.

TOLERANCES : FOR P_2 = C 0.02(L_1 - L_2) IN kg (TO BE ROUNDED OFF)

TESTING :- LOAD THE SPRING UP TO LENGTH L_1 AND DETERMINE P_1 ON THE BALANCE AND CHANGE LENGTH TO L_2 AND DETERMINE P_2 (WITH THAT 'C' CAN BE TESTED) THE DIMENSION MARKED THUS ( ) ARE TO BE TESTED.

WINDING DIRECTION : SET TEST FOR SPRING TO BE CARRIED OUT FOR 5 TIMES UP TO P_2 = 240 KP. (AS PER DIN 2095 PARA 5.)

THE TEST CERTIFICATE SHOULD CORRELATE WITH DRAWING AND LOAD VALUES P_1 & P_2 AT LENGTHS L_1 & L_2 RESPECTIVELY.

00

NO. OF PIECES	TITLE DIMENSION	SEMIPRODUCT	FINAL MATERIAL	MATERIAL	HEAT NO	NET WEIGHT 1.9 kg	GROSS WEIGHT	DRAWING NO	ITEM
						TOTAL NET WEIGHT			

SCALE	DRAWN BY G. Hari k	G. HARI KRISHNA	BLUE PRINT NO.	
	CHECKED			
	STANDARDS OFFICER		TRANSPAR COPY NO.	
	PRODUCTION SETTLED	APPROVED		
		DATE 8-12-75		

BHEL-HYD SAP ESA

RESTRICTED USE

BHEL HYDERABAD

COMPRESSION SPRING

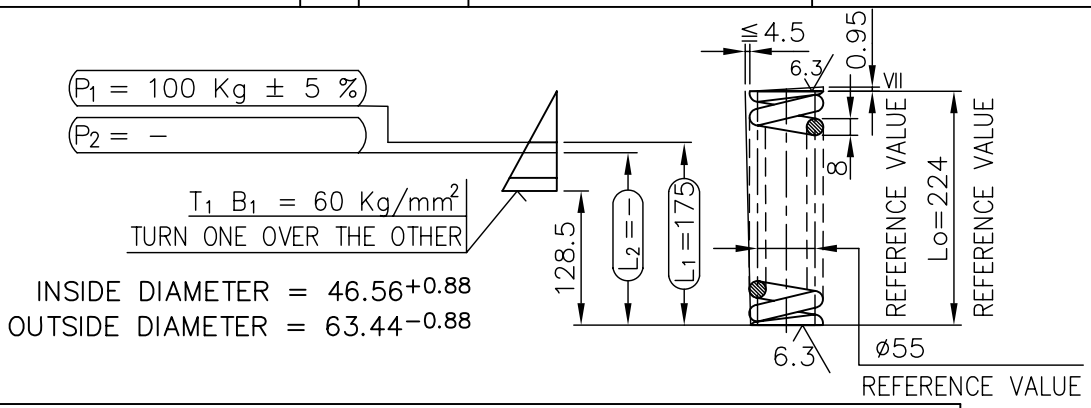
SP-11-531

4-305-19-00033-XX-00

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

REV.	DATE	ALTERED / CHECKED	REV.	DATE	ALTERED / CHECKED

GEN. DIM. LIMITS , FITS , & TOLERANCES AS PER P.S :- HY0230261



SPRING ENDS :- TO BE CENTERED IN FORMATION CONDITION. SPRING TO BE COLD FORMED, DEBURRED. INNER & OUTER CHAMFER WIDTH IS 0.5 TO 1.0mm. CHAMFER ANGLE 45°

MATERIAL :
OUTER SURFACE PROTECTION : OIL
MAXIMUM WORKING TEMPERATURE = 100°C
CALCULATIONS CORRESPONDS TO DIN 2089
REPRESENTATION, EXECUTION & TESTING CORRESPONDS TO DIN 2095
TOLLERANCE CORRESPONDS TO DIN 2095 5% FINE

SPRING CONSTANT: C=2.04Kg/mm±5%
SHEAR MODULUS G=8300 Kg/mm². NO. OF SPRING COILS i_f =12.5 REFERENCE VALUE.
THE END SHOULD BE FORMED BY BENDING ≈ 1 TURN
TOTAL STRETCHED LENGTH = 2510mm
SPRING Wt = 1 Kg

SPECIAL REQUIREMENTS ABOVE DIN 2095.

EXECUTION : SPRING SURFACE SHALL ($e_1 \leqq 3.5$) RIGHT ANGLE TO THE VERTICAL AND ($e_2 \leqq 0.95$) UNPARALLELITY TO ONE ANOTHER IN LOADED CONDITION.

