SPECIFICATION FOR PROCUREMENT OF CONSTANT LOAD AND VARIABLE LOAD SPRING CAGES

BASED ON BHEL OWN EXPERIENCE

1.0 PRODUCT INFORMATION :

The items covered under this document are intended for hangers and supports of TG Integral Piping to be installed in the machine hall of steam turbine sets .

2.0 SCOPE OF WORK :

The scope of work for the vendor shall be to supply completely (which includes design, selection of materials , fabrication, testing , packing and despatch) the spring cages covered by this document directly to thermal power station sites.

3.0 BID DRAWINGS:

Various types of spring cages sketches have been mentioned on sheet no.5,6,7, 8 , 9 along with BHEL code nos. and some mandatory dimensions. Vender has to furnish manufacturing drawings for BHEL approval against the requirement. Quantity of spring cages is to be supplied as per respective purchase order .

4.0 MATERIAL SPECIFICATION :

4.1 Material to be used for the manufacture of various parts of spring cages shall be strictly as per the sketches (mentioned above under clause no. 3) .

5.0 WELDING REQUIREMENT:

Welding of different components shall be carried out with matching electrodes by qualified welders and approved welding procedures as per ASME section-IX.

6.0 FABRICATION:

6.1 Dimensions of all the parts shall be in accordance with the drawing (mentioned above under clause 3) .

6.2 Surface finish of various components is to be decided by the vendor and should be mentioned in the manufacturing drawings

दिनांक एवं हस्ताक्षर SIGN & DATE

SUPERSEDES INVENTORY NO. / सामग्री सूची संख्या को अधिक्रमित करता है

हस्ताक्षर एवं दिनांक SIGN & DATE: 2/9/04

सामग्री सूची संख्या INVENTORY NO. P-5670

				नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
MEMBER OF PSC	N.R.DE	18.9.04	अनुवादक TRANSLATED BY	-	
QAX	S.S. CHAUHAN	20.9.04	निर्माणकर्ता WORKED BY	N.K.KAUSHIK	18.9.04
TSX	KISHAN LAL	20.9.04	जांचकर्ता CHECKED BY	S.GOEL	18/9/04
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	V.K.GUPTA	18.9.04

स्वीकृति : APPROVED : (B.K. BHALLA) AGM (STE)

ST 8.20

REV.NO. 04 Dt. 18.09.04

निर्माण PREPARED : STE | जारी ISSUED : STE (TL) | दिनांक DATE : 06-10-87

7.0 FINAL TESTING AND INSPECTION :

All items covered by this document shall be subjected to inspection by the purchaser and vendor shall provide all possible help in this regard to the purchaser at no additional cost . Vendor shall advice purchaser 4 weeks in advance when items are ready for inspection . Approval or passing of test / inspection and thereby issue of the test certificates or waival of inspection by purchaser shall not relieve the vendor of his responsibilities and obligations under the contract as well as shall not bind the purchaser to accept the equipment should it, on further tests after erection be found not complying with the contract .

Following tests / checks shall be carried out on springs .

7.1 Static load testing as per IS: 7906 , part – II .

7.2 Test load for compression to block length testing as per IS: 7906 , part-II .

Following tests / checks shall be carried out after assembly .

7.3 Dimensional checking .

7.4 Spring rate checking as per IS 7906 , part -II .

7.5 Forged components shall be subjected to the following tests.

(a) NDT :

20 % or minimum two pieces whichever is more of each type of forged components shall be subjected to MPI/DPT for surface crack examinations . In case any defect is found the whole lot shall be examined . No linear indication is permitted .

(b) Proof load :

20 % or minimum two pieces whichever is more shall be subjected to two times of maximum permissible axial working load as mentioned in the component drawings . In case any defect is noticed after proof load test the whole lot shall be tested for proof load test .

8.0 TEST CERTIFICATES :

Following inspection and tests certificates shall be submitted :

8.1 For plates and turnbuckles

(I) Chemical analysis.
(II) Mechanical properties.

8.2 For springs

(I) Chemical analysis.
(II) For clause 7.1
(III) For clause 7.2

8.3 For Assembly :

(i) Against clause 7.3
(ii) Against clause 7.4
(iii) Pre-set load certificate.

9.0 GUARANTEE :

Vendor shall guarantee all material , fabrication and workmanship of the spring cages furnished by him for a period of 24 months from the actual delivery or 18 months from the date of commissioning whichever is earlier .

10.0 MARKING AND IDENTIFICATION :

Following informations should be marked on the name plate for proper identification of the spring cages .

