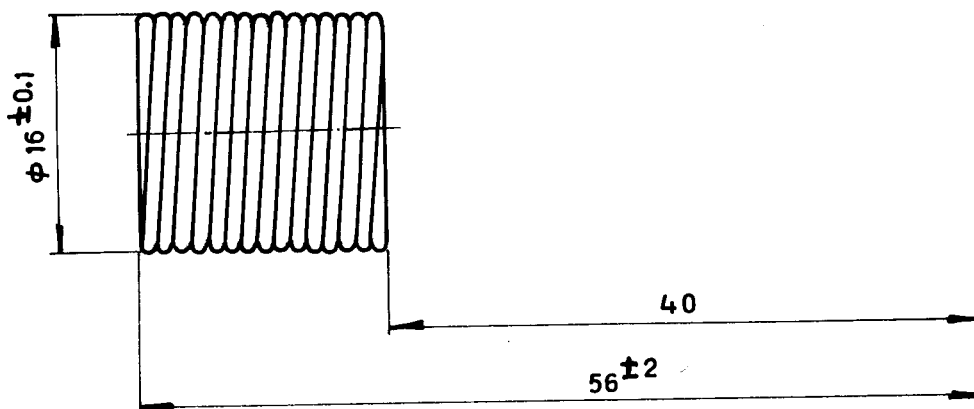
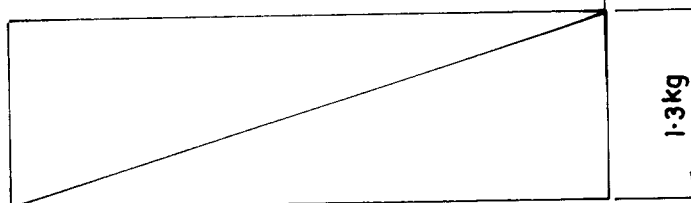
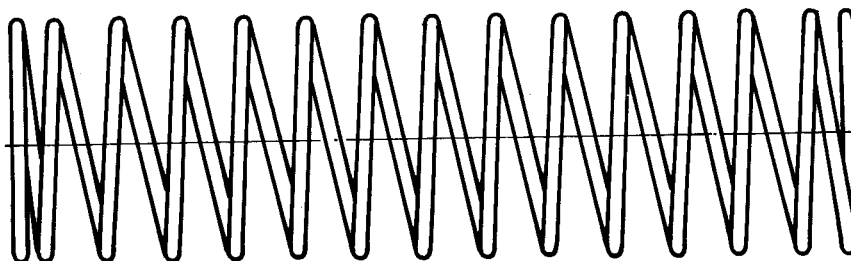


Ref: ENSFM02372

Scope of Supply

SI No.	Material Code	Material Description	Drawing No/Rev No	TDC No/Rev No	Quantity (No)
Schedule 1	964520210000	SPRING-3160	4V316006253/00	TDC:5:082/05	110
Schedule 2	964669930000	SPRING SP-107 (NICKEL PLATED)	3V000028107/00	-	2



NO. OF EFFECTIVE COILS : 13
 NO. OF TOTAL COILS : 15
 PITCH OF COILS : 4.0 mm
 DIAMETER OF WIRE : 1 mm
 MATERIAL : AISI 301/302/304
 SPRING CONSTANT : 0.03



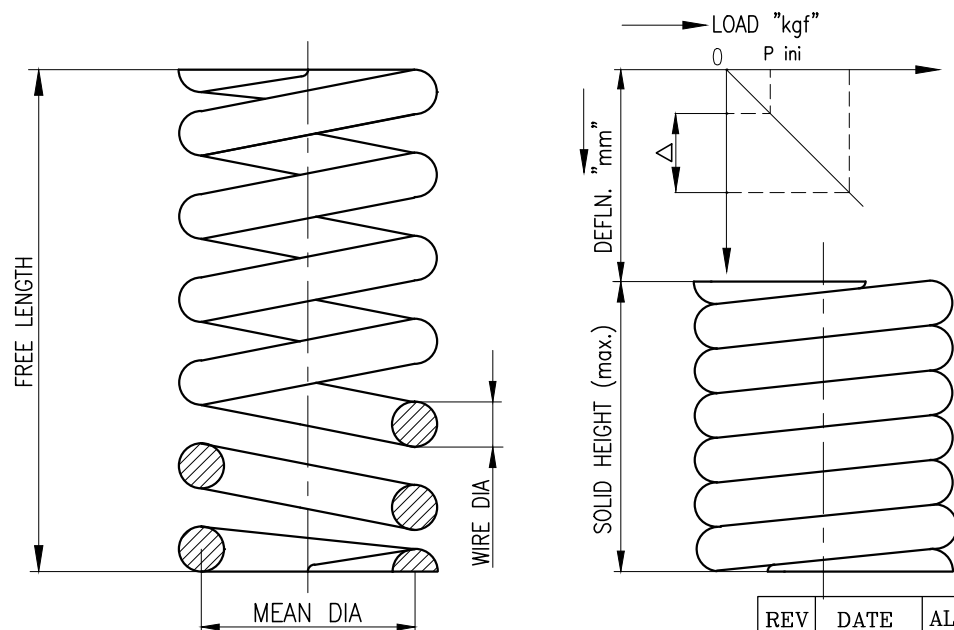
NOTE. ALL DIMENSIONS ARE IN MM.

NO. OF PIECES	NAME - DIMENSIONS	SEMI - PRODUCT	FINAL MATERIAL	INITIAL MATERIAL	SCRAP SORT	NET Wt (kg)	GROSS Wt (kg)	DRAWING NO.	ITEM NO.
REMARKS				TOTAL NET Wt (kg)					
NTS	SCALE	DRAWN	EC005	ALTERATIONS		DATE	SIGNATURE	ALTERATION INDEX	
		CHECKED	R.L. [Signature]						
		APPROVED	S.K. [Signature]						
		STDS. OFFICER	17.7.90	TRANS. COPY NO.					
		DATE							
TYPE		GROUP		OLD DRG.			NEW DRG.		
TITLE		DRAWING NO.		4 - V - 3160 - 06253			0		
		SPRING							



3-V-0000-28107
DRAWING NO.

Spring No.	Material	Wire Dia (d)	Mean Dia (Da)	No. of Active Turns (Na)	Toatal no. of Turns (N)	Free Length (Lf)	FULL CLOSE CONDITION			FULL OPEN CONDITION		
							Setting Length (Ls)	Deflection (X)	Load (F) kg	Deflection (X2)	Load (F2) kg	Shearing Stress τ (kg/mm2)
101	SWOC-V	8.5	70	6.5	9.7	165	126	39	91.3	63	147.5	42.81
102	SWOC-V	8.0	71	5.5	8.7	158	126	32	66.6	56	116.5	41.15
103	SWOC-V	9.5	69	6.5	9.7	165	126	39	148.8	63	240.3	49.25
104	SWOC-V	9.5	68	5.5	8.7	148	126	22	103.6	46	216.7	43.76
105	SWOC-V	8.0	67	5.5	8.7	148	126	22	54.5	46	113.9	37.96
106	SWOC-V	10.0	67	6.5	9.7	148	126	22	112.5	46	235.3	40.15
107	SWOC-V	10.5	69	5.5	8.7	148	126	22	148.0	46	309.5	46.97
108	SWOC-V	11.0	67	5.5	8.7	148	126	22	194.7	46	407.1	52.19
109	SWOC-V	9.0	68	5.5	8.7	148	126	22	83.5	46	174.5	41.45
110	SWOC-V	8.0	69	5.5	8.7	148	126	22	49.9	46	104.3	35.79
111	SWOC-V	6.5	73	7.5	10.7	216	126	90	55.1	114	69.7	47.21
112	SWOC-V	10.0	69	5.5	8.7	148	126	22	121.8	46	254.6	44.73
113	SWOC-V	7.5	69	5.5	8.7	154	126	28	49.0	52	91.1	37.93
114	SWOC-V	10.0	68	6.5	9.7	148	126	22	107.6	46	225.1	38.97
115	SWOC-V	9.5	70	5.5	8.7	148	126	22	95.0	46	198.6	41.29
116	SWOC-V	9.0	68	6.5	9.7	148	126	22	70.6	46	147.7	35.08
117	SWOC-V	8.0	61	7.3	10.5	154	126	28	69.2	52	128.5	39.00
118	SWOC-V	9.0	69	7.5	10.7	148	126	22	58.6	46	122.5	29.52
119	SWOC-V	8.5	68	5.5	8.7	148	126	22	66.4	46	138.8	39.15
120	SWOC-V	7.5	72.0	5.5	8.7	148	126	22	33.9	46	70.9	30.81
121	SWOC-V	8.5	69.0	6.5	9.7	154	126	28	68.4	52	127.1	36.37
122	SWOC-V	8.0	72.0	5.5	8.7	154	126	28	55.9	52	103.8	37.15
123	SWOC-V	7.0	69.0	5.5	8.7	154	126	28	37.2	52	69.1	35.40
125	SWOC-V	7.0	68.0	5.5	8.7	154	126	28	38.9	52	72.2	36.45
126	SWOC-V	8.0	72.0	5.5	8.7	154	126	28	55.9	52	103.8	37.15
127	SWOC-V	7.5	70.0	5.5	8.7	154	126	28	47.0	52	87.2	36.85
128	SWOC-V	8.0	69.0	6.5	9.7	154	126	28	53.7	52	99.7	34.23
129	SWOC-V	8.0	70.0	5.5	8.7	148	126	22	47.8	46	99.9	34.77



