Ref: RCHTFV2325

Scope of Supply

Item no	Material	Material Description	* Quantity (No)	Drawing No/Rev No	TDC No/Rev No	Specification
10	961620770000	HEX CLR BOLT-3/8"x23.8 -B7-5903-PHOS	45174	3V590309599/06	-	-
20	961620820000	NUT -5/16" -2H-5904-PHOS	40000	3V590409808/02	TDC:5:164/09	-
30	961620780000	HEX CLR BOLT-1/2"x28.6 -B7-5904-PHOS	32000	3V590409599/06	-	-
40	961621760000	NUT -5/8" -2H-5734-PHOS	21000	3V573409808/02	TDC:5:164/09	-
50	964650730000	EYE BOLT-5/16"x32 -T410-5903	20000	4V590326338/00	-	-
60	961620830000	NUT -3/8" -2H-5907-PHOS	15000	3V590709808/02	-	-
70	964650740000	EYE BOLT-5/16"x39.7 -T410-5904	15000	4V590426339/00	-	-
80	961621100000	NUT -1/2" -2H-5732-PHOS	13000	3V573209808/02	-	-
90	961621110000	NUT -7/8" -2H-5737-PHOS	10000	3V573709808/02	-	-
100	961620930000	FT STUD-5/8"x110 -B7-5734-PHOS	10000	3V573409598/06	TDC:5:164/09	-
110	964523990000	NUT -1/4" -2H-5712-PHOS	10000	3V571209808/02	-	-
120	961621120000	FT STUD-1/2"x95 -B7-5732-PHOS	7000	3V573209598/06	-	-
130	961620810000	HEX HD SCRU-3/4"x44.5 -B7-5717-PHOS	5000	3V571709600/01	-	-
140	414060001000	MCN WASHER-M10 -IS:2016	5000		-	BPS41406/IS-2016
150	961620790000	HEX CLR BOLT-9/16"x36.5 -B7-5907-PHOS	5000	3V590709599/06	-	-
160	964650750000	EYE BOLT-3/8"x45.2 -T410-5907	5000	4V590726340/00	-	-
170	961621690000	FT STUD-7/8"x155 -B7-5203-PHOS	3000	3V520309598/06	-	-
180	964562800000	NUT -5/8" -2H-N025	2500	3VN02506876/03	TDC:5:164/09	-
190	961621130000	FT STUD-7/8"x140 -B7-5737-PHOS	2000	3V573709598/06	-	-
200	964521310000	HEX CLR BOLT-3/8"x23.8 -B8-5933	1500	3V593309599/05	-	-
210	966000260000	Stud M16 x 158 - B7	1000	3VSFJA20721/00	-	ASTM A193 B7
220	966000270000	Stud - M16 - B16	1000	3VSFJM20721/00	TDC:5:164/09	ASTM A193 B16
230	530131080000	CHAIN 3X17X12 - 600 MM LONG (COMML QLTY)	1000	4VMISC90219/00	-	-
240	964533580000	NUT -M22 -2H-0017-H22	1000	3V001720717/00	TDC:5:164/09	-

Ref: RCHTFV2325

Scope of Supply

Item no	Material	Material Description	* Quantity (No)	Drawing No/Rev No	TDC No/Rev No	Specification
250	964612890000	HSCSCRU M24Tx75	1000	3V000027130/02	-	21CRMOV5-7
260	964611870000	HSH CAP SCREW	1000	4V046706601/02	-	-
270	411152008000	DE STUD-M20x80 -B7-TL100	800		-	BPS41115
280	963535190000	YOKE SWIVER M24	800	42000100007/06	-	-
290	961620800000	HEX CLR BOLT-3/8"x27 -B7-5803-PHOS	650	3V580309599/06	-	-
300	964527370000	FT STUD-M20x165 -B16-0035	650	3V003520729/02	-	-
310	964568880000	NUT -7/8" -GR7-F522	600	3VF52223249/02	TDC:5:164/09	-
320	964652730000	FT STUD-M33x3.5x155 -B16-3237	500	3V323720721/00	TDC:5:164/09	-
330	964521980000	BOLT-M30x3.5x110 -B7-0007	500	3V000720723/03	TDC:5:164/07	-
340	964565780000	NUT -1/2" -GR7-N301	450	3VN30195178/02	TDC:5:164/09	-
350	964652750000	NUT -M33x3.5 -GR7-3237-H33	450	3V323720717/00	-	-
360	964606500000	DE STUD M30X145X38X48-B7-L705	400	3VL70522459/00	-	-
370	964535330000	BOLT-M30x3.5x105 -B7-V449	350	3VV44921152/01	TDC:5:164/09	-
380	964568820000	FT STUD-7/8"x150 -B16-F522	300	3VF52223248/01	TDC:5:164/09	-
390	964613360000	HSC SCRU M30TX180	300	3V000027130/02	-	21CRMOV5-7
400	961621700000	NUT -3/4" -2H-5610-PHOS	250	3V561009808/02	-	-
410	964521860000	DE STUD-M22x135 -B7-0002	250	3V000220722/02	TDC:5:164/09	-
420	411152005500	DE STUD-M20x55 -B7-TL75	250		-	BPS 41115
430	411011204000	DE STUD-M12x40 -6.6-IS1862-A-TL52	250		-	BPS41101/IS-1862
440	964620610000	DE STUD M16X70X21X30-B16-L865	230	3VL86522457/02	-	A193 B16
450	964604690000	HSH CAP SCREW-M20x70	200	4V000025401/00	-	-
460	966000390000	FT STUD-1/2"x95 -B16-H952	200	3VH97295180/00	-	ASTM A193 B16
470	412290002000	LIFT EYE BOLT-M20 -CL3-IS4190-1T	200	-	-	IS-4190
480	964535590000	BOLT-M36x4x115 -B16-V468	200	3VV46821152/01	TDC:5:164/09	-
490	964535600000	BOLT-M36x4x115 -B7-V465	200	3VV46521152/01	TDC:5:164/09	-
500	964654080000	FT STUD-M42x3x340 -B7-0022	200	3V002220729/00	-	-

Ref: RCHTFV2325

Scope of Supply

Item no	Material	Material Description	* Quantity (No)	Drawing No/Rev No	TDC No/Rev No	Specification
510	964660230000	FT STUD-M36x3x370 -B7-0049	200	3V004920721/00	TDC:5:164/09	-
520	964650200000	HEX CLR BOLT-9/16" -B8M-5937	200	3V593795923/00	-	-
530	966000760000	HEX CLR BOLT-1/2"x28.6 -B7-M954-PHOS	200	3VM95435365/00	-	-
540	961621670000	FT STUD-3/4"x130 -B7-5610-PHOS	150	3V561009598/06	-	-
550	966000790000	NUT -5/16" -2H-M963-PHOS	150	3VM96335373/00	-	-
560	966000800000	HEX CLR BOLT-9/16"x36.5 -B7-M955-PHOS	150	3VM95535365/00	-	-
570	966000810000	HEX CLR BOLT-3/8"x27 -B7-M953-PHOS	150	3VM95335365/00	-	-
580	964621260000	DE STUD M30X145X38X48-B16-L715	130	3VL71522459/00	-	A193 B16
590	964535340000	BOLT-M30x3.5x105 -B16-V452	125	3VV45221152/01	TDC:5:164/09	-
600	964521920000	BOLT-M 8x30 -B7-0001	125	3V000120723/03	TDC:5:164/09	-
610	964535070000	FT STUD-M22x210 -B16-V379-DGPT	125	3VV37921125/00	TDC:5:164/09	-
620	964521840000	FT STUD-M36x3x485 -B7-0023	110	3V002320721/02	TDC:5:164/09	-
630	964562700000	FT STUD-5/8"x94 -B7-N001	100	3VN00106875/02	-	-
640	964535790000	BOLT-M 5x25 -8.8-R001-TL27	100	4VR00118902/00	TDC:5:164/09	-
650	964665510000	BOLT-M36x3x170 -B16-V730-DGPT	100	3VV73021150/00	TDC:5:164/09	-
660	964521780000	FT STUD-M36x3x295 -B7-0017	100	3V001720721/02	TDC:5:164/09	-
670	964534930000	FT STUD-M16x130 -B16-V091-DGPT	100	3VV09121125/00	TDC:5:164/09	-
680	964534940000	FT STUD-M16x150 -B16-V092-DGPT	100	3VV09221125/00	TDC:5:164/09	-
690	964535230000	DE STUD-M20x150 -B7-V145	100	3VV14521153/01	TDC:5:164/09	-
700	964660570000	BOLT-M22x75 -B16-V566	100	3VV56621150/01		-
710	964535280000	BOLT-M16x60 -B16-V108	100	3VV10821152/01	TDC:5:164/09	-
720	964522040000	FT STUD-M16x140 -B16-0024	100	3V002420721/02	TDC:5:164/09	-
730	964535780000	BOLT-M20x110 -B7-0017	100	3V001720728/00	TDC:5:164/09	-
740	411179620500	FT STUD-M16x205 -B7-CAD	100		-	BPS 41117
750	966000470000	EYE BOLT-3/8"x45.2 -A193B8MA	100	4VHL9127333/00	-	-
760	964535480000	DE STUD-M12x70 -B7-V201	100	3VV20121153/00	TDC:5:164/09	-
770	966000750000	HEX HD SCRU-3/4"x44.5 -B7-M956-PHOS	100	3VM95635371/00	-	-

Ref: RCHTFV2325

Scope of Supply

Item no	Material	Material Description	* Quantity (No)	Drawing No/Rev No	TDC No/Rev No	Specification
780	964620600000	DE STUD M24X130X32X43-B16-L950	70	3VL95022459/00	-	A193 B16
790	964620160000	LIFT EYE BOLT-M64x6 -CL3-IS4190	65		-	IS4190
800	964652720000	FT STUD-M33x3.5x155 -B7-3234	60	3V323420721/00	-	-
810	964621210000	FD STUD M42X290-B16-L794	50	3VL79422456/01	-	A193 B16
820	964605380000	DE STUD M24X120X32X43-B7-L858	50	3VL85822457/01	-	-
830	964621040000	DE STUD M20X110X26X50-B16-L801	50	3VL80122457/03	-	A193 B16
840	964660290000	DE STUD-M36x3x220 -B16-WA98	50	3VWA9821153/00	-	-
850	964620410000	DE STUD M24X112X35X40-B16-LB20	50	3VLB2022459/00	-	A193 B16
860	964605290000	LIFT EYE BOLT-M36x4 CL2-L805-4T	50	3VL80506620/00	-	-
870	966000690000	Stud M12x130 - B7	50	3VSDJA20721/01	-	ASTM A193 B7
880	964534230000	FT STUD-M12x90 -B7-0015	50	3V001520729/01	TDC:5:164/09	-
890	964660470000	FT STUD-M30x3x350 -B7-WA99-DGPT	50	3VWA9921125/00	-	-
900	964621100000	DE STUD M24X165X30X70-B16-L794	50	3VL79422457/04	-	A193 B16
910	964535260000	DE STUD-M30x3x170 -B16-V452	50	3VV45221153/00	TDC:5:164/09	-
920	964653130000	FT STUD-M36x3x220 -B16-3205	50	3V320521094/00	TDC:5:164/09	-
930	964621150000	DE STUD M16X110X25X45-B16-LA44	50	3VLA4422459/00	-	A193 B16
940	964620550000	DE STUD M36X200X44X59-B16-L897	50	3VL89722457/02	-	A193 B16
950	964652610000	FT STUD-M39x3x240 -B16-0045	50	3V004520729/00	TDC:5:164/09	-
960	964605240000	EYE BOLT-M12x65 -B7-L841	50	3VL84122455/03	-	-
970	964621170000	FD STUD M30X170-B16-L805	50	3VL80522456/00	-	A193 B16
980	964620560000	DE STUD M22X120X28X54-B16-L849	50	3VL84922457/02	-	A193 B16
990	964620570000	DE STUD M20X100X26X35-B16-L751	50	3VL75122459/00	-	A193 B16
1000	964529980000	LIFT EYE BOLT-M48x3 -CL3-IS4190	40		-	IS 4190
1010	964534980000	FT STUD-M22x170 -B16-V148-DGPT	30	3VV14821125/00	TDC:5:164/09	-
1020	964608550000	DE STUD-M16x70 -B16-L865--BLUE-BLKN	30	3VL86522702/00	-	-
1030	964605350000	DE STUD M20X100X26X50-B7-L825	30	3VL82522457/03	-	A193-B7
1040	964620540000	DE STUD M16X85X20X30-B16-L793	30	3VL79322457/01	-	A193 B16

Ref: RCHTFV2325

Scope of Supply

Item no	Material	Material Description	* Quantity (No)	Drawing No/Rev No	TDC No/Rev No	Specification
1050	964525430000	LIFT EYE BOLT-M36x3 -L029-4T	20	3VL02906620/01	-	-
1060	964605300000	LIFT EYE BOLT-M42x4.5 -CL3-IS4190	20	-	-	IS 4190
1070	964607010000	SELF LOCK NUT-M36x4-L789	15	4VL78920056/01	-	-

*The quantities mentioned in the enquiry are indicative for the entire Rate Contract (RC) period

BHARAT HEAVY ELECTRICALS LIMITED
Tiruchirapalli-620014

Pre-Qualification Requirement (To be submitted in Part-I bid)

Ref: RCHTFV2325

1. Vendor to furnish records of previous supplies of same or similar category items to any Central / State Govt Organization / PSU / Public Listed Company: To fulfil this criteria vendor shall submit previous records not more than 5 years old from date of part 1 bid opening.
2. Vendor should manufacture the items as per BHEL drawing and specification. To fulfil this criteria vendor shall submit the drawings and specifications duly sealed and signed.

BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE
Trichy - 620 014. India
CONFIRMATION TO TERMS AND CONDITIONS

Enquiry Reference: **RCHTFV2325**

TERMS & CONDITION	**VENDOR CONFIRMATION**
a. Vendor Quotation Ref No and Date	
b. Rate Contract: This is an enquiry for the finalization of a Rate Contract (RC) for a period as mentioned in 'Validity of offer' below The quantities mentioned in the enquiry are indicative for the entire RC period. **Purchase Orders will NOT be issued for the entire quantum in one lot, whereas POs will be released on a time to time basis during the RC period, based on actual requirement**.	
c. Vendor should give confirmation to BHEL's Technical Specification. Any deviations from the specification are to be furnished separately as "Schedule of Deviation". If there is no deviation vendor should indicate **"No Deviation".**	
d. The offer has to be submitted as a **Two-part bid** (Techno-commercial & Price bid)	
e. The tender will be finalized on item wise basis	
f. Terms of Payment: Indigenous Supplier (Non-MSE): 100% direct EFT Payment after 60 days from the date of receipt and acceptance of materials at BHEL stores / against site acknowledgement. Indigenous Supplier (MSE): Payment will be as per MSMED Act, 2006	
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.	
h. Delivery Terms: Prices shall be quoted on **"FIRM PRICE"** basis only. For Indigenous Supplies: FOR BHEL Trichy	
i. Validity of Offer: Prices should be valid for **9 months** from the date of finalisation of the rate contract or **12 months from the date of part-1 bid opening**, whichever is earlier.	
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.	

BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE
Trichy - 620 014. India
CONFIRMATION TO TERMS AND CONDITIONS

Enquiry Reference: **RCHTFV2325**

TERMS & CONDITION	**VENDOR CONFIRMATION**
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.	
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. Any warranty replacement during warranty period shall be supplied free of charge on FOR Site basis/destination specified by BHEL	
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	

BHARAT HEAVY ELECTRICALS LTD

VALVES PURCHASE
Trichy - 620 014, India
GENERAL TERMS AND CONDITIONS

Enquiry Reference: RCHTFV2325

1. QUOTATIONS:

a. BID system: The no. of bids to be submitted is mentioned in "Confirmation to the Terms and Conditions" attached.

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://eprocurebhel.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. (if PBG is not applicable)

(or)

Payment term is 100% direct payment after 60 days from the date of receipt and acceptance of materials and against 10% PBG valid for the warranty period. (if PBG is applicable)

If the materials are receivable at site:

Payment term is 100% direct payment after 60 days from the date of dispatch against site acknowledgement (if PBG is applicable)

(or)

Payment term is 100% direct payment after 60 days from the date of dispatch against site acknowledgement and against 10% PBG valid for the warranty period (if PBG is applicable)

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.

c. 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.

d. Delivery Terms:

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

For Foreign Suppliers: CFR/CIF Chennai seaport as per Incoterms 2010.

e. **Validity of Offer:** Prices should be fixed and should be valid for period as mentioned in the "Confirmation to the Terms and Conditions" attached.

f. **Delivery period:** Delivery schedule will be as mentioned in the "Confirmation to the Terms and Conditions" attached.

g. **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.

h. **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.

i. **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.

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.

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 Udhyog Aadhar and a certificate, as per the format in Annexure-A, issued by a chartered accountant during the financial year of the date of part-1 bid opening, certifying that the quantum of investment in plant and machinery is within the permissible limit as per the act for relevant status (Micro or small).

(or)

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.

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:

Risk & Cost Amount= [(A-B) + (A x 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)

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 and 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 preference and/or local content in respect of this procurement, the same shall be applicable.

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/Warrantee Certificate and other documents mentioned in PO/TDC/Drawing.

b. **To Purchase:**

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.

Foreign Vendors

Total Landed cost = CFR Rate in INR (A) + Applicable Duties (B) + Incidental Charges (C) + Loading for Container Shipment (D) + Loading for non-acceptance of commercial terms (E)

A - Foreign vendors to submit offers on CFR (Cost & Freight), Chennai port (LILO – Liner In; Liner Out) basis per item wise in foreign currency, which will be converted to INR by multiplying with the Exchange rate (SBI TT Selling rate) as on the technical bid opening date. If the date of opening happens to be a bank holiday, then the forex rate as on previous bank (SBI) working day shall be taken.

B - Customs duty, Safe guard duty (as per the notification No 02/2014-Customs (SG) dated 13th August 2014) and antidumping duty (as per the notification No 18/2016-Customs (ADD) dated 17.05.2016) as if applicable will be added to the INR price.

C - Incidental charges will be added to the CFR Value. The incidental charge is inclusive of port handling charges, & freight charges for movement from Chennai port to BHEL, Trichy.

D - In case of shipment through containers, if 14 free days for Container detention is not provided in the offer, a loading of 22% on the freight rate per MT shall be considered by BHEL for arriving at the Total Landed Cost.

E - Loading for non-acceptance of payment terms, delivery schedule & Liquidated Damages (LD) will be added to the CFR value 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.

Enquiry Reference: RCHTFV2325

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

(1)
S Suresh
Deputy Manager
Valves Purchase
24 Building, 3rd Floor,
BHEL, Trichy-620014
+91 431 2578668
suresh.s@bhel.in

(2)
Ajay Kumar Gupta
AGM
Valves Purchase
24 Building, 3rd Floor,
BHEL, Trichy-620014
+91 431 2578156
ajaykumar.gupta@bhel.in

****

Company Letter Head

Declaration

In line with Government Public Procurement Order No. P-45021/2/2017-PP (BE-II) dated 28.05.2018, we hereby certify that we, …… (supplier name) are local supplier meeting requirement of minimum local content (--%) defined in as above orders for the following Enquiry Sl Nos of BHEL Enquiry No **RCHTFV2325**

- Mention Enquiry Sl Nos – ……

Details of location at which local value addition will be made is as follows:

……

……

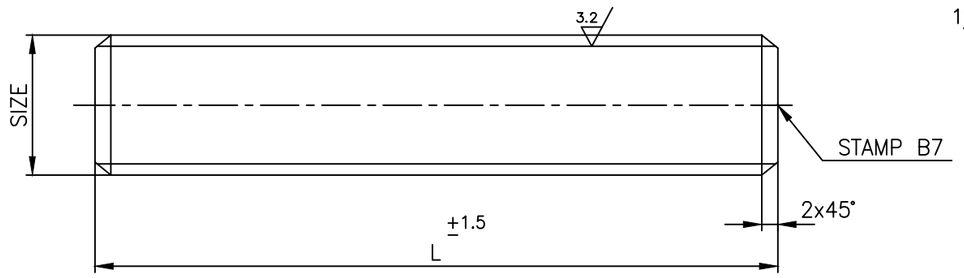
By issuing this declaration, we understand and are in acceptance to the following-

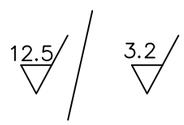
- False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.
- In case of debarment by any procuring entity for violation of the provisions of the Public Procurement (Preference to Make in India), Order 2017 we shall not be eligible for preference for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, the debarment takes effect prospectively from the date of uploading on the website(s) of The Department of Expenditure, GOI in such a manner that ongoing procurements are not disrupted.
- We undertake the onus of responsibility of submission of appropriately certified documents. We understand that BHEL is not at liability to verify the contents and will not be responsible for the declaration made by us. However, in case BHEL has any reason to doubt the authenticity of the local content, BHEL reserves the right to obtain the complete back up calculations before award of contract and we are liable to submit the same if requested by BHEL. We also understand that our bid is liable for rejection in case we fail to submit the details as requested by BHEL.

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-06875

SL.No	DRAWING No.	MATERIAL	MATL. CODE	SIZE	L	WEIGHT IN Kgs.	SIZE/RATING
01	3-V-N073-06875/02	ASTM A193 B7, HT, CERTIFY	964562670000	1/2"-13UNC-2A	68	0.07	2"-150
02	3-V-N081-06875/02		964562680000	1/2"-13UNC-2A	80	0.08	2"-300
03	3-V-N025-06875/02		964562690000	5/8"-11UNC-2A	86	0.13	3"-150
04	3-V-N001-06875/02		964562700000	5/8"-11UNC-2A	94	0.15	4"-150 6"-150
05	3-V-N009-06875/02		964562710000	5/8"-11UNC-2A	105	0.16	8"-150 3",4"-300
06	3-V-N017-06875/02		964562720000	5/8"-11UNC-2A	118	0.18	6"-300
07	3-V-N057-06875/02		964562730000	3/4"-10UNC-2A	112	0.25	10"-150
08	3-V-N041-06875/02		964562740000	3/4"-10UNC-2A	120	0.27	12"-150
09	3-V-N089-06875/02		964562750000	3/4"-10UNC-2A	133	0.30	8"-300
10	3-V-N065-06875/02		964562760000	1"-8UNC-2A	158	0.63	10"-300
11	3-V-N105-06875/02		964562770000	1.1/8"-8UN-2A	180	0.91	12"-300
12	3-V-N106-06875/02		964562780000	1.1/8"-8UN-2A	140	0.71	12"-300
13	3-V-N224-06875/02		964562290000	1"-8UNC-2A	170	0.71	20"-150
14	3-V-1387-06875/02		964564270000	1"-8UNC-2A	135	0.54	16"-150
15	3-V-N204-06875/02		964564280000	3/4"-10UNC-2A	105	0.25	6"-150
16	3-V-N206-06875/02	ASTM A193 B7, HT, CERTIFY	964564290000	7/8"-9UNC-2A	115	0.35	10"-150
17	3-V-N207-06875/02		964564300000	7/8"-9UNC-2A	125	0.38	12"-150
18	3-V-N212-06875/02		964564560000	7/8"-9UNC-2A	150	0.45	8"-300
19	3-V-F505-06875/01		964566800000	1.1/4"-8UN-2A	215	1.34	8"-600
20	3-V-F506-06875/01		964566810000	1.1/8"-8UN-2A	220	1.41	10"-600
21	3-V-F507-06875/02		964566820000	1.1/4"-8UN-2A	250	1.74	12"-600
22	3-V-N361-06875/01		964567040000	1.1/4"-8UN-2A	150	0.94	24"-150& 16"-300
23	3-V-N437-06875/01		964567430000	1.3/8"-8UN-2A	190	1.44	20"-300
24	3-V-N847-06875		964536630000	1.1/4"-8UN-2A	195	1.23	28"-150
25	3-V-N848-06875		964536640000	1.3/8"-8UN-2A	210	1.58	30"-150
26	3-V-N827-06875		964536650000	1.1/2"-8UN-2A	220	1.96	32"-150
27	3-V-N846-06875/01		964536660000	1.3/4"-8UN-2A	240	2.9	36"-150
28	3-V-NE97-06875		964653420000	1.1/2"-8UN-2A	260	2.32	26"-300
29	3-V-NK44-06875		964659010000	1.5/8"-8UN-2A	270	2.84	28"-300
30	3-V-NK45-06875		964659050000	2"-8UN-2A	275	4.38	28"-600
31	3-V-P788-06875		964659130000	1.3/8"-8UN-2A	235	1.59	14"-600





NOTE:-

FOR QUALITY REQUIREMENTS REFER LATEST APPLICABLE TDC:5:164

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

REV	DATE	ALTERED		REV	DATE	ALTERED	
14	12.06.19	CHD & APPD	R.P.SINGH SSK & KRS	13	08.12.18	CHD & APPD	R.P.SINGH SSK & KRS
		SL.No 31 INCLUDED.				SL.No 29 & 30 INCLUDED.	

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		31.12.09	
CHD	S.SATHEESHKUMAR		31.12.09	
APPD	K.RAJASEKARAN		31.12.09	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N T S		CAD .3-V-0000-06875-0-0	
CODE 320				

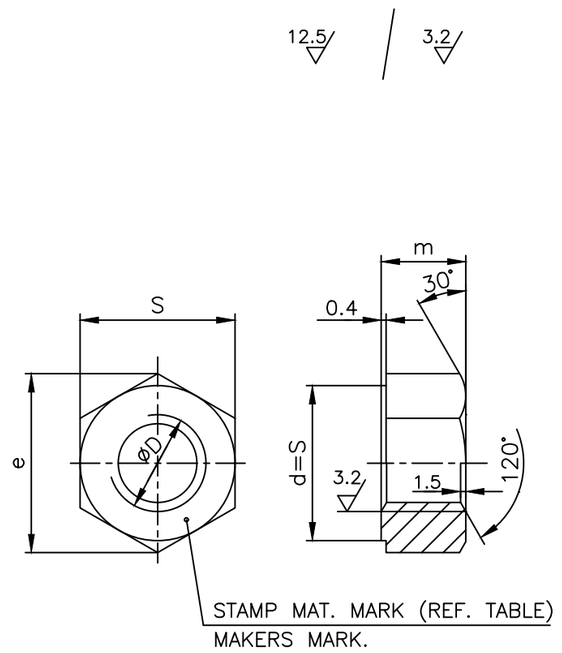
TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-06875	14

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-06876

SL. No.	DRAWING No.	COMP. CODE	MATL. SPECN.	S		e		m		øD	MATL. MARK	NET WT. (Kg.)
				MAX.	MIN.	MAX.	MIN.	MAX.	MIN.			
01	3.V.N073.06876/03	96 456 279	ASTM A194 – 2H, CERTIFY	22.22	21.59	25.65	24.61	12.80	11.79	1/2"–13 UNC –2B	2H	0.02
02	3.V.N025.06876/03	96 456 280		26.97	26.19	31.17	29.85	16.03	14.91	5/8"–11 UNC –2B	2H	0.03
03	3.V.N057.06876/03	96 456 281		31.75	30.78	36.65	35.10	19.25	18.03	3/4"–10 UNC –2B	2H	0.08
04	3.V.N065.06876/03	96 456 282		41.28	40.01	47.65	45.62	25.70	24.28	1"–8 UNC –2B	2H	0.17
05	3.V.N105.06876/03	96 456 283		46.02	44.60	53.16	50.85	29.93	27.41	1.1/8"–8 UN –2B	2H	0.27
06	3.V.N206.06876/02	96 456 431		36.52	35.41	42.16	40.37	22.47	21.16	7/8"–9 UNC –2B	2H	0.11
07	3.V.N204.06876/02	96 456 453	SA 307 Gr.B CERTIFY	31.75	30.78	36.65	35.10	19.25	18.03	3/4"–10 UNC –2B	307 B	0.08
08	3.V.N207.06876/02	96 456 454		36.52	35.41	42.16	40.37	22.47	21.16	7/8"–9 UNC –2B	307 B	0.11
09	3.V.F505.06876/01	96 456 683	ASTM A194 – 2H, CERTIFY	50.8	49.23	58.65	56.11	31.78	30.15	1.1/4"–8 UN –2B	2H	0.22
10	3.V.N848.06876	96 453 667		55.57	53.8	64.16	61.37	35.0	33.27	1.3/8"–8 UN –2B	2H	0.42
11	3.V.N827.06876	96 453 668		60.33	58.42	69.65	66.59	38.23	36.40	1.1/2"–8 UN –2B	2H	0.52
12	3.V.N846.06876/01	96 453 669		69.85	67.61	80.65	77.09	44.68	42.65	1.3/4"–8 UN –2B	2H	0.81
13	3.V.NK44.06876	96 465 904		65.07	63.02	75.15	71.84	41.45	39.53	1.5/8"–8 UN –2B	2H	0.68
14	3.V.NK45.06876	96 465 906		79.37	76.84	91.64	87.61	51.13	48.90	2"–8 UN –2B	2H	1.36



RETRACED WITH REV. 09 ON 26.11.18

NOTE:

1. FOR QUALITY REQUIREMENTS REFER LATEST APPLICABLE STANDARD(TDC:5:164).

REV	DATE	ALTERED R.P.SINGH
09	26.11.18	CHD & APPD SSK & KRS
		SL. No.13 & 14 INCLUDED.

