Annexure-I for Enquiry no. 1920-098 dated 20.11.2019, due date 14.12.2019

Un-Price Bid Format

Item Sl. No.	Material Code	Description	Unit of measure	Enquiry quantity	Drawing no.	BHEL specification no.	Quoted (kindly tick)
1	963530560000	VALVE SPRING	Nos.	1000	42000103394/01	TDC:5:082/05	Yes / No
2	963560360000	E/CONICAL SPRING	Nos.	1000	42000103391/00	TDC:5:082/05	Yes / No

GST	Whether GST is applicable? (kindly tick)	Applicable / Not applicable
	If GST is applicable, kindly tick whether it is Extra / Inclusive	Extra / Inclusive
	% age rate of GST (if applicable)	*Please mention clearly>>*
Delivery destination (FOR Goindwal Sahib basis)		*Please accept>>*
Validity of offers (**As per BHEL terms 60 days validity is required**)		*Please accept>>*

The quoted prices are **Firm, without any price esclation; are Rs. per piece;** and **are on FOR Goindwal Sahib basis.**

We accept all terms and conditions of the Tender enquiry no. 1920-098 dated 20.11.2019.

Authorised signatory with seal

Annexure-II for Enquiry no. 1920-098 dated 20.11.2019, due date 14.12.2019

Price Bid Format

Item Sl. No.	Material Code	Description	Unit of measure	Enquiry quantity	Unit Basic Price, Rs. *(to be filled by bidder)*	
					In Figures	In Words
1	963530560000	VALVE SPRING	Nos.	1000		
2	963560360000	E/CONICAL SPRING	Nos.	1000		

Nothing except prices will be entertained in price bid of tender.

Authorised signatory with seal

BHEL IVP-
GOINDWAL

SPECIAL TERMS AND CONDITIONS

Tender enquiry no. 1920-098 dated 20.11.2019 due date 14.12.2019
Item: Springs

Tender enquiry no.	**1920-098**
Enquiry date	**20.11.2019**
Last time and date of tender submission	**1500 Hrs 14.12.2019**
Tender opening time and date	**1530 Hrs 14.12.2019**
Quotation Parts	**Two-part Bid**
Item Description	**Springs**
Item Specification	**As per attached documents**
Delivery schedule	**Within 03 months from date of release of PO / LOI**
Validity of offer (In days)	**60 days from the date of Part-I opening of tender**
Quantity Variation	**+/- 10% of tender quantity**

Documents required along with supply of material	
1. Test Certificate	***Required***
2. Guarantee certificate	***Required***
3. Third Party Inspection Report	***Required in case of TPI***

PRE-QUALIFICATION CRITERIA

P1. Bidders should primarily be engaged in supply of same / similar items. Bidder has to provide any customer's Purchase Order(s) copy/ies for same / similar items. PO date should not be older than 01.04.2016 and cumulative value of POs should not be less than Rs 10,000.00 (Ten Thousand)".

For MSEs, the required cumulative value of PO shall be Rs. 5,000.00 (Five Thousand). For Claiming MSE benefits, bidder have to give documentary evidence like NSIC, UAN, etc.

This Pre-Qualification criteria shall not be applicable to Start-Up Firms. These relaxations and exemptions are in line with D.O. No. 5(4)/2016-BE-I dated 15.02.2017. For claiming Start-Up exemption, vendors have to submit DPIIT (Dept. of Promotion of Industry and Internal Trade)/DIPP (Department for Industrial Policy and Promotion) recognition certificates.

SPECIAL TERMS

S1. QUOTATION SUBMISSION

Sealed tenders in two parts; Part-I (Techno-commercial bid) and Part-II (Price bid) are hereby invited for supply of 'Springs' as per tender enquiry. The relevant documents are attached with the enquiry.
The two bids should be submitted in separate sealed inner envelopes duly mentioning the detail as follows:

Bid	Bid description	Superscribing on envelope	*** Should contain ***
Part-I in First sealed envelope	Techno-Commercial Offer	Part-I (Techno-Commercial) bid against tender Enquiry no: 1920-098 dated 20.11.2019 Due date 14.12.2019.	1. Acceptance of all terms and conditions of tender enquiry. (Preferred is submitting signed copy of terms and conditions; if nothing is mentioned for any term, it shall be summarily concluded that the same is acceptable and no representation whatsoever shall be entertained later on). 2. **Un-priced** bid as per format attached. **All details, i.e. whether quoted for item and taxes etc. should be filled**. 3. Purchase Order(s) (Not older than Dt. 01.04.2016) copy/ies of same/similar items, having cumulative value not less than Rs. 10,000.00. For MSEs, the required cumulative value of PO shall be Rs. 5,000.00 (Five Thousand). This Pre-Qualification terms shall not be applicable to Start-Up Firms.
Part-II in Second sealed envelope	Price Bid	Part-II (Price) bid against tender Enquiry no: 1920-098 dated 20.11.2019.	***Price bid in the format attached***. **Note: Anything other than prices mentioned in the price bid shall be considered invalid.**

Both the sealed envelopes should be put in outer sealed envelope superscribing all details i.e. Enquiry Number, Date, Supplier's Name and Address and Item.

S2. SCOPE OF SUPPLY

In addition to the clause no. G5 in "General Contract Conditions of tender", All the items are to be supplied as per below mentioned drawing/TSB /standards:

Sl. No.	Material Code	Description	Unit of Measure	Enquiry quantity	Drawing no.	BHEL specification no.
01	963530560000	VALVE SPRING	Nos.	1000	42000103394/01	TDC:5:082/05
02	963560360000	E/CONICAL SPRING	Nos.	1000	42000103391/00	TDC:5:082/05

S3. LOADING CRITERIA CUM COUNTER OFFER

No counter-offer will be given.

If there are more than one L1 bidders, quantity shall be equally divided.

S4. OTHER CONTRACT CONDITIONS

These Special terms & conditions and GCC collectively are the part of tender terms and conditions.

Checklist and sequence of documents to be submitted in two parts bids

S. No.	Documents		Status
1	Part-I envelope should contain: (1) Techno-Commercial bid (2) Purchase Order(s) (Not older than Dt. 01.04.2016) copy/ies of same/similar items, having cumulative value not less than Rs. 10,000.00. For MSEs, the required cumulative value of PO shall be Rs. 5,000.00 (Five Thousand). This Pre-Qualification terms shall not be applicable to Start-Up Firms. These documents should be contained in a separate envelope superscribing tender enquiry detail, due date of opening, sender's address.	Sealed envelope marked as Part-I "Techno-Commercial Bids"	Yes, Sealed
2	Part-II envelope should contain Price Bid sealed in separate envelope superscribing tender enquiry detail, due date of opening, sender address	Sealed envelope marked as Part-II "Price Bid"	Yes, sealed
3	*All two sealed envelopes put in an outer envelope mentioning all details like Enquiry no., description, due date*		*Yes*

Documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder.