NOTES:

1. ALTERNATE MATERIAL: A231-CrVd ANNEALED.
2. SPRING SHALL MEET THE LATEST TDC 5:192 REQUIREMENTS

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

REV	DATE	ALTERED
		CHD & APPD

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
	TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT							QN	
	BHARAT HEAVY ELECTRICALS LTD., UNIT: HIGH PRESSURE BOILER PLANT. TIRUCHIRAPALLI-620014.	DRN	JALAL	SIGN	JALAL	DATE	23.04.15	NO. OF VAR.	
		CHD	JALAL	JALAL	23.04.15				
		APPD	SANKARAN	SANKARAN	23.04.15				
DEPT	VL	SCALE	WEIGHT (KG).	REFERENCE INFORMATION				NO. OF ITEMS	
CODE	320	N T S							
TITLE						CARD CODE	DRAWING NO.	REV	
SPRING FOR DIA 100 CYLINDER						U 01	3-V-0000-28107	00	



Product: Safety and Safety Relief Valve Springs

Record of Revisions:

Rev. No.	Clause No.	Details of revision	Remarks
01		Editorial correction	
02	7.4.1.3 Fig. 1 Fig. 2	Introduced Charted average deflection changed as average deflection. Final deflection changed as Test deflection	
03	3.1.2 5.3.1 9.1	Heat treatment condition added Wire dia increased from 10 to 16 mm for cold Coiling based on IBR amendment. Point No.7 added. Point No.3 and 5 clarity brought in Annexure II. Point no 9.24 added.	
04	--	Modified in entirety. UT on bars of dia > 40 mm added. New materials added.	
05	3.1.2 5.2.1 5.2.11 7.5 8.2 Tables I,II,III,IV & V Annexure II	<i>Mechanical tests as applicable</i> <i>Coiling process</i> <i>Modified</i> <i>Removed</i> <i>Modified</i> <i>Modified</i> <i>Revised</i>	

1.0 SCOPE

- 1.1 This Technical Delivery Condition specifies the technical and inspection requirements for circular section wire, helical compression springs used in safety/safety relief valves. Primary considerations are for a spring designed to remain under static load with a compression load defined by (seat area X set pressure) for the major portion of its life. Load is intermittently added by virtue of the spring being compressed by the valve travel when the system pressure exceeds the valve set pressure and the valve opens. Approximately 10,000 cycles of intermittent valve openings are expected. It is the responsibility of the supplier to design, manufacture, test, certify and supply the springs as per this TDC.

2.0 APPLICABLE STANDARDS (Latest on the date of PO)

2.1 CODE REQUIREMENTS

ASME Sec-I (Boiler & Pressure Vessel Code)
ASME Sec-IV (Rules for Construction of Heating Boilers)
ASME Sec-VIII Div-1 & 2 (Rules for Construction of Pressure Vessels)
Indian Boiler Regulations: Regulation Nos: 307 to 314.
Dresser Specn MA 16.

2.2 REFERENCE STANDARDS

ASTM A-125 : Standard Specification for Steel Springs, Helical, Heat-Treated.
ASTM A-370 : Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
ASTM E-6 : Standard Terminology Relating to Methods of Mechanical Testing.
ASTM E-10 : Standard Test Method for Brinell Hardness of Metallic Materials.
ASTM E-18 : Standard Test Methods for Rockwell Hardness of Metallic Materials
ASTM E-140 : Standard Hardness Conversion Tables for Metals Relationship among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
ASTM B-456 : Standard Specification for Electrodeposited Coatings of Copper plus Nickel Plus Chromium and Nickel Plus Chromium.
IS: 7906 : Part I, II, III & IV for Hot and Cold rolled springs.

Even though the reference standards are given, the supply condition shall be in line with this TDC.



Product: Safety and Safety Relief Valve Springs

3.0 SPRING DRAWING

3.1 For each type of springs BHEL will provide a spring drawing which will be the basis for spring manufacturer. This drawing shall provide details of dimension, material and process.

3.1.1 The steel (raw material) shall be procured from Well-known Steel makers indicated by IBR with Mill TC. If the steel maker is not approved as a well known steel maker by IBR, then the raw material (wire/bar) shall be inspected and Mill Test certificates shall be countersigned by the concerned State DOB/CIB (if indigenously procured), or by the Inspecting Authorities approved by IBR (if imported).

3.1.2 Springs shall be made from steels made by basic oxygen, open-hearth process or electric furnaces. Mechanical tests shall be conducted for raw materials used for springs and shall meet the material specification requirements and these test values (YS, UTS, % Elongation, hardness *as applicable/specified in the material specification*) shall be reported in the raw material TC along with chemistry & heat treatment condition. Also, test certificate for the spring shall be furnished as per Annexure-II by the Spring Manufacturer.

4.0 DESIGN PARAMETERS

4.1 Each Spring Design shall be analyzed by the spring vendor. Calculations shall be submitted to BHEL for approval, if any change in design parameters.

4.2 SPRING RATE

4.2.1 BHEL requires springs that demonstrate the spring rate as specified in the spring drawing. If no tolerance specified in the drawing it shall not vary more than 5% of the nominal rate specified. This requires that the operating range of the spring be in the linear portion of the spring rate curve (fig 1). For a given carbon steel or low alloy spring, the linear region of the spring is generally defined to be between 15% and 85% of the total average deflection. The spring drawing is developed on the basis of an initial loading of approximately 15% deflection, then compressing the spring a given deflection (defined as test deflection) from which the load is measured. All springs shall have a load at test deflection within the limits specified in the spring drawing (See fig 2).

4.3 SPRING RATE MEASUREMENTS

4.3.1 Hysteresis as applied to a helical spring can be defined as that characteristic which causes a spring to follow a different load Vs deflection curve during a compression operation than during a relaxation operation. It is important that all load readings for the purposes of determining rate shall be made during a compression operation. If, for example a spring is inadvertently compressed beyond the 85% test load value, it is necessary to remove the load completely to zero (0) and recommence the test in order to obtain accurate results.

4.4 SPRING RATE CALCULATION

4.4.1 The Spring rates have been calculated using the following equation:

$$K = \frac{Gd^4}{8ND^3}$$

K = Spring rate (kg/mm)

d = Normal wire size (mm)

D = Mean Coil diameter (mm)

N = Active coils.

= Total coils - 2 for wire size < 12.7 mm.

= Total coils - 1.5 for wire size ≥ 12.7 mm

G = Torsional modulus of material (Kg/sq mm)

4.4.2 Springs shall be tested for spring rate in accordance with the requirements of Clause 6.8 of this TDC.



Product: Safety and Safety Relief Valve Springs

4.5 PERMANENT SET / SCRAGGING TEST

4.5.1 It is essential that springs be furnished in accordance with the requirements of the ASME Codes & IBR. The permanent set of the spring (defined as the difference between initial free height and free height measured 10 minutes after the spring has been compressed to its solid height 3 additional times) shall not exceed 0.5 % of the free height. Compressed solid height is defined in Annexure-I. If required, manufacturer may change the design with the approval of BHEL to meet the conditions.

4.6 FREE HEIGHT

4.6.1 The free height is a fixed parameter controlled by assembly physical considerations and subject only to the tolerance consideration as per Clause. 6.5.

4.7 INSIDE & OUTSIDE DIAMETERS

4.7.1 Assembly and machined part considerations determine whether the inside or outside diameter of the spring are critical, the spring drawing indicates the limits on the spring diameter within which a vendor can supply springs. Suggested bar size is also noted in drawing to assist in checking spring designs. It is suggested that the inside diameter be held if possible, however, a larger inside diameter is permissible. Vendors are cautioned that eccentricities, bowing, and other factors that cause an apparent change in spring dimension must be considered by the vendor in the diameter limits specified on the spring drawing.

4.8 LOAD LOSS

4.8.1 Manufacturer shall be responsible for ensuring that spring fabrication, heat treatment, stress relieving etc., are adequate to ensure proper spring manufacturing at an ambient temperature of 35 Deg C. Because of load loss characteristic non pre-stressed springs are preferred.

4.9 DE-CARBURISATION

4.9.1 The bars shall be free from defects so that springs produced shall be free from total de-carburisation and the depth of partial de-carburisation shall not exceed as follows:

For dia > 10 mm to ≤ 20 mm = 0.08 mm.

For dia > 20 mm to ≤ 80 mm = 0.13 mm.

4.9.2 The de-carburisation shall be examined at 100X on a test specimen suitably etched and cut from full cross section of the test spring showing at least one line inch of original bar circumference.

5.0 MANUFACTURE

5.1 Material shall conform to the requirements specified in the spring drawing.

5.2 COILING

5.2.1 *Unless specified in Drawing, springs may be manufactured by cold or hot coiling process.*

5.2.2 Springs shall be made out of machined and suitably finished bars to avoid surface defects and to minimize de-carburization.

5.2.3 The bar heating and subsequent heat treatments shall be done preferably in atmosphere controlled furnace. If not available, the same shall be done only in electric furnaces. Usage of oil-fired furnaces shall be mutually agreed prior to the placement of order.

5.2.4 The depth of partial de-carburisation shall not exceed the limits specified in Clause 4.9.

5.2.5 Springs shall be uniformly & suitably heat treated as per specification for developing the required physical properties specified in spring drawing.