–	–	–	–	–	–	–	–	–	–
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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365–121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M.SRINIVASAN		22.04.96	
CHD	N.DHANAPAL		22.04.96	
APPD	A.VISWANATHAN		22.04.96	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF. TABLE	CAD: C306876	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
HEX NUT	U 01	3–V–0000–06876	09

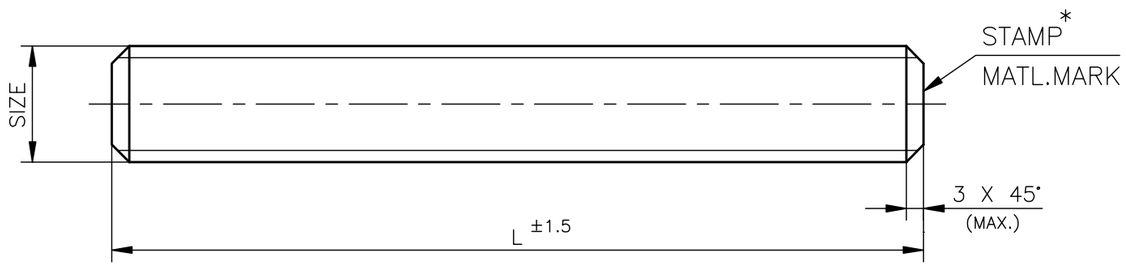
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-09598

3.2

SL.No	DRAWING No.	MATERIAL	MATL. CODE	MATL. MARK *	SIZE	L	WEIGHT IN Kgs.	REMARKS
01.	3-V-5732-09598/06	ASTM A193-B7	96 162 112	B7	1/2"-13UNC-2A	95	0.10	
02.	3-V-H962-09598	ASTM A193-B8	96 465 349	B8				
03.	3-V-5734-09598/06	ASTM A193-B7	96 162 093	B7	5/8"-11UNC-2A	110	0.17	
04.	3-V-H964-09598	ASTM A193-B8	96 465 351	B8				
05.	3-V-5737-09598/06	ASTM A193-B7	96 162 113	B7	7/8"-9UNC-2A	140	0.43	
06.	3-V-H967-09598	ASTM A193-B8	96 465 353	B8				
07.	3-V-5610-09598/06	ASTM A193-B7	96 162 167	B7	3/4"-10UNC-2A	130	0.29	
08.	3-V-5203-09598/06	ASTM A193-B7	96 162 169	B7	7/8"-9UNC-2A	155	0.50	
09.	3-V-5990-09598/06	ASTM A193-B7	96 162 168	B7	1/2"-13UNC-2A	80	0.08	
10.	3-V-Y013-09598/06	ASTM A193-B7	96 452 873	B7	7/16"-14UNC-2A	70	0.05	
11.	3-V-Y012-09598/06	ASTM A193-B7	96 452 872	B7	3/8"-16UNC-2A	51	0.03	
12.	3-V-Y047-09598/06	ASTM A193-B7	96 452 875	B7	5/8"-11UNC-3A	80	0.12	
13.	3-V-Y019-09598/06	ASTM A193-B7	96 452 874	B7	5/8"-11UNC-3A	89	0.13	



–	–	–	–	–	–	–	–	–	–
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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M.SRINIVASAN		20.07.92	
CHD	N.P.ESWARAN		20.07.92	
APPD	N.NAGARAJAN		20.07.92	

REV	DATE	ALTERED	
07	12.02.10	CHD & APPD	S.V.NATHAN / M.RAJAKUMAR

DRAWING No. 3-V-H962-09598, 3-V-H964-09598 AND 3-V-H967-09598 INCLUDED.

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF TABLE	CAD: F309598	
CODE 320			DR DRG. 454,2369	

TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-09598	07

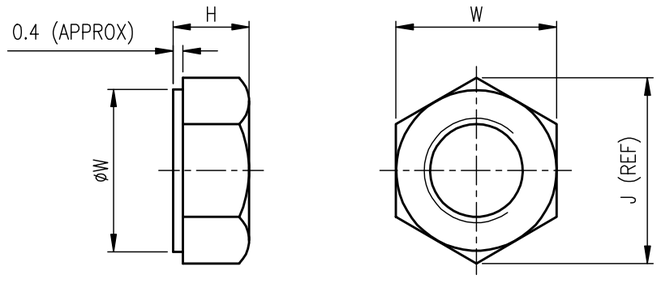
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-09808

3.2

SL.NO.	DRAWING NO.	SIZE	MATERIAL	MATERIAL CODE	W		J		H		WEIGHT IN KGS
					MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	
01	3-V-5732-09808/02	1/2"-13 UNC-2B	ASTM A194-2H	96 162 110	19.05	18.69	22.00	21.34	11.38	10.85	0.02
02	3-V-H962-09808		ASTM A194-Gr.8	96 465 350							
03	3-V-5734-09808/02	5/8"-11 UNC-2B	ASTM A194-2H	96 162 176	23.83	23.42	27.51	26.70	14.20	13.59	0.04
04	3-V-H964-09808		ASTM A194-Gr.8	96 465 352							
05	3-V-5737-09808/02	7/8"-9 UNC-2B	ASTM A194-2H	96 162 111	33.32	32.23	38.51	36.75	19.71	18.39	0.10
06	3-V-H967-09808		ASTM A194-Gr.8	96 465 354							
07	3-V-5904-09808/02	5/16"-18 UNC-2B	ASTM A194-2H	96 162 082	12.70	12.42	14.66	14.15	6.93	6.55	0.01
08	3-V-Y032-09808/01		ASTM A194-Gr.8	96 452 853							
09	3-V-5907-09808/02	3/8"-16 UNC-2B	ASTM A194-2H	96 162 083	14.27	14.00	16.51	15.95	8.56	8.13	0.01
10	3-V-5610-09808/02	3/4"-10 UNC-2B	ASTM A194-2H	96 162 170	28.58	27.64	32.99	31.50	16.89	15.67	0.07
11	3-V-5990-09808/02	5/8"-11 UNC-2B	ASTM A194-2H	96 162 171	26.97	26.19	31.17	29.85	16.03	14.91	0.06
12	3-V-Y034-09808/01		ASTM A194-Gr.8	96 452 855							
13	3-V-5999-09808/02	1/2"-13 UNC-2B	ASTM A194-2H	96 162 172	22.23	21.59	25.65	24.61	12.80	11.79	0.03
14	3-V-Y035-09808/01		ASTM A194-Gr.8	96 452 856							
15	3-V-5292-09808/02	5/16"-18 UNC-2B	ASTM A194-2HM	96 452 270	12.70	12.42	14.66	14.15	6.93	6.55	0.01
16	3-V-5712-09808/02	1/4"-20 UNC-2B	ASTM A194-2H	96 452 399	11.13	10.87	12.83	12.40	5.74	5.38	0.01
17	3-V-Y011-09808/02	3/8"-16 UNC-2B	ASTM A194-2H	96 452 857	17.45	16.99	20.17	19.38	9.58	8.66	0.01
18	3-V-Y031-09808/01		ASTM A194-Gr.8	96 452 852							
19	3-V-Y013-09808/02	7/16"-14 UNC-2B	ASTM A194-2H	96 452 858	19.05	18.49	22.00	21.08	11.20	10.24	0.02
20	3-V-Y033-09808/01		ASTM A194-Gr.8	96 452 854							



NOTES

01. NUTS OF ASTM A194-2H & 2HM SHALL BE PHOSPHATED.
02. THIS DRG. REPLACES EXISTING DRG. No. 3-V-0000-09597.
03. HARDNESS SHALL NOT EXCEED RC22 FOR 2HM NUTS.

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

REV	DATE	ALTERED	REV	DATE	ALTERED
04	17.02.10	S.V.NATHAN CHD & APPD M.RAJAKUMAR	02	01.4.95	A.S.PANDY CHD & APPD P.BOOMINATHAN
	DRAWING No. 3-V-H962-09808, 3-V-H964-09808 AND 3-V-H967-09808 INCLUDED.		DCN:FS:0320	IN NOTE 1 PHOSPHATED WAS GALVANISED.	
03	05.01.07	A.S.PANDY CHD & APPD P.BOOMINATHAN	01	20.6.88	A.S.PANDY CHD & APPD P.BOOMINATHAN
	DRG.CONVERTED IN ACAD			SL.NOS. 08, 12, 14 & 17 TO 20 INCLUDED REFERENCE 220/EX 082 (8922)	

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

365-121

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	EOL/VAD		04.01.07	
CHD	M.SRINIVASAN		05.01.07	
APPD	P.BOOMINATHAN		05.01.07	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N T S	REFER TABLE	3-V-0000-09597 CAD.REF.F309808	

CODE	TITLE	CARD CODE	DRAWING NO.	REV
	HEX NUT	U 01	3-V-0000-09808	04

Size A3

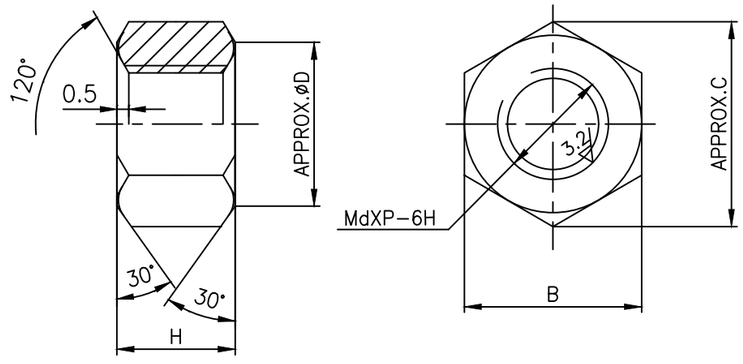
ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

12.5 / 3.2

DRAWING NO. 3-V-0000-20717

SL. NO.	DRAWING NO.	MATL. SPECN.	COMP.CODE	DIMENSIONS						FINISHED WT(kg)
				Md	P	H	B	C	øD	
01.	3-V-0001-20717	A194-2H, CERTIFY	96 452 160 0000	M22	2.5	18	32	37	31	0.07
02.	3-V-0002-20717		96 452 161 0000	M30	3	24	46	53.1	44	0.21
03.	3-V-0003-20717		96 452 312 0000	M42	3	42	65	75	62	0.29
04.	3-V-0004-20717/1		96 452 450 0000	M39	4	32	60 ⚠6	65	55	0.24
05.	3-V-0005-20717		96 452 688 0000	M5	0.8	4	8.3	9.2	7	0.01
06.	3-V-0006-20717		96 452 932 0000	M48	3	48	75	86.5	72	0.94
07.	3-V-0007-20717		96 453 057 0000	M52	3	52	80	92.4	77	1.2
08.	3-V-0008-20717		96 460 645 0000	M30	3	30	46	53.1	44	0.23
17.	3-V-0017-20717		96 453 358 0000	M22	2.5	22	32	37	31	0.09
18.	3-V-0018-20717/1		96 466 008 0000	M39	3	39	60 ⚠6	65	55	0.29
20	3-V-3234-20717		96 465 274 0000	M33	3.5	33	50	57.7	49	0.32

SL. NO.	DRAWING NO.	MATL. SPECN.	COMP.CODE	DIMENSIONS						FINISHED WT(kg)
				Md	P	H	B	C	øD	
09.	3-V-0009-20717/1	A194-Gr.7, CERTIFY	96 452 309 0000	M22	2.5	18	32	37	31	0.07
10.	3-V-0010-20717/1		96 452 310 0000	M30	3	24	46	53.1	44	0.21
11.	3-V-0011-20717/1		96 452 311 0000	M42	3	42	65	75	62	0.29
12.	3-V-0012-20717/1		96 453 058 0000	M52	3	52	80	92.4	77	1.2
13.	3-V-0013-20717/1		96 460 647 0000	M30	3	30	46	53.1	44	0.23
14.	3-V-0014-20717/2		96 453 203 0000	M39	4	32	60 ⚠6	65	55	0.24
15.	3-V-L793-20717/1		96 460 741 0000	M42	4.5	42	65	75	62	0.29
16.	3-V-0016-20717/1		96 453 357 0000	M22	2.5	22	32	37	31	0.09
19.	3-V-0019-20717/1		96 466 009 0000	M39	3	39	60 ⚠6	65	55	0.29
21	3-V-3237-20717		96 465 275 0000	M33	3.5	33	50	57.7	49	0.32



NOTES:-

01. LATEST APPLICABLE QUALITY WORK INSTRUCTION SHALL BE FOLLOWED IN ALL RESPECTS.

–	–	–	–	–	–	–	–	–	–
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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	Y.ARTHUR		17.3.07	
CHD	K.RAJASEKARAN		17.3.07	
APPD	M.RAJAKUMAR		17.3.07	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N T S		CAD REF: T320717 PT40	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
NUT	U 01	3-V-0000-20717	06

REV	DATE	ALTERED	REV	DATE	ALTERED
06	04.11.17	R.P.SINGH CHD & APPD SSK & KRS	05	10.05.08	M.SRINIVASAN CHD & APPD K.S.RAMAN

DIMENSIONS 60 WAS 56 FOR M39

DCP NO.802298

SL.NO. 20 & 21 INCLUDED.

Size A3

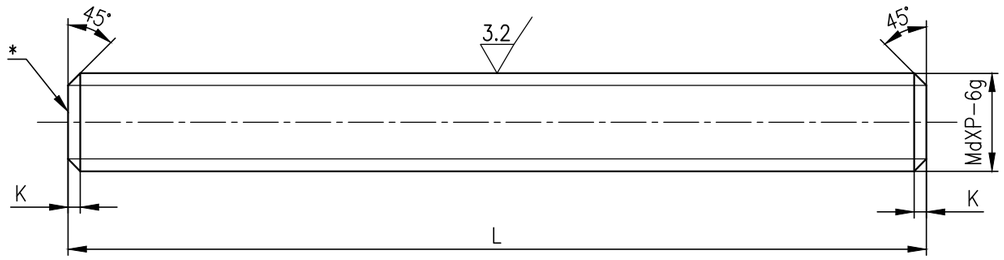
ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-20721

12.5 / 3.2

SL.NO.	DRAWING NO.	COMP. CODE	MATL. SPECN.	DIMENSIONS				NET WT. (IN KGS.)
				Md	P	L	K	
1.	3-V-0001-20721/02	964521620000	A 193 - B7, CERTIFY	M16	2	140	2	0.20
2.	3-V-0002-20721/02	964521630000		M20	2.5	180	2.5	0.41
3.	3-V-0003-20721/02	964521640000		M22	2.5	170	2.5	0.47
4.	3-V-0004-20721/02	964521650000		M22	2.5	200	2.5	0.60
5.	3-V-0005-20721/02	964521660000		M22	2.5	210	2.5	0.62
6.	3-V-0006-20721/02	964521670000		M22	2.5	220	2.5	0.65
7.	3-V-0007-20721/02	964521680000		M24	3	240	3	0.82
8.	3-V-0008-20721/02	964521690000		M24	3	270	3	0.95
9.	3-V-0009-20721/02	964521700000		M24	3	280	3	0.99
10.	3-V-0010-20721/02	964521710000		M24	3	290	3	1.02
11.	3-V-0011-20721/02	964521720000		M24	3	315	3	1.08
12.	3-V-0012-20721/02	964521730000		M30	3	245	3	1.33
13.	3-V-0013-20721/02	964521740000		M30	3	260	3	1.38
14.	3-V-0014-20721/02	964521750000		M30	3	315	3	1.72
15.	3-V-0015-20721/02	964521760000		M30	3	340	3	1.89
16.	3-V-0016-20721/02	964521770000		M30	3	385	3	2.10
17.	3-V-0017-20721/02	964521780000		M36	3	295	3	2.23
18.	3-V-0018-20721/02	964521790000		M36	3	300	3	2.31
19.	3-V-0019-20721/02	964521800000		M36	3	335	3	2.64
20.	3-V-0020-20721/02	964521810000		M36	3	350	3	2.80
21.	3-V-0021-20721/02	964521820000		M36	3	410	3	3.27
22.	3-V-0022-20721/02	964521830000		M36	3	435	3	3.44
23.	3-V-0023-20721/02	964521840000		M36	3	485	3	3.83
47.	3-V-0047-20721/02	964523210000		M24	3	205	3	0.70
49	3-V-0049-20721	964660230000		M36	3	370	3	2.95
51	3-V-3234-20721	964652720000		M33	3.5	155	3.5	0.90
53	3-V-SIJA-20721	966000220000		M22	2.5	240	2.5	0.705
55	3-V-SFJA-20721	966000260000		M16	2	158	2	0.245
57	3-V-SDJA-20721/1	966000690000		M12	1.75	130	1.75	0.11

SL.NO.	DRAWING NO.	COMP. CODE	MATL. SPECN.	DIMENSIONS				NET WT. (IN KGS.)
				Md	P	L	K	
24.	3-V-0024-20721/02	964522040000	A 193 - B16, CERTIFY	M16	2	140	2	0.20
25.	3-V-0025-20721/02	964522050000		M20	2.5	180	2.5	0.41
26.	3-V-0026-20721/02	964522060000		M22	2.5	170	2.5	0.47
27.	3-V-0027-20721/02	964522070000		M22	2.5	200	2.5	0.60
28.	3-V-0028-20721/02	964522080000		M22	2.5	210	2.5	0.62
29.	3-V-0029-20721/02	964522090000		M22	2.5	220	2.5	0.65
30.	3-V-0030-20721/02	964522100000		M24	3	240	3	0.82
31.	3-V-0031-20721/02	964522110000		M24	3	270	3	0.95
32.	3-V-0032-20721/02	964522120000		M24	3	280	3	0.99
33.	3-V-0033-20721/02	964522130000		M24	3	290	3	1.02
34.	3-V-0034-20721/02	964522140000		M24	3	315	3	1.08
35.	3-V-0035-20721/02	964522150000		M30	3	245	3	1.33
36.	3-V-0036-20721/02	964522160000		M30	3	260	3	1.38
37.	3-V-0037-20721/02	964522170000		M30	3	315	3	1.72
38.	3-V-0038-20721/02	964522180000		M30	3	340	3	1.89
39.	3-V-0039-20721/02	964522190000		M30	3	385	3	2.10
40.	3-V-0040-20721/02	964522200000		M36	3	295	3	2.23
41.	3-V-0041-20721/02	964522210000		M36	3	300	3	2.31
42.	3-V-0042-20721/02	964522220000		M36	3	335	3	2.64
43.	3-V-0043-20721/02	964522230000		M36	3	350	3	2.80
44.	3-V-0044-20721/02	964522240000		M36	3	410	3	3.27
45.	3-V-0045-20721/02	964522250000		M36	3	435	3	3.44
46.	3-V-0046-20721/02	964522260000		M36	3	485	3	3.83
48.	3-V-0048-20721/02	964523220000		M24	3	205	3	0.70
50	3-V-0050-20721	964660240000		M36	3	370	3	2.95
52	3-V-3237-20721	964652730000		M33	3.5	155	3.5	0.90
54	3-V-SIJM-20721	966000210000		M22	2.5	240	2.5	0.705
56	3-V-SFJM-20721	966000270000		M16	2	158	2	0.245
58	3-V-SDJM-20721/1	966000680000		M12	1.75	130	1.75	0.11



NOTES :

1. * PUNCH MATERIAL MARK B7 FOR A193 - B7
   B16 FOR A193 - B16
2. QUALITY REQUIREMENTS SHALL BE AS PER LATEST TDC 5 : 164

REV	DATE	ALTERED S.MADHURAM
07	01.11.19	CHD & APPD SSK & KRS

SL. NO. 57 & 58 PITCH 1.75 WAS 2

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

BHARAT HEAVY ELECTRICALS LTD.
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI 620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		01.02.08	
CHD	K.RAJASEKARAN		01.02.08	
APPD	M.RAJAKUMAR		01.02.08	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS		PT - 39a	

CODE 320

TITLE: STUD

CARD CODE: U 01

DRAWING NO.: 3-V-0000-20721

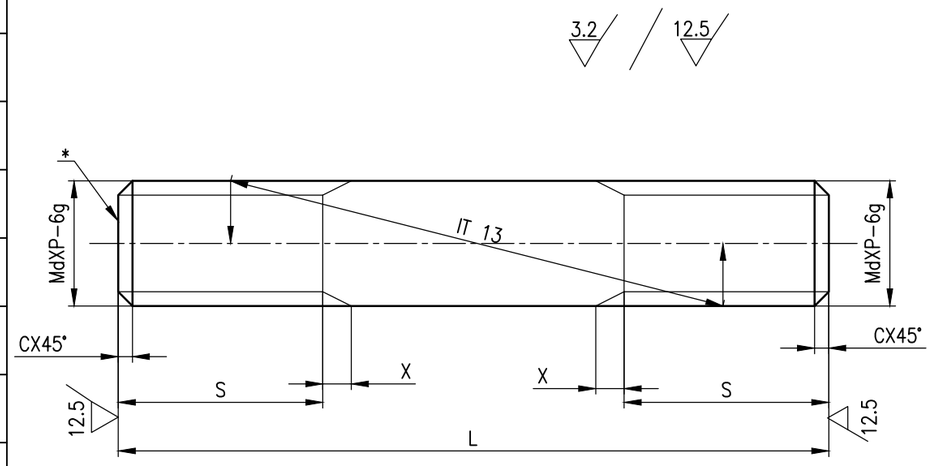
REV: 07

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-20722/3

SL.NO.	DRAWING NO.	MATL. SPECN.	DIMENSIONS							FINISHED WT.(KGS)	COMPONENT CODE
			Md	P	L	S	X	C	IT 13		
1.	3-V-0001-20722/02	A 193 - B 7, CERTIFY	M22	2.5	125	36	5	2.5	0.33	0.35	96 452 185 0000
2.	3-V-0002-20722/02		M22	2.5	135	36	5	2.5	0.33	0.38	96 452 186 0000
3.	3-V-0003-20722/02		M24	3	140	40	6	3	0.33	0.49	96 452 187 0000
4.	3-V-0004-20722/02		M24	3	150	40	6	3	0.33	0.53	96 452 188 0000
5.	3-V-0005-20722/02		M30	3	180	50	6	3	0.33	0.94	96 452 189 0000
6.	3-V-0006-20722/02		M30	3	190	50	6	3	0.33	0.99	96 452 190 0000
7.	3-V-0007-20722/02		M36	3	200	56	6	3	0.39	1.51	96 452 191 0000
8.	3-V-0008-20722/02		M36	3	215	50	6	3	0.39	1.72	96 452 429 0000
9.	3-V-0009-20722/02		M20	2.5	125	35	5	2.5	0.33	0.31	96 452 687 0000
10.	3-V-0010-20722		M30	3	210	50	6	3	0.33	1.165	96 466 067 0000



NOTES:

01. * PUNCH MATL MARK B7 FOR A 193-B7.
02. QUALITY REQUIREMENTS SHALL BE AS PER LATEST TDC 5:164

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

REDRAWN WITH REV:3, ON 20.12.12

REV	DATE	ALTERED VB
3	20.12.12	CHD & APPD SSK&KRS
SL.NO.10 INCLUDED		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: TA

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		20.12.12	
CHD	S.SATHEESH		20.12.12	
APPD	K.RAJASEKARAN		20.12.12	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS			
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-20722	3

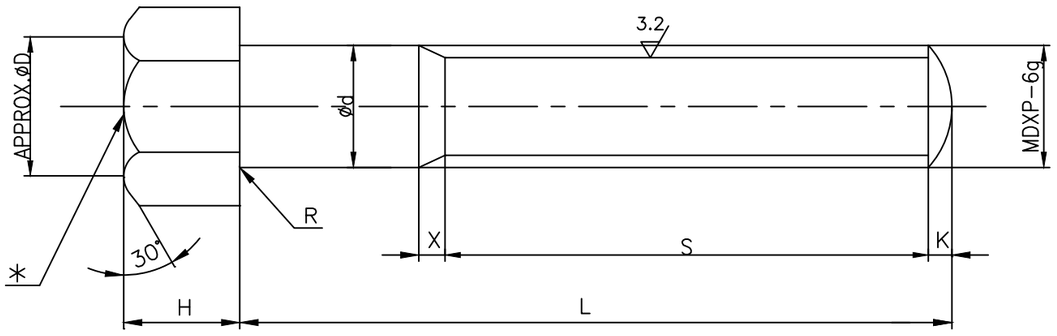
Size A3

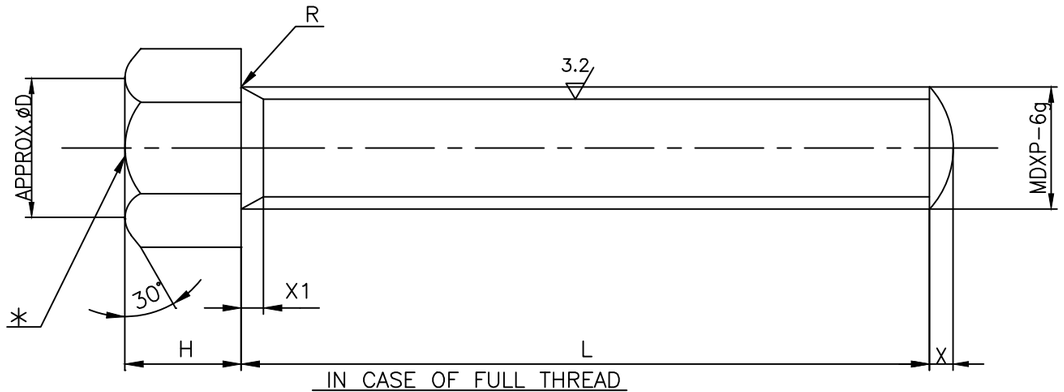
ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-20723/8

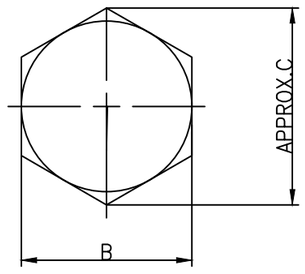
12.5 / 3.2

SL No.	DRAWING NO.	COMP. CODE	MATL. SPECN.	DIMENSIONS													FINISHED WT IN KGS
				Md	P	L	S	H	K	X	X1	R	ød	øD	B	C	
01	3-V-0001-20723/3	964521920000	ASTM A193 B7, CERTIFY	M8	1.25	30	30	5.5	–	2.5	3.5	0.4	8	12.6	13	15	0.02
02	3-V-0002-20723/3	964521930000		M10	1.5	16	16	7	–	3	4.5	0.4	10	16.5	17	19.6	0.02
03	3-V-0003-20723/3	964521940000		M10	1.5	20	20	7	–	3	4.5	0.4	10	16.5	17	19.6	0.02
04	3-V-0004-20723/3	964521950000		M12	1.75	20	20	8	–	3.5	5	0.6	12	18	19	21.9	0.03
05	3-V-0005-20723/3	964521960000		M20	2.5	60	46	13	5	5	–	0.8	20	29	30	34.6	0.23
06	3-V-0006-20723/3	964521970000		M24	3	90	54	15	6	6	–	0.8	24	34	36	41.6	0.45
07	3-V-0007-20723/3	964521980000		M30	3.5	110	66	19	7	7	–	1.0	30	44	46	53.1	0.88
08	3-V-0008-20723/3	964522410000		M16	2	50	38	10	4	4	–	0.6	16	23	24	27.7	0.10
09	3-V-0009-20723/3	964523140000		M20	2.5	55	46	13	5	5	–	0.8	20	29	30	34.6	0.22
10	3-V-0010-20723/2	964533300000		M16	2	90	60	10	4	4	–	0.6	16	23	24	27.7	0.16
11	3-V-0011-20723/2	964568210000		M20	2.5	85	46	13	5	5	–	0.8	20	29	30	34.6	0.31
12	3-V-0012-20723/2	964533560000		M20	2.5	126	70	13	5	5	–	0.8	20	29	30	34.6	0.43
13	3-V-0013-20723/1	964535750000		M30	3.5	120	76	19	7	7	–	1.0	30	44	46	53.1	0.95
14	3-V-0014-20723	964655090000		M16	2	75	38	16	4	4	–	0.6	16	23	24	27.7	0.14
15	3-V-0015-20723	964655100000		M24	3	141	40	15	6	6	–	0.8	24	34	36	41.6	0.64
16	3-V-0016-20723	964655120000		M20	2.5	70	25	14	5	5	–	0.8	20	26	30	34.6	0.27





IN CASE OF FULL THREAD



NOTES:

1. * PUNCH MATERIAL MARK B7 FOR A193-B7.
2. QUALITY REQUIREMENTS SHALL BE AS PER LATEST TDC 5:164.