G1. INSTRUCTION TO BIDDER

Quotations shall be submitted before due date and time. Late offers are liable to be rejected, so please ensure to submit bid well within due date and time. Techno-commercial part will be opened on due date.

Based on evaluation of techno-commercial offers, Price bids of bidders who qualify from techno-commercial evaluation shall be opened. BHEL may decide to open the Price bid same day at 1700 hrs. If not opened on the same day, all qualifying bidders shall be notified for date of opening of Price bids by email/fax/post/courier/E-procurement system generated email.

G1.1 INSTRUCTION TO BIDDER (In case of Non-E-Procurement / Paper/ Manual/ Hard Copy based tenders)

Sealed Tenders can be dropped in the tender box labeled as 'Tender box for MM contracts'. This tender box is located at the entrance of Admin block BHEL Goindwal. Fax (01859-222061) / E-Mail (**tendermm_ivp@bhel.in**) offers received in time shall be considered only when such offers are complete in all respects. In case of bulky tender please handover quotation to Sh Rakesh Kumar/ SDGM/Head-MM or Sh Gurcharan Singh / AGM-Operations & MM. [Contact: 01859 224 615/631]. Bid can be send to following address:

BHEL, Industrial Valve Plant,
#433, Industrial Complex,
Goindwal Sahib, Distt. Tarn Taran,
Punjab-143422.

G1.2 INSTRUCTION TO BIDDER (In case of E-Procurement)

Interested bidders/Suppliers shall submit their offer through e-Procurement mode at https://bhel.abcprocure.com. **Offers in any other mode will not be accepted.**

For Enterprise Procurement System (EPS) Bidders/Suppliers are requested to follow these steps:

a. Requirements

1. Computer with good Internet Connection.
2. Operating System should be Windows Vista / Windows 7 and above.
3. Web Browsers: Internet Explorer 9.0 (32-bit Browser only) & above

b. Mandatory Requirements:

Suppliers interested for registration for BHEL Open Tenders should have a valid DSC (Digital Signature Certificate) before Proceeding forward for Registration. Herein a Valid DSC refers to a Class-II/III Digital Signature Certificate (DSC) for Signing & Encryption (Required both digital signature certificate: Signing & Encryption) of bids issued by any of the valid Certifying Authorities (approved by Controller of Certifying Authorities) in India. Valid Digital Signature Certificate (DSC) must be installed in a computer system from where you want to access the website.

For Unregistered Suppliers in EPS:

Procedure for Online Registration in EPS for Open Tender Suppliers for BHEL. Please follow the below steps for registration: -

1. Click Register Button (Top of the Screen).

2. Please input your organization PAN No (in case of Indian supplier) or select your "country" in case you are an overseas Supplier.
3. Select Units to participate in.
4. Fill up Company details.
4. Key in your desired login id If you have registered by keying in PAN No. then your desired login id will be prefixed by "OTI", In case of **overseas suppliers it will be also prefixed with "OTI".**
5. Fill in the Captcha code & agree to the terms & conditions and privacy policy of this website and click SUBMIT.

Once the above steps are completed, contact to M/s eProcurement Technologies Limited for ID Activation. M/s e Procurement Technologies limited, Ahmedabad will activate your ID within 2 business hours. After registering, follow the steps provided in "For Registered Supplier" to view RFQ.

NB: - 1 BHEL Administrator or user will have no role for approving Registration and Open Tenders and DSC for any supplier who has registered himself from the front END which is in case of OT.

For Registered Supplier in EPS:

1. Supplier visits EPS home page
2. Supplier Login in with their user id and password
3. Search the RFQ ID and views it.
4. Attaches themselves to the RFQ by clicking the "I/We wish to participate".
5. Supplier fills the bid template and makes necessary attachments
6. Supplier submits their bid by clicking Sign, Encryption & Save button.

In any problem is faced by supplier while login/registration in EPS (**https://bhel.abcprocure.com**) and any other assistance, please contact the support team of M/s e Procurement Technologies limited, Ahmedabad as per details mentioned in table below: -

Name	Contact Nos.	e-mail ID	Role	Location
Mukunthan	+91 6353215001	Trichy.bhel@eptl.in	Support Executive	Trichy
Swapnil Hamilton	+91 7940270549	swapnil.h@eptl.in	Support Executive	HO – Ahmedabad
Hardik Oza	+91 7940270560	Hardik.oza@eptl.in	Support Executive	HO – Ahmedabad
Ankur Bhatt	+91 7940270590	ankur.bhatt@eptl.in	Support Executive	HO – Ahmedabad
Prashant Rajyaguru	+91 7940270545	prashant@eptl.in	Asst. Manager – Implementation & Support	HO – Ahmedabad
Dharam Rathod	+91 7940270596	dharam@eptl.in	Manager – Implementation & Support	HO – Ahmedabad
Pradip Parmar	+91 7940270532	pradip@eptl.in	Sr Mgr – Implementation & Support	HO – Ahmedabad
Devang Patel	+91 7940270576	devang@eptl.in	Sr Manager – Implementation & Support	HO – Ahmedabad

G2 OTHER IMPORTANT INFORMATION RELATED TO E-PROCUREMENT TENDERS

1. The bidder has to keep track of any changes by viewing the addendum / Corrigendum's issued by the Purchaser on time-to- time basis in the E-Procurement platform. The Company calling for tenders shall not be responsible for any claims/problems arising out of this.
2. The user should complete all the processes and steps required for bid submission. The successful bid submission can be ascertained once acknowledgement is given by the system through bid submission number after completing all the processes and steps. BHEL and M/s e Procurement Technologies limited will not be responsible for incomplete bid submission by users. Users may also note that the incomplete bids will not be saved by the system and are not available for the Purchaser for processing.
3. Before uploading scanned documents if any, the bidders shall sign on all the statements, documents, certificates uploaded by him, owning responsibility for their correctness / authenticity.
4. On the due date of tender opening, only technical bids will be opened. The opened technical bids will be evaluated by us and clarifications required, if any, will be called for from the bidders on technical and commercial points. If no reply is received from the vendor for the clarification raised by BHEL with in the final cut-off date, those vendors offer will be processed with the documents available / submitted against this tender. Offers not meeting the required specification and technical condition will be summarily rejected. The price bids of technically suitable bidders will be opened on a later date with prior intimation to techno-commercially suitable bidders.
5. Ranking L-1, L-2 etc. shall be done for individual item for the techno-commercially acceptable offers on landed cost to BHEL, IVP Goindwal basis and BHEL reserves the right to place order for individual items with different vendors. In the event of more than one vendor becoming L1 for the item, the enquiry quantity will be shared equally among all the L1 vendors.
6. BHEL reserves the right to negotiate with L1 vendor or re-float the tender for items where, **L1** price is not the lowest acceptable price; BHEL reserves the right to increase or decrease the tender quantity.
7. **If supplier is mentioning delivery destination within state/ outside state depending upon his location of factory, Free On Road etc these are assumed as on FOR Goindwal. If supplier is wishing to give delivery on Ex works basis, then he has to clearly mention about it.**