Product: Safety and Safety Relief Valve Springs

- 5.2.6 Unless otherwise agreed upon the direction of coiling shall be right hand only.
- 5.2.7 Pitch correction by wedging after coiling is prohibited. The correct pitches shall be obtained in the coiling process itself.
- 5.2.8 For transmitting axial loads on the connecting bodies the spring end shall be formed by grinding to provide smooth flat bearing surface of a minimum of 3/4 of the circumference as per fig.4.
- 5.2.9 The tip thickness 't' in fig.3, shall be between d/3 and d/4 approximately, where d is the diameter of wire.
- 5.2.10 The tips shall not protrude outside or inside of the spring. Such projections shall be ground smoothly to match the spring outside or inside diameter as the case may be. This is shown in fig.4.
- 5.2.11 The end coils shall have smooth consistent taper to minimize spring out of squareness under load. Common type of unacceptable and acceptable ends are shown in fig.5.

6.0 INSPECTION

6.1 All springs shall be 100% tested for conformance as per this TDC.

6.2 SURFACE FINISH INSPECTION

6.2.1 A visual inspection shall ensure that no projections on the inside or outside diameters exist that will exceed the nominal inner or outer spring diameters respectively. Manufacturers are responsible for ensuring that no laps, seams, folds, scaling or other defects which may act as stress risers or masked defects are present in any spring. Stress raisers are subject to evaluation by BHEL, however gas holes, pitting, or large sections where nominal spring wire diameter is reduced by more than (1.5 %) are considered unacceptable. The 1.5 % limitation also applies to surface ground flat for hardness readings.

6.3 INSIDE DIAMETER INSPECTION

6.3.1 Inside diameter shall be checked as per the spring drawing. For all springs the following tolerances apply to the diameters specified on spring drawing.

Inside diameter -----	Tolerance -----
25mm and smaller	+ 0.8 mm / - 0 mm
over 25mm to 50mm inclusive	+ 1.6 mm / - 0 mm
over 50mm to 100mm inclusive	+ 2.4 mm / - 0 mm
over 100mm	+ 3.2 mm / - 0 mm

6.3.2 The suggested wire diameters are indicated in the spring drawing.

6.4 END COIL INSPECTION

6.4.1 End coils should be wound closed against the adjacent full pitch coils. Deviation from this closure shall not exceed the following (Ref. Fig.3.)

Wire Size -----	Max. Opening -----
Less than 11.1mm	0.8 mm
Over 11.1 - 31.8	1.6
Over 31.8 - 44.5	3.2
Over 44.5 - 57.2	4.0
Over 57.2	4.8



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6.4.2 Maximum Tip thickness shall be in accordance with Cl. 5.2.10 (Ref. Fig.3)

6.4.3 The end coils shall be in accordance with Cl.5.2.9 & Cl.5.2.12.

6.5 FREE HEIGHT INSPECTION

6.5.1 The free height is determined by placing a straight edge across the top of the spring and measuring the perpendicular distance from the plate on which the spring stands to the bottom of the straightedge at the approximate centre of the spring. Tolerances are shown below:-

Free height	Tolerance
75mm and smaller	± 0.8mm
over 75mm to 165mm inclusive	±1.6mm
over 165mm to 254mm incl.	±2.4mm
Over 254mm to 356mm incl.	±3.2mm
Over 356mm to 559mm incl.	±4.8mm

6.5.1.1 Springs which "Rock" in their free standing position are considered acceptable under the following conditions:-

(a) A reasonable determination of free height of the centre line can be made, and variation in free height is within the tolerances specified above. A spring out of square by more than 2 Deg as measured in Cl.6.6 & Cl.6.7 is considered unacceptable (This applies for springs larger than 12mm diameter wire).

(b) Check wire diameter of spring ends are within the limits specified in fig.6.

6.5.2 Permanent Set/Scragging test shall be carried out for each spring as per Cl 4.5.1. Following the three deflection tests, the free height shall be measured. The spring shall be within tolerances as specified in Clause.6.5.1. Furthermore, loss in its free height (i.e., permanent set) shall not exceed 0.5% of the free height.

6.6 SQUARENESS AND CONCENTRICITY FOR SPRINGS LARGER THAN 14 MM WIRE SIZE.

6.6.1 A centrally located ball and washer mechanism, as shown in fig.7 shall be used for testing. The end plates shall be centrally fixed and not movable during test. When under final load, the ends of the spring shall sit squarely on the test plates with the ground surface in full contact with the test plates.

6.6.2 Deflect spring to 85% of the total deflection three times prior to taking tilt measurement.

6.6.3 The total included angle of the tilted washers at final load shall not be more than 3 deg. Angular tilt at one end of the spring shall not exceed 1 - 1/2 Deg.

6.6.4 The effects of bowing, eccentricities, etc., shall be limited to the tolerances specified in Clause 6.3.

6.6.5 Tilt measurement shall be taken when the spring is loaded to 85 % of total deflection as in spring drawing.

6.7 SQUARENESS AND CONCENTRICITY FOR SPRINGS 14 MM AND LESS WIRE SIZE

6.7.1 Springs shall be checked in accordance with Fig.8. "Y" values when measured with a scale not to exceed $\tan 1.5 \text{ deg.} \times \text{spring length (FL : free height)}$.

6.7.2 To accurately determine the spring end coil concentricity the actual inside diameter of either end coil must be measured. The smaller end should be placed against the surface plate. The difference between



Product: Safety and Safety Relief Valve Springs

either inside diameter must be divided by 2 and this amount subtracted out of measured "Y" value.

(i.e) Condn

$$\frac{\{Y - (ID_1 - ID_2)\}}{2} < (\tan 1.5 \text{ Deg}) \times FL$$

6.8 SPRING RATE VERIFICATION

6.8.1 Springs shall be checked to verify spring rate between initial load and final load values specified. The spring drawing indicates load and deflection values required. Springs larger than 14mm wire will be checked with washers and bearing in accordance with Fig.7. Other springs may be checked between flat end plates. The testing procedure shall be as follows:

(a) Spring shall be installed and tested with the stamped code facing the tester and at the upper side of the spring. This is to ensure consistency in testing.

(b) Apply initial load specified in spring drawing, set deflection recorder to zero.

(c) Apply test deflection specified in spring drawing, observe the load at test deflection. This load should be within the limits specified in spring drawing.

6.9 NON-DESTRUCTIVE EXAMINATION

6.9.1 UT shall be done on bars (used for springs) of dia. > 40mm as per ASTM A388 & with acceptance as per ASME Sec VIII Div 2 cl 3.3.4

6.9.2 Unless and otherwise specified, each Carbon & Low alloy Springs with wire size ≥ 25 mm and Tungsten springs with wire size of ≥ 19 mm shall be wet magnetic particle tested & accepted at manufacturer's works as per ASME Sec VIII Div 1 Mandatory Appendix 6. Non-ferromagnetic springs shall be Penetrant tested & accepted as per ASME Sec VIII Div 1 Mandatory Appendix 8.

6.9.3 All Non-Destructive examination shall be done after heat treatment, and prior to Spring Testing.

7.0 SURFACE TREATMENT

7.1 All springs shall be shot blasted before MPI/PT. This blasting procedure to be approved.

7.2 Unless specified otherwise, carbon steel and low alloy steel springs shall be furnished by the manufacturer in the phosphated condition.

7.3 All tungsten alloy springs shall be aluminized, using either baked-on paint or molten aluminum.

7.4 Springs will be given special coating when specified in spring specification sheet/drawing.

8.0 IDENTIFICATION

8.1 All springs of wire size 5mm and below shall be tagged individually to show the details of spring number given in drawing, unique number of individual spring, supplier code, specification and heat no of actual material.

8.2 All springs of wire size above 5mm and below 12mm should be vibro etched/*laser marked* to indicate the spring number given in drawing, unique number of individual spring, supplier code, specification and heat no of actual material.

8.2.1 The Purchase order number should be tagged on individual spring.



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8.3 All springs of wire sizes $\geq 12\text{mm}$ should be punched with the following details on the outside diameter of an inactive coil : Spring number given in drawing, material specification, supplier code (& supplier's symbol, if available), heat number, unique number of individual spring and spring marking as per applicable table.

9.0 RECORDS

9.1 The following records shall be furnished for each spring.

- a) Spring Raw Material Test certificate (Mill TC) including UT results as per cl 6.9.1
- b) Coiling and heat treatment temperature, soaking time, cooling media.
- c) Dimensional report.
- d) Test report of spring rate.
- e) Test Report for scragging test.
- f) Hardness
- g) Spring Test Certificate for each spring shall be as per typical test record indicated in Annexure II duly approved by Chief Inspector of Boilers/ Director of Boiler of the respective State or by Inspecting Authorities approved by IBR.
- h) Compliance certificate to IBR.