REDRAWN WITH REV.7 ON 12.04.08

REV	DATE	ALTERED	REV	DATE	ALTERED
8	04.03.13	DEEPAKRAJ CHD & APPD M.RAJAKUMAR	7	12.04.08	VB CHD & APPD KRS & M.R.K
	SL.No.15 AND 16 INCLUDED.			DRAWING CONVERTED AS SOFT COPY DCP No.800813	

NO OF	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

BHARAT HEAVY ELECTRICALS LTD.
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI 620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		12.04.08	
CHD	M.RAJASEKARAN		12.04.08	
APPD	M.RAJAKUMAR		12.04.08	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	–	PT-42	

CODE 320

TITLE	CARD CODE	DRAWING NO.	REV
BOLT	U 01	3-V-0000-20723	8

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

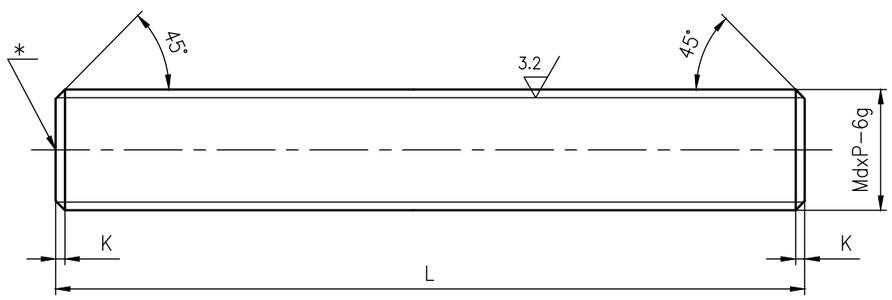
DRAWING NO. 3-V-0000-20729

SL No.	DRAWING No.	COMP. CODE	MATL. SPECN.	DIMENSIONS				WT(KG)
				MDxP-6g	L	K		
01	3-V-0001-20729/02	964524410000	A193 B7, CERTIFY	M30x3	185	3		1.03
02	3-V-0002-20729/02	964524420000		M30x3	280	3		1.55
03	3-V-0003-20729/02	964524430000		M42x3	440	3		4.79
04	3-V-0004-20729/02	964524440000		M48x3	520	3		7.39
05	3-V-0005-20729/02	964526850000		M20x2.5	195	2.5		0.48
06	3-V-0006-20729/02	964527050000		M30x3	270	3		1.49
07	3-V-0007-20729/02	964527260000		M36x3	270	3		2.04
08	3-V-0008-20729/02	964527270000		M36x3	500	3		3.78
09	3-V-0009-20729/02	964527280000		M36x3	310	3		2.34
10	3-V-0010-20729/02	964527290000		M20x2.5	165	2.5		0.52
11	3-V-0011-20729/02	964527300000		M22x2.5	180	2.5		0.54
12	3-V-0012-20729/02	964527310000		M24x3	190	3		0.68
13	3-V-0013-20729/02	964527320000		M24x3	210	3		0.75
14	3-V-0014-20729/02	964527330000		M24x3	250	3		0.89
15	3-V-0015-20729/01	964534230000		M12x1.75	90	2		0.09
16	3-V-0016-20729/01	964534240000		M16x2	125	2		0.20
17	3-V-0017-20729/01	964534250000		M20x2.5	150	2.5		0.47
18	3-V-0018-20729	964651670000		M42x3	220	3		2.4
19	3-V-0019-20729	964660060000		M39x3	480	3		4.5
20	3-V-0020-20729	964653440000		M39x3	240	3		2.2
21	3-V-0021-20729	964653450000		M39x3	280	3		2.6
22	3-V-0022-20729	964654080000		M42x3	340	3		3.5
23	3-V-0023-20729	964655060000		M48x3	300	3		4.20
24	3-V-0024-20729	964654870000		M30	240	3		1.3
25	3-V-0025-20729	964655080000		M33	220	3.5		1.5
26	3-V-0026-20729/02	964524450000	A193 B16, CERTIFY	M30x3	185	3		1.03
27	3-V-0027-20729/02	964524460000		M30x3	280	3		1.55
28	3-V-0028-20729/02	964524470000		M42x3	440	3		4.79
29	3-V-0029-20729/02	964524480000		M48x3	520	3		7.39
30	3-V-0030-20729/02	964526860000		M20x2.5	195	2.5		0.48
31	3-V-0031-20729/02	964527060000		M30x3	270	3		1.49
32	3-V-0032-20729/02	964527340000		M36x3	270	3		2.04
33	3-V-0033-20729/02	964527350000		M36x3	500	3		3.78
34	3-V-0034-20729/02	964527360000		M36x3	310	3		2.34
35	3-V-0035-20729/02	964527370000		M20x2.5	165	2.5		0.52
36	3-V-0036-20729/02	964527380000		M22x2.5	180	2.5		0.54
37	3-V-0037-20729/02	964527390000		M24x3	190	3		0.68
38	3-V-0038-20729/02	964527400000		M24x3	210	3		0.75
39	3-V-0039-20729/02	964527410000		M24x3	250	3		0.89
40	3-V-0040-20729/01	964534260000		M12x1.75	90	2		0.09
41	3-V-0041-20729/01	964534270000		M16x2	125	2		0.20
42	3-V-0042-20729/01	964534280000		M20x2.5	150	2.5		0.47
43	3-V-0043-20729	964651700000		M42x3	220	3		2.4
44	3-V-0044-20729	964660070000		M39x3	480	3		4.5
45	3-V-0045-20729	964652610000		M39x3	240	3		2.2
46	3-V-0046-20729	964652620000		M39x3	280	3		2.6
47	3-V-0047-20729	964654090000		M42x3	340	3		3.5
48	3-V-0048-20729	964654150000		M27x3	180	3		0.8
49	3-V-0049-20729	964655740000		M33	220	3.5		1.5

12.5 / 3.2

NOTES:-

1. QUALITY REQUIREMENTS SHALL BE AS PER LATEST APPLICABLE QUALITY WORK INSTRUCTION.
* 2. PUNCH MATL.MARK B7 FOR A193-B7 AND B16 FOR A193-B16



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

REV	DATE	ALTERED GANESH	REV	DATE	ALTERED GANESH
13	28.05.13	CHD & APPD K.RAJASEKARAN	12	14.03.13	CHD & APPD M.RAJAKUMAR
	SL. No. 49 INCLUDED.			SL. No. 25 INCLUDED.	

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		15.3.04	
CHD	K.RAJASEKARAN		15.3.04	
APPD	M.RAJAKUMAR		15.3.04	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF. TABLE	CAD REF:-T320729	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-20729	13

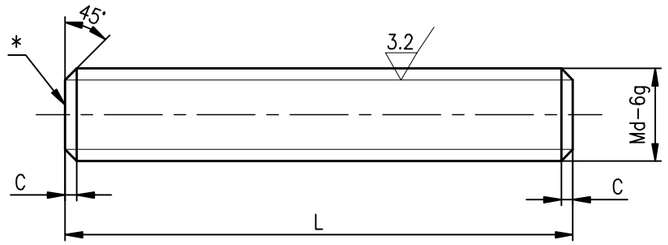
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-21094

12.5 / 3.2

SL.NO.	DRAWING NO.	COMP. CODE	MATL. SPECN.	DIMENSIONS			NET WT. (IN KGS.)
				Md-6g	L	C	
1.	3-V-5178-21094	96 456 983 0000	ASTM A193-B7, QT, CERTIFY	M16	90	3	0.14
2.	3-V-2891-21094	96 456 984 0000		M16	100	3	0.15
3.	3-V-5176-21094	96 456 985 0000		M20	120	3	0.28
4.	3-V-B102-21094	96 456 986 0000		M20	140	3	0.33
5.	3-V-5174-21094	96 456 987 0000		M24	140	3	0.46
6.	3-V-0026-21094	96 453 449 0000	ASTM A193-B16, QT, CERTIFY	M22x2.5	170	2.5	0.51
7.	3-V-3208-21094	96 465 310 0000		M30	190	4	1.02
8.	3-V-3201-21094	96 465 311 0000		M24	130	3	0.46
9.	3-V-3204-21094	96 465 312 0000	ASTM A193-B7, QT, CERTIFY	M36x3	220	4	1.75
10.	3-V-3205-21094	96 465 313 0000	ASTM A193-B16, QT, CERTIFY	M36x3	220	4	1.75
11.	3-V-3318-21094	96 465 362 0000	ASTM A193-B16, QT, CERTIFY	M36x3	235	4	1.88
12	3-V-P566-21094	96 465 421 0000	ASTM A193-B16, QT, CERTIFY	M24	150	3	0.5



NOTE:

1. * PUNCH MATERIAL MARK B7 FOR A193 – B7 & B16 FOR A193 – B16.

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

BHARAT HEAVY ELECTRICALS LTD.
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI _620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		05.03.99	
CHD	K.RAJASEKARAN		06.03.99	
APPD	M.RAJAKUMAR		10.03.99	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF.TABLE	CAD REF: C321094	

CODE 320

TITLE: STUD

CARD CODE: U 01

DRAWING NO. 3-V-0000-21094

REV 04

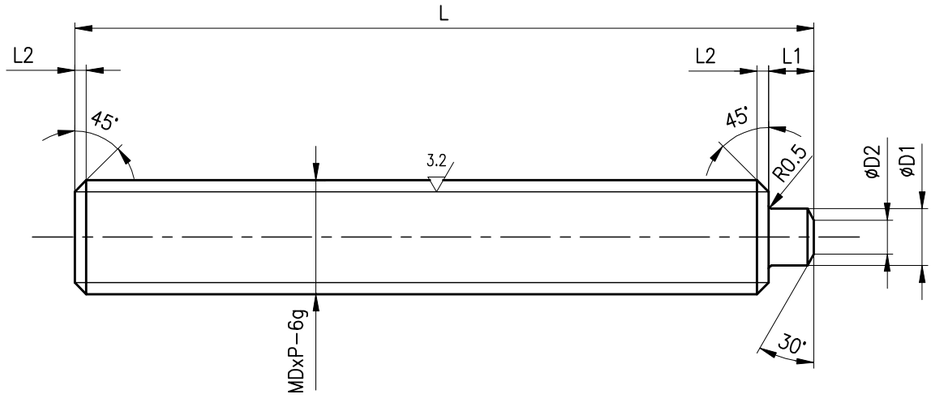
REV	DATE	ALTERED	REV	DATE	ALTERED
04	05.07.11	T.R.RAMAMURTHY CHD & APPD SSK & MRK	03	24.02.10	: GANESH CHD & APPD : M.R.K
	SL.No.12 INCLUDED			SL. No. 11 INCLUDED.	

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-21125/2

SL	DRAWING No.	MATL.CODE	MATL. SPECN.	DIMENSIONS						Wt(kg)
				MDxP-6g	øD1	øD2	L	L1	L2	
01	3-V-V089-21125	964534750000	A193-B7 CERTIFY	16x2	10	6	130	8	2	0.2
02	3-V-V113-21125	964534770000		16x2	10	6	140	8	2	0.2
03	3-V-V090-21125	964534760000		16x2	10	6	150	8	2	0.3
04	3-V-V114-21125	964534780000		16x2	10	6	160	8	2	0.3
05	3-V-V305-21125	964534860000		20x2.5	14	6	155	11	2.5	0.4
06	3-V-V162-21125	964534820000		20x2.5	14	6	175	11	2.5	0.5
07	3-V-V161-21125	964534810000		20x2.5	14	6	205	11	2.5	0.5
08	3-V-V146-21125	964534800000		22x2.5	16	8	170	11	2.5	0.5
09	3-V-V345-21125	964534870000		22x2.5	16	8	180	11	2.5	0.6
10	3-V-V145-21125	964534790000		22x2.5	16	8	195	11	2.5	0.6
11	3-V-V377-21125	964534890000		22x2.5	16	8	210	11	2.5	0.6
12	3-V-V177-21125	964534830000		22x2.5	16	8	225	11	2.5	0.7
13	3-V-V378-21125	964534900000		22x2.5	16	8	260	11	2.5	0.8
14	3-V-V193-21125	964534840000		24x3	18	10	220	13	3	0.8
15	3-V-V194-21125	964534850000		24x3	18	10	250	13	3	0.9
16	3-V-V393-21125	964534910000		30x3	24	16	245	13	3	1.4
17	3-V-V394-21125	964534920000		30x3	24	16	300	13	3	1.7
36	3-V-WA99-21125	964660470000		30x3	24	16	350	13	3	2.0
18	3-V-V091-21125	964534930000	A193-B16,CERTIFY	16x2	10	6	130	8	2	0.2
19	3-V-V115-21125	964534950000		16x2	10	6	140	8	2	0.2
20	3-V-V092-21125	964534940000		16x2	10	6	150	8	2	0.3
21	3-V-V116-21125	964534960000		16x2	10	6	160	8	2	0.3
22	3-V-V307-21125	964535040000		20x2.5	14	6	155	11	2.5	0.4
23	3-V-V164-21125	964535000000		20x2.5	14	6	175	11	2.5	0.5
24	3-V-V347-21125	964535050000		22x2.5	16	8	180	11	2.5	0.6
25	3-V-V163-21125	964534990000		20x2.5	14	6	205	11	2.5	0.5
26	3-V-V148-21125	964534980000		22x2.5	16	8	170	11	2.5	0.5
27	3-V-V147-21125	964534970000		22x2.5	16	8	195	11	2.5	0.6
28	3-V-V379-21125	964535070000		22x2.5	16	8	210	11	2.5	0.6
29	3-V-V179-21125	964535010000		22x2.5	16	8	225	11	2.5	0.7
30	3-V-V380-21125	964535080000		22x2.5	16	8	260	11	2.5	0.8
31	3-V-V195-21125	964535020000		24x3	18	10	220	13	3	0.8
32	3-V-V196-21125	964535030000		24x3	18	10	250	13	3	0.9
33	3-V-V395-21125	964535090000		30x3	24	16	245	13	3	1.4
34	3-V-V396-21125	964535100000		30x3	24	16	300	13	3	1.7
35	3-V-WA81-21125	964660010000		30x3	24	16	350	13	3	2.0



NOTES:-

1. * PUNCH MATL MARK B7 FOR A193-B7
   B16 FOR A193-B16
2. QUALITY REQUIREMENTS SHALL BE AS PER LATEST APPLICABLE QUALITY WORK INSTRUCTION.

12.5 / 3.2

REV	DATE	ALTERED	REV	DATE	ALTERED
2	01.10.09	VB CHD & APPD SSK&KRS	01	6.02.07	VB CHD & APPD MRK
ZONE	SL. No.36 INCLUDED.		SL.NO.35 INCLUDED		

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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		7.02.07	
CHD	K.RAJASEKARAN		7.02.07	
APPD	M.RAJAKUMAR		7.02.07	

DEPT VL
CODE
SCALE
WEIGHT (KG).
REFERENCE INFORMATIONS: CAD REF:-3-V-0000-21125-2-0
NO. OF ITEMS

TITLE: STUD
CARD CODE: U 01
DRAWING NO.: 3-V-0000-21125
REV: 2

Size A3

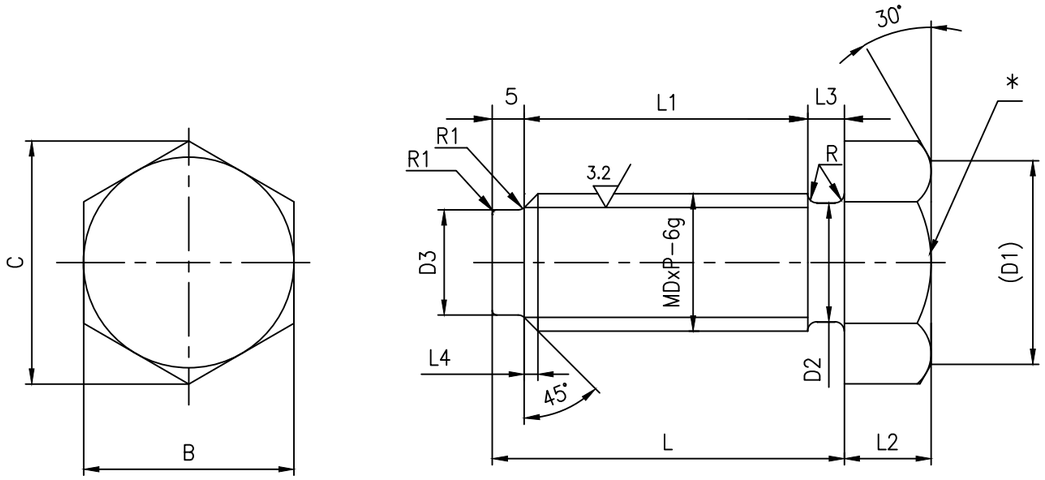
ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-21150

14000 12.5 3.2

SL No.	DRAWING No.	MATL. SPECN.	DIMENSIONS												WT(KG)
			MDxP-6g	(øD1)	øD2	øD3	L	L1	L2	L3	L4	R	C	B	
01	3-V-V401-21150 / 964535110000	A193 B7,CERTIFY	16x3	23	13.5	13	50	39	10	6	2	1.5	27.7	24	0.11
02	3-V-V417-21150 / 964535120000		24x3	34	20.5	19	70	55	15	10	3	2	41.6	36	0.36
03	3-V-V449-21150 / 964535130000		30x3	44	26.5	25	90	75	19	10	3	2	53.1	46	0.7
04	3-V-V465-21150 / 964535140000		36x3	53	32.5	31	120	105	23	10	3	2	63.5	55	1.33
09	3-V-V688-21150/1 / 964665230000		22X2.5	31	19.5	18	75	64	14	6	2	1.5	37	32	0.27

SL No.	DRAWING No.	MATL. SPECN.	DIMENSIONS												WT(KG)
			MDxP-6g	øD1	øD2	øD3	L	L1	L2	L3	L4	R	C	B	
05	3-V-V404-21150 / 964535150000	A193 B16,CERTIFY	16x3	23	13.5	13	50	39	10	6	2	1.5	27.7	24	0.11
06	3-V-V420-21150 / 964535160000		24x3	34	20.5	19	70	55	15	10	3	2	41.6	36	0.36
07	3-V-V452-21150 / 964535170000		30x3	44	26.5	25	90	75	19	10	3	2	53.1	46	0.7
08	3-V-V468-21150 / 964535180000		36x3	53	32.5	31	120	105	23	10	3	2	63.5	55	1.33
10	3-V-V566-21150/1 / 964660570000		22X2.5	31	19.5	18	75	64	14	6	2	1.5	37	32	0.27
11	3-V-V730-21150 / 964665510000		36x3	53	32.5	31	170	155	23	10	3	2	63.5	55	1.73



NOTES:-

1. QUALITY REQUIREMENTS SHALL BE AS PER LATEST TDC 5:184
* 2. PUNCH MATL.MARK B7 FOR A193-B7
B7 FOR A193-B16

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

REDRAWN WITH REV. 03 ON 03.10.18

REV	DATE	ALTERED R.P.SINGH
03	03.10.18	CHD & APPD SSK & KRS

SL. No. 11 INCLUDED

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		22.10.15	
CHD	S.SATHEESH		22.10.15	
APPD	K.RAJASEKARAN		22.10.15	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N T S		CAD REF:-T321150	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
BOLT	U 01	3-V-0000-21150	03

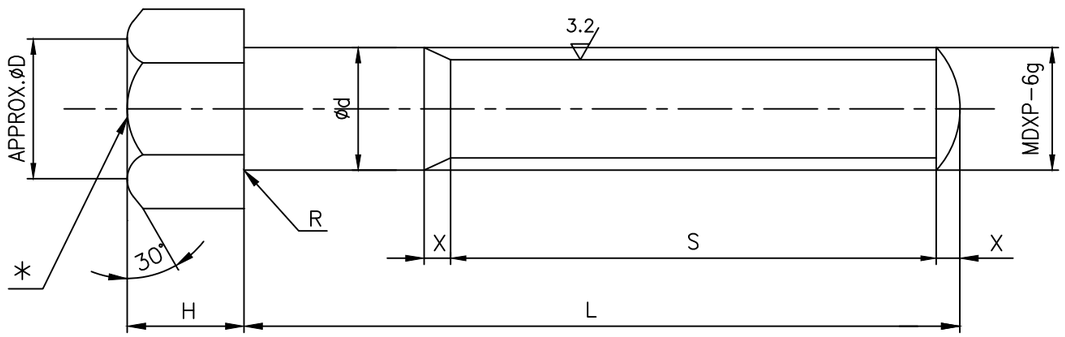
ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

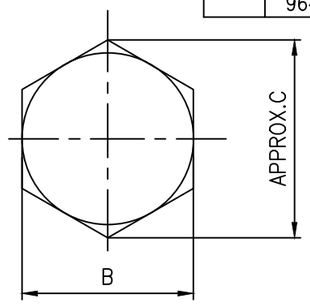
DRAWING NO. 3-V-0000-21152

12.5 / 3.2

SL No.	DRAWING No. / COMP.CODE	MATL. SPECN.	DIMENSIONS MDxP-6g	L	S	ød	øD	X	H	R	B	C	Wt(kg)
01	3-V-V105-21152/1 / 964535270000	A193-B7,CERTIFY	16x2	60	38	16	23	4	10	0.6	24	27.7	0.12
02	3-V-V145-21152/1 / 964535310000		22x2.5	70	36	22	31	5	14	0.8	32	37	0.26
03	3-V-V449-21152/1 / 964535330000		30x3.5	105	66	30	44	7	19	1	46	53.1	0.75
04	3-V-V297-21152/1 / 964535450000		22x2.5	65	36	22	31	5	14	0.8	32	37	0.25
05	3-V-V465-21152/1 / 964535600000		36x4	115	56	36	53	8	23	1	55	63.5	1.32
15	3-V-V679-21152 / 964663590000		36x4	125	70	36	53	8	23	1	55	63.5	1.45

SL No.	DRAWING No. / COMP.CODE	MATL. SPECN.	DIMENSIONS MDxP-6g	L	S	ød	øD	X	H	R	B	C	Wt(kg)
06	3-V-V108-21152/1 / 964535280000	A193-B16,CERTIFY	16x2	60	38	16	23	4	10	0.6	24	27.7	0.12
07	3-V-V084-21152/1 / 964535300000		20x2.5	55	32	20	29	5	13	0.8	30	34.6	0.21
08	3-V-V148-21152/1 / 964535320000		22x2.5	70	36	22	31	5	14	0.8	32	37	0.26
09	3-V-V452-21152/1 / 964535340000		30x3.5	105	66	30	44	7	19	1	46	53.1	0.75
10	3-V-V300-21152/1 / 964535460000		M22x2.5	65	36	22	31	5	14	0.8	32	37	0.25
11	3-V-V180-21152/1 / 964535560000		M24x3	90	54	24	34	6	15	0.8	36	41.6	0.43
12	3-V-V201-21152/1 / 964535570000		M16x2	50	38	16	23	4	10	0.6	24	27.7	0.10
13	3-V-V433-21152/1 / 964535580000		M24x3	75	54	24	34	6	15	0.8	36	41.6	0.37
14	3-V-V468-21152/1 / 964535590000		M36x4	115	56	36	53	8	23	1	55	63.5	1.32
16	3-V-V756-21152 / 964665550000		M24x3	70	54	24	34	6	15	0.8	36	41.6	0.35





NOTES:-

1. * PUNCH MATL MARK B7 FOR A193-B7
   B16 FOR A193-B16
2. QUALITY REQUIREMENTS SHALL BE AS PER LATEST APPLICABLE QUALITY WORK INSTRUCTIONS.

REDRAWN WITH REV.3 ON 12.04.08

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

REV	DATE	ALTERED / CHD & APPD
05	22.03.19	ALTERED R.P.SINGH / CHD & APPD SSK & KRS
		SL.NO. 16 INCLUDED.
4	03.03.16	ALTERED VB / CHD & APPD SSK & KRS
ZONE		SL. No.15 INCLUDED.
3	12.04.08	ALTERED VB / CHD & APPD KRS & M.R.K
		DRAWING CONVERTED AS SOFT COPY
		DCP No.800813

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

365-121

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		12.04.08	
CHD	K.RAJASEKARAN		12.04.08	
APPD	M.RAJAKUMAR		12.04.08	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N.T.S			
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
BOLT	U 01	3-V-0000-21152	5

Size A3

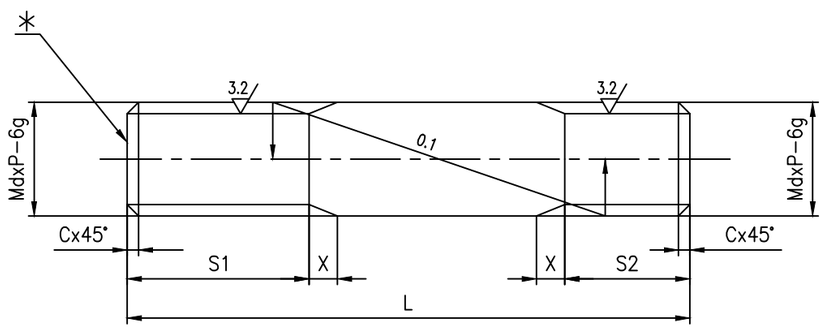
ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

12.5 / 3.2

DRAWING NO. 3-V-0000-21153/6

SL No.	DRAWING No.	COMP. CODE	MATL. SPECN.	MDxP-6g	L	S1	S2	X	C	Wt(kg)
01	3-V-V081-21153/1	964535190000	A 193-B7,CERTIFY	16x2	110	65	21	4	2	0.17
02	3-V-V409-21153	964535210000		20x2.5	105	60	26	5	2.5	0.26
03	3-V-V145-21153/1	964535230000		20x2.5	150	80	26	5	2.5	0.37
04	3-V-V449-21153	964535250000		30x3	170	100	38	6	3	0.94
05	3-V-V201-21153	964535480000		12x1.75	70	45	17	3.5	2	0.06
06	3-V-V233-21153	964535490000		12x1.75	90	50	17	3.5	2	0.08
07	3-V-V433-21153	964535500000		22x2.5	120	80	28	5	2.5	0.36
08	3-V-V177-21153	964535510000		22x2.5	155	80	28	5	2.5	0.46
09	3-V-V377-21153	964535610000		24x3	185	85	32	6	3	0.66
10	3-V-V393-21153	964535620000		30x3	200	100	38	6	3	1.11
11	3-V-V465-21153	964535630000		36x3	210	110	44	6	3	1.68
25	3-V-WA99-21153	964660480000		36x3	220	120	44	6	3	1.76

SL No.	DRAWING No.	COMP. CODE	MATL. SPECN.	MDxP-6g	L	S1	S2	X	C	Wt(kg)
12	3-V-V084-21153/1	964535200000	A 193-B16,CERTIFY	16x2	110	65	21	4	2	0.17
13	3-V-V412-21153/1	964535220000		20x2.5	105	60	26	5	2.5	0.26
14	3-V-V148-21153/1	964535240000		20x2.5	150	80	26	5	2.5	0.37
15	3-V-V452-21153	964535260000		30x3	170	100	38	6	3	0.94
16	3-V-V204-21153	964535520000		12x1.75	70	45	17	3.5	2	0.06
17	3-V-V236-21153	964535530000		12x1.75	90	50	17	3.5	2	0.08
18	3-V-V436-21153	964535540000		22x2.5	120	80	28	5	2.5	0.36
19	3-V-V180-21153	964535550000		22x2.5	155	80	28	5	2.5	0.46
20	3-V-V380-21153	964535640000		24x3	185	85	32	6	3	0.66
21	3-V-V396-21153	964535650000		30x3	200	100	38	6	3	1.11
22	3-V-V468-21153	964535660000		36x3	210	110	44	6	3	1.68
23	3-V-WA81-21153	964660020000		30X3	220	120	38	6	3	1.3
24	3-V-WA98-21153	964660290000		36x3	220	120	44	6	3	1.76
26	3-V-V680-21153	964663480000		36x3	240	80	60	6	3	1.76



NOTES:-

1. * PUNCH MATL MARK B7 FOR A193-B7
   B16 FOR A193-B16
2. QUALITY REQUIREMENTS SHALL BE AS PER LATEST APPLICABLE QUALITY WORK INSTRUCTIONS

DRAWING RETRACED WITH REV.2 ON 26.7.2000

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

REV	DATE	ALTERED:	REV	DATE	ALTERED:	REV	DATE	ALTERED
6	04.07.15	CHD & APPD: SSK&KRS	5	01.10.09	CHD & APPD: SSK&KRS	2	26.7.2K	:VB CHD & APPD :MRK
SL. No.26 INCLUDED			SL. No.25 INCLUDED			SL. NoS.05 TO 11 AND 16 TO 22 INCLUDED. IN SL Nos.03 & 14 DIMENSIONS 150 & 80 WERE 145 & 75 RESPECTIVELY. IN SL No.13 DIMENSION 60 WAS 66. DCN No.TA 1091		

REV	DATE	ALTERED:	REV	DATE	ALTERED:
4	29.10.08	CHD & APPD: KRS&MRK	3	6.02.07	CHD & APPD: KRS&MRK
SL. No.24 INCLUDED			SL. No.23 INCLUDED		

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

BHARAT HEAVY ELECTRICALS LTD.
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI 620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		26.7.2K	
CHD	K.RAJASEKARAN		26.7.2K	
APPD	M.RAJAKUMAR		26.7.2K	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N T S			
CODE 320				

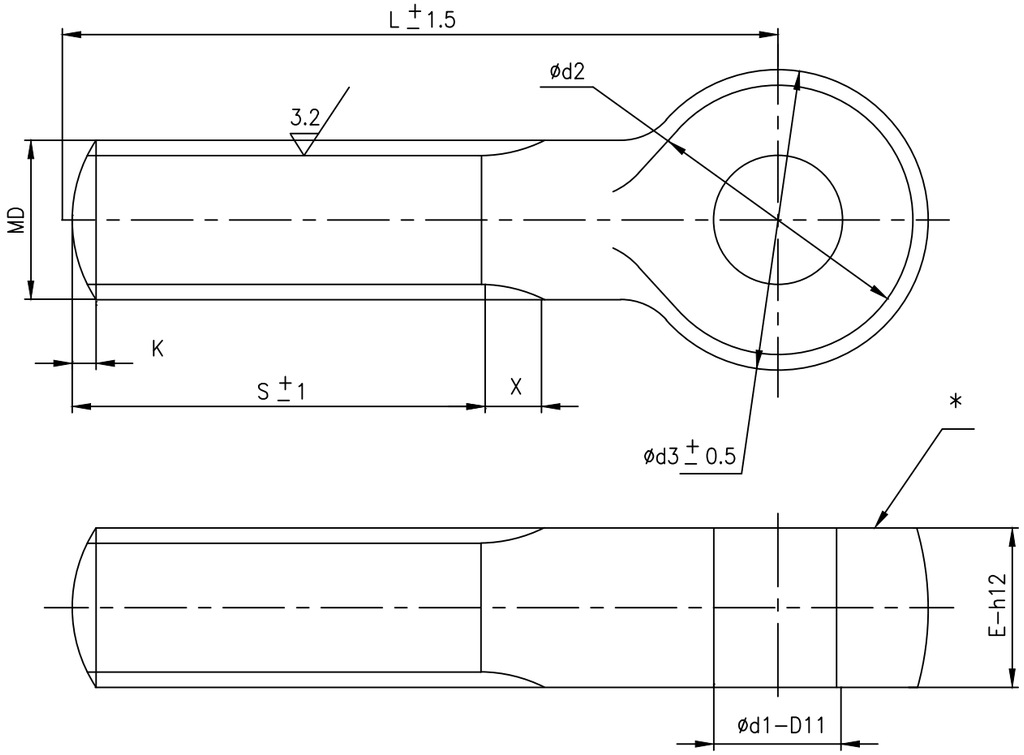
TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-21153	6

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

Sl. No.	DRAWING NUMBER	MATERIAL CODE	MATERIAL SPECIFICATION	SIZE	DIMENTIONS										
					MD	ød1	ød2	ød3	L	S	E	K	X	WEIGHT	SIZE/RATING
01	3VL84122455 /03	964605240000	SA 193 B7 CERTIFY QUENCHED AND TEMPERED	M12x65x35	M12	11	23	24	65	35	12	2	3.5	0.215	250/300
02	3VL87322455 /03	964605250000		M16X85X45	M16	13	30	32	85	45	16	2	4	0.508	150/600
03	3VL85722455 /03	964605260000		M20X105X60	M20	17	36	38	105	60	20	2.5	5	0.77	300/300
04	3VL88922455 /03	964605270000		M20X110X60	M20	17	36	38	110	60	20	2.5	5	0.79	350/600
05	3VL84222455 /03	964605470000		M16X90X60	M16	13	30	32	90	60	16	2	4	0.601	250/300
06	3VL82522455 /03	964605480000		M10X55X35	M10	8	17	18	55	35	10	1.5	3	0.150	150/300
07	3VL79022455 /03	964607040000		M20X140X60	M20	17	36	38	140	60	20	2.5	5	0.77	800/150
08	3VP56022455 /00	964657040000		M20X150X60	M20	17	36	38	150	60	20	2.5	5	0.47	300/300
09	3VNH5122455/00	964654890000		M24X170X45	M24	26	37	45	170	45	25	2.5	5	0.7	400/300
10	3VNH5022455/00	964655110000		M24X195X50	M24	26	37	45	195	60	25	2.5	5	0.8	350/600

12.5 3.2



NOTES:

1. EYE BOLT SHOULD BE MADE OUT OF FORGING.
2. * PUNCH MATERIAL MARK "B7"
3. QUALITY REQUIREMENTS SHALL BE AS PER LATEST TDC:5:164
   BLACKENING SHALL BE DONE INSTED OF CADMIUM PLATING

REV	DATE	ALTERED
06	12.12.12	GANESH CHD & APPD MRAJAKUMAR

SL NO. 08 TO 10 INCLUDED

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.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M.P.S			
CHD	P.R.K.			
APPD	S.C.S.			