G3 PRICE BASIS

a. Order of enquiry item sl. No. shall be maintained in the quotation.
b. The rates quoted shall be firm and fixed. No price variation is proposed and allowed.
c. Rates quoted should be F.O.R Goindwal basis. If bidder has quoted Ex Works, loading shall be done as per BHEL discretion for tender evaluation.

Variation in GST or any other statutory levies during contractual delivery period shall be to BHEL's account

G4 VALIDITY OF OFFERS:

The offers shall be kept open for acceptance 'for number of days mentioned in special terms and conditions' from the date of opening of the tender. In case of extension of tender opening date, the validity shall be suitably revised.

G5 SCOPE OF SUPPLY

Material shall be supplied as per the applicable latest Technical Delivery Conditions (TDC)/ Material Standard requirements/BPS/Drawing and other requirement as given in the Tender

Enquiry. National & International material Standards shall have to be arranged by vendors themselves.

G6 REPLACEMENT OF REJECTION

If the material is rejected due to defective workmanship during inspection or at the time of actual use, within the guarantee period (i.e. as per clause 13), the rejected material shall be replaced by the supplier. Corresponding quantity shall be treated as unsupplied against respective purchase order till replacement is received at BHEL. If the material is found defective and rejected during use for which payment has already been released the rejected quantity shall be supplied free of cost by the vendor within a month of intimation of the rejection by BHEL.

Lifting of rejected material is under Supplier's scope. BHEL will inform related invoice, qty etc to supplier. Supplier is expected to give the plan to lift and advance intimation when visiting to lift the material. Material should be lifted within one month from date of intimation. After one month BHEL will not be responsible for rejected material. BHEL may decide to send the rejected material on to Pay basis to supplier. Any leniency/ unresponsiveness/delay on part of supplier may lead to appropriate action by BHEL. Any request to postpone in written may be considered but replacement should not be linked with lifting of material.

G7 SUPPLIED MATERIAL ADJUSTMENT

Item/s pending in previous PO has to be billed in previous PO only. Otherwise BHEL will be free to adjust the supplies in previous PO. Any implication of tax will be on supplier's account. For this it is desirable to reconcile the pending PO statement every month/frequently. BHEL will give pending PO statement every month. This can also be viewed at Portal (http://vis.bheltry.co.in/mm/index.jsp).

G8 DELIVERY SCHEDULE

Supplies shall be affected and completed as per schedule mentioned in special terms and conditions. **Further, BHEL may release delivery schedule from time to time based upon our requirement with mutual understanding.** Vendor shall be required to complete the order as per the BHEL schedule requested.

G9 ACCESS TO MANUFACTURING PREMISES:

While Purchase Orders placed on the vendor are under execution, authorized representatives of BHEL shall be allowed free access to the manufacturing facilities for the purpose of inspection or monitoring the progress of purchase orders. This access will also be extended to representatives of BHEL's customers accompanying the authorized representative/s of BHEL (which shall be intimated in advance), if our contractual requirements with our customers call for the same.

G10 TERMS OF PAYMENT:

a. Due payment against supplies received shall be due after 30 days of receipt and acceptance of material and shall be paid within next 15 days' period. In case of any deviation from standard payment term mentioned, BHEL at its discretion may load on the item price at "Base rate of SBI (as applicable on the date of bid opening; Techno-commercial bid opening) + 6% shall be considered for loading for the period of relaxation sought by bidders.
b. Documents to be submitted (if applicable)
    i. Tax invoice (Invoice shall be GST compliant and should contains all the required information such as GST No, HSN code etc.)
    ii. Transporter copy along with material/consignment.
    iii. Material Test Certificates (MTC) and
    iv. Compliance Certificate.
c. GST registration number is to be submitted by qualified vendor as per GST law.
d. It is mandatory to mention proper material codes in the invoices and separate invoices to be raised for different POs.

e. ***BHEL releases payment through EFT mode ONLY. Necessary details may please be submitted by filling required format before release of payment.***

f. ***Conditions relating to release of GST portion:***
Payment of GST portion will be released to vendor only upon completion of statutory requirement and further subject to following:
The reimbursement of GST portion of invoice shall be released only upon: -

1. vendor declaring such invoice in his GSTR-1 and
2. receipt of goods and Tax invoice by BHEL and
3. Confirmation of payment of GST thereon by vendor on GSTN portal.
4. Above is subject to receipt of goods/service and tax invoice thereof along with vendor declaring invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL.

- In case GST credit is delayed/denied to BHEL due to non/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 shall be recoverable from vendor along with interest levied / leviable on BHEL.

- In case vendor delays declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from vendor/contractor alongwith interest levied / leviable on BHEL.

G11 AVAILING INPUT TAX CREDIT (ITC) BY BHEL:

1. Since ITC can be availed only when BHEL is in possession of GST Tax invoice and after receipt of goods. Thus, vendor to ensure timely dispatch of goods and Tax invoice. It may be noted that in case of any delay in receipt of Tax Invoice and/or receipt of goods, the ITC availment by BHEL will get delayed thus entailing additional cash outflow & may even get denied if ITC availment timelines are breached.

2. Further ITC can be availed only when vendor has declared such invoice in his outward supply Return GSTR-1 and after GST thereon has been paid by him at the time of filing of monthly Return.

3. If GST credit is delayed/denied to BHEL due to non/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 shall be recoverable from vendor along with interest levied/leviable on BHEL.

4. Further, in case vendor delays declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from vendor/contractor along with interest levied/leviable on BHEL.

G12 LIABILITY UNDER REVERSE CHARGE (RCM)

Any GST liability arising on BHEL under Reverse Charge (RCM) before actual receipt of goods and/ or Invoice thereof would be subject to recovery of Interest leviable for the period between the date of such liability and actual date of eligibility of ITC based on receipt of goods, receipt of Invoices and other conditions specified in GST Law as applicable.