10.1 BHEL Code NO . and DU NO .
10.2 Maximum travel .
10.3 Minimum / Maximum load .
10.4 Pre-set load , if any .
10.5 Spring rate .

11.0 PACKING , PAINTING AND PRESERVATION :

11.1 Water proof paper and felt lining of the package shall be overlapped at seams at least 15 mm and the seam shall be sealed .

11.2 All the parts except springs shall be carefully packed and painted with red oxide paint in line with painting scheme given below for transportation in such a manner that these are protected against damage and the climatic conditions to which it may be subjected in transit and storing up to 24 months . The threaded portion and machined surfaces shall be protected with grease. Spring surface shall be manganese phosphated and oil dipped .

Painting Scheme

Paint (Coat)	Paint Type	No. of coat	DFT*
Primer Paint	: Epoxy base Zinc rich primer paint	2 Coats	70
Intermediate Paint	: Epoxy TiO_2 Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	60

Total DFT 180

DFT – Dry Film Thickness (final) in microns.

Shade : Smoke Grey ISC 692 as per IS-5 or Equivalent

The surface shall be cleaned before painting with suitable means . However in case of any specific requirement from the customer same shall be informed separately .

12.0 INSTRUCTION FOR BID PREPARATION :

Vendor shall essentially furnish unit rates for each type of spring cage and manufacturing drawing , failure to furnish the same the bid may be rejected .

13.0 CROSS REFERED STANDARDS :

ASME SEC-IX, IS:2004, IS:2062, IS:4454 PART-I, IS:7906 PART-II , IS : 5 & BS : 3602

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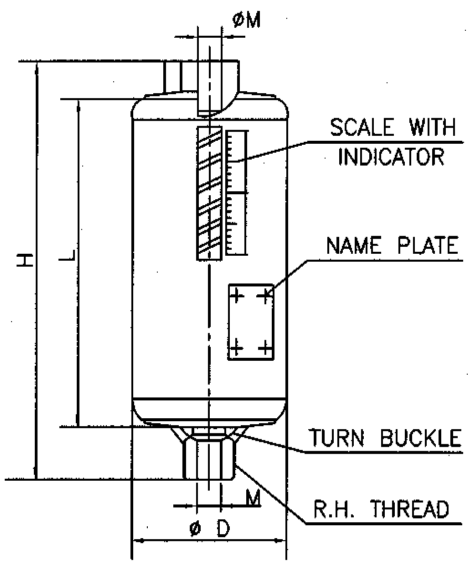

TABLE : VARIABLE LOAD SPRING CAGE (TYPE–A)

MAXIMUM TRAVEL IN mm	MIN.LOAD/ MAX.LOAD IN Kg.	BHEL CODE NO.	L	H	M	ø D	APPROX. WEIGHT IN Kg.	SPRING RATE IN Kg./ mm
50	166/500	W97372424283	155	200	M 16	115	05.0	06.66
	333/1000	W97372424330	180	230	M 20	155	10.0	13.33
100	12/52	W97372424143	245	280	M 12	90	03.0	00.40
	41/125	W97372424089						00.83
	83/250	W97372424011	250	290		115	06.0	01.66
	166/500	W97372424020		300	M 16		06.5	03.33
	333/1000	W97372424038	290	340	M 20	155	13.5	06.66
	666/2000	W97372424321	305	370	M 24	180	21.0	13.33
	2666/6000	W97372424070	480	370	M 42	245	80.0	53.33
200	12/52	W97372424239	470	510	M 12	90	05.0	00.21
	41/125	W97372424224					06.0	00.41
	83/250	W97372424348	475			115	10.0	00.63
	166/500	W97372424313	470	515	M 16		10.0	01.66
	333/1000	W97372424305	525	580	M 20	155	20.0	03.33
	666/2000	W97372424291	540	600	M 24	180	32.0	06.66

NOTES :–

(1) THE SKETCH INDICATES ONLY GENERAL OUTLINE DIMENSION FOR GENERAL INFORMATION. VENDOR HAS TO FURNISH MANUFACTURING DRAWINGS ETC. FOR REVIEW .
(2) PROVISION SHOULD BE MADE TO LOCK THE HANGER IN ANY POSITION BEFORE ERECTION AND DURING HYDRAULIC TESTING AND THIS LOCKING ARRANGEMENT SHOULD BE CAPABLE TO WITHSTAND 1.5 TIMES THE MAXIMUM LOAD .
(3) MATERIAL OF SPRING SHOULD BE Gr– III , IS:4454 (PART–1) AND FOR TURNBUCKLE CLASS–II , IS:2004 .
(4) MATERIAL FOR THE REST COMPONENTS SHOULD BE Gr–27, BS:3602 OR Gr–B, IS:2062 OR EQUIVALENT .
(5) MAXIMUM VARIATION IN SPRING RATE 6 % .
(6) DIMENSION "H" IS CORRESPONDING TO ZERO COMPERSION OF THE SPRING. THIS DIMENSION SHALL BE EXTENDED ACCORDING TO THE LOAD ON THE SPRING CAGE .
(7) TURNBUCKLE SHOULD BE OF SUCH DESIGN THAT DIMENSION "H" CAN BE ADJUSTED BY 100 MM BY USING TURNBUCKLE.
(8) DIMENSION M , MIN./ MAX. LOAD AND SPRING RATE ARE MANDATORY .