Product: Safety and Safety Relief Valve Springs

Table 1

Material: Carbon & Alloy Steels

Reference Specification ASTM A689 Carbon and Alloy Steel Bars for Springs

Material Specification	Torsional Modulus at 70°F (x 10 ⁶ psi)	Hardness (HRC)	Spring Marking
ASTM A231, ASTM A232	11.5	---	CR
ASTM A322 GRADE 6150 & 5160	10.5	46-50	
ASTM A304 GRADES 4161H, 5160H, 51B60H, 6150H, 9260H			
ASTM A401			
BS970 Pt2 GRADES 735A51,735H51			
BS 2803 GRADES 735A50, 685A55			
DIN 17221 GRADE 51CrMoV4			
DIN 17225 GRADE 50CrV4			
EN 10089 GRADES 51CrV4, 52CrMoV4			
EN 10270-2			
IS 4454-2			

Table 2

Material: Tungsten Alloy Steel

Material Specification	Torsional Modulus at 70°F (x 10 ⁶ psi)	Hardness (HRC)	Spring Marking
ASTM A681 Type H-12, H-21	11.0	44-48	E
BS 4659 TYPE BH-12, BH-21			

Table 3

Material: Stainless Steel

Material Specification	Torsional Modulus at 70°F (x 10 ⁶ psi)	Hardness (HRC)	Spring Marking
ASTM A313 TYPE 316	10.0	---	SY
ASTM A276 TYPE 316	9.8	---	

Table 4

Material: Non-Ferrous

Material Specification	Torsional Modulus at 70°F (x 10 ⁶ psi)	Hardness (HRC)	Spring Marking
ASTM B164 CLASS A (MONEL 400 FULL HARD, Spring Temper)	9.2	23-26	MO
MONEL K-500 (AMS 4676)	9.2	34-38	KM



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Table 5
Material: High Temperature

Material Specification	Torsional Modulus at 70°F (x 10 ⁶ psi)	Hardness (HRC)	Spring Marking
ASTM A564 TYPE 631 17-7PH CONDN C	11.0	42-46	NC
ASTM A 564 TYPE 630 17-4 PH	10.5	40-44	PH
ASTM A638 GRADE 660	10.5	40-44	C7
ASTM B166 (INCONEL 600 AND 601)	11.0	34-38	I
ASTM B637 GRADE 688 OR AMS 5699 Heat treated to AMS 5699D PARA 1.2.1	11.5	40-44	IX
ASTM B637 GRADE 688 OR AMS 5699 heat treated to AMS 5699D PARA 1.2.2	11.5	36-40	IXS
ASTM B446 GRADE 625 INCONEL 625 ROD & BARS (UNS NO: 6625)	11.5	88 HRB	I6X
AMS 5844 (MP35N UNS R30035)	11.5	44-55	MP



Product: Safety and Safety Relief Valve Springs

ANNEXURE I

DEFINITIONS

TOTAL DEFLECTION:-- The amount of deflection achieved when the Spring is compressed to its solid height.

COMPRESSED SOLID HEIGHT:- The perpendicular distance between the plates of the testing machine when the spring is compressed with a test load sufficient to bring all coils into contact.

SOLID CAPACITY:

$$P = Gd^4 F / 8 ND^3$$

Where,

G = Effective torsional modulus of elasticity (Kg/sq.mm)

d = Nominal bar diameter (mm)

D = Mean Coil or helix diameter (mm)

F = Spring deflection = free to solid (mm)

N = Active turns.

P = Solid capacity (kgf)

UNCORRECTED SOLID STRESS -

$$S = 8 PD / 3.1416 d^3$$

FINAL DEFLECTION: - A distance specified on the SD sheet for a particular spring which reflects a percentage of the average deflection. The value is used for rate measuring purpose only, within the linear region.

LINEAR REGION:- The part of the load /deflection curve of a particular spring in which deflection increases linearly with increased load. For this purposes of this specification of this range is defined as between 15% and 80% of nominal solid deflection for carbon and low alloy springs.

FREE HEIGHT:- The perpendicular height of the spring measured along the centerline after pressing to solid once and releasing.

PERMANENT SET/ SCRAGGING:- The difference between the free heights measured before and after the spring has been compressed to its solid height and released, 3 times.



Product: Safety and Safety Relief Valve Springs

ANNEXURE II

TEST CERTIFICATE FOR SAFETY VALVE /SAFETY RELIEF VALVE SPRINGS

Inspection Report No : _____

Date: _____

- 1 Name of Manufacturer :
- 2 PO Number and Date :
- 3 Quantity :
- 4 Drawing No :
- 5 Type of spring :
- 6 Spring Number :
- 7 Coiling Practice :
- 8 Spring record :

Sl. No	Description	Required	Actual	Remarks
9.1	Unique number of spring			
9.2	Material Specn. <i>of Raw Material Used</i>			
9.3	Melt no			
9.4	Raw Matl TC No			
9.5	Wire dia			
9.6	Outside dia			
9.7	Inside dia			
9.8	No of Active turns			
9.9	Solid Height			
9.10	Squareness			
9.11	Spring Rate			
9.12	Free Height			
9.13	<i>Final Load</i>			
9.14	Permanent set/Scragging			
9.15	Hardness			
9.16	MPI Results for Springs			
9.17	MPI Report to be submitted			
9.18	Surface Coating			
9.19	Depth of De-Carburisation			
9.20	Others Pl Specify			
9.21	Note to be added to verify compliance to IBR			

Inspected by _____

NOTE: THE ABOVE CERTIFICATE SHALL BE APPROVED BY CHIEF INSPECTOR OF BOILERS/DIRECTOR OF BOILERS IN THE STATE OF MANUFACTURER/ IBR APPROVED INPSEPCTING AUTHORITY.