TOLERANCES : FOR P_2 = C x 0.02 ($L_1 - L_2$) IN Kg (TO BE ROUNDED OFF).

TESTING :- LOAD THE SPRING UP TO LENGTH L_1 AND DETERMINE P_1 ON THE BALANCE AND CHANGE LENGTH TO L_2 AND DETERMINE P_2 (WITH THAT 'C' CAN BE TESTED). THE DIMENSION MARKED THUS ( ) ARE TO BE TESTED.

WINDING DIRECTION : SET TEST FOR SPRING TO BE CARRIED OUT FOR 5 TIMES UP TO P_2 = 192 Kg (AS PER DIN 2095 PARA 5.)

THE TEST CERTIFICATE SHOULD CORRELATE WITH DRAWING AND LOAD VALUES P_1 & P_2 AT LENGTHS L_1 & L_2 RESPECTIVELY.

00
VAR

SP-11-528		SPRING STEEL					1
REMARKS	ITEM NO	DESCRIPTION	STD	MATL. CODE / MATL. SPEN.	A / C	UNIT	UNIT Wt. / QTY.

BHEL-HYD SAP ESA

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	G.HARI KRISHNA		12.5.76	
CHD.	A.SINGH		12.5.76	NA
APPD.	P.N.REDDY		8.12.75	

RESTRICTED USE

DEPT. I.T.D / DEPT. CODE 415	UNTOL. DIM. GR. ~~C/M/F~~		SCALE N.T.S	WEIGHT (KG) 1	REF. TO ASSY DRG. –	ITEM NO.	NO.OF ITEMS –N.A–