G13 INSPECTION

a. All required tests as called in referred material standard/BHEL/TDC/drawing etc shall be carried out by vendor at no extra cost. **BHEL may decide to inspect itself/arrange third party at vendors' works itself as and when necessary with prior intimation to the vendor.** No additional charges shall be claimed for such inspections.
b. Third party inspection charges will be borne by BHEL. Moreover, all required infrastructure (testing, tools etc) have to be arranged by supplier.
c. **Vendor will give inspection call sufficiently in advance considering the delivery period stipulated in the purchase order.**
d. Material Test Certificates (MTC), Inspection reports and Compliance/Guarantee Certificate are to be provided along with the supplies.
e. Latest applicable revisions of standards/procedures to be referred. International/National standards are to be arranged by vendor.
f. Any inspection carried out before supply by vendor/incoming stage at BHEL notwithstanding, if any defect/non-conformity is noted during processing, the same shall be attended/replaced by vendor at no extra cost.
g. Necessary tooling including thread gauges etc. have to be arranged by vendor. Only in exceptional cases, based on BHEL discretions item/nature, BHEL may consider request to provide gauges if available with BHEL. But in no case this shall be linked with delivery of material.
h. BHEL representative from unit or CQ is authorized to carry out audits along with TPIA at vendor's works before clearing the items for dispatch.

G14 PREFERENCES FOR MSE's

Preferences as mentioned in "Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012" & "Public Procurement Policy for Micro and Small Enterprises (MSEs) Amendment Order, 2018", shall be given to Micro and Small enterprises.

Main points which are mentioned in the above orders are as follows:

- 25% Procurement of the tender value shall be made from MSE (Micro, Small Enterprises) firms.
- 25% of the 25% quantity (i.e. 6.25% of the tender quantity) offered to the MSE's shall be reserved for MSE's owned by SC/STs. Failure to participate by any MSE owned by SC/ST's; this 6.25% quantity shall be procured from other MSEs.
- 3% from within the 25% quantity offered to the MSE's shall be reserved for women owned MSE's. Failure to participate by any MSE owned by women; this 3% quantity shall be procured from other MSEs.
- EMD shall be exempted for MSE's. All these benefits are subject to production of all statutory documents
- In tender, participating Micro and Small Enterprises quoting price within price band of L1+15 per cent shall also be allowed to supply a portion of requirement by bringing down their price to L1 price in a situation where L1 price is from someone other than a Micro and Small Enterprise and

such Micro and Small Enterprise shall be allowed to supply up to 25 per cent of total tendered value. In case of more than one such Micro and Small Enterprise, the supply shall be shared proportionately (to tendered quantity).

"MSE suppliers can avail the intended benefits only if they submit along with the offer UAM (Udyog Aadhaar Memorandum), attested copies of either EM II certificate having deemed validity (five years from the date of issue of acknowledgement in EM II) or valid NSIC certificate or EM II certificate along with attested copy of a CA certificate (Format enclosed at Annexure -1 where deemed validity of EM II certificate of five years has expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents is not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer.

G15 GUARANTEE/WARRANTEE

Vendor shall give a guarantee of 18 months from the date of dispatch or 12 months from date of receipt, against manufacturing defects, whichever is earlier. In case of non-acceptance of this term bid will be rejected.

G16 PENALTY FOR LATE DELIVERY

'Time is the essence of the contract'. As such, delivery of goods specified in the Purchase Orders released under the scope of this contract shall be made within the time limit prescribed therein. Penalty for late delivery will be applicable @ 0.5% per week or part thereof subject to a maximum of 10.0 %.

If any vendor does not accept LD **½% of the supply for each week of delay subject to a maximum of 5%,** their offer is likely to be rejected by BHEL and the price bid shall not be opened. Bidders accepting for 10% LD shall not be loaded on account of LD. However, bidders who offer any other % LD [between 5% to 10%] shall be loaded @ % deviation from 10% and their accepted %. e.g. If a bidder accepts for a max of 7% LD only, their offer would be loaded @ 3% (10 – 7 = 3).

BHEL reserves the right to receive or not receive the material after the due date of PO. Applicable GST shall also be recovered from suppliers/contractors on LD amount. For this Debit note will be issued by BHEL indicating the respective supply invoice number.

G17 RISK PURCHASE

BHEL shall be entitled to terminate the contract/pending POs at any stage and to purchase elsewhere at the risk and cost of the vendor, either the whole of the goods or any part thereof which the supplier has failed to deliver or dispatch within the time stipulated as aforesaid. Vendor shall be liable for the losses, which BHEL may sustain by way of such risk purchase.

G18 SUB-CONTRACT

The purchase order or any part thereof shall not be sub-contracted, assigned or otherwise transferred without previously obtaining the BHEL's consent in writing.

G19 FORCE MAJEURE

If at any time during the continuance of the contract, the performance in which or in any part by either party of any obligations under the contract are prevented or delayed by reason of any war, hostilities, acts of public enemy, civil commotion, sabotage, fires, explosions, epidemics, quarantine restrictions, or acts of God (hereinafter referred to "an events" then provided the notice of happening of any such event is given by either party to the other within 21 days of the occurrence thereof, neither party shall by reason of such event be entitled to terminate the contract nor shall either party have any claim for damages against the other in respect of such non-performance and delay in performance and delivery under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist. If the performance in whole or part of any obligation under the contract is prevented or delayed by reason of any such event, claims of extension of time shall be granted for periods considered reasonable by BHEL subject to prior notification by the vendor to BHEL of the particulars of the event and supply to BHEL, if required, of any supporting evidence. Any waiver of time in respect of partial installment shall not be deemed a waiver of time in respect of remaining deliveries.

G20 DISPUTES

In the event of any dispute and/or difference arising between the Vendor and BHEL as to interpretation and/or execution of the contract and/or the respective rights and liabilities of the parties, such disputes and/or differences shall be referred to the sole arbitrator nominated by BHEL. The provisions of the Indian Arbitration Act and the rules there under shall apply to such arbitration. The award passed by the arbitrator shall be final and conclusively binding on all the parties.

G21 JURISDICTION

The court of the place from where the purchase order is issued during the contractual period shall alone have jurisdiction to decide any dispute arising out of or in connection with the purchase order.

G22 CLARIFICATIONS

The correspondence exchanged against the tender from both tenderer and BHEL through email/e-procurement are considered as valid document legally though it is not signed. It is treated as valid confirmations made on behalf of the respective company and very much comes under the legal ambit of the business transaction and hence it is binding on both the parties to the business. Any transaction pertaining to the tender from both the parties of business done round the clock irrespective of the office or business hours of the companies, are valid legally and binding on both the parties. This applies to the extent only in such cases where deadline time for transaction is not specifically declared by either or both the parties to the business.