Product: Safety and Safety Relief Valve Springs

Figure - 1

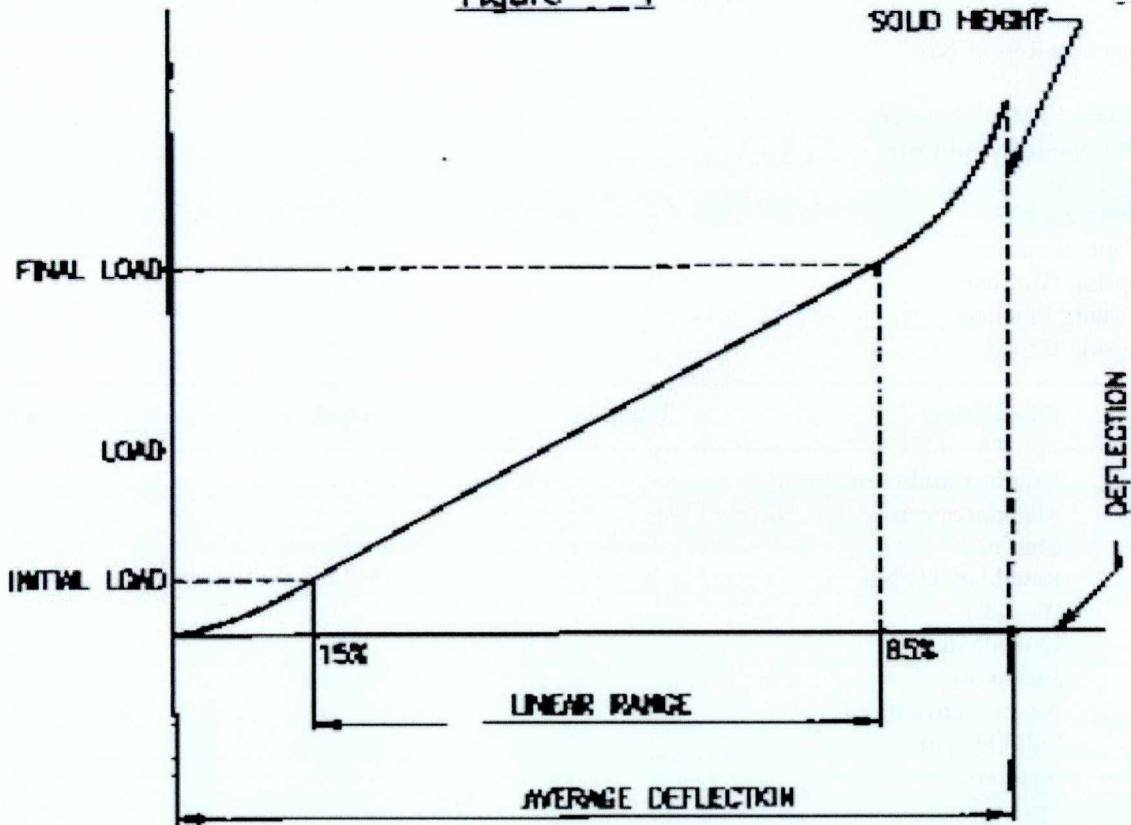


Figure - 2

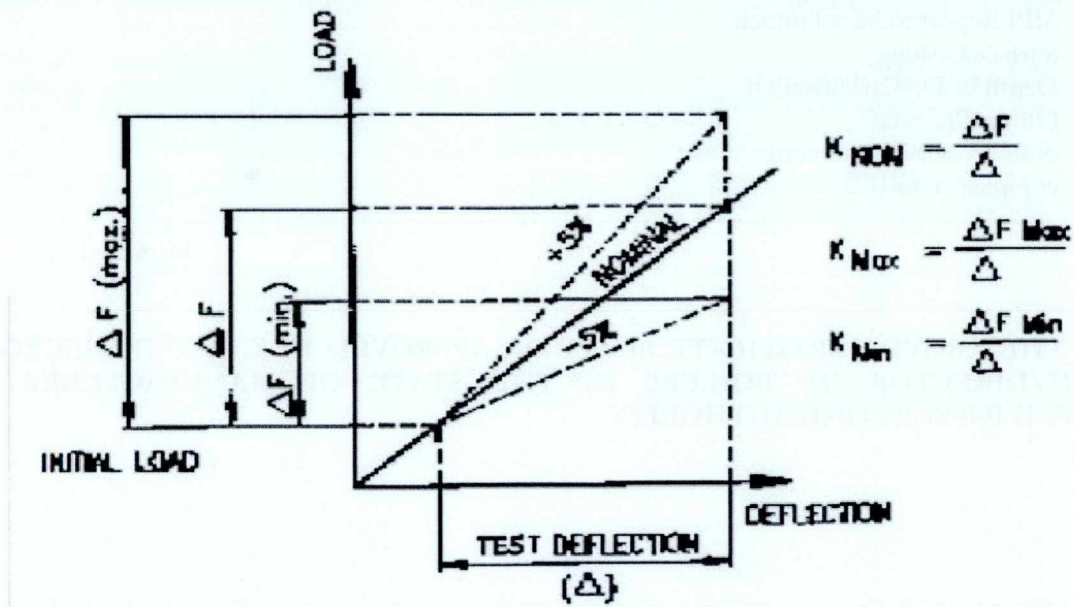


Figure - 3

SIDE VIEW OF SPRING

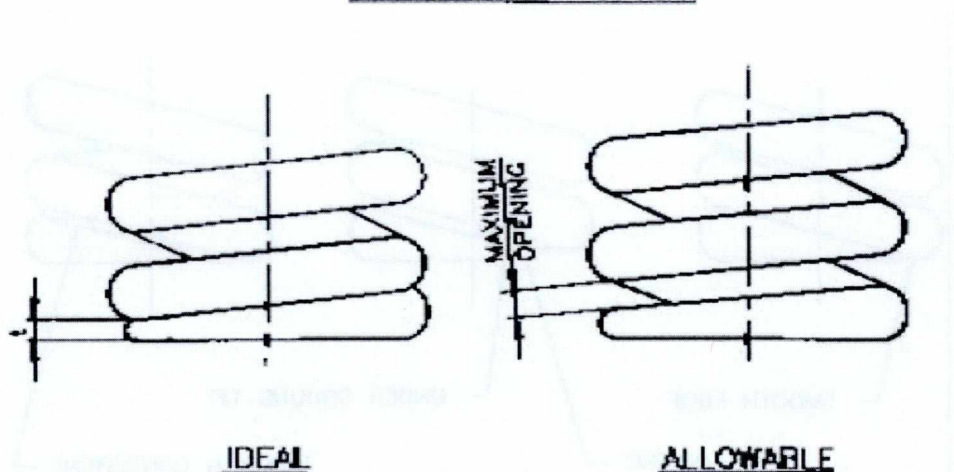
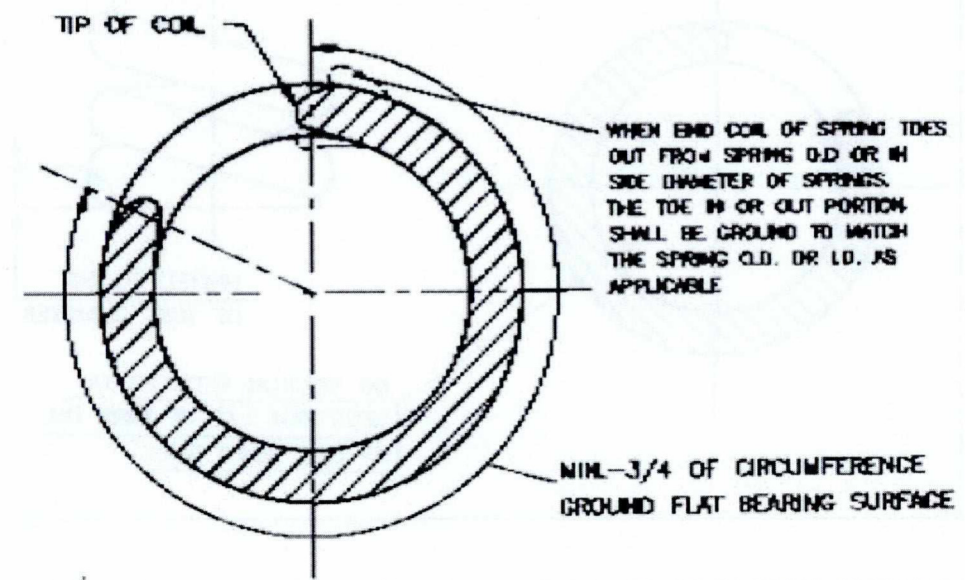


Figure - 4

END VIEW OF SPRING



Product: Safety and Safety Relief Valve Springs

Figure – 5
SIDE VIEW OF SPRING

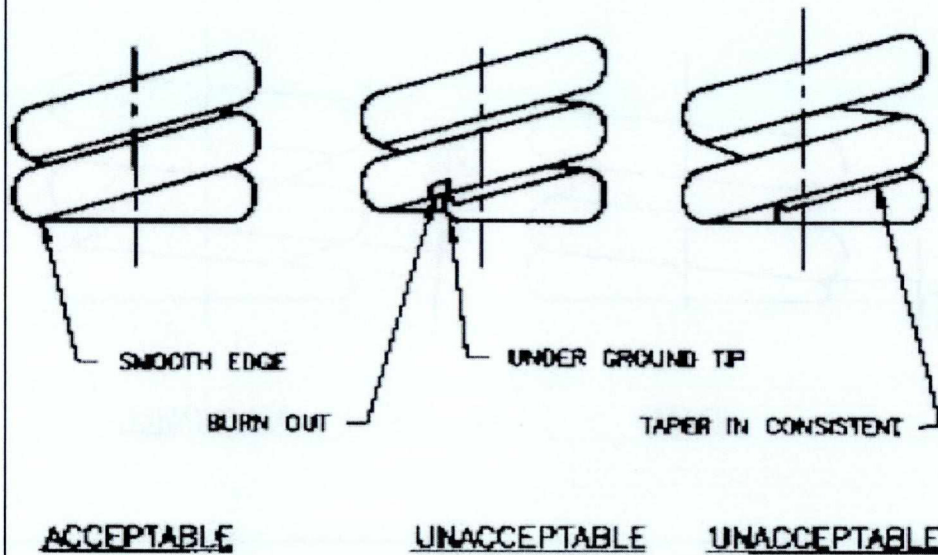


Figure – 6

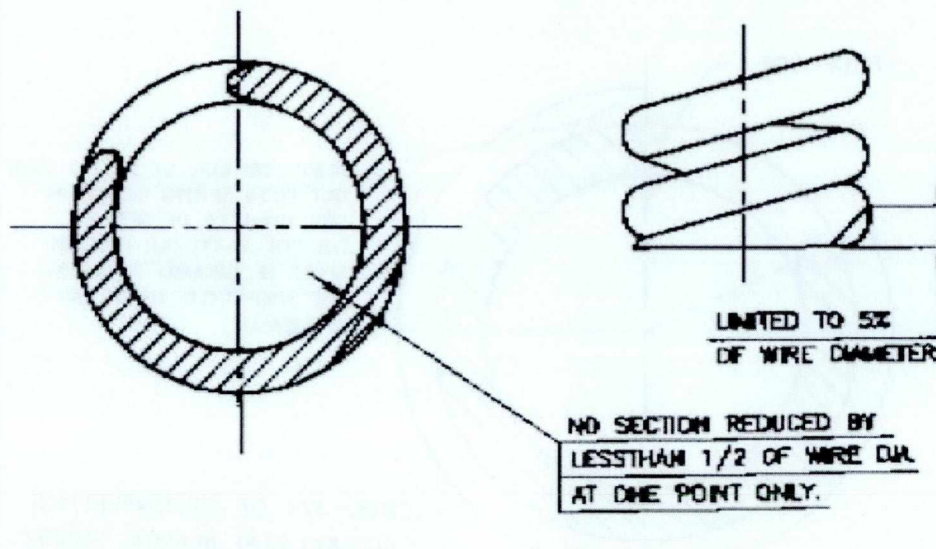
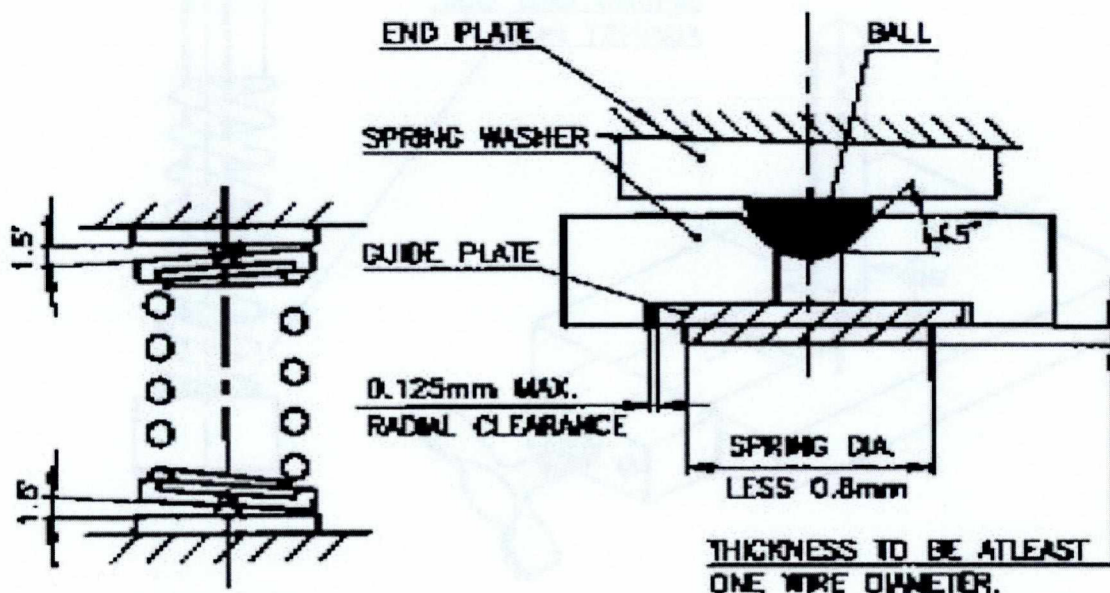