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS		PT–40	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
EYE BOLT	U 01	3–V–0000–22455	06

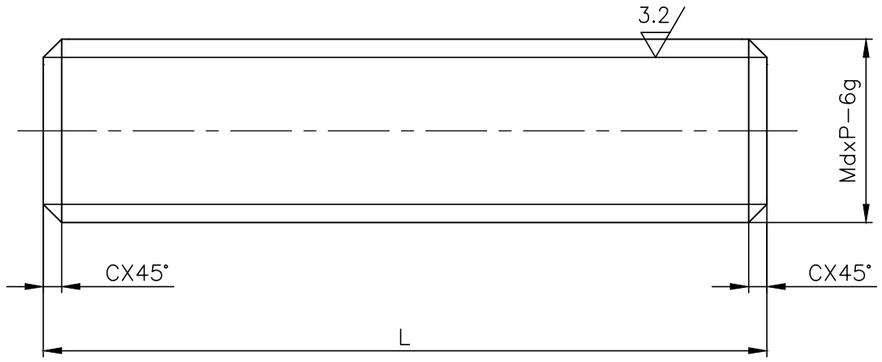
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-22456

12.5 / 3.2

SL NO	DRAWING NO	COMPONENT CODE	ALT CODE	MATL.SPECN	DIMENSIONS			WEIGHT IN KGS.
					MdXP	L	C	
01	3-V-L805-22456	96 462 117 0000	93 114 801 0000	A193 B16-QT CERTIFY	M30X3	170	3	0.93
02	3-V-L820-22456	96 462 118 0000	93 114 802 0000		M30X3	180	3	0.98
03	3-V-L751-22456	96 462 119 0000	93 114 843 0000		M36X3	210	3	1.68
04	3-V-L752-22456	96 462 120 0000	93 114 844 0000		M36X3	220	3	1.76
05	3-V-L793-22456/01	96 462 059 0000	93 117 177 0000		M42X4.5	280	3	3.05
06	3-V-L794-22456/01	96 462 121 0000	93 117 193 0000		M42X3	290	3	3.15
07	3-V-L826-22456	96 462 122 0000	93 117 337 0000		M24X3	60	3	0.22
08	3-V-L833-22456	96 462 123 0000	93 117 338 0000		M20X2.5	50	3	0.13
09	3-V-3246-22456/01	96 462 124 0000	93 168 844 0000		M42x3	165	3	1.75



NOTE:

01. PUNCH MATL MARK B16 FOR A193-B16
02. LATEST APPLICABLE QUALITY PROCEDURE SHALL BE FOLLOWED
03. BLACKENING TO BE DONE

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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M.P.S		31.08.93	
CHD	P.R.K		31.08.93	
APPD	S.C.S		31.08.93	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VWL	N.T.S	REF. TABLE		
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-22456	06

REV	DATE	ALTERED	REV	DATE	ALTERED
06	19.12.15	JALAL CHD & APPD RAJASEKAR	05	01.12.07	MSV CHD & APPD KSR
COLUMN ALT CODE ADDED SD CODES ADDED NOTES ALTERED			IN SL. NO. 09 M42X3 WAS M42X4.5		

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-22457

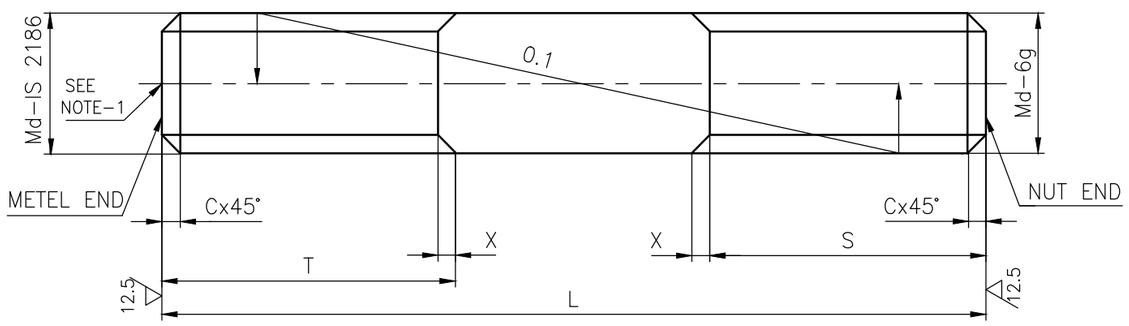
SL NO	DRAWING NO	MATL SPECN	DIMENSIONS						WT IN Kg	COMP CODE	ALT CODE	DESCRIPTION
			Md	L	T	S	X	C				
01	3-V-L850-22457/02	A193-B16-QT-CERT	M16X2	65	21	30	3	2	0.102	964620090000	931147910000	M16x65x21x30
02	3-V-L801-22457/03	A193-B16-QT-CERT	M20x2.5	110	26	50	3.75	2.5	0.234	964621040000	931147920000	M20x110x26x50
03	3-V-L841-22457/03	A193-B7-QT-CERT	M22X2.5	120	28	54	3.75	2.5	0.313	964605170000	–	M22x120x28x54
04	3-V-L842-22457/02	A193-B7-QT-CERT	M16X2	65	21	30	3	2	0.102	964605130000	–	M16x65x21x30
05	3-V-L857-22457/02	A193-B7-QT-CERT	M16X2	70	21	30	3	2	0.111	964605140000	–	M16x70x21x30
06	3-V-L803-22457/03	A193-B7-QT-CERT	M24X3	130	32	53	4.5	3	0.603	964605180000	–	M24x130x32x53
07	3-V-L805-22457/02	A193-B16-QT-CERT	M16X2	80	21	30	3	2	0.134	964620100000	931147930000	M16x80x21x30
08	3-V-L809-22457/02	A193-B16-QT-CERT	M30x3	150	38	48	4.5	3	0.832	964621060000	931147940000	M30x150x38x48
09	3-V-L825-22457/03	A193-B7-QT-CERT	M20X2.5	100	26	50	3.75	2.5	0.209	964605350000	–	M20x100x26x50
10	3-V-L833-22457/03	A193-B16-QT-CERT	M20X2.5	100	26	50	3.75	2.5	0.209	964621070000	931147950000	M20x100x26x50
11	3-V-L849-22457/03	A193-B16-QT-CERT	M22X2.5	120	28	54	3.75	2.5	0.313	964620560000	931147960000	M22x120x28x54
12	3-V-L858-22457/02	A193-B7-QT-CERT	M24X3	120	32	43	4.5	3	0.426	964605380000	–	M24x120x32x43
13	3-V-L866-22457/02	A193-B16-QT-CERT	M24X3	120	32	43	4.5	3	0.426	964621080000	931147970000	M24x120x32x43
14	3-V-L889-22457/03	A193-B7-QT-CERT	M36x3	200	44	59	4.5	3	1.478	964605400000	–	M36x200x44x59
15	3-V-L897-22457/03	A193-B16-QT-CERT	M36x3	200	44	59	4.5	3	1.478	964620550000	931147980000	M36x200x44x59
16	3-V-L865-22457/02	A193-B16-QT-CERT	M16X2	70	21	30	3	2	0.110	964620610000	931147990000	M16x70x21x30
17	3-V-L890-22457/02	A193-B7-QT-CERT	M16X2	75	21	30	3	2	0.118	964605430000	–	M16x75x21x30
18	3-V-L898-22457/02	A193-B16-QT-CERT	M16X2	75	21	30	3	2	0.118	964621090000	931148000000	M16x75x21x30
19	3-V-L794-22457/04	A193-B16-QT-CERT	M24X3	165	30	70	4.5	3	0.585	964621100000	931171880000	M24x165x30x70
20	3-V-L793-22457/02	A193-B16-QT-CERT	M16X2	85	20	30	3	2	0.134	964620540000	931171890000	M16x85x20x30
21	3-V-L790-22457/03	A193-B16-QT-CERT	M30x3	185	38	63	4.5	3	0.942	964621110000	931172170000	M30x185x38x63
22	3-V-L789-22457/03	A193-B7-QT-CERT	M30x3	185	38	63	4.5	3	0.942	964607020000	–	M30x185x38x63
23	3-V-L979-22457/02	A193-B7-QT-CERT	M12X1.75	48	13	25	3.5	2	0.420	964607030000	–	M12x48x13x25
24	3-V-L529-22457/01	A193-B7-QT-CERT	M27x3	145	40	55	4.5	2	0.720	964608150000	–	M27x145x40x55
25	3-V-L603-22457/01	A193-B7-QT-CERT	M16x2	55	16	21	3	2	0.086	964621120000	931223550000	M16x55x16x21
26	3-V-L604-22457/01	A193-B16-QT-CERT	M16x2	55	16	21	3	2	0.086	964621130000	931223560000	M16x55x16x21
27	3-V-Z116-22457	A193-B8MA-QT-CERT	M20X2.5	100	26	50	3.75	2.5	0.209	964658870000	–	M20x100x26x50

3.2 / 12.5

15&17

NOTES

01. PUNCH MATL MARK B7 FOR A193-B7, B16 FOR A193-B16 & B8MA FOR A193-B8MA.
02. LATEST APPLICABLE QUALITY PROCEDURE SHALL BE FOLLOWED
03. BLACKENING TO BE DONE



REV	DATE	ALTERED	R.P.SINGH
12	19.02.19	CHD & APPD	SSK & KRS

SL No. 27 INCLUDED.
NOTE SL No. 01 ALTERED.

REV	DATE	ALTERED	JALAL
11	19.12.15	CHD & APPD	ATHIANNAVI

MATL CODE 96462009 WAS 96462103 IN S.NO. 1
MATL CODE 96462010 WAS 96462105 IN S.NO. 7

–	–	–	–	–	–	–	–	–	–
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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M P S	M P S	16.06.97	
CHD	P R K	P R K	16.06.97	
APPD	S C S	S C S	16.06.97	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N.T.S	--	———	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-22457	12

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

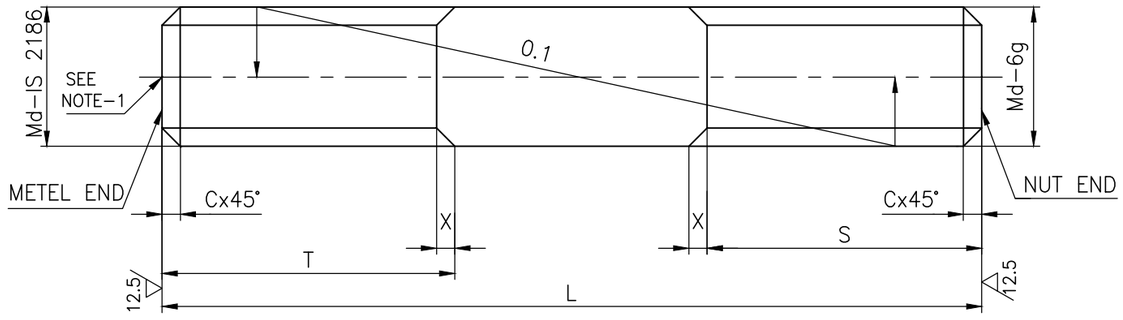
DRAWING NO. 3-V-0000-22459

3.2 / 12.5

SL. No	DRAWING No.	MATL.SPECN	DIMENSION						WT IN Kg	COMP CODE	ALT CODE	DESCRIPTION
			Md	L	T	S	X	C				
01	3-V-L950-22459/00	A193-B16-QT-CERTIFY	M24X3	130	32	43	4.5	3	0.603	964620600000	931148030000	M24x130x32x43
02	3-V-L801-22459/01	A193-B7-QT-CERTIFY	M20X2.5	110	26	50	3.75	2.5	0.234	964605490000	–	M20X110X26X50
03	3-V-L805-22459/00	A193-B7-QT-CERTIFY	M16X2	80	21	30	3	2	0.134	964605500000	–	M16X80X21X30
04	3-V-L804-22459/00	A193-B7-QT-CERTIFY	M30X3	150	38	48	4.5	3	0.832	964605510000	–	M30X150X38X48
05	3-V-L972-22459/01	A193-B7-QT-CERTIFY	M12X1.75	48	17	30	3.5	2	0.042	964605860000	–	M12X48X17X30
06	3-V-L973-22459/00	A193-B7-QT-CERTIFY	M12X1.75	50	13	20	3.5	2	0.044	964605870000	–	M12X50X13X20
07	3-V-L915-22459/00	A193-B7-QT-CERTIFY	M12X1.75	55	17	24	3.5	2	0.048	964605880000	–	M12X55X17X24
08	3-V-L922-22459/00	A193-B7-QT-CERTIFY	M16X2	57	16	20	4	2	0.09	964605890000	–	M16X57X16X20
09	3-V-L977-22459/00	A193-B7-QT-CERTIFY	M16X2	62	20	20	4	2	0.097	964605900000	–	M16X62X20X16
10	3-V-L976-22459/00	A193-B7-QT-CERTIFY	M16X2	72	24	30	4	2	0.104	964605910000	–	M16X72X24X30
11	3-V-L919-22459/00	A193-B7-QT-CERTIFY	M16X2	120	21	85	4	2	0.189	964605920000	–	M16X120X21X85
12	3-V-L975-22459/00	A193-B7-QT-CERTIFY	M20X2.5	77	28	28	5	2.5	0.189	964605930000	–	M20X77X28X28
13	3-V-L916-22459/00	A193-B7-QT-CERTIFY	M20X2.5	128	28	80	5	2.5	0.315	964605940000	–	M20X128X28X80
14	3-V-L917-22459/00	A193-B7-QT-CERTIFY	M20X2.5	167	28	116	5	2.5	0.412	964605950000	–	M20X167X28X116
15	3-V-L725-22459/00	A193-B7-QT-CERTIFY	M30X3	160	38	48	4.5	3	0.85	964606440000	–	M30X160X38X48
16	3-V-L735-22459/00	A193-B16-QT-CERTIFY	M30X3	160	38	48	4.5	3	0.85	964621250000	931148410000	M30X160X38X48
17	3-V-L715-22459/00	A193-B16-QT-CERTIFY	M30X3	145	38	48	4.5	3	0.81	964621260000	931148810000	M30X145X38X48
18	3-V-L705-22459/00	A193-B7-QT-CERTIFY	M30X3	145	38	48	4.5	3	0.81	964606500000	–	M30X145X38X48
19	3-V-L751-22459/00	A193-B16-QT-CERTIFY	M20X2.5	100	26	35	5	3	0.25	964620570000	931148420000	M20X100X26X35
20	3-V-L509-22459/00	A193-B16-QT-CERTIFY	M30X3	190	50	58	4.5	3	0.99	964620580000	931174690000	M30X190X50X58
21	3-V-L507-22459/00	A193-B7-QT-CERTIFY	M30X3	190	50	58	4.5	3	0.99	964607440000	–	M30X190X50X58
22	3-V-LA41-22459/00	A193-B16-QT-CERTIFY	M24X3	95	30	30	3	2	0.34	964621140000	931226510000	M24X95X30X30
23	3-V-LA44-22459/00	A193-B16-QT-CERTIFY	M16X2	110	25	45	3	2	0.17	964621150000	931227140000	M16X110X25X45
24	3-V-LA45-22459/00	A193-B7-QT-CERTIFY	M16X2	110	25	45	3	2	0.17	964621160000	931227190000	M16X110X25X45
25	3-V-LB19-22459/00	A193-B7-QT-CERTIFY	M24X3	112	35	35	3	2	0.4	964620400000	–	M24X112X35X35
26	3-V-LB20-22459/00	A193-B16-QT-CERTIFY	M24X3	112	35	40	3	2	0.4	964620410000	–	M24X112X35X40
27	3-V-L493-22459/00	A193-B7-QT-CERTIFY	M36X3	172	44	59	4.5	3	1.4	964620660000	–	M36X172X44X59
28	3-V-L494-22459/00	A193-B16-QT-CERTIFY	M36X3	172	44	59	4.5	3	1.4	964620670000	–	M36X172X44X59

NOTES

01. PUNCH MATL MARK B7 FOR A193-B7 & B16 FOR A193-B16
02. LATEST APPLICABLE QUALITY PROCEDURE SHALL BE FOLLOWED
03. BLACKENING TO BE DONE



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

REV	DATE	ALTERED	JALAL
09	13.12.16	CHD & APPD	ATHIANNAVI

DIMN 'S' IN S.No. 26: 40 WAS 35

REV	DATE	ALTERED	JALAL
08	19.12.15	CHD & APPD	RAJASEKAR

COLUMN ALT CODE ADDED
SD CODES ADDED
NOTES ALTERED

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

365-121

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M P S	M P S	31.08.93	
CHD	P R K	P R K	31.08.93	
APPD	S C S	S C S	31.08.93	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N.T.S	– –	———	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-22459	09

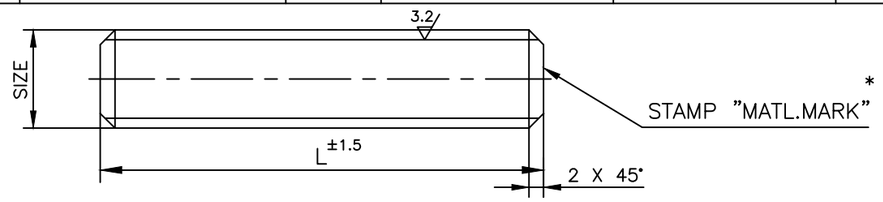
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

12.5 / 3.2

DRAWING NO. 3-V-0000-23248

SL.No	DRAWING No.	MATERIAL	MATL. CODE	SIZE	L	WEIGHT IN Kgs.	MATL. MARK*
01	3-V-F522-23248/01	ASTM A193 Gr. B16	96 456 882 0000	7/8"-9UNC-2A	150	0.45	B16
02	3-V-F523-23248/01		96 456 883 0000	3/4"-10UNC-2A	133	0.30	B16
03	3-V-F524-23248/01		96 456 884 0000	1"-8UNC-2A	170	0.71	B16
04	3-V-F525-23248/01		96 456 885 0000	1.1/4"-8UN-2A	215	1.34	B16
05	3-V-F526-23248/01		96 456 886 0000	1.1/8"-8UN-2A	220	1.41	B16
06	3-V-F527-23248/02		96 456 887 0000	1.1/4"-8UN-2A	250	1.74	B16
07	3-V-0001-23248/01	ASTM A193-B8M CL.2, CERTIFY	96 465 635 0000	1/2"-13UNC-2A	80	0.08	B8M
08	3-V-0002-23248/01		96 465 636 0000	5/8"-11UNC-2A	86	0.13	B8M
09	3-V-0003-23248/01		96 465 637 0000	5/8"-11UNC-2A	105	0.16	B8M
10	3-V-0004-23248/01		96 465 638 0000	5/8"-11UNC-2A	118	0.18	B8M
11	3-V-0005-23248/01		96 465 639 0000	3/4"-10UNC-2A	120	0.26	B8M
12	3-V-0006-23248/01		96 465 640 0000	3/4"-10UNC-2A	133	0.29	B8M
13	3-V-0007-23248/01		96 465 641 0000	7/8"-9UNC-2A	150	0.45	B8M
14	3-V-0008-23248/01		96 465 642 0000	1"-8UNC-2A	135	0.53	B8M
15	3-V-0009-23248/01		96 465 643 0000	1"-8UNC-2A	158	0.62	B8M
16	3-V-0010-23248/01		96 465 644 0000	1"-8UNC-2A	170	0.67	B8M
17	3-V-0011-23248/01		96 465 645 0000	1.1/8"-8UN-2A	180	0.90	B8M
18	3-V-0012-23248/01		96 465 646 0000	1.1/4"-8UN-2A	215	1.32	B8M
19	3-V-0013-23248/01		96 465 647 0000	1.1/4"-8UN-2A	250	1.54	B8M
20	3-V-0014-23248/01		96 465 769 0000	7/8"-9UNC-2A	120	0.36	B8M
21	3-V-0016-23248/01		96 465 830 0000	1.1/8"-8UN-2A	140	0.87	B8M
22	3-V-0015-23248		96 465 794 0000	1/2"-13UNC-2A	95	0.09	B8M
23	3-V-F933-23248		96 465 938 0000	1.1/8"-8UN-2A	220	1.41	B8M
24	3-V-0017-23248	ASTM A193 Gr. B7M	96 465 854 0000	1/2"-13UNC-2A	80	0.08	B7M
25	3-V-0018-23248		96 465 855 0000	5/8"-11UNC-2A	86	0.13	B7M
26	3-V-0019-23248		96 465 856 0000	5/8"-11UNC-2A	105	0.16	B7M
27	3-V-0020-23248		96 465 857 0000	5/8"-11UNC-2A	118	0.18	B7M
28	3-V-0021-23248		96 465 858 0000	3/4"-10UNC-2A	120	0.26	B7M
29	3-V-0022-23248		96 465 859 0000	3/4"-10UNC-2A	133	0.29	B7M
30	3-V-0023-23248		96 465 860 0000	7/8"-9UNC-2A	150	0.45	B7M
31	3-V-0024-23248		96 465 861 0000	1"-8UNC-2A	135	0.53	B7M
32	3-V-0025-23248		96 465 862 0000	1"-8UNC-2A	158	0.62	B7M
33	3-V-0026-23248		96 465 863 0000	1"-8UNC-2A	170	0.67	B7M
34	3-V-0027-23248		96 465 864 0000	1.1/8"-8UN-2A	180	0.90	B7M
35	3-V-0028-23248		96 465 865 0000	1.1/4"-8UN-2A	215	1.32	B7M
36	3-V-0029-23248		96 465 866 0000	1.1/4"-8UN-2A	250	1.54	B7M
37	3-V-0030-23248		96 465 867 0000	7/8"-9UNC-2A	120	0.36	B7M
38	3-V-0031-23248		96 465 868 0000	1.1/8"-8UN-2A	140	0.87	B7M



NOTE

01. FOR QUALITY REQUIREMENTS: REFER LATEST APPLICABLE PROCEDURE.

REV	DATE	ALTERED	REV	DATE	ALTERED
08	22.02.21	R.P.SINGH CHD & APPD SAMEER & SSK	07	26.06.20	R.P.SINGH CHD & APPD SAMEER & SSK
	3-V-F933-23248 INCLUDED.			FOR SL. No. 07 TO 21 MATL. SPECIFICATION UPDATED. 3-V-0015-23248 INCLUDED.	

–	–	–	–	–	–	–	–	–	–
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

REDRAWN WITH REV.5 ON 26.03.18

365-121

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M.SRINIVASAN		18.05.98	
CHD	K.S.RAMAN		18.05.98	
APPD	N.NAGARAJAN		18.05.98	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF.TABLE	B16 & B7M CAD :C323248	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-23248	08

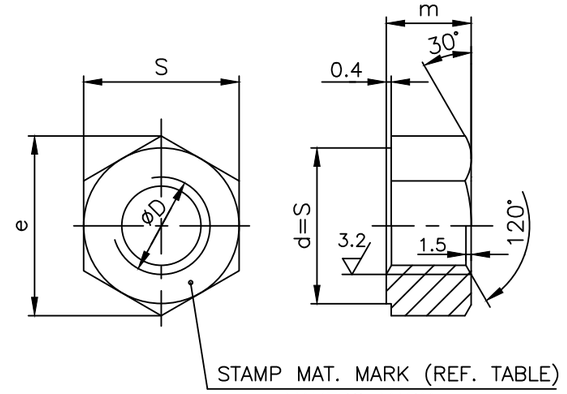
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-23249

SL. No.	DRAWING No.	COMP. CODE	MATL. SPECN.	S		e		m		øD	MATL. MARK	NET WT. (Kg.)
				MAX.	MIN.	MAX.	MIN.	MAX.	MIN.			
01	3-V-F522-23249/02	96 456 888 0000	ASTM A194 – Gr.7	36.52	35.41	42.16	40.37	22.47	21.16	7/8"-9 UNC -2B	GR.7	0.11
02	3-V-F523-23249/02	96 456 889 0000	ASTM A194 – Gr.7	31.75	30.78	36.65	35.10	19.25	18.03	3/4"-10 UNC -2B	GR.7	0.08
03	3-V-F524-23249/02	96 456 890 0000	ASTM A194 – Gr.7	41.28	40.01	47.65	45.62	25.70	24.28	1"-8 UNC -2B	GR.7	0.17
04	3-V-F525-23249/02	96 456 891 0000	ASTM A194 – Gr.7	50.80	49.23	58.65	56.11	31.78	30.15	1.1/4"-8 UN -2B	GR.7	0.27
05	3-V-F526-23249/02	96 456 892 0000	ASTM A194 – Gr.7	46.02	44.60	53.16	50.85	29.93	27.41	1.1/8"-8 UN -2B	GR.7	0.22
06	3-V-0001-23249	96 465 648 0000	ASTM A194 – Gr.8M	22.22	21.59	25.65	24.61	12.80	11.79	1/2"-13 UNC -2B	GR.8M	0.02
07	3-V-0002-23249	96 465 649 0000	ASTM A194 – Gr.8M	26.97	26.19	31.17	29.85	16.03	14.91	5/8"-11 UNC -2B	GR.8M	0.03
08	3-V-0003-23249	96 465 650 0000	ASTM A194 – Gr.8M	31.75	30.78	36.65	35.10	19.25	18.03	3/4"-10 UNC -2B	GR.8M	0.08
09	3-V-0004-23249	96 465 651 0000	ASTM A194 – Gr.8M	36.52	35.41	42.16	40.37	22.47	21.16	7/8"-9 UNC -2B	GR.8M	0.11
10	3-V-0005-23249	96 465 652 0000	ASTM A194 – Gr.8M	41.28	40.01	47.65	45.62	25.70	24.28	1"-8 UNC -2B	GR.8M	0.17
11	3-V-0006-23249	96 465 653 0000	ASTM A194 – Gr.8M	46.02	44.60	53.16	50.85	29.93	27.41	1.1/8"-8 UN -2B	GR.8M	0.22
12	3-V-0007-23249	96 465 654 0000	ASTM A194 – Gr.8M	50.80	49.23	58.65	56.11	31.78	30.15	1.1/4"-8 UN -2B	GR.8M	0.27
13	3-V-0008-23249	96 465 847 0000	ASTM A194 – Gr.2HM	22.22	21.59	25.65	24.61	12.80	11.79	1/2"-13 UNC -2B	GR.2HM	0.02
14	3-V-0009-23249	96 465 848 0000	ASTM A194 – Gr.2HM	26.97	26.19	31.17	29.85	16.03	14.91	5/8"-11 UNC -2B	GR.2HM	0.03
15	3-V-0010-23249	96 465 849 0000	ASTM A194 – Gr.2HM	31.75	30.78	36.65	35.10	19.25	18.03	3/4"-10 UNC -2B	GR.2HM	0.08
16	3-V-0011-23249	96 465 850 0000	ASTM A194 – Gr.2HM	36.52	35.41	42.16	40.37	22.47	21.16	7/8"-9 UNC -2B	GR.2HM	0.11
17	3-V-0012-23249	96 465 851 0000	ASTM A194 – Gr.2HM	41.28	40.01	47.65	45.62	25.70	24.28	1"-8 UNC -2B	GR.2HM	0.17
18	3-V-0013-23249	96 465 852 0000	ASTM A194 – Gr.2HM	46.02	44.60	53.16	50.85	29.93	27.41	1.1/8"-8 UN -2B	GR.2HM	0.22
19	3-V-0014-23249	96 465 853 0000	ASTM A194 – Gr.2HM	50.80	49.23	58.65	56.11	31.78	30.15	1.1/4"-8 UN -2B	GR.2HM	0.27
20	3-V-0015-23249	96 465 940 0000	ASTM A194 – Gr.8M	55.57	53.8	64.16	61.37	35.0	33.27	1.3/8"-8 UN -2B	GR.8M	0.42

12.5 / 3.2



NOTE:

1. FOR QUALITY REQUIREMENTS REFER LATEST APPLICABLE QUALITY PROCEDURE.
2. SUITABLE OIL PRESERVATIVE SHALL BE APPLIED.

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

REV	DATE	ALTERED	R.P.SINGH
05	03.03.21	CHD & APPD	SAMEER & SSK

SL. No. 20 INCLUDED.