निर्माणकर्ता WORKED BY	N.K.K	[signature]	18.09.04
जांचकर्ता CHECKED BY	S..G.	[signature]	18-09-04

सामग्री सूची संख्या INVENTORY NO.	हस्ताक्षर एवं दिनांक SIGN & DATE	स्वत्वाधिकार एवं गोपनीय	COPYRIGHT AND CONFIDENTIAL	सामग्री सूची संख्या को अधिक्रमित करता है SUPERSEDES INVENTORY	दिनांक एवं हस्ताक्षर SIGN & DATE
P-5670	21/9/04	इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।	The information on this documents is the property of Bharat Heavy Electrical Limited.It must not be used directly or indirectly in any way detrimental to the interest of the company		

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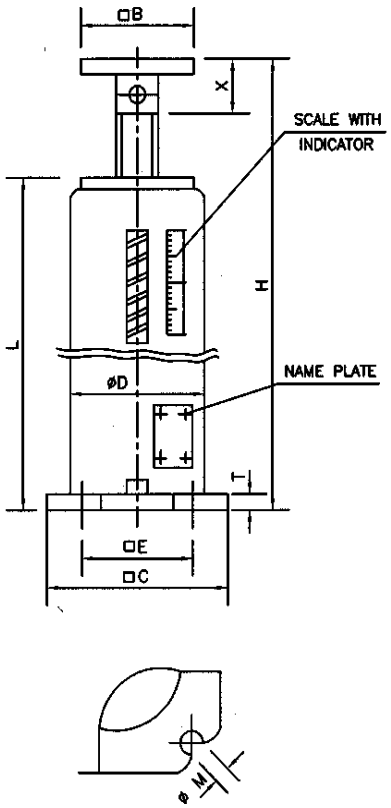
TABLE : VARIABLE LOAD SPRING CAGE (TYPE–B)



MAXIMUM TRAVEL IN mm	MIN.LOAD/ MAX.LOAD IN Kg.	BHEL CODE NO.	ø D	L	H	T	X	B	C	E	ø M	APPROX. WEIGHT IN Kg.	SPRING RATE IN Kg./ mm
50	12/52	W97372424364	90	145	195	8	36	80	125	95	12	3.0	0.83
	41/125	W97372424267		150	200		30					4,0	1.68
	83/250	W97372424135	115			10		100	150	115	14	6.0	3.33
100	12/52	W97372424356	90	245	305	8		80	125	95	12	4.0	0.40
	41/125	W97372424216	90	250	310							5.0	0.83
	83/250	W97372424046	115			10		100	150	115	14	8.0	1.66
	166/500	W97372424054				12							3.33
	333/1000	W97372424062	155	290	360		40	120	190	140	18	16.0	6.66
	666/2000	W97372424160	180	300	370	12	40	150	220	170		25.0	13.33
200	12/52	W97372424240	90	470	250	8	30	80	125	95	12	7.0	0.20
	41/125	W97372424380			550		36					7.4	0.41
	333/1000	W97372424275	155	525	615	12	40	120	190	140	18	25.0	3.33
	666/2000	W97372424100	180	540	630			150	220	170		37.0	6.66
	1333/4000	W97372424372	220	640	730	16	50	170	260	200	20	69.0	13.33

NOTES :–

(1) THE SKETCH INDICATES ONLY GENERAL OUTLINE DIMENSION FOR GENERAL INFORMATION. VENDOR HAS TO FURNISH MANUFACTURING DRAWINGS ETC. FOR REVIEW .

(2) PROVISION SHOULD BE MADE TO LOCK THE HANGER IN ANY POSITION BEFORE ERECTION AND DURING HYDRAULIC TESTING AND THIS LOCKING ARRANGEMENT SHOULD BE CAPABLE TO WITHSTAND 1.5 TIMES THE MAXIMUM LOAD .