G23 LOI (Letter of Intent)

BHEL may issue LOI prior to the PO for any reason whatsoever. The LOI in such cases is to be treated as PO for all practical purposes and all the Terms & Conditions of the tender shall be applicable from the date of issue of LOI.

G24 WORDS AND FIGURES

a. If, in the price structure quoted for the required goods/ services/ works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity}, the unit price shall prevail and the total price corrected accordingly, unless in the opinion of the purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly.
b. If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
c. If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject of (a) and (b) above.
d. If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the purchaser, the bid is liable to be ignored.
e. Bids should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else shall be liable for rejection.
f. All overwriting/cutting, etc will be numbered by bid opening officials and announced during bid opening.

G25 GENERAL

a. BHEL will not be bound by any power of attorney granted by the vendors or by changes in the composition of the firm made subsequent to the execution of the contract. They may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the vendor concerned.
b. BHEL reserves the right to extend the due date of opening, which shall be informed. Validity of offer shall be deemed to be revised accordingly.
c. BHEL reserves the right to accept or reject any part or whole of the tender of a bidder by assigning a valid reason thereof. BHEL reserves the right to cancel the tender without assigning any reason thereof and without any obligation before any commitment.
d. If possible, please submit soft copy of price quotation [copied on a blank CD of standard make] put in the sealed offer.
e. Acceptance of all terms and conditions, in the form of signed copy of T&C or confirmation separately written, shall be submitted along with quotation. If nothing is mentioned, it shall be concluded that terms and conditions are acceptable.
f. BHEL may increase/decrease item/s based on BHEL requirement before price bid opening. Suitable price implication may be asked from suppliers.
g. BHEL may drop item/items from tender at any stage of tender before placing PO. BHEL may also delete PO with consent with supplier within delivery date of PO.
h. After releasing PO, it is assumed that supplier has accepted PO if we do not receive acknowledgement from supplier within 5 days of date of PO.
i. Any term is special tender terms and conditions will supersede the GCC.
j. BHEL reserves the right to negotiate with L1 bidder/s.

G26 BANNED FIRMS

The offers of the bidders who are on the banned list as also the offer of the bidders, who engage in the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website www.bhel.com.

G27 DISCLAIMER CLAUSE: (Only for E procurement)

Neither the Organization (Bharat Heavy Electricals Ltd.) nor the service provider (M/s e Procurement Technologies limited) is responsible for any failure of submission of bids due to failure of internet or other connectivity problems or reasons thereof.

G28 FRAUD PREVENTION POLICY

The Bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice.

G29 REVERSE AUCTION

BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.
If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

G30 SUSPENSION OF BUSINESS DEALINGS WITH DEFAULTERS

The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site **www.bhel.com.**

1.0 Integrity commitment, performance of the contract and punitive action thereof:

1.1. Commitment by BHEL:

BHEL commits to take all measures necessary to prevent corruption in connection with the tender process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

1.2. Commitment by Bidder/ Supplier/ Contractor:

1.2.1. The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

1.2.2. The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.
1.2.3. The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on www. bhel.com and/or under applicable legal provisions

G31 PREFERENCE TO MAKE IN INDIA

For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017, 28.05.2018 & 29.05.2019 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT before finalization of contract/PO/WO against this NIT.

In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and / or local content in respect of this procurement, same shall be applicable.

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*	*Mechanical tests as applicable* *Coiling process* *Modified* *Removed* *Modified* *Modified* *Revised*	

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.

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.

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 to 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.

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

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 deg. x 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

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

(i.e) Condn

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

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 ≥ 25mm and Tungsten springs with wire size of ≥ 19mm 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.

8.3 All springs of wire sizes ≥ 12mm 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.

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

Table 5
Material: High Temperature

Material Specification	Torsional Modulus at 70^0F (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

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.

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. *of Raw Material Used*			
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	*Final Load*			
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.