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

365-121

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M.SRINIVASAN		22.04.96	
CHD	N.DHANAPAL		23.04.96	
APPD	A.VISWANATHAN		23.04.96	

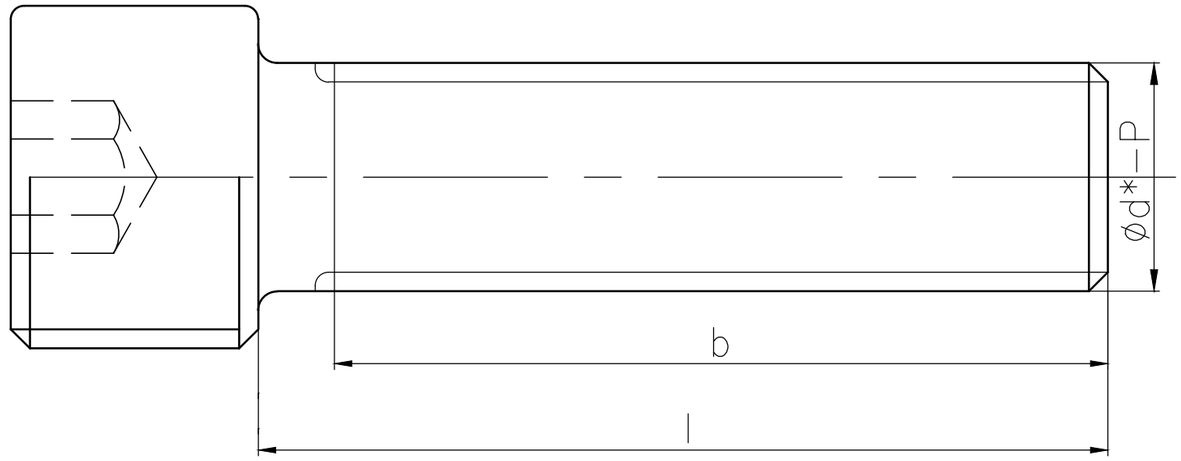
DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF. TABLE	CAD: F323249	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
HEX NUT	U 01	3-V-0000-23249	05

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO: 3-V-0000-27130



TABULATION:

Variant No	Material Code	Nominal Size (d)	Nominal Length (l)	Threaded length (b)	Pitch	Unit Weight in Kg	Tolerance values on					
							Major dia		Pitch dia		Minor dia	
							Upper	Lower	Upper	Lower	Upper	Lower
001	964612830000	M16	55	44	2	0.13	-0.177	-0.457	-0.177	-0.337	-0.177	-0.481
002	964612840000	M16	105	55	2	0.21	-0.177	-0.457	-0.177	-0.337	-0.177	-0.481
003	964612850000	M18	65	56	2.5	0.20	-0.200	-0.535	-0.200	-0.370	-0.200	-0.550
004	964612860000	M20	75	63	2.5	0.28	-0.200	-0.535	-0.200	-0.370	-0.200	-0.550
005	964612870000	M20	115	45	2.5	0.38	-0.200	-0.535	-0.200	-0.370	-0.200	-0.550
006	964612880000	M22	80	70	2.5	0.37	-0.200	-0.535	-0.200	-0.370	-0.200	-0.550
007	964612890000	M24	75	63	3	0.45	-0.212	-0.587	-0.212	-0.412	-0.212	-0.628
008	964612900000	M24	135	60	3	0.64	-0.212	-0.587	-0.212	-0.412	-0.212	-0.628
009	964612910000	M30	65	45	3.5	0.68	-0.225	-0.650	-0.225	-0.437	-0.225	-0.689
010	964612920000	M30	130	80	3.5	1.05	-0.225	-0.650	-0.225	-0.437	-0.225	-0.689
011	964612930000	M36	130	84	4	1.59	-0.712	-0.712	-0.237	-0.461	-0.237	-0.749
012	964612940000	M42	140	90	4.5	2.39	-0.750	-0.750	-0.250	-0.486	-0.250	-0.810
013	964613360000	M30	180	60	3.5	1.14	-0.225	-0.650	-0.225	-0.437	-0.225	-0.689
014	964613990000	M22	50	43	2.5	0.28	-0.200	-0.535	-0.200	-0.370	-0.200	-0.550
015	964614000000	M24	65	56	3	0.39	-0.212	-0.587	-0.212	-0.412	-0.212	-0.628
016	964614010000	M30	100	72	3.5	0.57	-0.225	-0.650	-0.225	-0.437	-0.225	-0.689
017	964614020000	M42	120	96	4.5	2.16	-0.750	-0.750	-0.250	-0.486	-0.250	-0.810

NOTES:

1. ALL REMAINING DIMENSIONS OF THE HEXAGON SOCKET HEAD CAP SCREWS SHALL BE ACCORDING TO ISO 4762
2. TOP AND BOTTOM OF HEAD SHALL BE SUITABLY RADIUSED OR CHAMFERED.
3. HEADS OF SCREWS SHOULD BE PLAIN AND NOT KNURLED.
4. ALL SCREWS SHALL BE MARKED WITH MATERIAL SPECIFICATION FOR IDENTIFICATION
5. ALL SCREWS SHALL BE ZINC AND OLIVE DRAB PASSIVATED
6. HARDNESS OF THE SCREWS BEFORE SURFACE PROTECTION SHALL BE 22-24 HRC
7. THESE SCREWS WILL BE CUT TO SIZE TO SUIT THE REQUIREMENT. ANY PRECAUTIONS/SPECIAL MEASURES TO BE CONSIDERED BY THE PURCHASER TO RETAIN THE PROPERTIES OF THE SCREWS AFTER CUTTING TO SIZE SHALL BE INDICATED BY THE VENDOR ALONG WITH THE QUOTATION.

02

NO OF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
			21CrMoV5-7 (1.7709)						

03

DCP No.	ALTD: RIYAZ	APPD: S.M	DCP No.	ALTD: C.K.S	APPD: M.C.K & M.S.V
	CHD: M.C.K	DT: 01.10.21		CHD: M.C.K & M.S.V	DT: 27.09.17

REV	ZONE	
03		NEW ROWS 14-17 ADDED IN TABULATION.
02		NEW ROW ADDED IN TABULATION.

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

365-121/A
09.09.20

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	CHITRANJAN	C.K.S	27.09.17	—
CHD	CHAITANYA	M.C.K	27.09.17	
APPD	M.S.VINOD	M.S.V	27.09.17	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REFER TABULATION		—
CODE 310				

TITLE	CARD CODE	DRAWING NO.	REV
HEX. SOCKET HEAD CAP SCREW	U 01	3-V-0000-27130	03

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

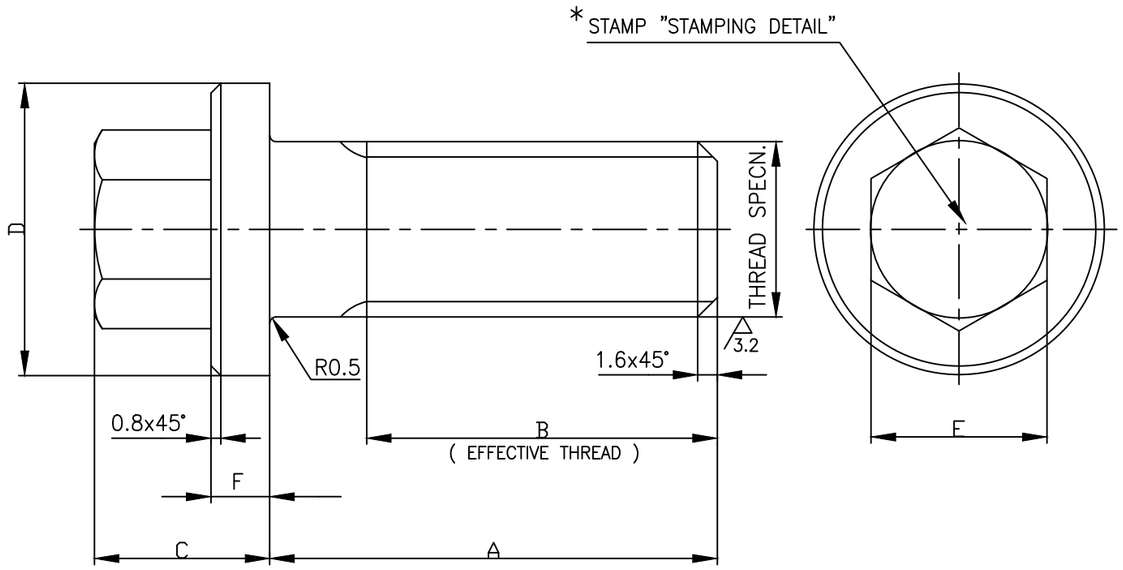
DRAWING NO. 3-V-0000-35365

SL. No.	DRAWING NUMBER	COMPONENT CODE	MATL. SPECN	THREAD SPECN	A	B	C	D MAX	D MIN	E MAX	E MIN	F	STAMPING DETAIL *	WT. (Kg.)
01	3-V-M953-35365	96 600 081 0000	SA 193 - B7	0.375"-16 UNC-3A	27.0	22.2	9.5	14.28	13.97	9.60	9.40	3.2	B7	0.003
02	3-V-M954-35365	96 600 076 0000	SA 193 - B7	0.500"-13 UNC-3A	28.6	23.8	12.7	21.44	21.03	12.78	12.57	4.8	B7	0.007
03	3-V-M955-35365	96 600 080 0000	SA 193 - B7	0.5625"-12UNC-3A	36.5	28.6	14.3	23.83	23.39	14.35	14.15	4.8	B7	0.009

6.3 / 3.2

NOTES:

01. ALL SA193 B7 BOLTS SHALL BE PHOSPHATED.
02. BREAK ALL SHARP CORNERS.



REV	DATE	ALTERED
		CHD & APPD

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.

SL. No.	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No / COMP. CODE	ITEM No

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: FORGED STEEL VALVE

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	S.MADHURAM		08.03.21	–
CHD	S.SURENDAR		08.03.21	
APPD	S.SATHEESKUMAR		08.03.21	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF. TABLE	CAD: F309599	–

CODE: 320

TITLE: HEX. HEAD BOLT

CARD CODE: U 01

DRAWING NO.: 3-V-0000-35365

REV: 00

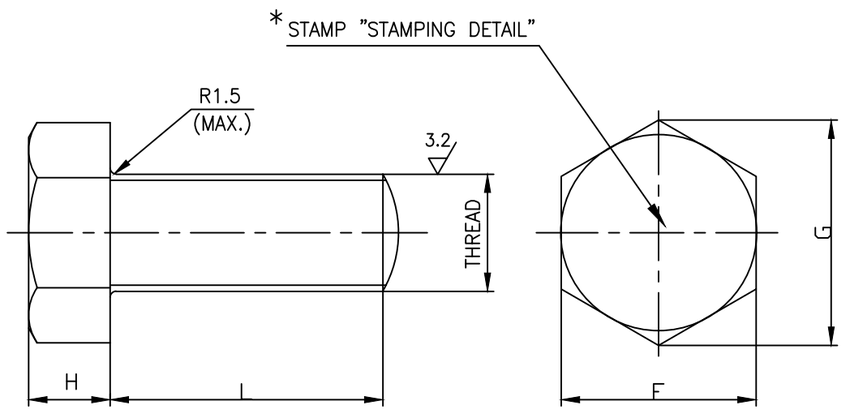
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-35371

SL. No.	DRAWING NUMBER	COMPONENT CODE	MATL. SPECN	THREAD	L	F		G		H		STAMP DETAIL *	WT. (Kg.)
						MAX	MIN	MAX	MIN	MAX	MIN		
01	3-V-M956-35371	96 600 075 0000	SA 193 – B7	0.75"-10 UNC-3A	44.5	31.8	30.8	36.7	35.1	13.3	11.5	B7	0.18

6.3 / 3.2



NOTES:

01. ALL SA193 B7 BOLTS SHALL BE PHOSPHATED.
02. BREAK ALL SHARP CORNERS.

REV	DATE	ALTERED
		CHD & APPD

–	–	–	–	–	–	–	–	–	–
SL. No.	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No / COMP. CODE	ITEM No

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: FORGED STEEL VALVE

365-121

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	S.MADHURAM		08.03.21	–
CHD	S.SURENDAR		08.03.21	
APPD	S.SATHEESKUMAR		08.03.21	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF. TABLE	CAD: F309600	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
HEX. HEAD BOLT	U 01	3-V-0000-35371	00

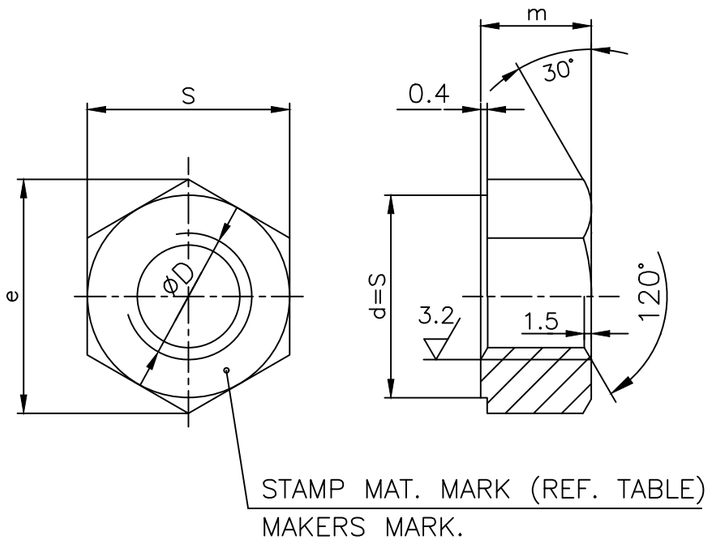
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO: 3-V-0000-35373

SL. No.	DRAWING No.	COMP. CODE	MATL. SPECN.	S		e		m		øD	MATL. MARK	NET WT. (Kg.)
				MAX.	MIN.	MAX.	MIN.	MAX.	MIN.			
01	3.V.M959.35373	96 465 933 0000	ASTM A194 – 2H, PROD. ATTEST	22.22	21.59	25.65	24.61	12.80	11.79	1/2"–13 UNC–2B	2H	0.02
02	3.V.M961.35373	96 465 935 0000		26.97	26.19	31.17	29.85	16.03	14.91	5/8"–11 UNC–2B	2H	0.03
03	3.V.M962.35373	96 465 934 0000		31.75	30.78	36.65	35.10	19.25	18.03	3/4"–10 UNC–2B	2H	0.08
04	3.V.M963.35373	96 600 079 0000		12.70	12.42	14.66	14.15	6.93	6.55	5/16"–18 UNC–2B	2H	0.01

12.5 ▽ / 3.2 ▽



STAMP MAT. MARK (REF. TABLE)
MAKERS MARK.

NOTE:

1. FOR QUALITY REQUIREMENTS REFER LATEST APPLICABLE STANDARD TDC

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

REV	DATE	ALTERED:
		CHD & APPD:
ZONE		

TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

365–121/A
09.09.20

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

	NAME	SIGN	DATE	NO.OF VAR.
DRN	R.P.SINGH		20.01.21	—
CHD	SAMEER BHAT		20.01.21	
APPD	S.SATHEES		20.01.21	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS.	–		—
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
HEX NUT	U 01	3–V–0000–35373	00

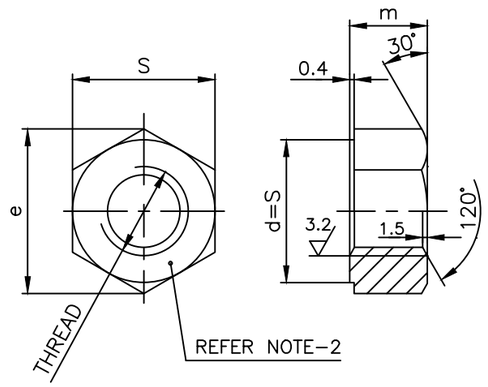
Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-95178/08

SL. No.	DRAWING No.	COMP. CODE	MATL. SPECN.	S		e		m		THREAD	MATL. MARK	NET WT. (Kg.)
				MAX.	MIN.	MAX.	MIN.	MAX.	MIN.			
01	3.V.M357.95178/03	96 456 484	ASTM A194 Gr.7,HT,CERTIFY	26.97	26.19	31.17	29.85	16.03	14.91	5/8"-11 UNC-2B	Gr.7	0.033
02	3.V.M359.95178/03	96 456 486	ASTM A194 Gr.7,HT,CERTIFY	31.75	30.78	36.65	35.10	19.25	18.03	3/4"-10 UNC-2B	Gr.7	0.076
03	3.V.N301.95178/02	96 456 578	ASTM A194 Gr.7,HT,CERTIFY	22.22	21.59	25.65	24.61	12.80	11.79	1/2"-13 UNC-2B	Gr.7	0.021
04	3.V.N304.95178/02	96 456 579	ASTM A194 Gr.7,HT,CERTIFY	41.28	40.09	47.65	45.62	25.70	24.28	1"-8 UNC-2B	Gr.7	0.165
05	3.V.N309.95178/02	96 456 580	ASTM A194 Gr.7,HT,CERTIFY	46.02	44.60	53.16	50.85	28.93	27.41	1-1/8"-8 UN-2B	Gr.7	0.266
06	3.V.M358.95178/03	96 456 485	ASTM A194 Gr.8,SH,CERTIFY	26.97	26.19	31.17	29.85	16.03	14.91	5/8"-11 UNC-2B	Gr.8	0.033
07	3.V.N363.95178/02	96 456 618	ASTM A194 Gr.8,SH,CERTIFY	22.22	21.59	25.65	24.61	12.80	11.79	1/2"-13 UNC-2B	Gr.8	0.021
08	3.V.M463.95178/02	96 456 654	ASTM A194 Gr.8,SH,CERTIFY	24.00	23.67	--	26.75	14.80	14.10	M16-6H	Gr.8	0.034
09	3.V.B001.95178/02	96 456 656	ASTM A194 Gr.8,SH,CERTIFY	--	19.00	--	21.10	--	10.00	M12-6H	Gr.8	0.018
10	3.V.N204.95178/02	96 456 657	ASTM A194 Gr.8,SH,CERTIFY	31.75	30.78	36.65	35.10	19.25	18.03	3/4"-10 UNC-2B	Gr.8	0.076
11	3.V.NH84.95178/00	96 465 629	ASTM A194 Gr.7,HT,CERTIFY	60.33	58.42	69.65	66.59	38.23	36.40	1-1/2"-8UN-2B	Gr.7	0.52

6.3 / 3.2



NOTES:

1. FOR QUALITY REQUIREMENTS REFER LATEST APPLICABLE STANDARD.
2. PUNCH MATERIAL MARK(REFER TABLE) & MAKER'S MARK.

REV	DATE	ALTERED	REV	DATE	ALTERED
08	16.06.14	M.RAMESH	07	20.11.13	M.S
		CHD & APPD MS&SSK			CHD & APPD SSK & KRS
SL.No.11 INCLUDED			DRAWING CONVERTED INTO AUTOCAD ASTM A194 Gr.8 WAS AISI 304. GALVANISING REMOVED FOR Gr.7 DCP:801645		
06	28.05.01	TRR	05	13.06.96	K.P.L
		CHD & APPD KSR			CHD & APPD AVN
MATL.SPECN. A194 Gr.4 REVISED TO A194 Gr.7 REFER DCN. CS: 1147			MATL. Gr.8 & Gr.D CHANGED AS SS 304. REFER CS:DCN:CS: 0585		

-	-	-	-	-	-	-	-	-	-
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

RETRACED WITH REV. 07 ON 20.11.2013

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	K.P.L		13.06.96	
CHD	N.D.P		13.06.96	
APPD	A.V.N		13.06.96	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF. TABLE	CAD: C395178	
CODE 320				

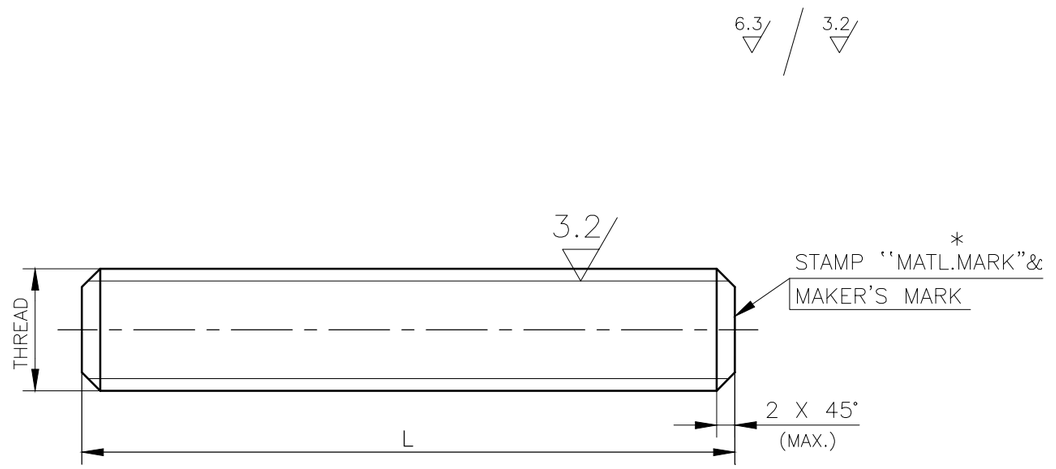
TITLE	CARD CODE	DRAWING NO.	REV
HEX. NUT	U 01	3-V-0000-95178	08

Size A3

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-95180

SL.No	DRAWING No.	MATERIAL CODE	MATERIAL SPECN.	DIMENSIONS		MATERIAL MARK *	FINISHED WEIGHT(Kgs.)	SIZE/RATING
				THREAD	L			
01.	3-V-M357-95180/02	96 456 481 0000	ASTM A320 Gr.L7,HT, CERTIFY	5/8"-11UNC-2A	105	L7	0.164	4"/300C
02.	3-V-M358-95180/02	96 456 482 0000		5/8"-11UNC-2A	118	L7	0.184	6"/300C
03.	3-V-M359-95180/02	96 456 483 0000		3/4"-10UNC-2A	133	L7	0.298	8"/300C
04.	3-V-N228-95180/01	96 456 525 0000	ASTM A193 -B16,QT, CERTIFY	5/8"-11UNC-2A	105	B16	0.164	4"/300C
05.	3-V-N229-95180/01	96 456 526 0000		5/8"-11UNC-2A	118	B16	0.184	6"/300C
06.	3-V-N230-95180/01	96 456 527 0000		3/4"-10UNC-2A	133	B16	0.298	8"/300C
07.	3-V-N306-95180/01	96 456 570 0000		5/8"-11UNC-2A	94	B16	0.146	6"/150C & 4"/150C
08.	3-V-N305-95180/01	96 456 571 0000		3/4"-10UNC-2A	112	B16	0.251	10"/150C
09.	3-V-N304-95180/01	96 456 572 0000		1"-8UNC-2A	158	B16	0.629	10"/300C
10.	3-V-N309-95180/01	96 456 573 0000		1 1/8"-8UNC-2A	180	B16	0.910	12"/300C
11.	3-V-N301-95180/01	96 456 574 0000		1/2"-13UNC-2A	68	B16	0.068	2"/150C
12.	3-V-N262-95180/01	96 456 575 0000		1/2"-13UNC-2A	80	B16	0.080	2"/300C
13.	3-V-N292-95180/01	96 456 576 0000		5/8"-11UNC-2A	86	B16	0.134	3"/150C
14.	3-V-N266-95180/01	96 456 577 0000		3/4"-10UNC-2A	120	B16	0.269	12"/150C
15.	3-V-N363-95180/01	96 456 616 0000	ASTM A193 -B8,SH, CERTIFY	1/2"-13UNC-2A	80	B8	0.080	2"/300C
16.	3-V-N364-95180/01	96 456 617 0000		5/8"-11UNC-2A	105	B8	0.164	3"/300C
17.	3-V-N204-95180/01	96 456 659 0000	SA307-Gr.B CERTIFY	3/4"-10UNC-2A	106	Gr.B	0.25	6"/150C
18.	3-V-N211-95180/01	96 456 660 0000		3/4"-10UNC-2A	125	Gr.B	0.27	6"/300C
19.	3-V-N622-95180/01	96 456 790 0000	ASTM A193 -B16,QT, CERTIFY	1 1/8"-8UN-2A	140	B16	0.7	14"/300C
20.	3-V-C537-95180/01	96 456 802 0000		1 5/8"-8UN-2A	300	B16	3.3	12"/900C
21.	3-V-C538-95180/01	96 456 803 0000		2"-8UN-2A	390	B16	6.3	14"/900C
22.	3-V-M768-95180/01	96 456 851 0000	ASTM A320 Gr.L7,HT, CERTIFY	5/8"-11UNC-2A	86	L7	0.13	3"/150C
23.	3-V-M769-95180/01	96 456 852 0000		5/8"-11UNC-2A	94	L7	0.15	4"/150C & 6"/150C
24.	3-V-NG10-95180	96 465 375 0000	ASTM A193 B16, QT CERTIFY	1 1/8"-8UN-2A	200	B16	0.98	20"/300C
25.	3-V-NH84-95180	96 465 628 0000		1 1/2"-8UN-2A	220	B16	1.96	32"/150C
26.	3-V-H972-95180	96 600 039 0000		1/2"-13UNC-2A	95	B16	0.09	1/2"/3000C



NOTE

01. FOR QUALITY REQUIREMENTS REFER LATEST APPLICABLE QUALITY PROCEDURE.
02. SUITABLE RUST PREVENTIVE COATING SHALL BE APPLIED AFTER MACHINING.

DRAWING REDRAWN WITH REV.13 ON 06.06.2016

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

REV	DATE	ALTERED	
13	06.06.16	CHD & APPD	B.AJITH KUMAR MS & KRS

SL.NO: 26 INCLUDED

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: CS

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	T.R.R.MURTHY		27.09.99	
CHD	N.DHANAPAL		27.09.99	
APPD	K.S.RAMAN		27.09.99	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF TABLE	CAD: F395180	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
STUD	U 01	3-V-0000-95180	13

Size A3

FOR TOL. OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP/QP

SL NO.	DRAWING NO.	COMP CODE.	DIMENSION																
			Md X P -6g	b (Js15)	ϕd_1 (Js16)	ϕd_2 (Js16)	ϕd_3 (Js16)	e	f	ϕg (h16)	h (Js16)	K (Js16)	m (Js16)	r_1	r_2	r_3	t	WT IN KG.
1.	3-V-L129-06620	96452542	M24	38.50	50.80	91.00	50.80	18	5	19.0	45.80	20.65	24.65	9	12	2	47	1.4
2.	3-V-L029-06620	96452543	M36X3	55.60	75.95	127.25	70.95	26	8	30.0	65.95	28.65	32.80	13	18	3	66	4.75
3.	3-V-L033-06620	96452998	M48x3	70.60	101.10	167.75	91.50	35	8	40.0	86.10	36.80	46.80	18	22	4	83	6.3
4.	3-V-L805-06620	96460529	M36x4	55·60	75·95	127·25	70·95	26	8	30·0	65·95	28·65	32·80	13	18	3	66	4·75
5.	3-V-L820-06620	96460530	M42 X4·5	65·60	86·10	145·75	81·50	30	8	35·0	75·95	32·65	38·80	15	20	3	77	5·25
6	3-V-L793-06620	96460695	M80×6	105.7	131.25	267.6	141.25	50	14	71	131.25	63.95	63.95	—	35	5	127	18·0
7	3VL794-06620	96460696	M64	90.7	111.10	211.45	111.10	42	14	55.7	106.1	50.95	50.95	—	25	5	108	11·0
8	3VL789 06620	96460794	M60X4	90·7	111.10	211.45	111.10	42	14	55.7	106.1	50.95	50.95	—	25	5	108	10.6

NOTES:

1. EYE BOLT SHALL COMPLY WITH IS:4190 IN RESPECT OF REQUIREMENT NOT COVERED IN THIS DRAWING.
2. MATERIAL: STEEL TO CLASS 2 OF IS:1875
3. OTHER REFERED STANDARDS:

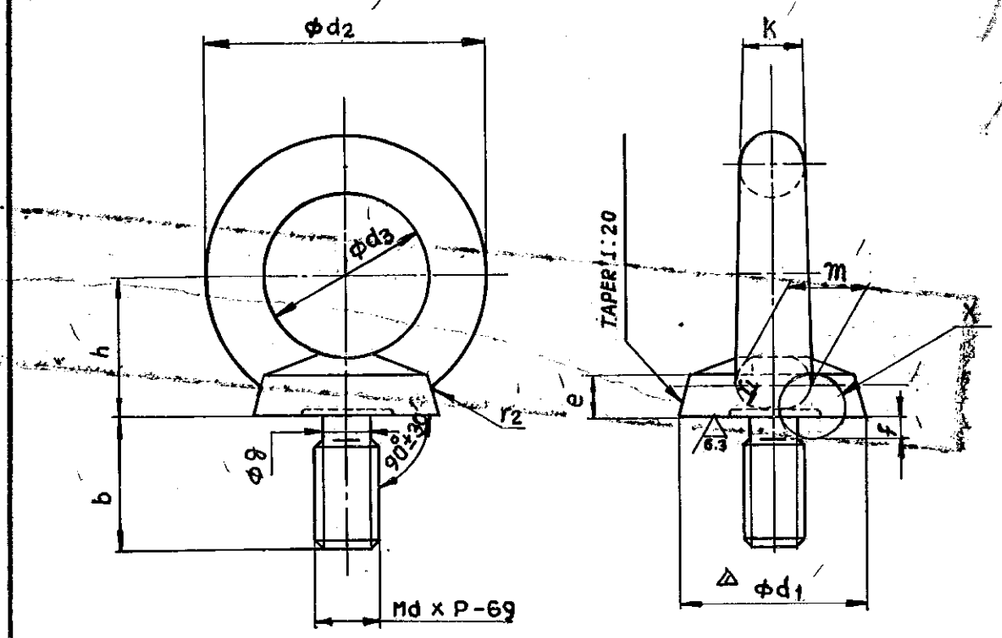
   IS:1367-TECHNICAL SUPPLY CONDITIONS FOR THREADED STEEL FASTENERS.