Figure - 7

FOR WIRE DIAMETER ABOVE 14MM



SQUARENESS CHECK
 for WIRE DIA. 14mm
 and ABOVE

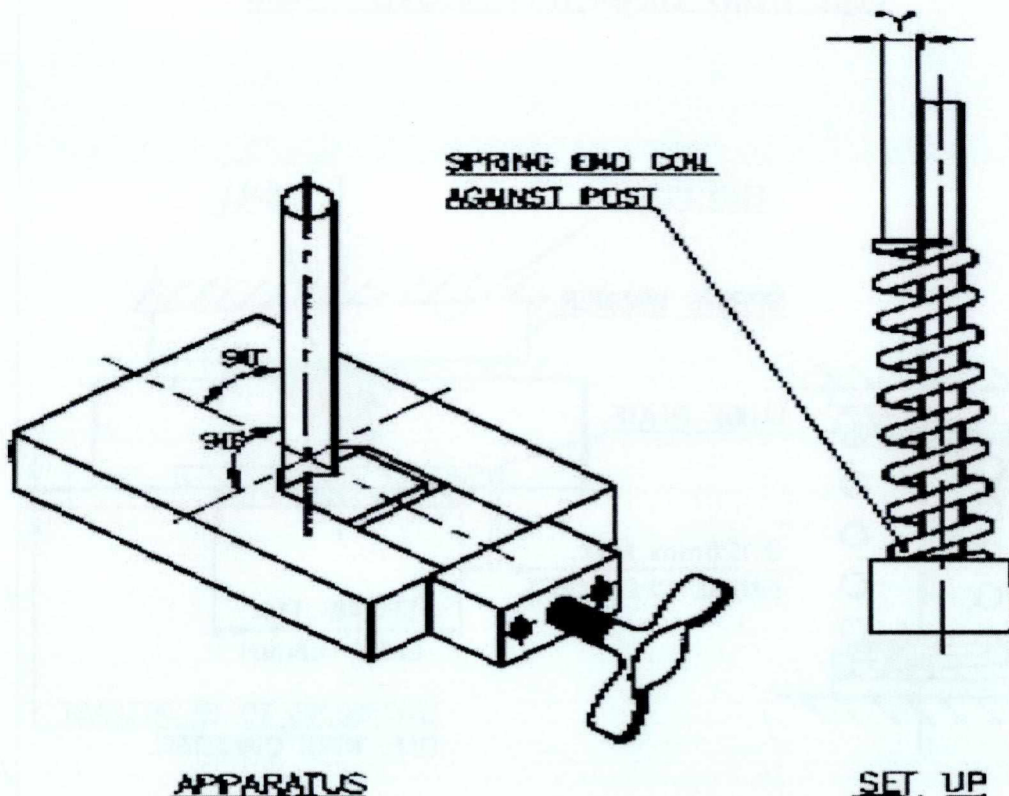
TYPICAL UPPER AND LOWER
ENDS OF SPRING TEST
WASHERS

NOTES:

1. ENDS PLATES TO BE CENTRALLY FIXED AND NOT MOVABLE DURING TEST.
2. SPRING WASHER AND BALL SIZES DEPEND ON LOADS BEING TESTED. SURFACES SHOULD BE ANTI-GALLING AND HAVE FINISH. LUBRICATE WITH MOLY-KOTE. IT IS SUGGESTED THIS BEARING SURFACES BE HARDENED.

Product: Safety and Safety Relief Valve Springs

Figure – 8

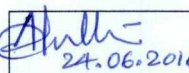
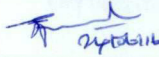
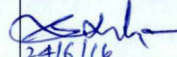


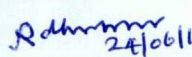



CHECKING CONCENTRICITY AND SQUARENESS
OF ENDCOILS

(WIRE DIA. 14mm AND BELOW)

NOTES:

1. 'Y' VALUES WHEN MEASURED WITH A SCALE SHALL NOT EXCEED 1.5% MULTIPLIED BY SPRING LENGTH.
2. TO ACCURATELY DETERMINE SPRING END COIL CONCENTRICITY THE ACTUAL INSIDE DIAMETER OF EITHER END COIL MUST BE MEASURED. THE SMALLER END SHOULD BE PLACED AGAINST THE SURFACE PLATE.
3. THE DIFFERENCE BETWEEN EITHER INSIDE DIAMETER MUST BE DIVIDED BY 2 AND THIS AMOUNT SUBTRACTED OUT OF MEASURED 'Y' VALUE.

 24.06.2016	 24/06/16	 24/6/16	 24/6/16	 24/6/16	 24/06/16	 24/06/16
Abdur Rahman	G.Panneerselvam	S.Selvarajan	I.Muthu	E.Athiannavi	R.Dharmar	U.Revisankaran
Engr./QA	DGM/QA	SDGM/QA	Valves/Purchase	Valves/Engg	AGM / QC	AGM/QA&BE
Prepared By	Reviewed by				Approved by	



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014. India

CONFIRMATION TO TERMS AND CONDITIONS

Enquiry Reference: ENSFM02372

<u>TERMS & CONDITION</u>	<u>VENDOR CONFIRMATION</u>
<p>a. Vendor Quotation Reference No. and Date</p>	
<p>b. Pre-Qualification Requirement</p> <p>Vendor to furnish records of previous supplies of same or similar category items to any Central / State Govt Organization / PSU / Public Listed Company.</p>	
<p>c. Vendor should give confirmation to BHEL's Technical Specification. To fulfil this criteria vendor shall submit the specification duly sealed and signed.</p> <p>Any deviations from the specification are to be furnished separately as "Schedule of Deviation".</p> <p>If there is no deviation vendor should indicate "No Deviation".</p>	
<p>d. The offer has to be submitted as a Two-part bid (Techno-commercial & Price bid)</p>	
<p>e. The tender will be finalized on item wise basis</p>	
<p>f. Terms of Payment: <u>Indigenous Supplier (Non-MSE):</u> 100% direct EFT Payment after 60 days from the date of receipt and acceptance of materials at BHEL stores / against site acknowledgement. <u>Indigenous Supplier (MSE):</u> Payment will be as per MSMED Act, 2006. (Udyam Registration Certificate to be enclosed along with the offer)</p>	
<p>g. Liquidated Damage: Liquidated damages shall be 0.5% of the undelivered portion per week of the delay or part thereof subject to a maximum of 10% of the total order value.</p>	
<p>h. Delivery Terms: Prices shall be quoted on "FIRM PRICE" basis only. <u>For Indigenous Supplies:</u> FOR BHEL Trichy</p>	
<p>i. Validity of Offer: Prices should be valid for 60 days from the date of part-1 bid opening of this tender. The delay in responding to BHEL technical clarification beyond four days will be subsequently added to the validity period, Revised Price Bids will not be encouraged.</p>	
<p>j. Delivery period: Delivery period should be 8 weeks from the date of purchase order. If supplier offers more than the required delivery period BHEL will operate 0.5% loading factor for evaluation of their offer for every week delay subject to a maximum of 2%. Any other delivery period after loading to maximum will be rejected.</p>	
<p>k. Risk Purchase: Risk purchase penalties as per clause 5 of general terms and conditions is applicable for this enquiry. Non acceptance to risk purchase clause the offer is liable for rejection.</p>	



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014. India

CONFIRMATION TO TERMS AND CONDITIONS

Enquiry Reference: ENSFM02372

<u>TERMS & CONDITION</u>	<u>VENDOR CONFIRMATION</u>
l. Guarantee Clause: The vendor shall give a guarantee for the performance of his supplies for a period of eighteen months from the date of dispatch or twelve months from the date of commissioning whichever is earlier.	
m. Performance Bank Guarantee: Performance Bank Guarantee is not applicable for this enquiry	
n. Counter-offering Counter-offering is not applicable for this enquiry	
o. Integrity Pact Integrity pact is not applicable for this enquiry	

Name:

Seal and Signature of authorised signatory



Maharatna Company

BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: **ENSFM02372**

1. QUOTATIONS:

a. BID system:

- i. Two part bid: The offers are invited in Two part bid system (Part I will be Techno-commercial bid and part II will be Price Bid). Techno-commercially suitable vendors alone will be intimated for price bid opening.

b. Submission of offer:

- i. Offer called through e-Procurement mode: The bidder shall submit the bid online in BHEL e-Procurement portal at <https://eprocbhel.co.in/>

The bidder would be required to register on the above e-procurement portal for submitting their bids. Offers through email and hardcopy are not acceptable.

- c. **Regulations**: Offers should be free from correction and erasures. Corrections if any must be attested. All amounts shall be indicated both in words as well as figures. In case of a difference between the amount quoted in words and figures, the amount quoted in words shall prevail.
- d. **PVC**: Price Variation clause not acceptable. Prices should be firm.
- e. **Catalogue**: Manufacturer's name, Trade Mark or Patent No. if any should be specified. Illustrative leaflets giving technical particulars are required along with quotation.
- f. **Samples**: Samples should be submitted separately, if specially requested in tender, before the due date of the enquiry. They should be clearly marked with the enquiry reference and date on the enclosing cover to facilitate identification.
- g. **GST Number**: GST registration number, HSN number (Item wise) with applicable taxes should be mentioned in the offer. If the vendor is not GST registered the offer is liable for rejection.
- h. **Deviation**. Any deviations from the specification are to be furnished separately as "Schedule of Deviation". If there is no deviation, vendor should indicate "No Deviation" in the offer.
- i. **Confirmation**: Confirmation for compliance is to be given in the offer for all the techno commercial conditions specified in the tender.