Figure – 1

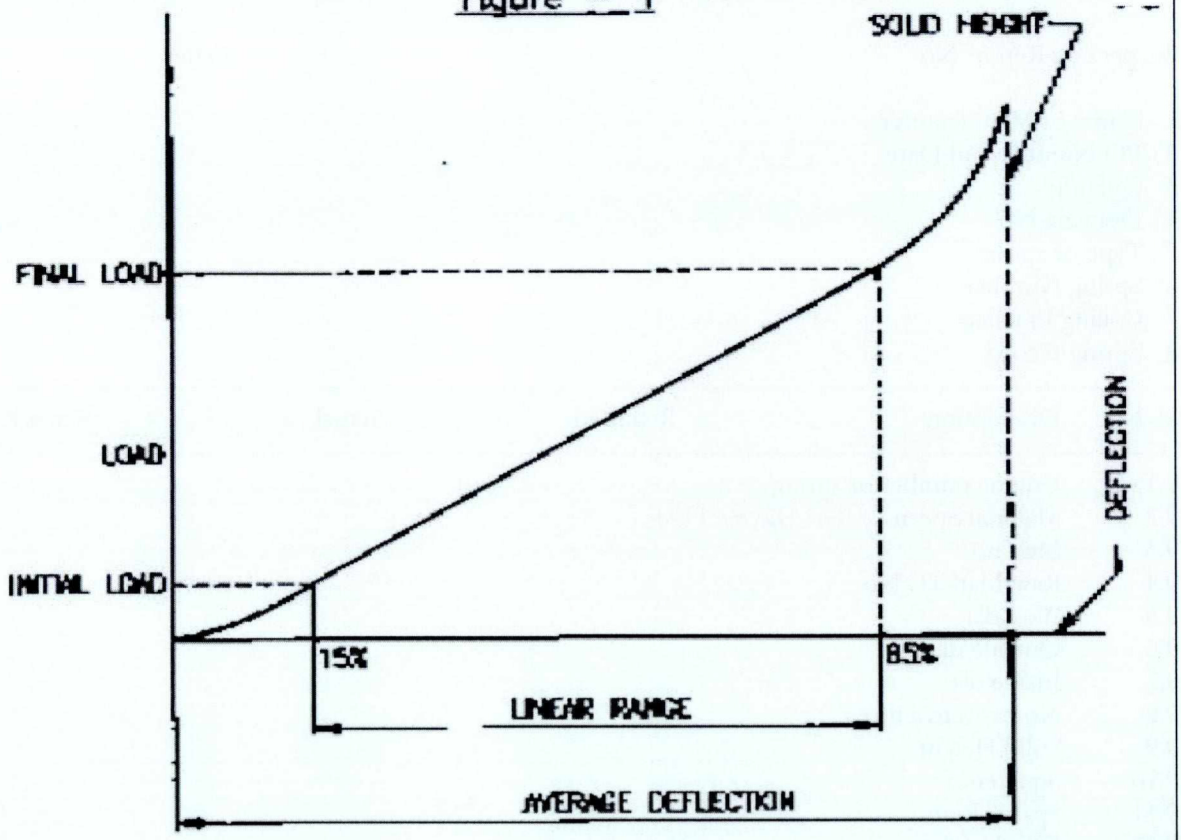


Figure – 2

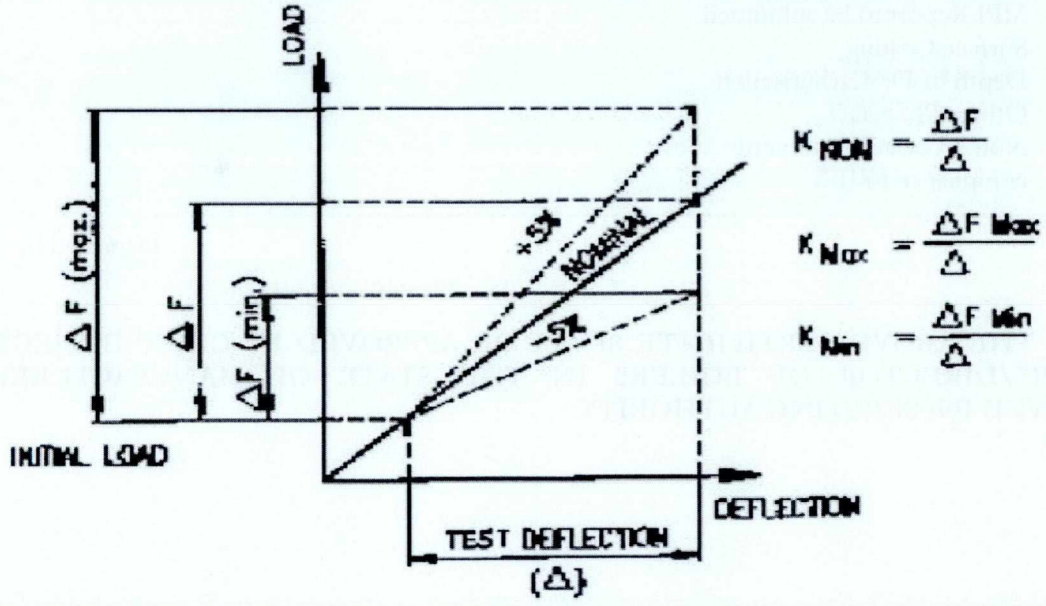


Figure – 3

SIDE VIEW OF SPRING

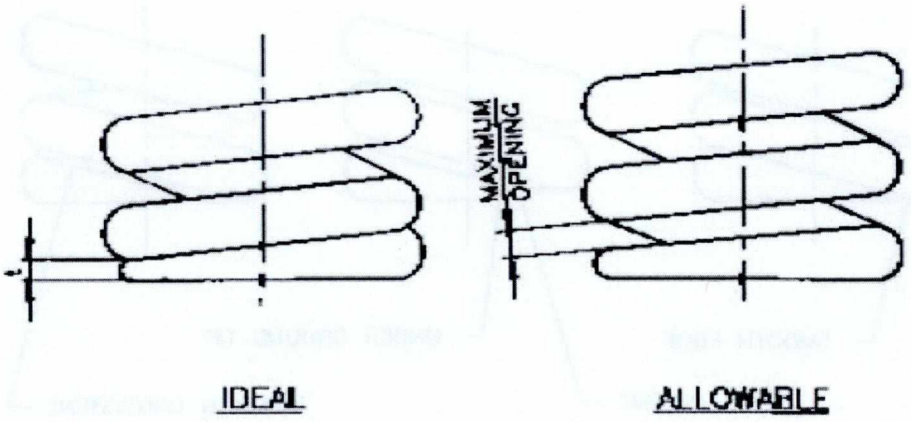


Figure – 4

END VIEW OF SPRING

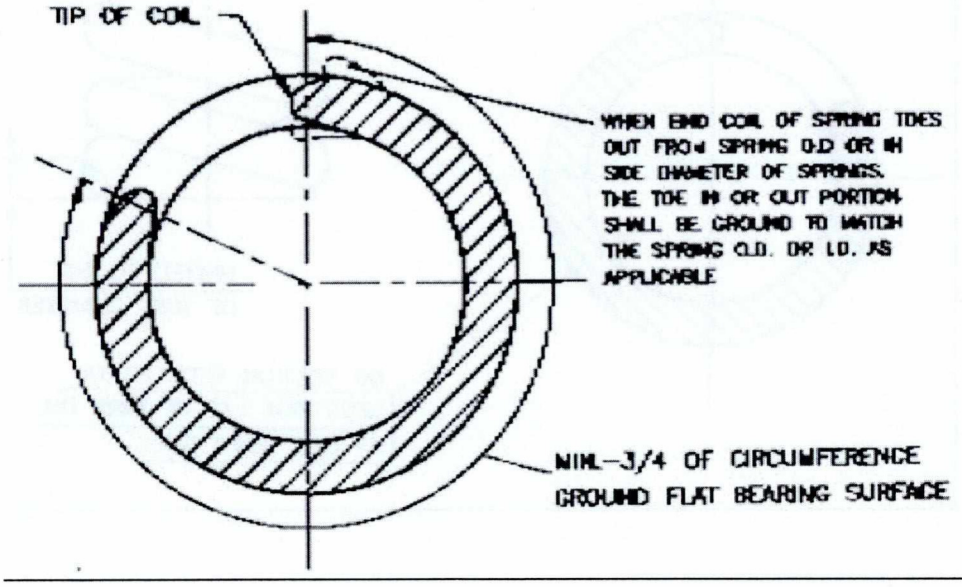
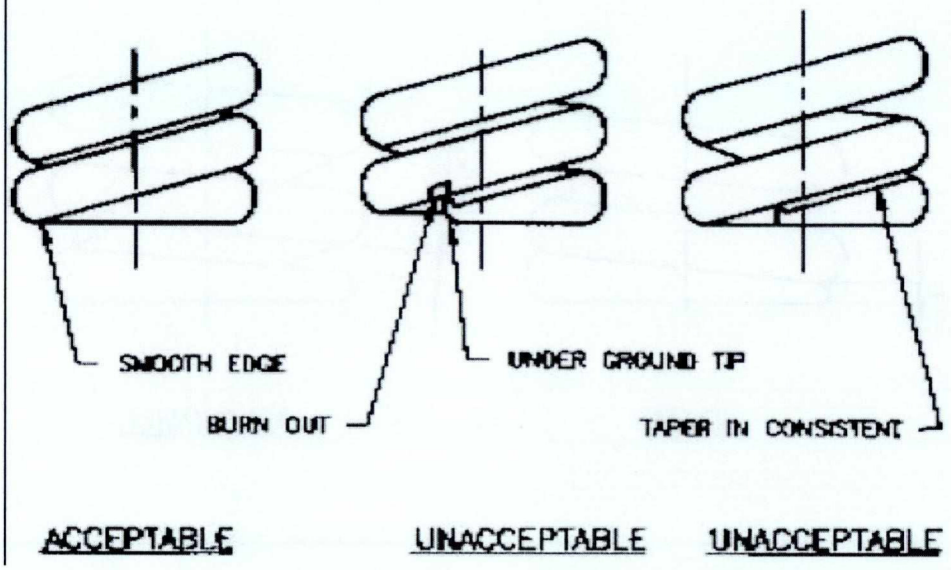