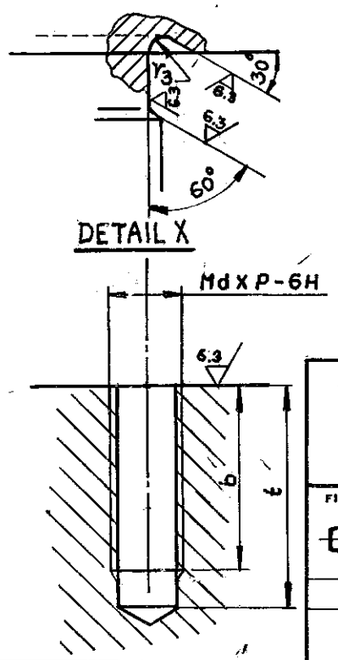
   IS:1875 - SPECIFICATION FOR CARBON STEEL, BILLETS, BLOOMS AND SLABS FOR FORGINGS.

   IS:2614 - METHODS FOR SAMPLING OF FASTENERS.

   IS:4218-ISOMETRIC SCREW THREADS.

4. TEST CERTIFICATE ACCORDING TO IS:4190, SHALL BE OBTAINED ALONGWITH EACH SUPPLY.





REV	DATE	ALTD: MPS	REV	DATE	ALTD: MPS	REV.	DATE	ALTERED R.L.	ZONE
03	12.4.95	CHD & APP'D. SCI	02	28·6·93	CHKD:	01	16.4.93	CHECKED S.K.	
	SL.NO. 6 & 7 INCLUDED			SL.NO. 4 & 5 INCLUDED.			ϕd_1 WAS ϕd_2. DCN No. TA 02.50		

REV	DATE	ALTD; MPS
04	27.3.97	CHD; APP'D: SCI
SL. NO. 8 ADDED		

BHARAT HEAVY ELECTRICALS LTD.,

BOILER PLANT UNIT, TIRUCHIRAPALLI-14

FIRST ANGLE	SCALE	DRAWN	R. Rajkumar.	TOTAL NET wt. (kg)	
	N.T.S.	CHECKED	M.R.K.	TYPE	
		APPROVED	V.B		
ALL DIMENSIONS IN MILLIMETRES		DATE		NEW/OLD DRG. NO.	

33-115

TITLE

EYE BOLT (WITH COLLAR)

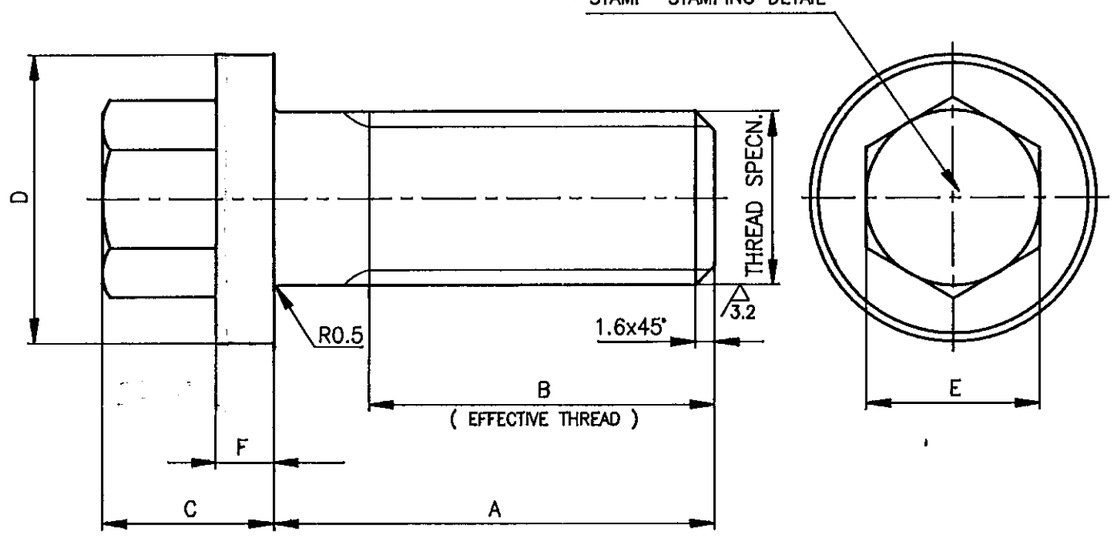
DRAWING NO. 3-V-0000-06620

REVISION

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-09599

SL. No.	DRAWING NUMBER	COMPONENT CODE	MATL. SPECN	THREAD SPECN	A	B	C	D MAX	D MIN	E MAX	E MIN	F		STAMPING DETAIL *	WT. (Kg.)
01	3-V-5903-09599/06	96 162 077 0000	SA 193 - B7	0.375"-16 UNC-3A	23.8	19.8	9.5	16.66	16.31	9.60	9.40	3.2		B7	0.004
02	3-V-5933-09599/05	96 452 131 0000	SA 193 - B8											B8	
03	3-V-5904-09599/06	96 162 078 0000	SA 193 - B7	0.500"-13 UNC-3A	28.6	23.8	12.7	21.44	21.03	12.78	12.57	4.8		B7	0.007
04	3-V-5934-09599/05	96 452 132 0000	SA 193 - B8											B8	
05	3-V-5907-09599/06	96 162 079 0000	SA 193 - B7	0.5625"-12UNC-3A	36.5	28.6	14.3	23.83	23.39	14.35	14.15	4.8		B7	0.009
06	3-V-5937-09599/05	96 452 133 0000	SA 193 - B8											B8	
07	3-V-5803-09599/06	96 162 080 0000	SA 193 - B7	0.375"-16 UNC-3A	27.0	22.2	9.5	14.28	13.97	9.60	9.40	3.2		B7	0.003
08	3-V-5949-09599/05	96 452 134 0000	SA 193 - B8											B8	
09	3-V-5632-09599/06	96 452 135 0000	SA 193 - B7	0.375"-16 UNC-3A	19.1	14.3	9.5	14.28	13.97	9.60	9.40	3.2		B7	0.002
10															
11				0.375"-16 UNC-3A	23.8	19.8	9.5	16.66	16.31	9.60	9.40	3.2			0.004
12	3-V-5291-09599/06	96 452 268 0000	SA 193 - B7M											B7M	
13	3-V-5292-09599/06	96 452 269 0000	SA 193 - B7M	0.500"-13 UNC-3A	28.6	23.8	12.7	21.44	21.03	12.78	12.57	4.8		B7M	0.007
14	3-V-5818-09599/06	96 456 547 0000	SA 193 - B7M	0.375"-16 UNC-3A	27.0	22.2	9.5	14.28	13.97	9.60	9.40	3.2		B7M	0.003



6.3 / 3.2

NOTES:

01. ALL SA193 B7 & B7M BOLTS SHALL BE PHOSPHATED.
02. BREAK ALL SHARP CORNERS.

RETRACED WITH REV. 05 ON 29.03.95

NO OF	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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO. OF VAR.
DRN	R.MOHAN	R. Mohan	24.03.95	
CHD	K.RAVICHANDRAN		6.4.95	
APPD	N.NAGARAJAN		7.4.95	

DEPT VL | CODE 320 | SCALE NTS | WEIGHT (KG). REF. TABLE | REFERENCE INFORMATIONS: CAD: F309599 | NO. OF ITEMS

TITLE: HEX. HEAD BOLT | CARD CODE U 01 | DRAWING NO. 3-V-0000-09599 | REV 06

Size A3

REV	DATE	ALTD & CHD & APPD	DCN: FS:
06	09.05.01	ALTD: M.U.C. CHD & APPD:	0888

CHAMFER 0.8x45° REMOVED.
NOTE 02 ADDED

REV	DATE	ALTERED & CHD & APPD	DCN: FS:
05	29.03.95	ALTERED R.Mohan. CHD & APPD	0320

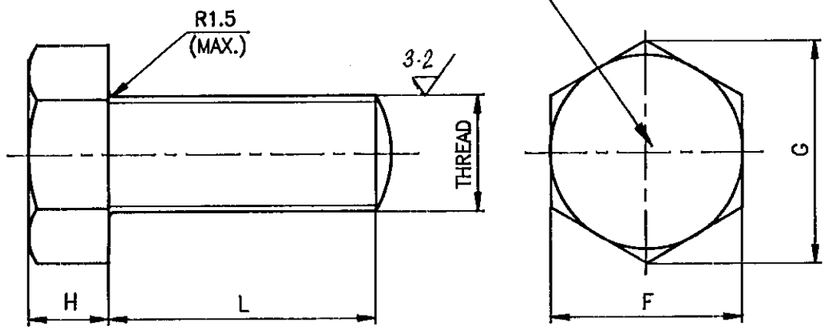
NOTE 01, PHOSPHATING DETAIL INCLUDED.
FOR SL.No.14, NEW COMP.CODE 96.456.547.0000. GIVEN.

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-09600

SL. No.	DRAWING NUMBER	COMPONENT CODE	MATL. SPECN	THREAD	L			F MAX	F MIN	G MAX	G MIN	H MAX	H MIN	STAMP DETAIL *	WT. (Kg.)
01	3-V-5717-09600/01	96 162 081 0000	SA 193 - B7	0.75"-10 UNC-3A	44.5			31.8	30.8	36.7	35.1	13.3	11.5	B7	0.18

* STAMP "STAMPING DETAIL"



6.3 / 3.2

NOTES:

01. BOLT SHALL BE PHOSPHATED.

RETRACED WITH REV. 01 ON 29.03.95

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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	R.MOHAN	R. Mohan	31.03.95	
CHD	K.RAVICHANDRAN		6.4.95	
APPD	N.NAGARAJAN		7.4.95	

DEPT VL | CODE 320 | SCALE NTS | WEIGHT (Kg). REF. TABLE | REFERENCE INFORMATIONS: DR. REF D43871/466 PART No. 3884, CAD: F309600 | NO. OF ITEMS

TITLE: HEX. HEAD BOLT | CARD CODE U 01 | DRAWING NO. 3-V-0000-09600 | REV 01

Size A3

REV	DATE	ALTERED / CHD & APPD
05	29.03.95	R. Mohan /

DCN: FS: 0320

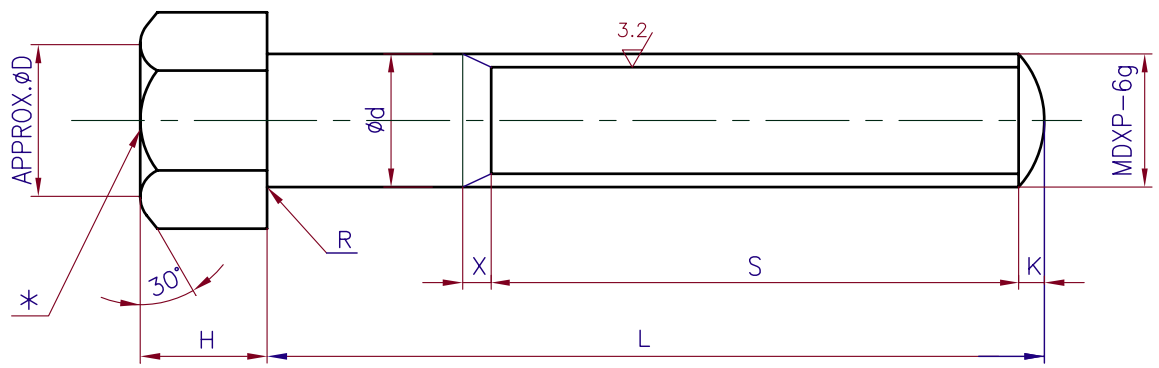
NOTE 01, PHOSPHATING DETAIL INCLUDED.
ALL METRIC DIMENSIONS WERE INCH DIMENSIONS.

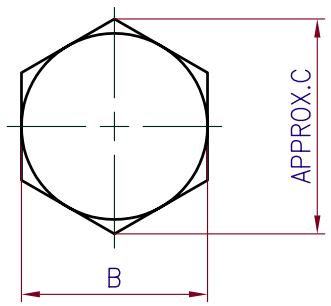
ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

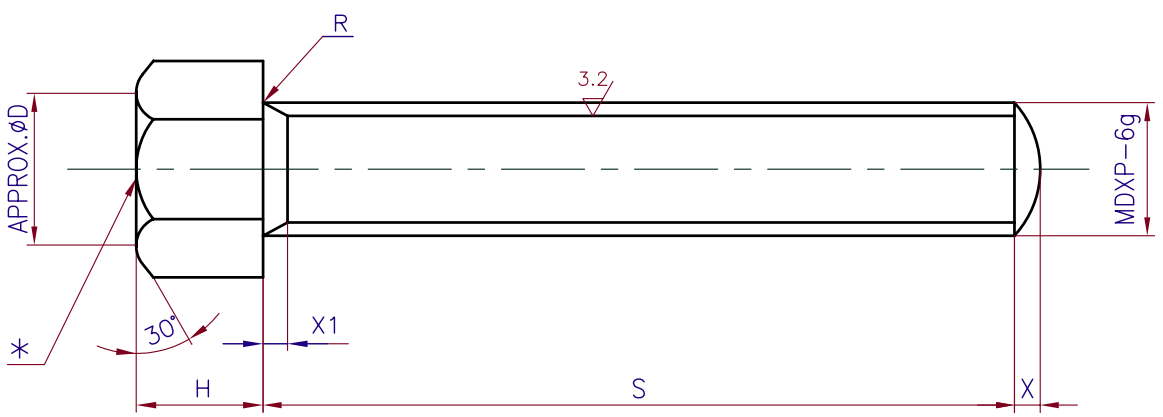
DRAWING NO. 3-V-0000-20728/11

12.5 / 3.2

SL No.	DRAWING NO.	COMP. CODE	MATL. SPECN.	DIMENSIONS														NET WT (Kgs)	REMARKS
				MD	P	L	S	H	K	X	X1	R	ød	øD	B	C			
01	3-V-0001-20728/02	964524380000	ASTM A193 B7 CERTIFY	M16	2	70	70	10	–	4	6	0.6	16	23	24	27.7			0.14	
02	3-V-0002-20728/02	964524390000		M39	4	120	80	25	4	8	–	1.2	39	57.5	60	69.3			1.73	
03	3-V-0003-20728/02	964524400000		M14	2	120	30	10	2	4	–	0.6	14	20	21	24.2			0.11	
04	3-V-0004-20728/02	964526840000		M5	0.8	25	25	3.5	–	2	2	0.2	5	7	8.3	9.2			0.01	
05	3-V-0005-20728/02	964528590000		M30	3.5	80	45	19	4	7	–	1.0	30	44	46	53.1			0.57	
06	3-V-0006-20728/02	964529810000		M20	2.5	70	50	13	5	5	–	0.8	20	29	30	34.6			0.27	
07	3-V-0007-20728/02	964530600000		M6	1	16	16	4	–	2	3	0.25	6	9.8	10	11.5			0.01	
08	3-V-0008-20728/02	964531710000		M20	2.5	95	40	13	5	5	–	0.8	20	29	30	34.6			0.33	
09	3-V-0009-20728/03	964531720000		M24	3	85	50	15	6	6	–	0.8	24	34	36	41.6			0.40	
10	3-V-0010-20728/02	964605960000		M8	1.25	20	20	5.5	–	2.5	3.75	0.5	8	12.6	13	15.0			0.011	
11	3-V-0011-20728/02	964605970000		M8	1.25	25	25	5.5	–	2.5	3.75	0.5	8	12.6	13	15.0			0.012	
12	3-V-0012-20728/02	964532250000		M24	3	120	60	15	6	6	–	0.8	24	34	36	41.6			0.55	
13	3-V-0013-20728/02	964533230000		M36	4	100	60	23	4	8	–	2	36	53	55	63.5			1.30	
14	3-V-0014-20728/01	964534120000		M16	2	120	70	10	4	4	–	0.6	16	23	24	27.7			0.22	
15	3-V-0015-20728	964535410000		M16	2	20	20	10	–	4	6	0.6	16	23	24	27.7			0.04	
16	3-V-0016-20728	964650030000		M24	3	75	40	15	6	6	–	0.8	24	34	36	41.6			0.34	
17	3-V-0017-20728	964535780000		M20	2.5	110	60	13	5	5	–	0.8	20	29	30	34.6			0.38	
18	3-V-0018-20728	964535900000		M36	4	130	80	23	4	8	–	2	36	53	55	63.5			1.54	







IN CASE OF FULL THREAD

NOTES:

1. * PUNCH MATERIAL MARK B7 FOR A193 B7.
2. QUALITY REQUIREMENTS SHALL BE AS PER LATEST TDC.5:164

REV	DATE	ALTERED	VB
11	27.04.05	CHD & APPD	KRS & MRK
		SL. NO.18 INCLUDED.	

REV	DATE	ALTERED	VB
10	01.02.03	CHD & APPD	
		SL. NO.17 INCLUDED.	

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

RETRACED WITH REV.10 DATED 01.02.03

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.

	NAME	SIGN	DATE	NO.OF VAR.
DRN	V.BAIRAVAN		01.02.03	
CHD	K.RAJASEKARAN		01.02.03	
APPD	M.RAJAKUMAR		01.02.03	

DEPT VL
CODE 320

SCALE /

WEIGHT (KG). –

REFERENCE INFORMATIONS
PT-42
CAD REF.3V020728

NO. OF ITEMS

TITLE
BOLT

CARD CODE U 01

DRAWING NO. 3-V-0000-20728

REV 11

Size A3

TP-DG-3-V-0000-20728
CORPORATE DRG ID

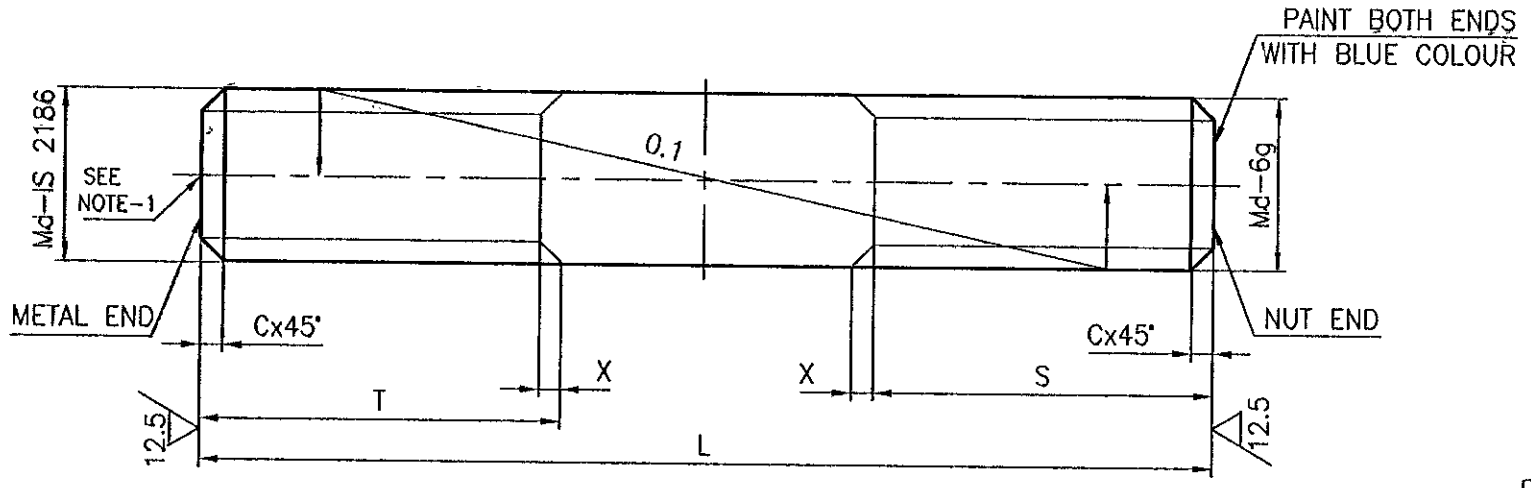
ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO.

SL NO	DRAWING NO	MATL SPECN	DIMENSIONS						WT IN Kg	COMP CODE	DESCRIPTION
			Md	L	T	S	X	C			
01	3-V-L841-22702	A 193 B7	M22	120	28	54	3.75	2.5	0.313	96 460 852 0000	M22x120x28x54
02	3-V-L857-22702	QT P. ATT.	M16	70	21	30	3	2	0.111	96 460 853 0000	M16x70x21x30
03	3-V-L897-22702		M36x3	200	44	59	4.5	3	1.478	96 460 854 0000	M36x3x200x59
04	3-V-L865-22702	A 193 B16	M16	70	21	30	3	2	0.110	96 460 855 0000	M16x70x30
05	3-V-L898-22702	QT	M16	75	21	30	3	2	0.118	96 460 856 0000	M16x75x30
06	3-V-L950-22702	P. ATT.	M24	130	32	43	4.5	3	0.603	96 460 857 0000	M24x130x32x43
07	3-V-L715-22702		M30X3	145	38	48	4.5	3	0.81	96 460 858 0000	M30x145x38x48

3.2 / 12.5

15&17



NOTES :-

01. PUNCH MATL MARK B7 FOR A193-B7 & B16 FOR A193-B16
02. QUALITY REQUIREMENTS SHALL BE AS PER APPLICABLE LATEST QUALITY PROCEDURE.
03. BLAKENING SHALL BE DONE AS PER APPLICABLE LATEST QUALITY PROCEDURE.

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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO. OF VAR.
DRN	M P S			
CHD	P R K		13/9/2000	
APPD	S C S		13/9/2000	

DEPT VL | CODE 320 | SCALE N.T.S | WEIGHT (KG). -- | REFERENCE INFORMATIONS | NO. OF ITEMS

TITLE: STUD | CARD CODE U 01 | DRAWING NO. 3-V-0000-22702 | REV 00

REV	DATE	ALTERED	REV	DATE	ALTERED
		CHD & APPD			CHD & APPD

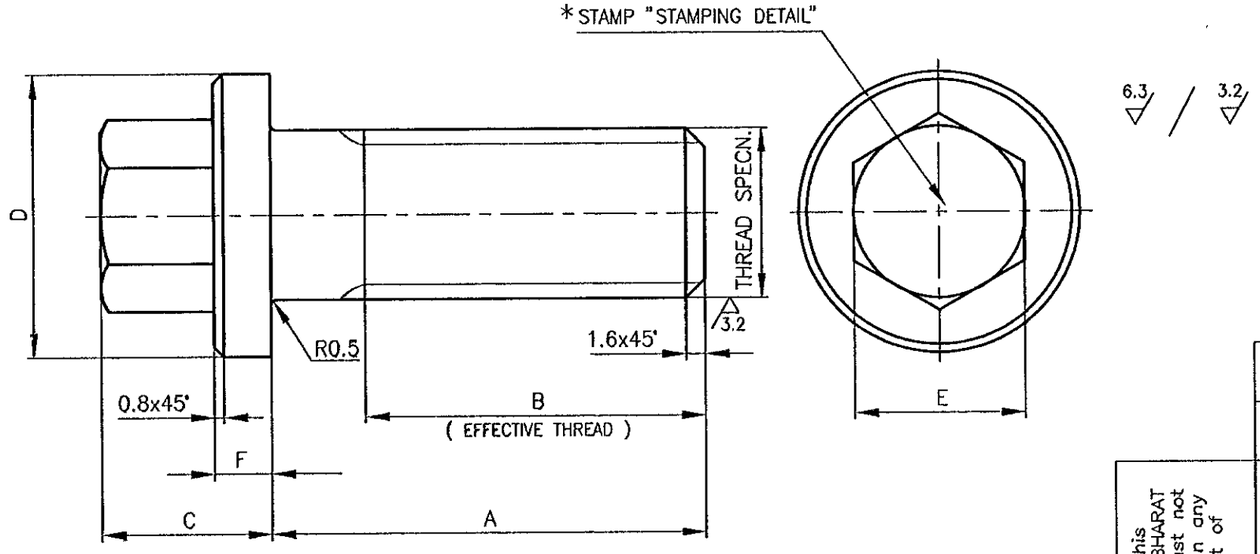
Size A3

CORPORATE DRG ID
TP-DG-3-V-0000-22702

ALL DIMENSIONS ARE IN MILLIMETRES. FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP / QP.

DRAWING NO. 3-V-0000-95923

SL. No.	DRAWING NUMBER	COMPONENT CODE	MATL. SPECN	THREAD SPECN	A	B	C	D		E		F		STAMPING DETAIL *	WT. (Kg.)
								MAX	MIN	MAX	MIN				
01	3-V-5933-95923/00	96 465 017 0000	SA 193 - B8M	0.375"-16 UNC-3A	23.8	19.8	9.5	16.66	16.31	9.60	9.40	3.2		B8M	0.004
02	3-V-5934-95923/00	96 465 018 0000	SA 193 - B8M	0.500"-13 UNC-3A	28.6	23.8	12.7	21.44	21.03	12.78	12.57	4.8		B8M	0.007
03	3-V-5937-95923/00	96 465 020 0000	SA 193 - B8M	0.5625"-12 UNC-3A	36.5	28.6	14.3	23.83	23.39	14.35	23.39	4.8		B8M	0.009
04	3-V-5949-95923/00	96 465 021 0000	SA 193 - B8M	0.375"-16 UNC-3A	27	22.2	9.5	14.28	13.97	9.6	13.97	3.2		B8M	0.003



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

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI-620014.
365-121

	NAME	SIGN	DATE	NO.OF VAR.
DRN	M.SRINIVASAN		28.02.2000	
CHD	P.BOOMINATHAN		07/03/2K	
APPD	K.SAKETHARAMAN		08/03/2K	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	REF. TABLE	CAD: F395923	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
HEX. HEAD BOLT	U 01	3-V-0000-95923	00

REV	DATE	ALTERED
		CHD & APPD

Size A3

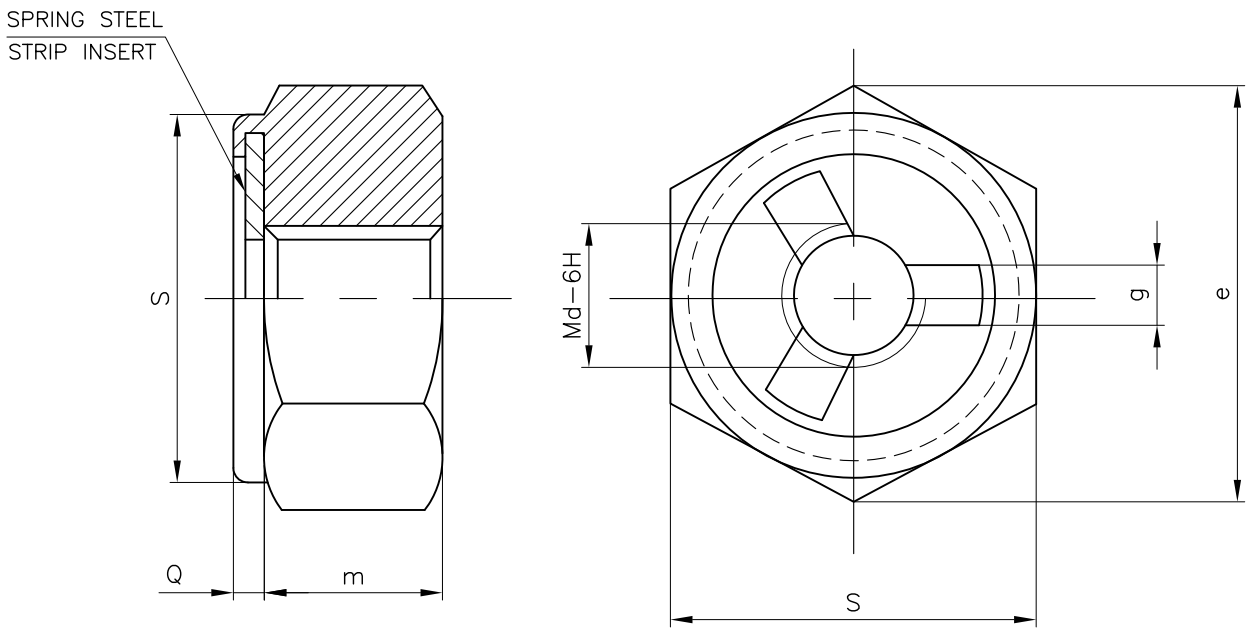
ALL DIMENSIONS ARE IN MILLIMETRES.