2. COMMERCIAL TERMS & CONDITIONS:

a. Terms of Payment:

For Indigenous Suppliers:

If the materials are receivable at BHEL Stores, Trichy:

Payment term is 100% direct Payment after 60 days from the date of receipt and acceptance of materials.

Any deviation in the above payment terms, any other conditions in payment terms or any other payment terms will not be accepted and offers will not be considered.

For New Suppliers: For new suppliers not registered with BHEL, Trichy for the product, payment shall be made 60 days after receipt and acceptance of materials.

- b. **Liquidated Damage**: Liquidated damages shall be 0.5% of the undelivered portion per week of the delay or part thereof subject to a maximum of 10% of the total order value.

Any deviation from the above LD clause, loading will be applied to the extent to which it is not agreed by the bidder (at offered value)

Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers. Hence applicable GST shall also be recoverable from suppliers on LD amount. Debit note will be issued by BHEL for this amount, indicating the respective supply invoice number.

c. Delivery Terms:

For Indigenous Suppliers: FOR BHEL Trichy inclusive of freight and insurance

- d. **Validity of Offer**: Prices should be fixed and should be valid for period as mentioned in the "Confirmation to the Terms and Conditions" attached.
- e. **Delivery period**: Delivery schedule will be as mentioned in the "Confirmation to the Terms and Conditions" attached. If supplier offers more than the required delivery period BHEL will operate 0.5% loading factor for evaluation of their offer for every week delay.



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: **ENSFM02372**

- f. **Guarantee period:** The vendor shall give a guarantee for the performance of his supplies for a period of **eighteen months** from the date of dispatch or **twelve months** from the date of commissioning whichever is earlier.
- g. **Miscellaneous:** Any conditions which might have been quoted by the seller and are in contravention to the terms of PO and which have not been specifically accepted by Purchaser will not be applicable to the contract/PO.
- h. **Performance Bank Guarantee:** If tender calls for Performance Bank Guarantee, vendor should provide a performance bank guarantee (PBG) in BHEL format for 10% of the total Purchase order value valid for warranty/guarantee period with an additional claim period of 2 months. PBG should be issued from list of consortium banks.
- i. **Counter Offering:** If counter offering is applicable for the enquiry, the L1 rates will be counter-offered to other eligible vendors as per below points
 - In case there are only two qualified offers for any item, the L1 rate will be counter-offered to the L2 vendor.
 - In case of more than two qualified offers for any item, the L1 rates will be counter-offered to maximum (n-1) vendors (where 'n' is the no. of techno-commercially qualified vendors) or the no. of vendors required (as mentioned in the "Confirmation to the Terms and Conditions" attached), whichever is lower.
 - In case a lower ranked vendor does not accept the counter-offered rates, the rates may be offered to next higher ranked vendor.
 - The manner of splitting of the enquiry quantity across L1 and counter-offer accepted vendors will be as per the ratios mentioned in the "Confirmation to the Terms and Conditions" attached.

3. COMPLIANCE / ACCEPTANCE REQUIRED FOR FOLLOWING POINTS TO ENSURE INPUT TAX CREDIT

- a. Response to Tenders for Indigenous supplier/Vendor will be entertained only if the vendor has a valid GST registration No (GSTIN) which should be clearly mentioned in the offer. If the Vendor is exempted from GST registration, a declaration with due supporting documents need to be furnished for considering the offer. Vendor under composition scheme should declare that he is a composition Vendor supported by the screen shot taken from GST portal. The dealer has to submit necessary documents if there is any change in status under GST.
- b. Supplier shall mention their GSTIN in all their invoices (incl. credit Notes, Debit Notes) and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No. which is linked/uploaded in GSTN network shall be clearly indicated), Billed to party (with GSTIN) & Shipped to party details, item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, Place of Supply etc.
- c. Invoices will be processed only upon completion of statutory requirement and further subject to following:
 - i. Vendor declaring such invoice in Form GST ANX-1
 - ii. Receipt of Goods or Services and Tax invoice by BHEL
- d. All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).
- e. As the continuous uploading of tax invoices in GSTN portal (in GST ANX-1) is available for all (i.e. both Small & Large) tax payers under proposed new GST Return System, all invoice raised on BHEL may be uploaded immediately in GST portal on despatch of material /rendering of services. The supplier shall ensure availability of Invoice in GST portal before submission of invoice to BHEL. Invoices will be admitted by BHEL only if the invoices are available in GSTN portal (in BHEL's GST ANX-2).
- f. A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL.
- g. All documents like Test Certificate, LR copy, any other document mentioned in PO, shall be sent along with the vehicle/consignment. For all consignments received within the calendar month, input credit will be availed within that month in line with monthly returns filing cycle. In case of any discrepancy in the document or non-submission of documents mentioned in the PO, then BHEL will not be able to accept or account the material, in such case availing of tax credit will be deferred to next month or so.
- h. In case of discrepancy in the data uploaded by the supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note or debit note (details also to be uploaded in GSTN portal) for the shortages or rejections in the supplies or additional claims, within the calendar month informed by BHEL.



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: **ENSFM02372**

- i. In cases where invoice details have been uploaded by the vendor but failed to remit the GST amount to GST Department (Form PMT-08 or Form GST RET-01 to be submitted) within stipulated time, then GST paid on the invoices pertaining to the month for which GST return not filed by the vendor will be recovered from the vendor along with the applicable interest (currently 24% p.a) and all subsequent bills of the vendor will not be processed till filing of the GST return by the vendor.
- j. Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contractors. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this, debit note will be issued by BHEL indicating the respective supply invoice number.
- k. In case any changes in taxes and duties as per Gov. Notification (including GST), the same shall be applicable from time to time.
- l. Duplicate copy of the Invoice meant for the transporter should accompany the material as stipulated under CE Rules 52A and 172C OR 57CE.
- m. TDS on GST shall be applicable as per the GST Act.
- n. In case GST credit is denied to BHEL due to non-receipt or delayed receipt of goods and/ or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount claimed in the invoice shall be disallowed to the vendor.
- o. Where any GST liability arising on BHEL under Reverse Charge (RCM), the vendor has to submit the invoices to BHEL well within the timeline prescribed in GST Law, to enable BHEL to discharge the GST liability. If there is a delay in submission of invoice by the vendor resulting in delayed payment of GST by BHEL along with Interest, then such Interest payable or paid shall be recovered from the vendor.
- p. GST TDS will be deducted as per Section 51 of CGST Act 2017 and in line with Notification 50/2018 – Central Tax dated 13.09.2018. GST TDS certificate which will be generated in GST portal subsequent to vendor accepting the TDS deduction in the GST portal, will be issued to the vendor.

4. SPECIAL PROVISIONS FOR MICRO AND SMALL ENTERPRISES (MSE):

- a. 25% of the tendered quantity is earmarked for MSE suppliers in this tender.
- b. If L1 vendor (or) Counter offer accepted vendor/s is from a Micro / Small enterprise which put together covers 25% of the total tendered quantum, the 25% earmarking provision is not applicable.
- c. Out of the 25% tendered quantity reserved for MSE suppliers, 6.25% shall be earmarked for procurement from MSE owned by SC / ST entrepreneurs. In the event of failure of such Micro and Small enterprises to participate in the tender process or meet the tender requirements and the L1 price, the 6.25% sub-target for procurement ear-marked MSE owned by SC / ST entrepreneurs shall be met with other MSE enterprise/s.
- d. 3% reservation for women owned MSEs within the above mentioned 25% reservation. In the event of failure of such Micro and Small enterprises to participate in the tender process or meet the tender requirements and the L1 price, the 3% sub-target for procurement ear-marked MSE owned by women entrepreneurs shall be met with other MSE enterprise/s. The definition for MSEs owned by Women Entrepreneurs is clarified as:
 - i. In case of proprietary MSE, proprietor shall be woman.
 - ii. In case of partnership MSE, the women partners shall be holding at least 51% share in the unit.
 - iii. In case of private limited companies, at least 51% share shall be held by the women promoters.
- e. In case MSE vendor participating in the tender quotes within the price band of LI +15%, they will be allowed to supply the portion of the requirement subject to acceptance of LI price by MSE vendor. In case of more than one such MSE, the supply shall be shared proportionately, provided the available quantum can be split.
- f. In a tender where both MSE and Non-MSE Vendors have participated and non-MSE Vendor has become the lowest bidder and the quantum envisaged in the tender cannot be split, then the MSE vendor will be given preference for ordering the available quantum provided the MSE vendor quoted price is within L1 + 15%, and if the MSE vendor accepts the L1 rate.
- g. MSE suppliers can avail the intended benefits only if,

The vendor submits along with offer, a copy of the Udyam Registration Certificate.

(or)

The vendor has already submitted the above documents for the financial year of the date of part-1 bid opening and the MSE status has been updated in BHEL Trichy's records.

Non submission of such documents will lead to consideration of their bids at par with other bidders and MSE status of such suppliers shall be shifted to Non MSE supplier till the supplier submits these documents.