Figure – 5

SIDE VIEW OF SPRING



ACCEPTABLE UNACCEPTABLE UNACCEPTABLE

Figure – 6

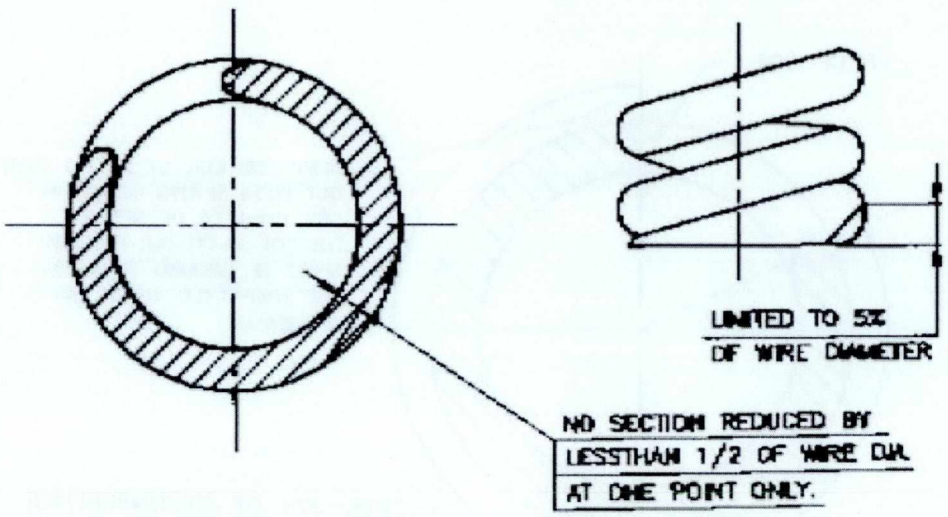
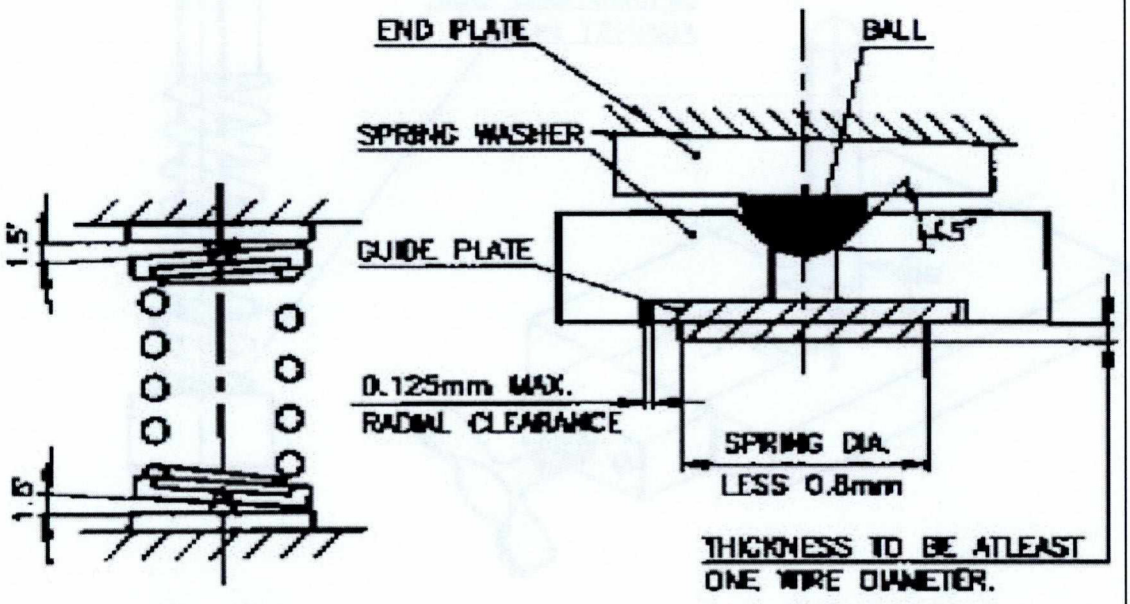


Figure – 7

FOR WIRD DIAMETER ABOVE 14MM



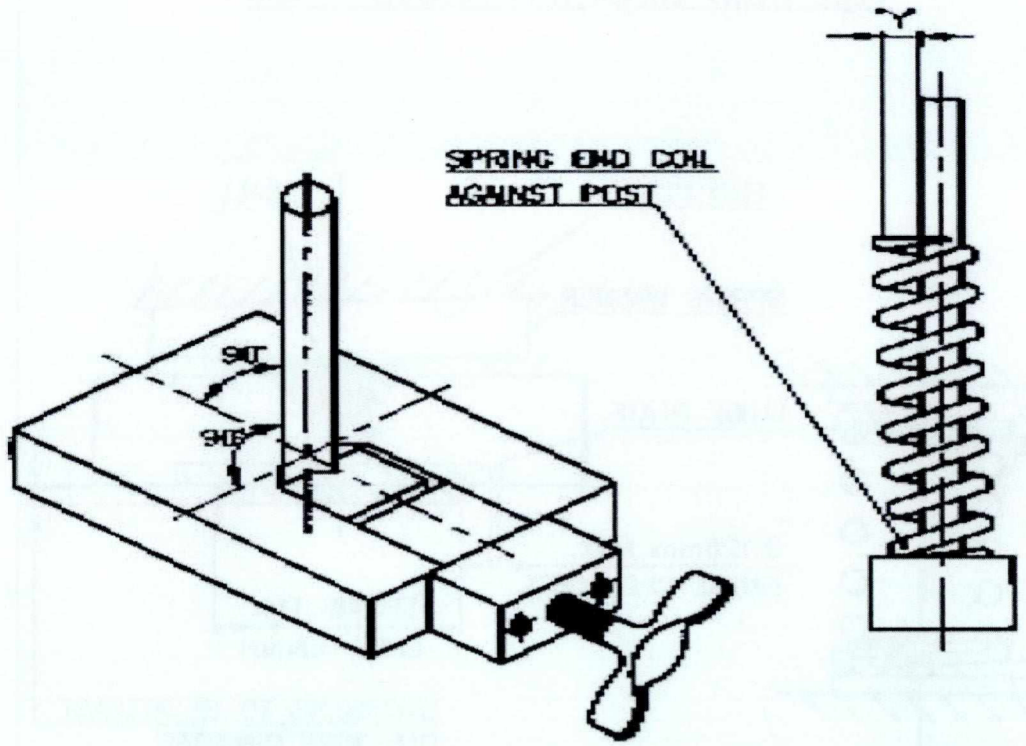
SQUARENESS CHECK for WIRE DIA. 14mm and ABOVE