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

REV	DATE	ALTERED	JALAL
03	05.02.14	CHD & APPD	SAKETH

DRAWING REDRAWN IN ACAD
PLATING MATERIAL ZINC WAS CADMIUM

DCP No.:801694



NOTES:

1. VENDOR SHALL DESIGN AND SUPPLY THE NUT WITH SPRING INSERT IN SUCH A WAY THAT SPRING INSERT SHALL PREVENT UNSCREWING UNDER SCREWED AND TIGHTENING CONDITION.
2. MATERIAL: STEEL CONFORMING TO IS:1367– PROPERTY CLASS 6.
3. GRADE: PRECISION ACCORDING TO IS:1367
4. MANUFACTURING AND WORKMANSHIP: ACCORDING TO IS:1367.
5. FINISH: TO BE ZINC PLATED.

S.No.	DRAWING No.	MdXP	e (MIN)	S	m	Q	g	WT/100 No.	COMP. CODE
3	4–V–L709–20056/1	M36X4	63	55	28	8	12	30.2	964607010000
2	4–V–L804–20056/3	M30X3.5	53.1	46	23	7	10	21.2	964605230000
1	4–V–L803–20056/3	M24X3	41.6	36	16	8	8	10	964605220000

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

365-122

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

	NAME	SIGN	DATE	NO.OF VAR
DRN	JALAL		05.02.14	
CHD	JALAL		05.02.14	
APPD	SAKETH		05.02.14	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	--	———	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
SELF LOCKING HEX NUT	U 01	4–V–0000–20056	03

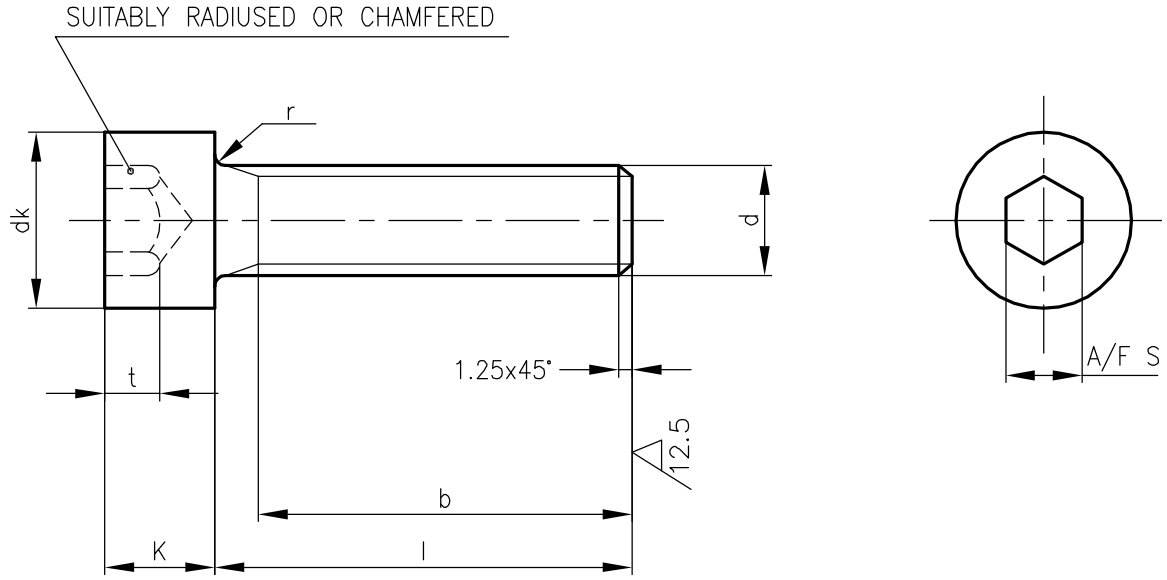
Size A4

ALL DIMENSIONS ARE IN MILLIMETRES.

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

REV	DATE	ALTERED:
		CHD & APPD:

6.3 / 12.5



TABULATION:–

VARIANT No.	COMPONENT CODE	NOMINAL SIZE (d)	l	APPROXIMATE WT. (KG) PER 1000 PIECES	SURFACE PROTECTION
007	964604740000	M 10	40	32.9	TO BE GALVANISED & BLUE PASSIVATED
006	964604730000	M 8	35	18.9	TO BE GALVANISED & BLUE PASSIVATED
005	964604710000	M 8	30	16.9	TO BE GALVANISED & BLUE PASSIVATED
004	964604700000	M 8	45	22.9	TO BE GALVANISED & BLUE PASSIVATED
003	964604690000	M 20	70	216	TO BE HOT DIP GALVANISED
002	964603450000	M 8	40	20.9	TO BE GALVANISED & BLUE PASSIVATED
001	964603400000	M 12	35	42.9	TO BE GALVANISED & BLUE PASSIVATED

NOTES:–

1. FOR OTHER DETAILS REFER IS:2269.
2. HARDNESS SHALL BE 25–34 HRC.
3. FOR TOLERANCE REFER IS:1367 (part 2),PRODUCT GRADE A
4. FOR THREAD DETAILS REFER IS:4218(part 3,5 &6)
5. FOR SAMPLING & ACCEPTABILITY REFER IS:2614

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
		REFER TABULATION	P8.8 CERTIFY	QUENCHED & TEMPERED		REFER TABULATION			

BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI 620014.
365–120

	NAME	SIGN	DATE	NO.OF VAR
DRN	CHITRANJAN	C.K.S	05.04.13	
CHD	M.C.K	M.C.K	05.04.13	
APPD	M.S.V	M.S.V	05.04.13	

DEPT		SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL		NTS	REFER TABULATION		
CODE 310					

TITLE	CARD CODE	DRAWING NO.	REV
HEX. SOCKET HEAD CAP SCREW	U 01	4–V–0000–25401	00

Size A4

ALL DIMENSIONS ARE IN MILLIMETRES.

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

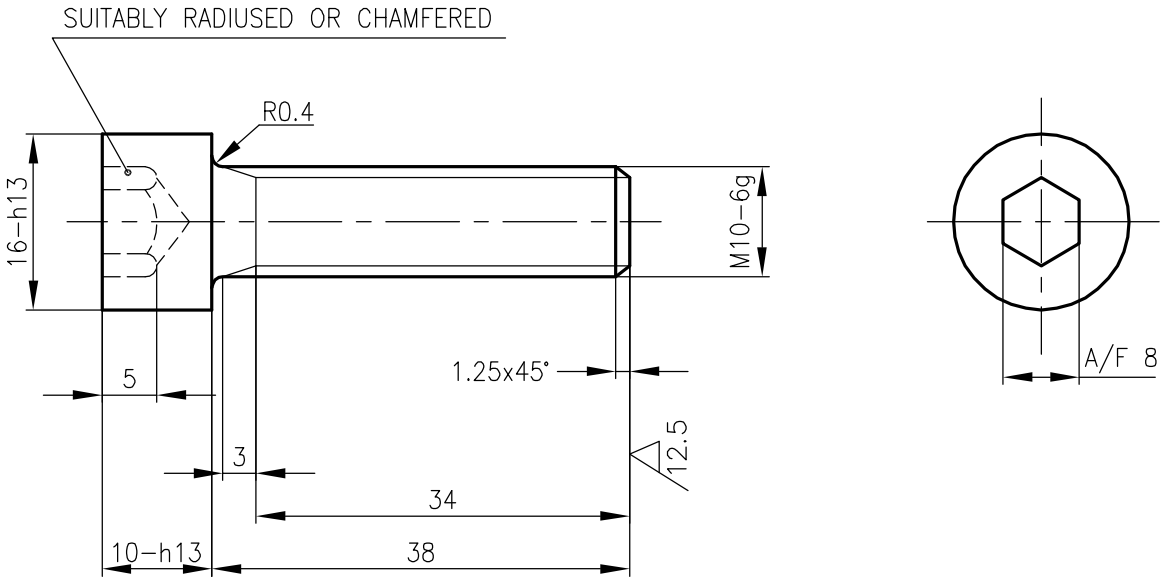
REV	DATE	ALTERED: K.J
02	21.01.13	CHD & APPD: MCK & MSV

SUB DELIVERY CODE INCLUDED

REFER DCN:801435.

6.3 / 12.5

16–h13	0.0
	–0.270
10–h13	0.0
	–0.220



NOTES:–

1. FOR OTHER DETAILS REFER BPS:41202 OR IS:2269.
2. HEAT TREATMENT : QUENCHED AND TEMPERED.
3. TO BE PHOSPHATED.
4. HARDNESS SHALL BE 25–34 HRC.

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
01	SUGGESTED SIZE ROD ø25x50		SA193–B7 CERTIFY			0.03	0.19		29

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

	NAME	SIGN	DATE	NO.OF VAR
DRN	N.RAJASEKAR	N.R	21.09.94	
CHD	P.LOGANATHAN	P.L	21.09.94	
APPD	P.LOGANATHAN	P.L	21.09.94	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	0.03	02 MATL. CODE 931035590000/964611870000	
CODE 310				

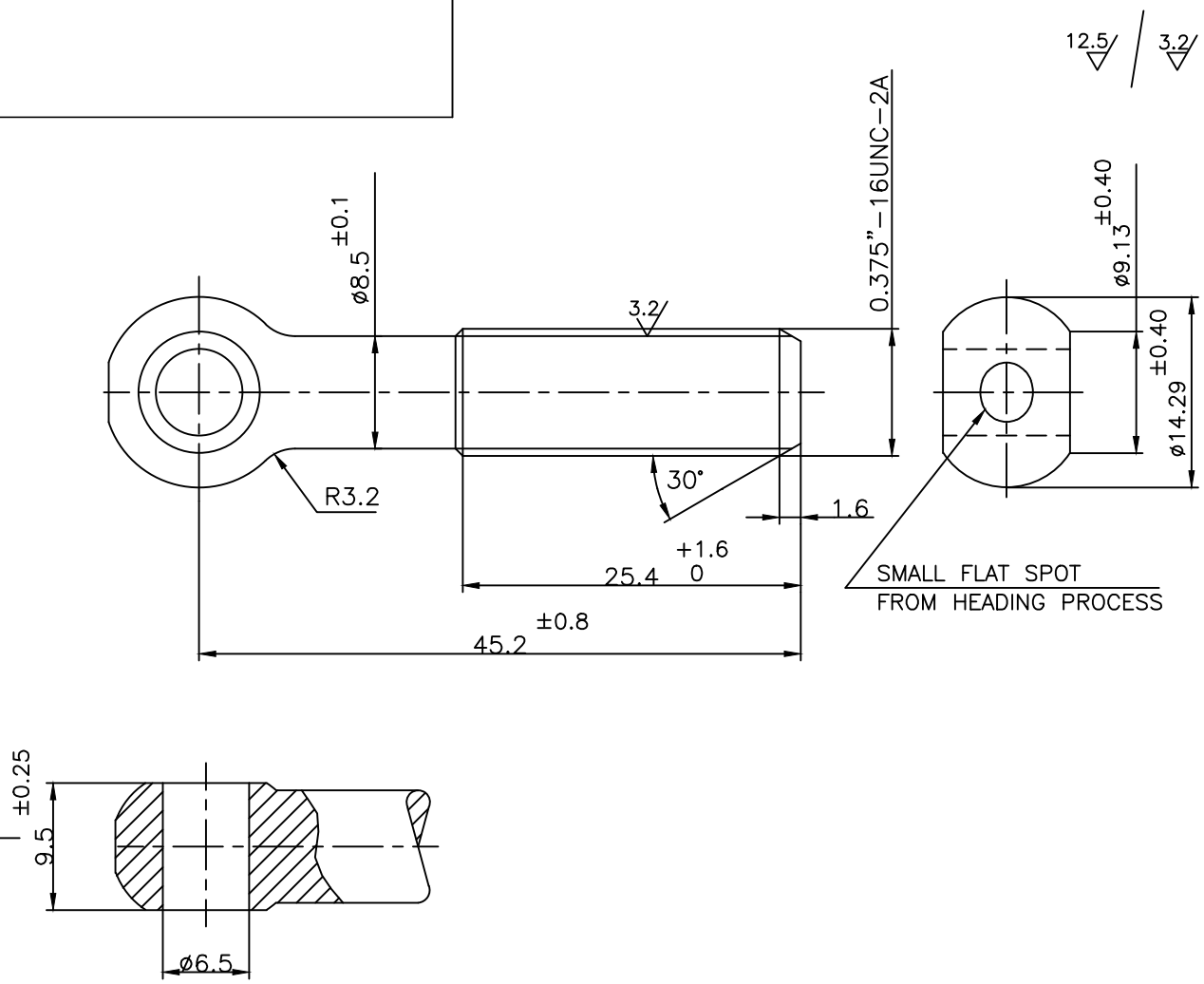
TITLE	CARD CODE	DRAWING NO.	REV
HSH CAP SCREW M10x40	U 01	4–V–0467–06601	02

Size A4

ALL DIMENSIONS ARE IN MILLIMETRES.

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

REV	DATE	ALTERED
		CHD & APPD



NOTE

01. HEAT TREAT AS PER APPLICABLE QUALITY PROCEDURE

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
01	–	96600047	A193B8MA	QT 27–34 HRc.	–	0.03	–	–	182

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

	NAME	SIGN	DATE	NO.OF VAR
DRN	MADHURAM.		07.10.17	
CHD	RANA PRATAP		07.10.17	
APPD	K.RAJASEKARAN		07.10.17	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	0.03	COMP CODE: 96600047000	
CODE 320			CAD : F426340	

TITLE	CARD CODE	DRAWING NO.	REV
EYE BOLT	U 01	4–V–HL91–27333	

Size A4

ALL DIMENSIONS ARE IN MILLIMETRES.

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

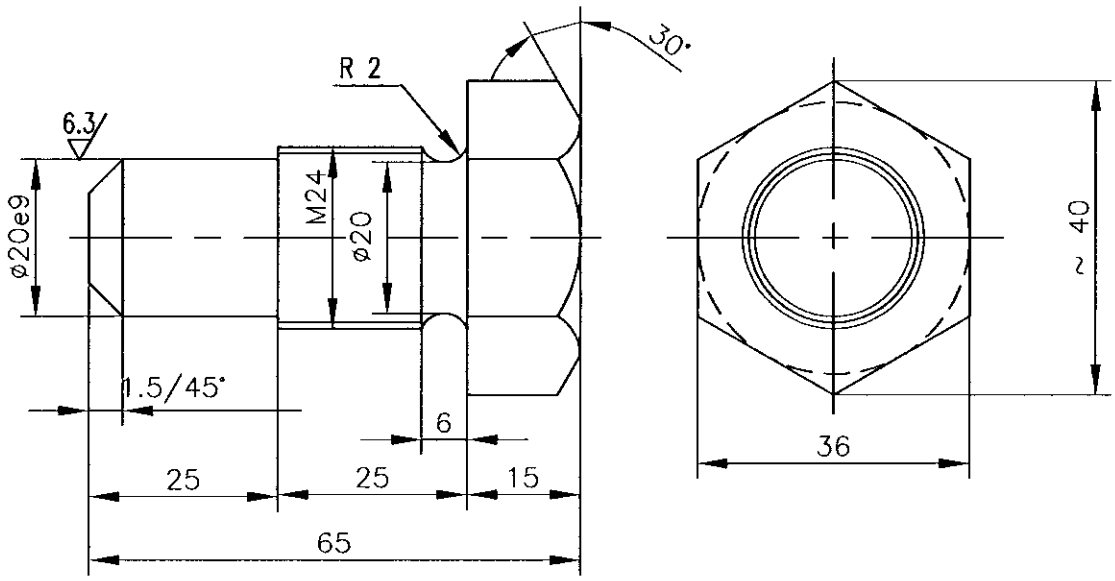
REV	DATE	ALTERED
06	11.06.01	CHD & APPD

DRG.UPDATED AND REDRAWN.

DCN: SB: 1298

12.5 / 6.3

$20\ e\ 9 = 20^{-0.04}_{-0.092}$



NOTES: –

1. FOR QUALITY REQUIREMENTS REFER APPLICABLE LATEST QUALITY PROCEDURE.
2. CADMIUM PLATING 0.005 TO 0.0125 MM.

COMPONENT CODE: 842000124800/963535190000

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
01	DIA 50	15 039 197	A 193 B7			0.23			01

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

	NAME	SIGN	DATE
DRN	V.ARUMUGAM		
CHD	K.SRIDHARAN		
APPD	S.NATARAJAN		

NO.OF VAR

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
SB	NTS	0.230	–	
CODE 330				

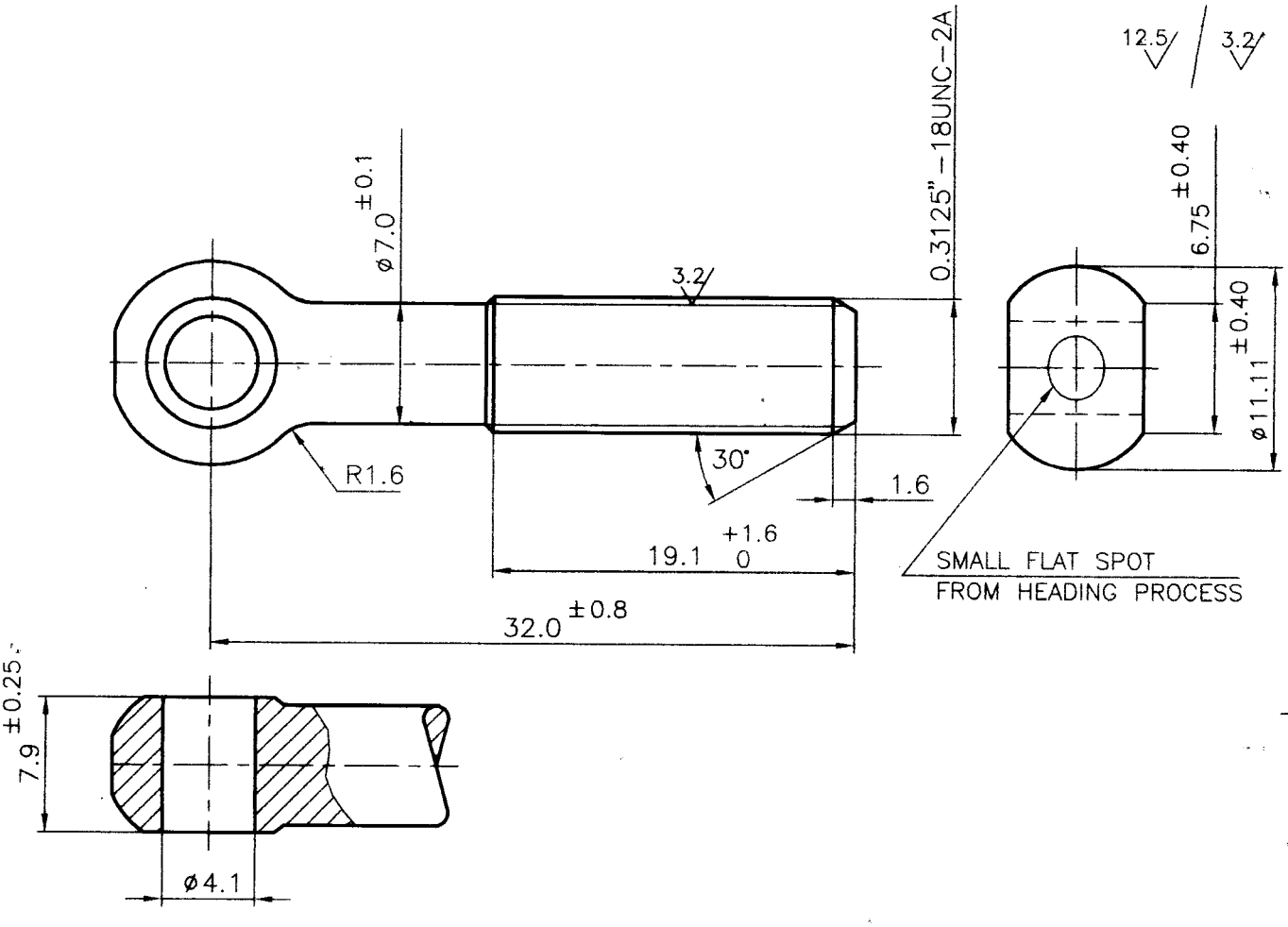
TITLE	CARD CODE	DRAWING NO.	REV
YOKE SWIVER	U 01	4–20–001–00007	06

Size A4

TP-DG-4-V-5903-26338
CORPORATE DRG ID

ALL DIMENSIONS ARE IN MILLIMETRES.
FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP/QP

REV	DATE	ALTERED
		CHD & APPD



NOTE

01. HEAT TREAT AS PER APPLICABLE QUALITY PROCEDURE

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No.
01	–	96465073	ASTM A276 TYPE 410	QT 27–34 HRc.	–	0.01	–	–	182

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

	NAME	SIGN	DATE	NO.OF VAR
DRN	M.SRINIVASAN		27.02.01	
CHD	P.BOOMINATHAN		27-02-01	
APPD	K.S.RAMAN		27/2/01	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	0.01	COMP CODE: 96465073 30000	
CODE 320			CAD FILE: 26338	

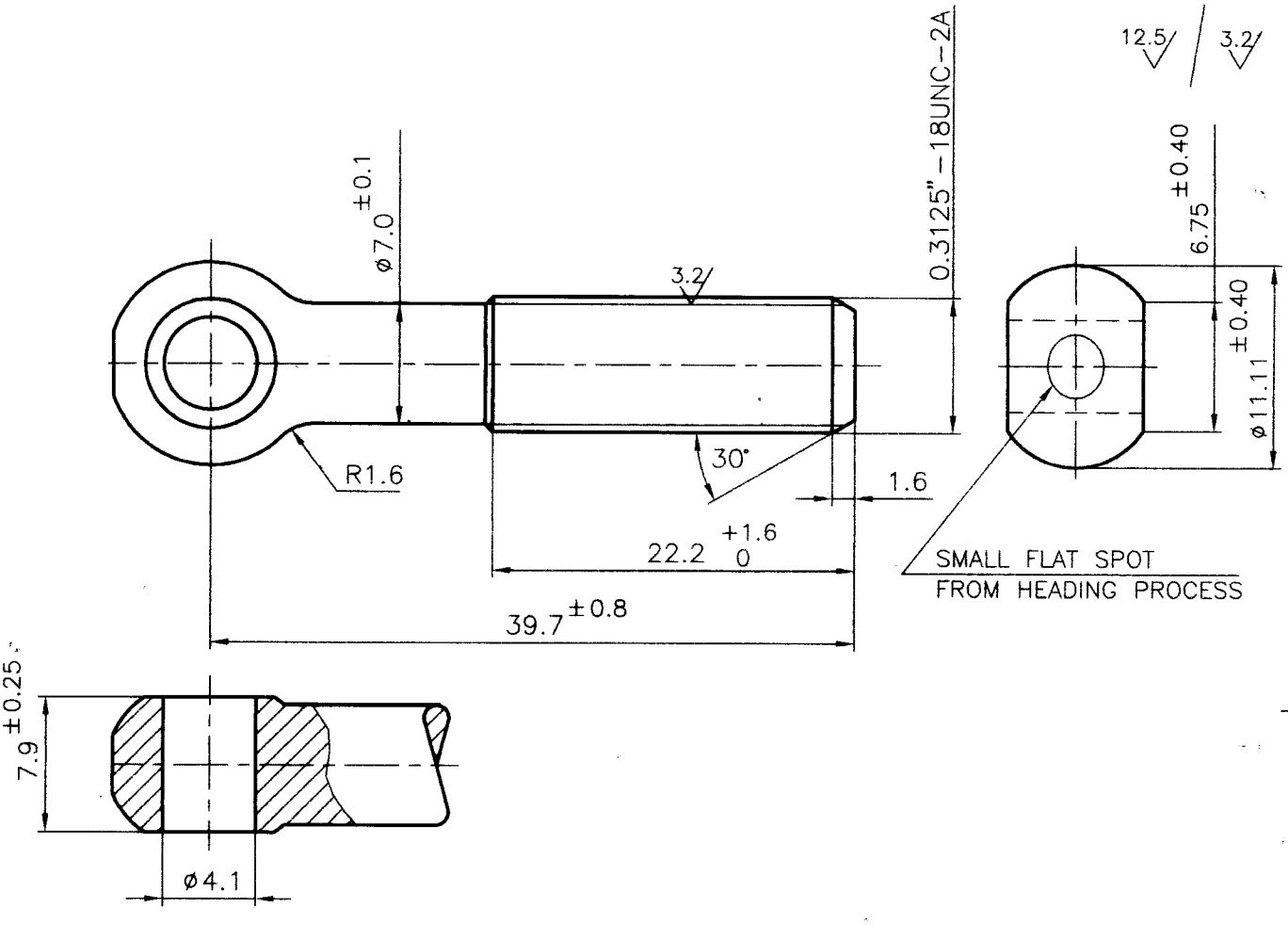
TITLE	CARD CODE	DRAWING NO.	REV
EYE BOLT	U 01	4–V–5903–26338	

TP-DG-4-V-5903-26338
CORPORATE DRG ID

TP-DG-4-V-5904-26339
CORPORATE DRG ID

ALL DIMENSIONS ARE IN MILLIMETRES.
FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER RELEVANT QCP/QP

REV	DATE	ALTERED
		CHD & APPD



NOTE

01. HEAT TREAT AS PER APPLICABLE QUALITY PROCEDURE

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
01	–	96465074	ASTM A276 TYPE 410	QT 27–34 HRc.	–	0.02	–	–	182

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

	NAME	SIGN	DATE	NO.OF VAR
DRN	M.SRINIVASAN	14.4	27.02.01	
CHD	P.BOOMINATHAN		27.02.01	
APPD	K.S.RAMAN		27/02/01	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	NTS	0.02	COMP CODE: 9041[illegible]40000	01
CODE 320			CAD : P-26339	

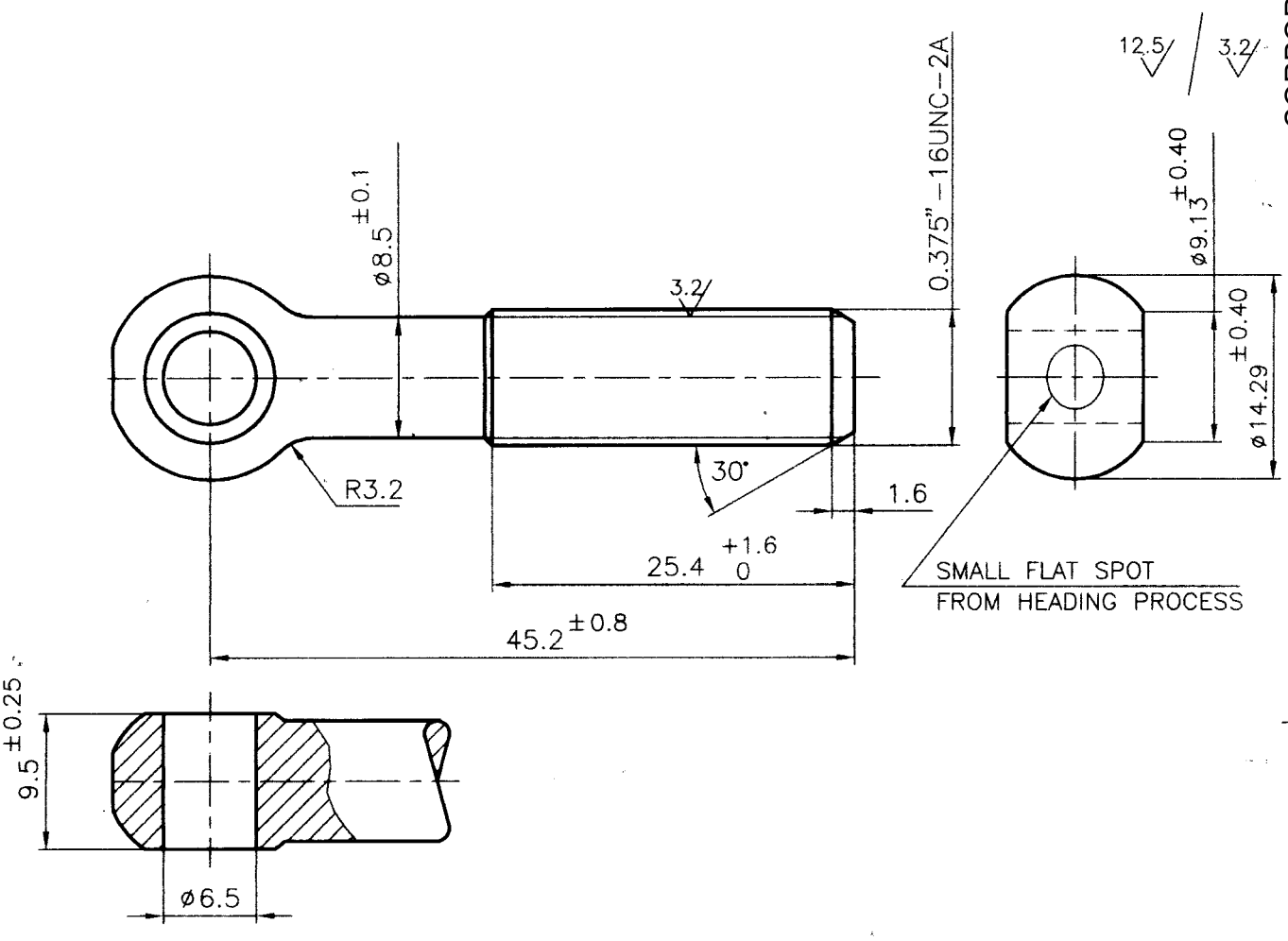
TITLE	CARD CODE	DRAWING NO.	REV
EYE BOLT	U 01	4-V-5904-26339	

CORPORATE DRG ID
TP-DG-4-V-5904-26339

ALL DIMENSIONS ARE IN MILLIMETRES.