(3) MATERIAL OF SPRING SHOULD BE Gr– III , IS:4454 (PART–1) AND FOR TURNBUCKLE CLASS–II , IS:2004 .

(4) MATERIAL FOR THE REST COMPONENTS SHOULD BE Gr–27, BS:3602 OR Gr–B, IS:2062 OR EQUIVALENT .

(5) MAXIMUM VARIATION IN SPRING RATE 6 % .

(6) DIMENSION "H" IS INDPENDENT FROM THE BLOCKING POSTION OF COLD LOAD SETTING AND PERMITS AN ADJUSTMENT OF 30 mm .

(7) DIMENSION E, C, M, & B , MIN/MAX. LOAD & SPRING RATE ARE MANDATORY.

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S..G.	N.K.K		
18-09-04	18.09.04		

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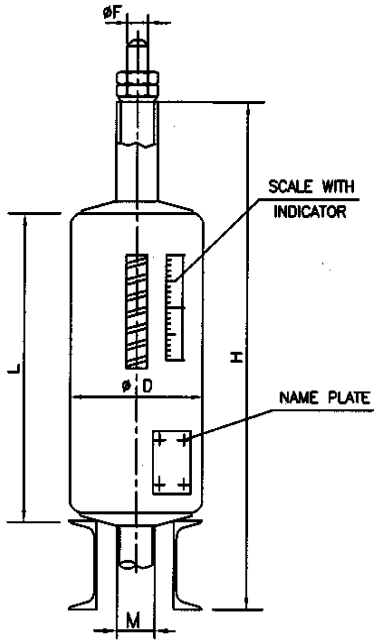

TABLE : VARIABLE LOAD SPRING CAGE (TYPE–C)

MAXIMUM TRAVEL IN mm	MIN. LOAD / MAX. LOAD IN Kg.	BHEL CODE NO.	ø D	L	H	ø F	M	APPROX. WEIGHT IN Kg.	SPRING RATE IN Kg./ mm
100	12/52	W97372424151	90	250	360	14	M 12	3.0	0.40
	41/125	W97372424127							0.83
	83/250	W97372424119	115					6.0	1.66
	166/500	W97372424097				18	M 16		3.33
	333/1000	W97372424232	155	290	400	22	M 20	12.0	6.66

NOTES :–

(1) THE SKETCH INDICATES ONLY GENERAL OUTLINE DIMENSION FOR GENERAL INFORMATION. VENDOR HAS TO FURNISH MANUFACTURING DRAWINGS ETC. FOR REVIEW .

(2) PROVISION SHOULD BE MADE TO LOCK THE HANGER IN ANY POSITION BEFORE ERECTION AND DURING HYDRAULIC TESTING AND THIS LOCKING ARRANGEMENT SHOULD BE CAPABLE TO WITHSTAND 1.5 TIMES THE MAXIMUM LOAD .

(3) MATERIAL OF SPRING SHOULD BE Gr– III , IS:4454 (PART–1) AND FOR TURNBUCKLE CLASS–II , IS:2004 .

(4) MATERIAL FOR THE REST COMPONENTS SHOULD BE Gr–27, BS:3602 OR Gr–B, IS:2062 OR EQUIVALENT .

(5) MAXIMUM VARIATION IN SPRING RATE 6 % .

(6) DIMENSION "H" IS CORRESPONDING TO ZERO COMPRESSION OF THE SPRING. THIS DIMENSION SHALL BE RECUDED ACCORDING TO THE LOAD ON THE SPRING CAGE.

(7) DIMENSION F, M, MIN/MAX. LOAD & SPRING RATE ARE MANDATORY.

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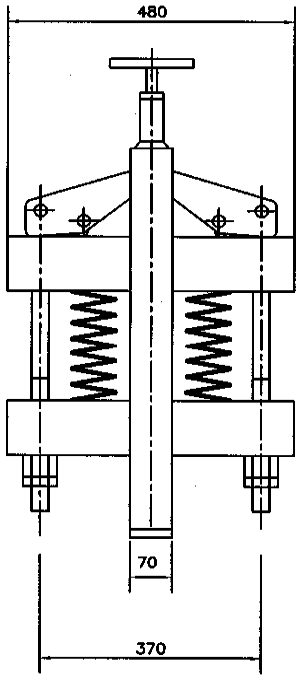
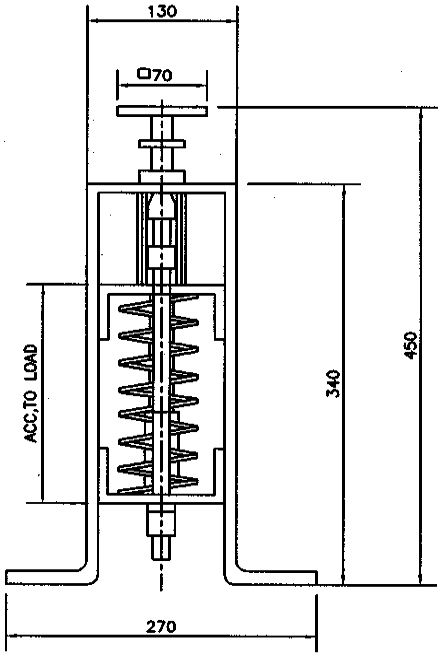
CONSTANT LOAD SPRING CAGE (TYPE–D)