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 $\frac{0.4}{}$ FINISH. LUBRICATE WITH MOLY-KOTE. IT IS SUGGESTED THIS BEARING SURFACES BE HARDENED.

Figure – 8



APPARATUS SET UP

CHECKING CONCENTRICITY AND SQUARENESS OF ENDCOILS

(WIRE DIA 14mm AND BELOW)

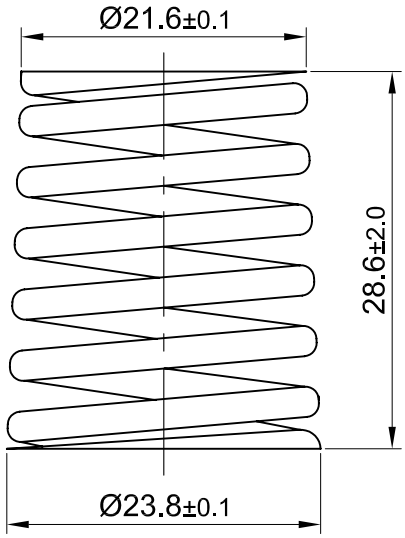
NOTES:

1. "Y" VALUES WHEN MEASURED WITH A SCALE SHALL NOT EXCEED DIA 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.

ALL DIMENSIONS ARE IN MILLIMETRES.

FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP/QP

REV	DATE	ALTERED
		CHD & APPD



NO OF EFFECTIVE COILS - 5
NO OF TOTAL COIL - 7
DIA OF WIRE - 1
MATERIAL - AISI 304
SPRING CONSTANT - 0.023 Kg/mm
TOLERANCE ON LOAD - ±5%

NOTES:-

1. FOR QUALITY REQUIREMENTS REFER APPLICABLE LATEST QUALITY PROCEDURE
2. SUPPLIER TO FURNISH MATERIAL T.C, DIMENSIONAL AND TEST REPORT.

PART CODE: 963560360000

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI 620014.
365–122

	NAME	SIGN	DATE	NO.OF VAR
DRN	S.THIRUMARAN	S.T.	12.02.08	
CHD	K.SRIDHARAN	K.S.	12.02.08	
APPD	S.NATARAJAN	S.N.	12.02.08	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
SB	NTS	0.003	4-20-001-00220	
CODE 330				

TITLE	CARD CODE	DRAWING NO.	REV
CONICAL SPRING	U 01	4-20-001-03391	00

Size A4

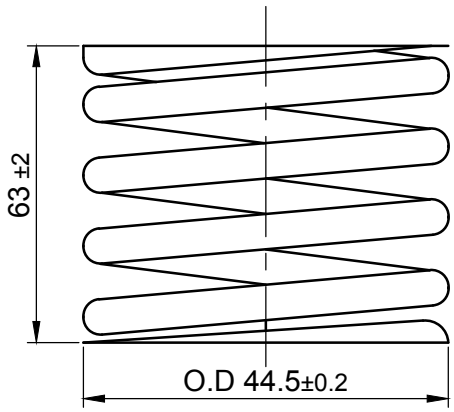
ALL DIMENSIONS ARE IN MILLIMETRES.

FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP/QP

REV	DATE	ALTERED	J.S
01	21.09.17	CHD & APPD	J.S & H.R

CADMIUM PLATING REMOVED. ZINC PHOSPATE COATING INCLUDED.

DCN : SB : 802286 / 5023034



No. OF EFFECTIVE COILS - 3

No. OF TOTAL COIL - 5

DIA. OF WIRE - 4.5

MATERIAL - ASTM A227/228

ZINC PHOSPATE COATING - 30 MICRONS

SPRING CONSTANT - 2.2 Kg/mm

TOLERANCE ON LOAD - ±5%

NOTES:

1. FOR QUALITY REQUIREMENTS REFER APPLICABLE LATEST QUALITY PROCEDURE.
2. SUPPLIER TO FURNISH MATERIAL T.C, DIMENSIONAL AND TEST REPORTS.

PART CODE: 963530560000

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI 620014.
365–122

	NAME	SIGN	DATE	NO.OF VAR
DRN	S.THIRUMARAN	S.T.	12.02.08	
CHD	K.SRIDHARAN	K.S.	12.02.08	
APPD	S.NATARAJAN	S.N.	12.02.08	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
SB	NTS	0.15	4-20-001-00061	
CODE 330				

TITLE	CARD CODE	DRAWING NO.	REV
VALVE SPRING	U 01	4-20-001-03394	01

Size A4

Annexure –I

Certificate by Chartered Accountant on letter head

Thl·s t's to Cert'tfy that M/S ....., (hereinafter referred to as 'company') having its registered office at ..... is registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part-11) ..... dtd:....., Category:..... (Micro/Small)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year ..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost **excluding land and building and the items specified by the Ministry of Small Scale Industries vide its** notification No.S.0.1722(E) dated October 5, 2006 :
   Rs.....Lacs
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and **furniture, fittings and other items not direCtly related to the service rendered or as may be notified under the MSMED** Act, 2006:
   Rs.....Lacs

(Strike off whichever is not applicable)

The above investment of Rs.....Lacs is within permissible limit of Rs.....Lacs for .....Micro / Small (Strike off which is not applicable) Category under MSMED Act 2006.

Or

The company has been graduated from its original category {Micro/ Small) (Strike off which is not applicable) and the date of graduation of such enterprise from its original category is ..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name-

Membership number-

Seal of Chartered Accountant