TITLE
COMPRESSION SPRING

CARD CODE

DRAWING NO. ~~4-11-6855~~
4-305-19-00057
REV. 00

SHT No. 01 NO OF SHT. 01

INVENTORY NO 4305190057-

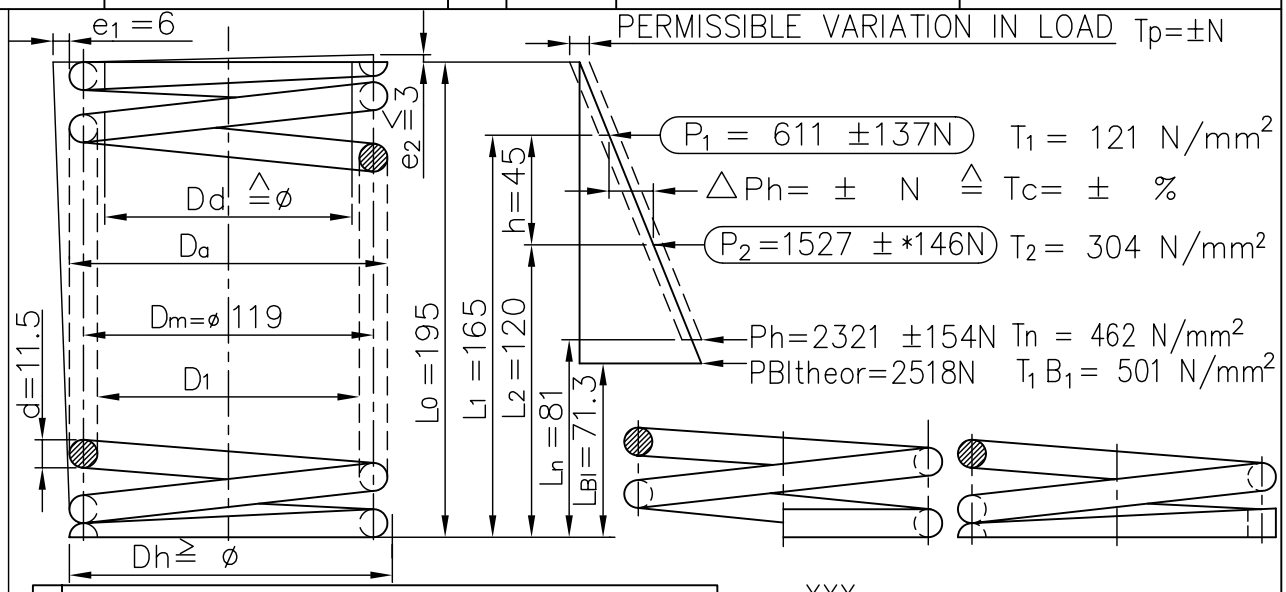
COMPUTER FIL

JCS

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

REV.	DATE	ALTERED / CHECKED	REV.	DATE	ALTERED / CHECKED

GEN. DIM. LIMITS , FITS , & TOLERANCES AS PER P.S :- HY0230261



PERMISSIBLE VARIATION IN LOAD Tp=±N

P_1 = 611 ±137N T_1 = 121 N/mm²

△Ph= ± N ≙ Tc= ± %

P_2 =1527 ±*146N T_2 = 304 N/mm²

Ph=2321 ±154N Tn = 462 N/mm²

PBltheor=2518N T_1B_1 = 501 N/mm²

1	XXX XXX	5 6.5	
2	XXX	78450N	20.36N
3	XXX XXX	XXX XXX	⊗ ○
4	DEBURRING OF SPRING ENDS CHAMFER WIDTH=0.5mm CHAMFER ANGLE= 45°	OMITTED INTERNALLY EXTERNALLY	○ ⊗ ⊗
5	WIRE OR BAR SURFACE	DRAWN ROLLED CENTRELESS GROUND SPRING SHOT PEENED	○ ○ ⊗ ○
6	MAX, WORKING TEMPERATURE t = 100°c		
7	SURFACE PROTECTION		
8	MATERIAL = 50 CrV4 T1 PER = N/mm²	DIN =17225 AS PER DIN =2089 BL 1	
9	MATERIAL STRETCHED LENGHT = 2430mm.	DIN = 2077	

* P_2 = P_1

XXX

	XXX	XXX	XXX	XXX	XXX
XXX P1 TO Pn e1 , e2 Lo	○ ○ ○ ○	○ ○ ○ ○	○ ○ ○ ○	⊗ ⊗ ⊗ ⊗	○ ○ ○ ○

11	DURING MANUFACTURING CORRECTION THROUGH Lo if ~~ø~~ ~~Dm~~
12	SETTING LOAD OF TESTING = 5TIMES OF 2500 N HOT FORMED YES ⊗ NO ○
13	SPRING TO BE CENTERED INFORMED CONDITION Di= 107.5 ±1.7mm Da= ±1 mm
14	TO TEST THE LENGHT OF SPRING @ = 120 HOLD THE SPRING BETWEEN TWO PLATES SUCH THAT (e2≦2mm)
15	SUPPLIER SHOULD SEND ALL SPRINGS WITH TAGS CLEARLY INDICATING THE DRG. NO & PURCHASE ORDER NO.

REMARKS	ITEM NO	DESCRIPTION	STD	MATL. CODE / MATL. SPEN.	A/C	UNIT	UNIT Wt. / QTY.

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

00 VAR

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	M.U.K		7.3.83	
CHD.	M.V.R		8.3.83	
APPD.				N.A

RESTRICTED USE

DEPT. I.T.D / DEPT. CODE 415	UNTOL. DIM. GR. ~~C/M/F~~	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
		N.T.S	2.0	N.A	N.A	N.A

TITLE
COMPRESSION SPRING
SP-11-610

CARD CODE

DRAWING NO. 4-305-41-00081 REV. 00

SHT No. 01 NO OF SHT. 01

REF. DRG. NO. 3-9003-1311-00

DATE

COMPUTER FILE E5410081.

INVENTORY NO

JCS

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm)

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.

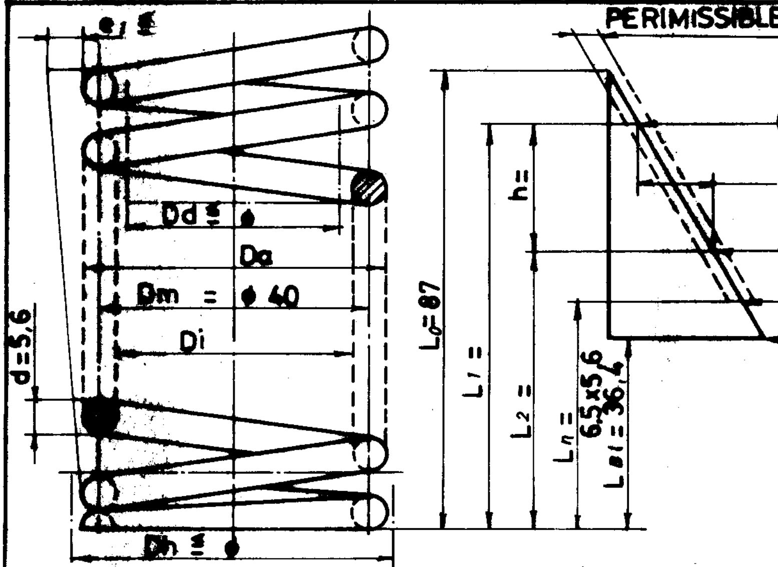
REV.	DATE	ALTERED / CHECKED	REV.	DATE	ALTERED / CHECKED
			01	29.02.20	-FIG2 & FIG3 REMOVED -NOTE ADDED BELOW THE SPRING FIGURE