TABLE

LOAD IN Kg.	BHEL CODE NO.	APPROX. WEIGHT IN Kg.
25	W97372442010	20.00
30	W97372442028	20.00
35	W97372442036	20.00
43.7	W97372442052	20.00
15	W97372442168	20.00

NOTES :–

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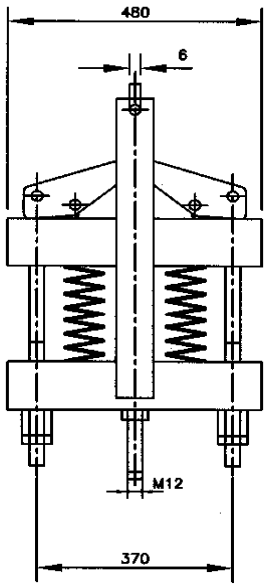
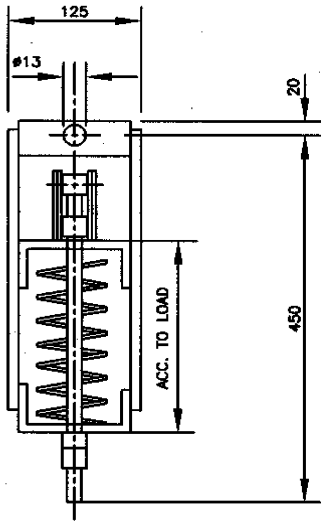
(2) PROVISION SHOULD BE MADE TO LOCK THE HANGER IN ANY POSITION BEFORE ERECTION AND DURING HYDRAULIC TESTING AND THIS LOCKING ARRANGEMENT SHOULD BE CAPABLE TO WITHSTAND 1.5 TIMES THE MAXIMUM LOAD .
(3) MATERIAL OF SPRING SHOULD BE Gr– III , IS:4454 (PART–1) AND FOR TURNBUCKLE CLASS–II , IS:2004 .
(4) MATERIAL FOR THE REST COMPONENTS SHOULD BE Gr–27, BS:3602 OR Gr–B, IS:2062 OR EQUIVALENT .
(5) MAXIMUM VARIATION IN SPRING RATE 6 % .
(6) MAXIIMUM VERTICAL MOVEMENT IS 100 mm.

CONSTANT LOAD SPRING CAGE (TYPE–E)





TABLE

LOAD IN Kg.	BHEL CODE NO.	APPROX. WEIGHT IN Kg.
25	W97372442044	20.00
27	W97372442060	20.00
33	W97372442079	20.00
36	W97372442087	20.00
23	W97372442095	20.00
20	W97372442109	20.00
22	W97372442117	20.00
15	W97372442125	20.00
16	W97372442133	20.00
15.5	W97372442141	20.00
10	W97372442150	20.00

NOTES :–

(1) THE SKETCH INDICATES ONLY GENERAL OUTLINE DIMENSION FOR GENERAL INFORMATION. VENDOR HAS TO FURNISH MANUFACTURING DRAWINGS ETC. FOR REVIEW .
(2) PROVISION SHOULD BE MADE TO LOCK THE HANGER IN ANY POSITION BEFORE ERECTION AND DURING HYDRAULIC TESTING AND THIS LOCKING ARRANGEMENT SHOULD BE CAPABLE TO WITHSTAND 1.5 TIMES THE MAXIMUM LOAD .
(3) MATERIAL OF SPRING SHOULD BE Gr– III , IS:4454 (PART–1) AND FOR TURNBUCKLE CLASS–II , IS:2004 .
(4) MATERIAL FOR THE REST COMPONENTS SHOULD BE Gr–27, BS:3602 OR Gr–B, IS:2062 OR EQUIVALENT .
(5) MAXIMUM VARIATION IN SPRING RATE 6 % .
(6) MAXIMUM VERTICAL MOVEMENT IS 100 mm.

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