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: **ENSM02372**

h. Definitions of MSEs owned by SC/ST is under:

- i. In case of proprietorship firm, proprietor must be SC/ST.
- ii. In case of partnership firm, the SC/ST partners must be holding at least 51% shares in the unit.
- iii. In case of private limited companies, at least 51% share must be held by SC/ST promoters.
- iv. The caste/Tribe/Community certificate issued by the following authorities in the prescribed form for SCs/STs can be considered.

i. Authorized to Issue SC/ST certificate:

- i. District Magistrate/Additional District Magistrate/Collector/Deputy commissioner/Additional Deputy Commissioner/Deputy collector/1st class stipendiary magistrate/Sub divisional Magistrate/Taluka Magistrate/Executive magistrate/Extra Assistant commissioner.
- ii. Chief Presidency magistrate/Additional chief presidency magistrate/Presidency magistrate.
- iii. Revenue Officer not below the rank of tehsildar.
- iv. Sub-Divisional officer of the area where the individual and / or his family normally resides.

j. To avail the benefits of MSE under SC/ST category, the related documents as stated above should be submitted along with tender documents.

k. Payment for MSE vendors will be as per MSMED Act, 2006.

5. RISK PURCHASE PENALTIES

a. In case of delay in delivery beyond PO delivery /mutually agreed delivery, or vendor fails /refuses to complete the PO as per terms, or insufficient facilities at vendor's works to execute a PO, BHEL has the right to get the items ordered elsewhere at the risk and cost of the vendor with notice to the vendor and the additional expenditure / difference in cost, if any, including consequential cost shall be recovered from the defaulted vendor. Also, in such case of withdrawal of orders, BHEL shall recover the additional expenditure / difference from vendor by adjusting against amount due to vendor and/or by invoking the BG and/or by any other suitable means as decided by BHEL. In addition, BHEL may recover from the defaulter vendor any loss to BHEL arising due to withdrawal of orders in such case, and action shall be taken as per latest revision of BHEL Guidelines for Suspension of Business dealings with Suppliers / Contractors.

b. BHEL has the right to divert/cancel the order if the vendor has not procured minimum 50% of the quantity of raw materials within 60 days from PO date. Purchase order placed on steel mills and with proper payment voucher/proof will be considered for not cancelling the PO by BHEL. The submission of data by vendor for DB clearance by BHEL/QC shall be the proof of procurement. This is to avoid delay in project schedule due to delay in raw material procurement by vendors. In case the vendor fails to procure at least 50% of the quantity of raw materials within 60 days from PO date, BHEL has the right to get the items ordered elsewhere at the risk and cost of the defaulting Vendor and the additional expenditure / difference in cost, if any, including consequential cost shall be recovered from the defaulting Vendor and action shall be taken as per latest revision of BHEL Guidelines for Suspension of Business dealings with Suppliers / Contractors and SEARP.

c. The defaulted vendor shall be liable for any loss, which BHEL may sustain by reason of such risk purchases in addition to liquidated damages as mentioned under LD clause.

d. Vendors pending payments shall be withheld to cover the liabilities of BHEL towards risk purchase, if any.

e. Reasons like power cut, labour issues, machine break down, etc. which are controllable by the sub-contractor shall not be accepted as reason for delay for delivery extension purposes.

f. If PO delivery needs to be extended for reason attributable to BHEL, vendor may request BHEL in writing for delivery extension with justifications within 15 days from date of PO closure and before invoice.

g. Process of calculating the risk and cost amount is as follows:

$$\text{Risk \& Cost Amount} = [(A-B) + (A \times H/100)]$$

Where,

A= Value of Balance scope of Work/ Supply (*) as per rates of new contract

B= Value of Balance scope of Work/ Supply (*) as per rates of old contract being paid to the contractor/ supplier at the time of termination of contract i.e. inclusive of PVC & ORC, if any.

H = Overhead Factor to be taken as 5

In case (A-B) is less than 0 (zero), value of (A-B) shall be taken as 0 (zero).

*(Balance scope of work/ supply)



BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: **ENSFM02372**

Difference of Contract Quantities and Executed Quantities as on the date of issue of Letter for "Termination of Contract", shall be taken as balance scope of Work/ Supply for calculating risk & cost amount. Contract quantities are the quantities as per original contract. If, Contract has been amended, quantities as per amended Contract shall be considered as Contract Quantities. Items for which total quantities to be executed have exceeded the Contract Quantities based on drawings issued to contractor from time to time till issue of Termination letter, then for these items total Quantities as per issued drawings would be deemed to be contract quantities. Substitute/ extra items whose rates have already been approved would form part of contract quantities for this purpose. Substitute/ extra items which have been executed but rates have not been approved, would also form part of contract quantities for this purpose and rates of such items shall be determined in line with contractual provisions. In-case portion of work is being withdrawn, contract quantities pertaining to portion of work withdrawn shall be considered as 'Balance scope of work/supply' for calculating Risk & Cost amount.

- h. Vendors are cautioned that, withdrawal after price bid opening or after contract signing or PO/LOI acceptance will be construed as tampering with BHEL's tender process. Suitable action for suspension of further business with the vendor may be taken as per BHEL corporate procedures.
- i. Abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/vender.php (Guidelines for suspension of business dealings with suppliers/ contractors).

6. GENERAL CONDITIONS

- a. The manner of finalization will be as mentioned in the "Confirmation to the Terms and Conditions" attached. Separate orders will be released for each project and documents should be supplied for each order separately.
- b. BHEL reserves the right to reduce the tender quantity and to NOT to order for some or all material based on the changes in project.
- c. BHEL shall have the right to visit vendor works during the execution of contract along with end customer for verifying status, inspection and testing of the material.
- d. BHEL reserves the right to negotiate or re-float the tender in case the quoted prices are not acceptable.
- e. Supplier shall arrange packing to avoid lose or damages during Road Transport, Site handling & Storage.
- f. BHEL reserves the right to reject the offer of a particular bidder due to unsatisfactory past performance in the execution of a contract at any of BHEL projects / units.
- g. The Drawings and Technical documents given in this enquiry are the sole property of BHEL. This should not be misused in any form.
- h. Purchase Order, PO Item serial number, Material code, Quantity should be clearly marked on the packing
- i. Confirmation for compliance is to be given in the offer for all the conditions specified above and to the respective Purchase Specification.
- j. The bidder along with its associate/collaborators/sub-contractors/sub-vendors/consultants/service providers shall strictly adhere to BHEL fraud prevention policy (refer www.bhel.com) and shall immediately bring to the notice of the BHEL management about any fraud or suspected fraud as soon as it comes to their notice.
- k. For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017, 28.05.2018, 29.05.2019 and 04.06.2020, issued by DPIIT, Ministry of Commerce and Industry. If any subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract / PO / WO against this NIT. In the event of any Nodal Ministry prescribing higher or lower percentage of purchase and / or local content in respect of this procurement, same shall be applicable. Default purchase preference shall be 20% to local suppliers with default minimum local content of 50%.

7. DOCUMENTATION:

- a. **With Consignment:** Duplicate for transporter copy, Original Invoice, Packing List, Delivery Challan, O&M manual (if applicable) Material Test Certificate, Test Certificates, Compliance Certificate, Guarantee/Warranty Certificate and other documents mentioned in PO/TDC/Drawing.
- b. **To Purchase:**



Maharatna Company

BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE

Trichy - 620 014, India

GENERAL TERMS AND CONDITIONS

Enquiry Reference: **ENSFM02372**

- i. FOR BHEL TRICHY case- Original Invoice, Duplicate for transporter copy, Packing list, LWB and Delivery challan, GST declaration as mentioned in point 3c.
- ii. FOR Site case- Original Invoice, Original LWB, Original Packing List, Original IBR documents, Original despatch clearance Certificate and Inspection report, Test certificates as per PO, Original Site Acknowledgment etc.
- c. **Identification:** Material code, Purchase Order, PO item serial number, Unique serial number if any should be provided in all despatch documents, materials and packing clearly.

8. TENDER EVALUATION:

a. Techno-commercial Bid.

- i. All vendors should submit General arrangement drawing, datasheet and C&I diagram (if any) of the offered product
- ii. Point by point technical confirmation of all pages of our technical specifications and commercial conditions are required with your sign and seal along with techno commercial offer.
- iii. Offers from supplier not having technical capability or not agreed for commercial terms, will be rejected.

b. Price Bid.

- i. Bidders qualified for part I will be intimated for participating in priced bid opening.
- ii. L1 bidder will be decided based on landed cost for the equipment to BHEL.

Indigenous Vendors

Total Landed cost/rate for each item = FOR Rate in INR (A) + Applicable Taxes (B) + Loading non-acceptance of commercial terms (C) – Applicable input tax credit (D)

A - Indigenous vendors submit offers on Free on Road (FOR), Stores, HPBP BHEL Trichy in INR.

B - Applicable GST and any other charges quoted by indigenous vendors will be added to the base price.

C - Loading for non-acceptance of payment terms, delivery schedule & liquidated damages (LD) will be added to the F.O.R. value for arriving the landed rate.

D - However, input tax credit shall be availed for GST, hence the same is excluded for arriving at the landed cost.

iii. In case of tie for the L1 positions,

- a. In the course of evaluation, if more than one bidder happens to occupy L1 status, effective L1 will be decided by soliciting discounts from respective L1 bidders.
- b. In case more than one bidder happens to occupy the L1 status even after soliciting discounts, the L1 bidder shall be decided by a toss/draw of lots, in the presence of the respective L1 bidders(s) or their representative(s).
- c. Ranking will be done accordingly, BHEL's decision in such situation shall be final and binding.

Note:

All clarifications / issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below

(1)

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