GENERAL ENGINEERING LIMITS, FITS & TOLERANCES AS PER PS. NT 000001

ADDITIONAL INFORMATION

STATUS OF DRAWING

DISTRIBUTION OF PRINTS



Tp = ± kp

P_1 =	±	kp	τ_1 =		kp/mm²
ΔP_h=	±	kp	≙ τ_c =	±	%
			(BETWEEN (0.2 TO 0.8) f n)		
P_2=	±	kp	τ_2 =		kp/mm²
P_n	±	kp	τ_n =		kp/mm²
$P_{Bl\ theor}$=		kp ;	τ_{iBl} =		kp/mm²

NOTE: - BOTTOM END CLOSED AND GROUND
-TOP END OPEN

1.	NUMBER OF WORKING SPRINGS if = 5,5 TOTAL NUMBER OF COILS ig = 6.5
2.	SHEAR STRESS (G= 8300 kp/mm²) C= 3.25 kp/mm
3.	HAND OF COILING: RIGHT HAND ● LEFT HAND ●
4.	DEBURRING OF SPRING ENDS: OMITTED ○ ; CHAMFER WIDTH 0.2 ÷ 0.5 mm INTERNALLY ● ; CHAMFER ANGLE 45° EXTERNALLY ●
5.	WIRE OR BAR SURFACE: DRAWN ○ ; ROLLED ○ ; CENTRE LESS GROUND ○ ; SPRING SHOT-PEENED ○
6.	MAXIMUM WORKING TEMPERATURE t = 100 °c
7.	SURFACE PROTECTION: GREASED
8.	MATERIAL DIN Ti PER. Kp / mm² TO DIN
9.	MATERIAL : SPRING STEEL WIRE DIN C 17223

10.	PERMISSIBLE VARIATIONS	DIN 2095 COARSE	DIN 2095 MEDIUM	DIN 2095 FINE	DIN 2096	
	Da, Di, (Dm)	●	●	○	○	○
	P_1 TO P_n	○	○	○	○	○
	e_1 e_2	○	○	○	○	○
	Lo	○	○	○	○	○

11.	IN-MANUFACTURE CORRECTION THROUGH Lo, if, d Dm
12.	FORMATION TEST WITH FIVE TIMES P = kp HOT FORMED YES: ○ , NO: ○
13.	SPRING TO BE CENTERED IN FORMATION CONDITION WITH Di = ± mm Da = ± mm
14.	WHILE INSPECTING LENGTH L_2 = OUTER DIA Da SHOULD BE PERPENDICULAR TO SPRING AXIS AND e_2 ≤ mm
15.	SPRING SUPPLIER SHOULD DISPATCH SPRINGS WITH TAGS CLEARLY INDICATING DRAWING NUMBER, PURCHASE NUMBER etc...

NOTES. 1. SPRING SHOULD HAVE CLOSED COIL ONLY ON ONE END AS SHOWN.
2. SPRING TO BE CHECKED ONLY DIMENSIONALLY.

QTY. VARIANT	BASIC VARIANT	UNIT OF QTY. / RM. UNIT QTY.	DESCRIPTION	ITEM No.	STD.	DRAWING NO.	ITEM NO. / VARIANT	MATERIAL CODE / MATERIAL SPECN.	A / C	COMP.	GROUP	UNIT WT (Kg) / QTY.
00			SP - 11- 570			172F190						

CARD TYPE-2 ← 21 | 21 → CARD TYPE-1

REF. DRG. No.

SIGN. AND DATE

INVENTORY NO.

BHARAT HEAVY ELECTRICALS LIMITED
HYDERABAD

BHEL-HYD SAP INFORMATICS CENTRE

	CODE		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.
I.T	415		1/	0.16		

TITLE

COMPRESSION SPRING

	NAME	SIGN.	DATE
DRAWN	M.V.Rao.	[signature]	4-1-78
CHECKED		[signature]	
APPROVED		[signature]	

DIMENSIONS TO BE CONTROLLED WITHIN LIMITS AS SHOWN. MACHINING TOLERANCE ± .25mm UNLESS OTHERWISE SHOWN. NON-MACHINING TOLERANCE ± Old drg no. 3- 9002-4501-00

CARD CODE

DRAWING NO. 4-305-41-00140 VAR. REV. 01

SHEET No. | No. OF SHEETS