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

REV	DATE	ALTERED
		CHD & APPD



NOTE

01. HEAT TREAT AS PER APPLICABLE QUALITY PROCEDURE

NO OFF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
01	–	96465075	ASTM A276 TYPE 410	QT 27–34 HRc.	–	0.03	–	–	182

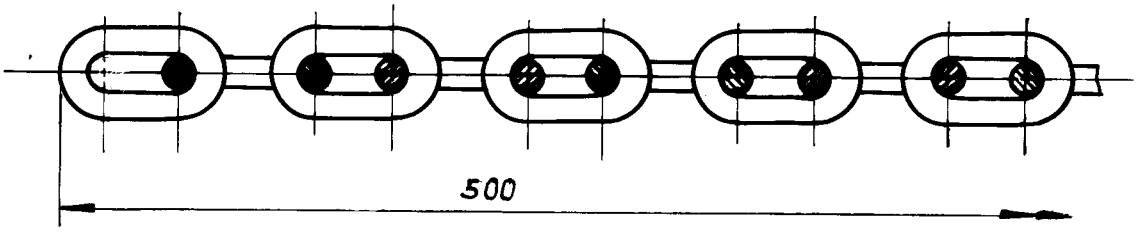
BHARAT HEAVY ELECTRICALS LTD.,
UNIT: HIGH PRESSURE BOILER PLANT.
TIRUCHIRAPALLI 620014.
365–122

	NAME	SIGN	DATE
DRN	M.SRINIVASAN		27.02.01
CHD	P.BOOMINATHAN		27.02.01
APPD	K.S.RAMAN		27/2/01

NO. OF VAR

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATION	NO. OF ITEMS
VL	NTS	0.03	COMP CODE: 96465075000	
CODE 320			CAD : F426340	

TITLE	CARD CODE	DRAWING NO.	REV
EYE BOLT	U 01	4–V–5907–26340	



NO. OF PIECES	NAME - DIMENSIONS	MATL. CODE	COMP. CODE	INITIAL MATERIAL	SCRAP SORT	NET wt (kg)	GROSS wt (kg)	DRAWING NO.	ITEM NO.
1	LINK CHAIN φ3X17X12 IS 2429 PART II / 706r.30	53 013 108	93 101 643 0000			0,05			

REMARKS

TOTAL NET Wt (kg)

SCALE			
N.T.S.	DRAWN	V. Bairavan.	TRANS. COPY NO.
	CHECKED	A.U.NATHAN	
	APPROVED		
	STDS. OFFICER		
	DATE	18-12-87	

ALTERATIONS	DATE	SIGNATURE	ALTERATION INDEX	

TYPE	GROUP	OLD DRG.	NEW DRG

TITLE: LINK CHAIN

DRAWING NO.: 4-V-MISC-90219 00

33-116

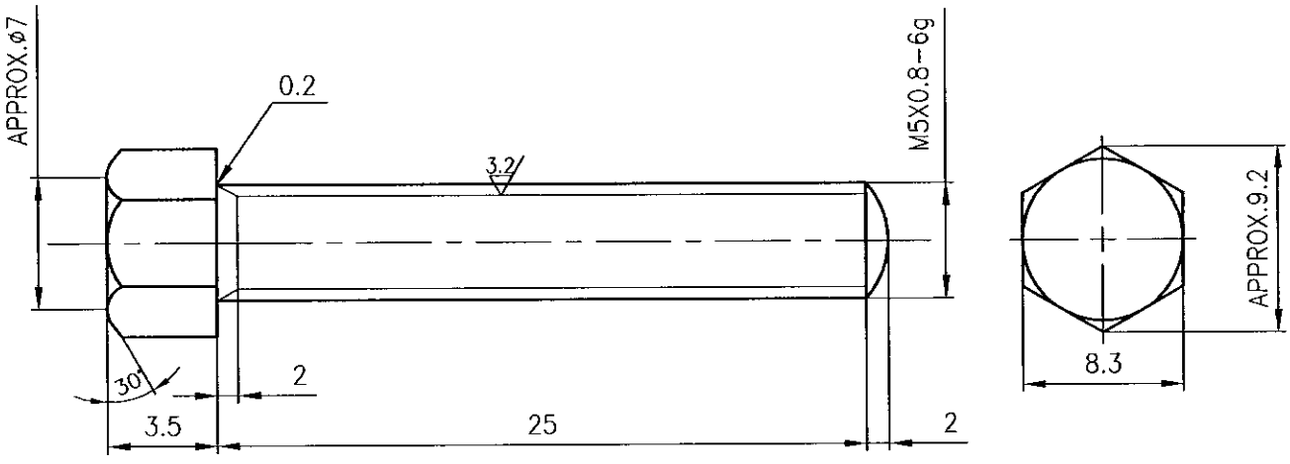
TP-DG-4-V-MISC-90219
CORPORATE DRG ID

ALL DIMENSIONS ARE IN MILLIMETRES.

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

REV	DATE	ALTERED
		CHD & APPD

12.5 / 3.2



NOTES:

1. QUALITY REQUIREMENTS SHALL BE AS PER LATEST TDC.5:164

COMP. CODE: 964535790000

NO OF	DESCRIPTION	MATL CODE	MATL SPECN	HEAT TREATMENT	SCRAP SORT	NET WT (kg)	GROSS WT (kg)	DRAWING No	ITEM No
			STEEL CL.8.8			0.01			

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

	NAME	SIGN	DATE	NO.OF VAR
DRN	V.BAIRAVAN		07.08.03	
CHD	K.RAJASEKARAN		07.08.03	
APPD	M.RAJAKUMAR		07.08.03	

DEPT	SCALE	WEIGHT (KG).	REFERENCE INFORMATIONS	NO. OF ITEMS
VL	N T S		CAD REF : T418902	
CODE 320				

TITLE	CARD CODE	DRAWING NO.	REV
BOLT	U 01	4-V-R001-18902	0

Size A4

STUDS – TYPE A

(AS PER IS: 1862 - 1975)

1.0 SCOPE: Covers the requirement of STUDS - TYPE A in the size range M3 to M39x3

2.0 SPECIFICATION AND REFERENCE STANDARDS

MATERIAL	STEEL
DIMENSION AND PREFERRED SIZES	FIG 1 & TABLE 1 OF THIS STANDARD
PREFERRED LENGTH, SIZE COMBINATION	TABLE 2 OF THIS STANDARD
THREAD	PITCH AS PER TABLE – 1,TOLERANCE 6g, STANDARD IS: 4218 PART - 3,5&6
MECHANICAL PROPERTIES	CLASS 6.6, AS PER IS:1367 PART-3
TOLERANCE	PRODUCT GRADE- A, AS PER IS:1367 PART-2
SAMPLING AND ACCEPTIBILITY	IS:2614
GENERAL REQUIREMENTS	STUDS SHALL COMPLY WITH IS: 1862 IN RESPECT OF REQUIREMENTS NOT COVERED IN THIS STANDARD.

2.1 Referred standards (Only current versions are applicable)

IS: 1862 Specification for Studs.
IS: 1367 Technical supply conditions for threaded steel fasteners.
IS: 2614 Methods for sampling of fasteners.
IS: 4218 ISO Metric screw threads.

3.0 Designation

A Grade A Stud to this standard of thread size M10 and nominal length 25 mm shall be designated as:

3.1 On Drawings

i) Material Specification column	IS: 1862 - A
ii) Description column	STUD A GR. A 6.6 M10x25
iii) Drawing number column	BPS 41101
iv) Material Code Column	41101 10025 00

3.2 Order Description

For placing indents, issuing enquiries and on purchase order, ordering description given below shall be followed.

Stud A M10x25, IS: 1862 – A 6.6

4.0 ADDITIONAL INFORMATION

4.1 Property class 5.6 or 6.8 may also be accepted on agreement between the purchaser and supplier.

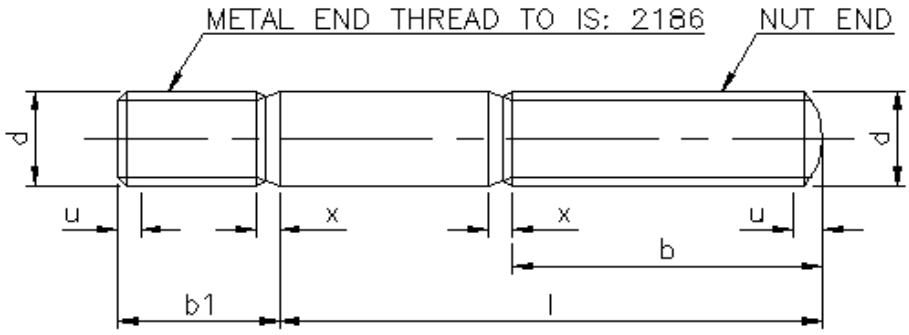
4.2 For Cadmium plated studs, refer BPS: 41141.

4.3 These studs are recommended for use in steel.

4.4 For studs for use in cast iron, refer BPS: 41102.

4.5 Studs with cut threads are also acceptable.

FIG. 1 DIMENSION FOR STUDS
(All dimensions are in millimeters)



u according to IS:1368 – Dimensions of ends of bolts and Screws

x according to IS:1369 – Dimensions of Screw thread runouts and undercuts

(Table 1. All dimensions are in millimeters)

Thread Size d (h13)	b^{+2p} *			b1 (js 16)		
	1≤125	125<1≤200	1>200	Nom	Max	Min
M3	12	-	-	3	3.3	2.7
M4	14	-	-	4	4.38	3.62
M5	16	-	-	5	5.38	4.62
M6	18	-	-	6	6.38	5.62
M8	22	-	-	8	8.45	7.55
M10	26	32	-	10	10.45	9.55
M12	30	36	-	12	12.55	11.45
M16	38	44	57	16	16.55	15.45
M20	46	52	65	20	20.65	19.35
M24	54	60	73	24	24.65	23.35
M30	66	72	85	30	30.65	29.35
M36x3	78	84	97	36	36.8	35.2
(M39x3)	84	90	103	39	39.8	38.2

Note:

1. Sizes in brackets are non-preferred.

* 2. P is pitch of thread.

Table 2 – Preferred length – size combinations for studs
(All dimensions are in millimeters)

Nominal Length'l'	M3	M4	M5	M6	M8	M10	M12	M16	M20	M24	M30	M36X3	(M39x3)
14													
16													
20													
25						17.8							
30													
35						24.2							
40							41						
45						29.4			133				
50								92.7					
55													
60								108		259			
65													
70													
75													
80									224				
85													
90													
100									271				
110													
120													
130													
140													
150													
160													
170													
180													
190													
200													
225													
250													
275													
300													

NOTE:

1. Preferred lengths are between the bold stepped lines.
2. Weights are given in kg per 1000 numbers only.
3. For stocked sizes refer BPS components booklet.
4. For studs with length above the stepped bold line, thread length b ~ 1 – (x+3)

STUD FOR TEMPERATURE USE

(For Temperature of Medium upto 425°C)

1.0 SCOPE:

Covers the requirements for Studs for use in temperature of medium upto 425°C in the size range M8 to M30.

2.0 SPECIFICATION AND REFERENCE STANDARDS:

Dimensions and preferred sizes			Table 1 of this standard
Preferred length size combination			Table 2 of this standard
Tolerance	Product Grade		A
	Indian Standard		IS:1367 (Part 2)
Thread	Pitch		Table 1 of this Standard
	Tolerance	Metal End	IS:2186
		Nut End	6 g to IS:4218 (Part-3, 5 & 6)
Material	ASTM A193 -B7 Certified in quenched and tempered condition		
Manufacture	Thread rolling process upto M 24		
Mechanical Properties	As specified in ASTM A 193-B7		
Marking	All studs shall be marked `B7` on any one side		
General Requirements	Studs shall comply with TDC:5:164 in respect of requirements not covered in this standard except for Cadmium plating		

2.1 Referred Standards (Only current versions are applicable)

IS: 1367 (Part-2) Technical supply conditions for threaded steel fasteners.

IS: 2186 Dimensions for external interference fit threads.

IS: 4218 ISO Metric screw threads.

ASTM A 193 Specification for alloy steel and stainless steel bolting material for high temperature service.

TDC:5:164 TDC for studs to ASTM A193 Gr B7 and ASTM A193 Gr B16.

3.0 DESIGNATION:

A Grade A Stud to this standard of thread size M12 and nominal length 75 mm shall be designated as:

3.1 On Drawings:

i) Material Specification column: A 193-B7
ii) Description Column : STUD Gr A T425 M12X75
iii) Drawing Number Column : BPS 41115
iv) Material Code Column : 4111512075

3.2 Ordering Description:

For placing indents, issuing enquiries and on purchase order, the Ordering Description given below shall be followed.

Stud M12x75 BPS:41115-A-ASTM-A193-B7

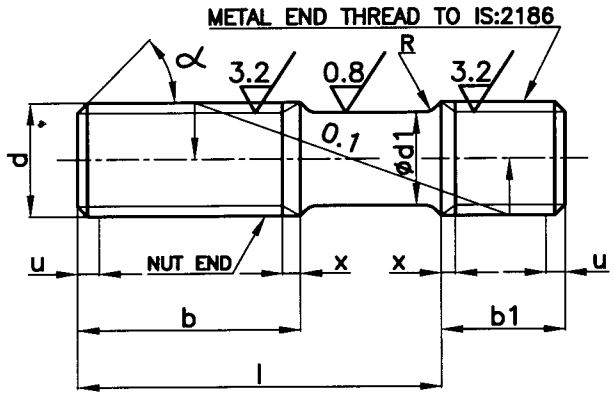
4.0 ADDITIONAL INFORMATION:

4.1 Copies of the following Standards shall be enclosed along with Purchase Order.

1. TDC:5:164
2. BPS:41115

TABLE 1 – DIMENSIONS AND PREFERRED LENGTH – SIZE COMBINATION FOR STUDS.

12.5 (3.2 , 0.8)



R = 2 X PITCH

ød1 = PITCH DIA

u ACCORDING TO IS:1368

x ACCORDING TO IS:1369 (PART–1)

THREAD SIZE d	ød1	α	b1	b	
				*	**
M8	7.188	30°	8	19	22
M10	9.026	30°	10	20	25
M12	10.863	30°	12	25	35
M16	14.701	30°	16	30	42
M20	18.376	30°	20	35	50
M24	22.051	30°	24	40	54
(M27)	25.051	45°	27	46	60
M30	27.727	45°	30	50	64

NOTE:–

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. PREFERRED LENGTHS ARE BETWEEN STEPPED BOLD LINES.
3. WEIGHTS ARE GIVEN IN KG/1000 NUMBERS.
4. FOR STOCKED SIZES REFER BPS COMPONENTS BOOKLET.
5. FOR TOLERANCES FOR UNTOLERANCED DIMENSIONS REFER TP 023 0299.

TABLE–2

NOMINAL LENGTH (l)																		
30	35	40	45	50	55	60	65	70	75	80	85	95	100	120	130	140	150	160
														WEIGHTS				
25.6																		
	41.8	46.2																
	80.5	88.4	96.4		112.1							175.3						
			155.6	172.9	185.3	197.6				247								
					303.2	323.4								554.4				708.4
						420.2		468.5		516.8								
									580									

* FOR SIZES LEFT SIDE OF THE STEPPED BROKEN LINE.

** FOR SIZES RIGHT SIDE OF THE STEPPED BROKEN LINE

IF NOMINAL LENGTH 'l' IS LESS THAN THREAD LENGTH 'b', THEN 'b' IS RECKONED AS b ≈ l–(x+3)

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PLANT STANDARD

HPBP TIRUCHIRAPPALLI

BPS 41115

Rev. No. 02

PAGE 3 OF 3

STUD BOLTS FOR TEMPERATURE USE

(For medium of Temperature upto 425°C)

1.0 SCOPE

Covers the requirements for Stud Bolts for use in medium of temperature 425°C in the size range M12 to M39x3.

2.0 SPECIFICATION AND REFERENCE STANDARDS

Dimensions and preferred sizes	Fig 1 & Table 1 of this standard	
Preferred length size combination	Table 1 of this standard	
Tolerance	Product grade	A
	Indian Standard	IS: 1367 (Part 2)
Thread	Pitch	Table 1 of this standard
	Tolerance	6g
	Indian Standard	IS 4218 (Part 3, 5 & 6)
Material	Steel according to ASTM A193 - B7 Certified in quenched and tempered condition	
Manufacture	Thread rolling up to M24	
Mechanical Properties	As specified in ASTM A193-B7	
Marking	All studs shall be stamped B7 on any one side	
General requirements	Studs shall comply with TDC:5:164 in respect of requirements not covered in this standard except for cadmium plating.	

2.1 Referred standards (Only current versions are applicable)

IS 1367 Part 2	Technical supply conditions for threaded steel fasteners
IS 1368	Dimensions for ends of parts with external ISO metric threads
IS 4218 Part 3,5 & 6	ISO metric screw threads
ASTM A193	Specification for alloy steel and stainless steel bolting material for high temperature service
TDC:5:164	TDC for alloy steel studs to specification ASTM SA193 Gr B7 / B7m / B16 oil field equipment

3.0 DESIGNATION

A Grade 'A' Stud to this standard of thread size M16 and nominal length 90mm shall be designated as:

3.1 On Drawings

i) Material Specification column	A193 - B7
ii) Description Column	STUD BOLT GR A T425 M16x90
iii) Drawing Number Column	BPS 41117
iv) Material Code column:	4111716090

3.2 Ordering Description

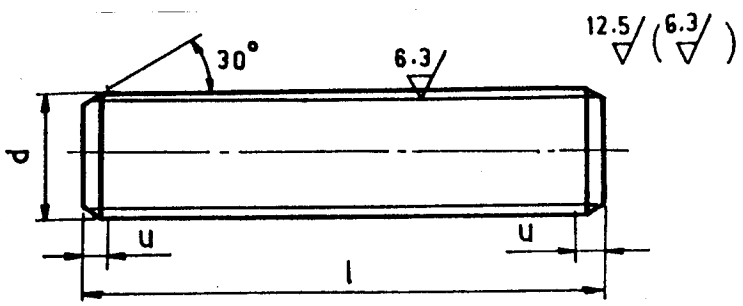
For placing indents, issuing enquiries and on purchase order, Ordering Description given below shall be followed.

Stud M16x90 - BPS: 41117 A - ASTM A193-B7

4.0 ADDITIONAL INFORMATION

4.1 Copies of this standard and TDC:5:164 shall be enclosed along with the purchase order

FIG. 1, DIMENSIONS FOR STUD BOLTS
(All dimensions are in millimetres)



'**u**' according to IS:1368

TABLE 1 PREFERRED LENGTH - SIZE COMBINATION FOR STUD BOLTS
(All dimensions are in millimetres)

Thread Size d	Nominal Length (l)																	
	60	70	80	90	100	110	120	130	140	150	160	170	180	200	225	240	250	280
	Weights																	
M12		62	70.9															
M16				135.9	151.7		183.3										357.1	
M20				221.9			280.9		303									
M24							390.4			496.9			603.4					
(M27)									591.4				770.8					
M30									722.9		832.4							
(M33)													1208.6					
(M39x3)														1875.7				

Note:

1. Preferred lengths are in between the stepped bold lines
2. Weights are given in Kg per 1000 numbers only
3. Sizes in brackets are non-preferred

Based on IS: 2016

MACHINED WASHERS

1.0 SCOPE:

Covers the requirements for machined washers in the size range 1.7 to 155mm.

2.0 SPECIFICATION AND REFERENCES STANDARDS

Dimensions and tolerances	Table 1 of this standard	
Material	Suitable Steel	
Finish	Natural finish	
Sampling and Acceptability	Indian standard	IS: 6821 & IS: 5369
General requirements	Washers shall comply with IS: 2016 in respect of requirements not covered in this standards	

2.1 Referred standards (only the current versions are applicable).

IS: 2016 Specification for Plain washers

IS: 5369 General requirements for plain washers and lock washers

IS: 6821 Methods for sampling non–threaded fasteners

3.0 DESIGNATION

A machined washers to this standard for bolt/screw size M10 shall be designated as:

3.1 On Drawings

1) Material Specification column : IS: 2016
2) Description Column : WASHER MCD 10
3) Drawing Number column : 4140610000
4) Material code Column : 4140600010

3.2 Ordering Description

For placing indents, issuing enquiries and on Purchase order, the Ordering Description given below shall be followed:

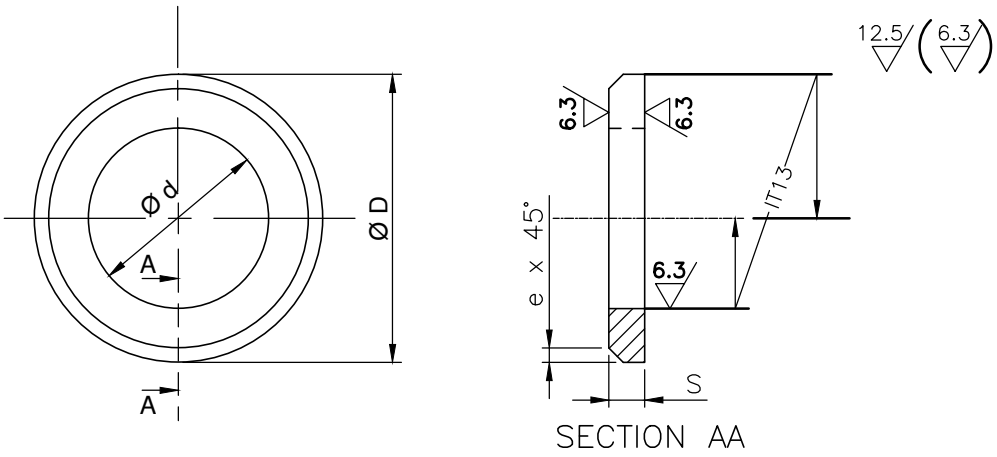
Machined Washer 10. 5* IS: 2016 – steel

4.0 ADDITIONAL INFORMATION

4.1 These washers can be used for product grades A and B of general purpose bolts and screws.

*4.2 While preparing ordering Description only the actual hole size (corresponding to bolt/screw size) shall be filled in referring to Table.

TABLE 1– DIMENSION FOR MACHINED WASHERS



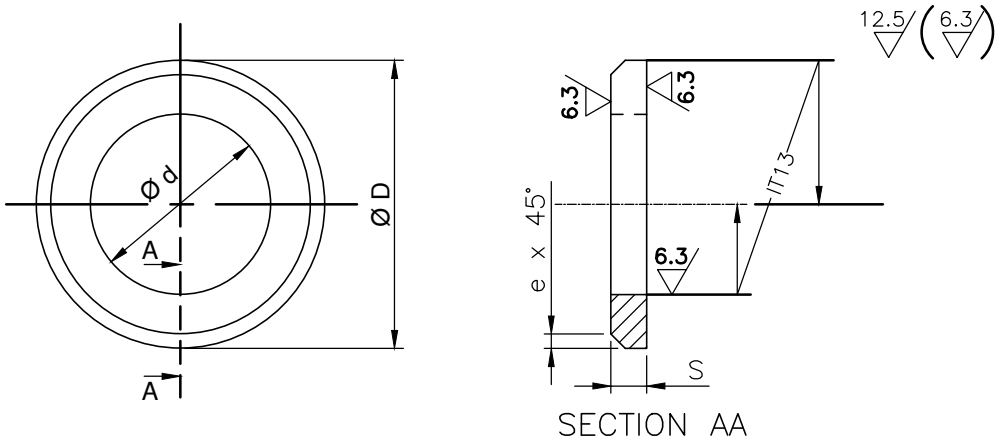
(All dimension are in millimeters)

d H12	D		S		e	For bolt/	weight
	Basic	Tol	Basic	Tol	Nom	screw size	
1.7	4	$^{0}_{-0.3}$	0.3	±0.1	0.1	M1.6	
2.2	5	$^{0}_{-0.3}$	0.3	±0.1	0.1	M2	
3.2	7	$^{0}_{-0.3}$	0.5	±0.1	0.2	M3	
4.3	9	$^{0}_{-0.3}$	0.8	±0.1	0.3	M4	0.3
5.3	10	$^{0}_{-0.3}$	1.0	±0.1	0.4	M5	
6.4	12.5	$^{0}_{-0.4}$	1.6	±0.2	0.6	M6	1.1
8.4	17	$^{0}_{-0.4}$	1.6	±0.2	0.6	M8	
10.5	21	$^{0}_{-0.5}$	2	±0.2	0.6	M10	4
13	24	$^{0}_{-0.5}$	2.5	±0.3	0.6	M12	6.2
17	30	$^{0}_{-0.5}$	3	±0.3	0.6	M16	11.1
21	37	$^{0}_{-0.8}$	3	±0.3	1.0	M20	16.7
25	44	$^{0}_{-0.8}$	4	±0.3	1.0	M24	31.7
(28)	50	$^{0}_{-0.8}$	4	±0.3	1.0	(M27)	41.7
31	56	$^{0}_{-1.0}$	4	±0.3	1.0	M30	52.9
(34)	60	$^{0}_{-1.0}$	5	±0.6	1.0	(M33)	

NOTE;

1. Sizes in brackets are non–preferred.
2. Weights are given in kg per 1000 numbers only.
3. For stocked sizes refer BPS components booklet.

TABLE 1– DIMENSION FOR MACHINED WASHERS (Contd.)



SECTION AA

(All dimension are in millimeters)

d H12	D		S		e	For bolt/	weight
	Basic	Tol	Basic	Tol	Nom	screw size	
37	66	$^{0}_{-1.0}$	5	±0.6	1.6	M36	89.9
(40)	72	$^{0}_{-1.0}$	6	±0.6	1.6	(M39)	
43	78	$^{0}_{-1.0}$	7	±1.0	1.6	M42	180
(46)	85	$^{0}_{-1.5}$	7	±1.0	1.6	(M45)	243
50	92	$^{0}_{-1.5}$	8	±1.0	1.6	M48	291
(54)	98	$^{0}_{-1.5}$	8	±1.0	1.6	(M52)	
58	105	$^{0}_{-1.5}$	9	±1.0	1.6	M56	
(62)	110	$^{0}_{-1.5}$	9	±1.0	2.0	(M60)	
66	115	$^{0}_{-1.5}$	9	±1.0	2.0	M64	486.5
74	125	$^{0}_{-1.8}$	10	±1.0	2.0	M72	
82	140	$^{0}_{-1.8}$	12	±1.2	2.5	M80	
93	160	$^{0}_{-1.8}$	12	±1.2	3.0	M90	
104	175	$^{0}_{-1.8}$	14	±1.2	3.0	M100	
(124)	210	$^{0}_{-2}$	16	±1.2	3.0	(M120)	
(155)	250	$^{0}_{-2}$	18	±1.2	4.0	(M150)	

NOTE;

1. Sizes in brackets are non–preferred.
2. Weights given are in kg per 1000 numbers only.
3. For stocked sizes refer BPS components booklet.

Revision Record: 00: 17.01.90: First issue. Rev: 01:21.06.90 Editorial corrections. Rev 02:21.04.91 TC for studs/bolts added. Rev 03: 04.04.96: Annexure I amended. Cl 3.3.3 & 5.3 modified. Rev 04:20.10.96: NDT, Acid pickling added & re-written. Rev 05: 28.04.98: Cl 3 modified to include MPI, certificate modified & Cl 7.4 deleted. Rev 06:15.06.99: Title, Cl 1 to 5 & 7.1 modified. Cl 7.2 changed to Cl 7.3. Cl 7.3 changed to 7.4 and modified. Cl 7.2 Galvanizing added. Test certificate sample format modified.
Rev 07: 15/06/2017: TDC: 5:166 for CS & AS Nuts has been merged with this TDC. Totally revised in line with changed requirements and Xylan coating requirements added.
Rev 08: 14/09/2019: Cl 1.0, 2.0, 3.0, 4.0, 5.0 modified in line with API 6A 21st Ed 2018 Errata 1 and for better clarity.
Rev.09: 19/02/2021: Latest version of the referred Standards/Specifications indicated thoughtout TDC; Cl.2.0 iid added; Cl.4.1 added; Annexure-1 modified;

1.0 MATERIAL SPECIFICATIONS:

All the codes, standards, specifications, drawings & procedures, etc., referred in this TDC shall be of latest revision as on the date of Purchase Order, unless specified otherwise.

Studs/Bolts - Alloy Steel	:	ASME SA 193-*19* /ASTM A 193-*20* Gr B7, B7M & B16.
Nuts - Carbon Steel	:	ASME SA 194-*19* /ASTM A 194-*20A* Gr 2H & 2HM
Alloy Steel	:	ASME SA 194-*19* /ASTM A 194-*20A* Gr 4 & 7
Additional Requirements	:	As listed below (Supplementary to the above material specifications)
Size and Quantity	:	As per Purchase Order (PO) & Applicable Drawing

2.0 GENERAL REQUIREMENTS:

i. This TDC is applicable for Valves, OFE (API 6A 21st Ed 2018 Errata 3 Addendum 1 & API 16C 2nd Ed 2015 Addendum 1 Errata 4) and other applications including NACE MR0175 / ISO 15156:2015 Parts 1, 2 & 3. The products shall be manufactured to the relevant requirements specified in the applicable drawings, specifications, PO & this TDC.

ii. Studs / Bolts / Nuts used for OFE application:

a. Studs / Bolts / Nuts shall be qualified and manufactured in accordance with BSL 1 of API 20E. The qualification & requalification records as per API 20E *Ed 2017 Addendum 2* shall be maintained by the Supplier. The supplier shall prepare Manufacturing Process Specification(MPS) to include as a minimum allowable levels for all Studs/Bolts/Nuts manufacturing parameters including process control variables and heat treatment parameters as per API 20E *Ed 2017 Addendum 2* and this TDC.

b. Raw material shall be fully wrought. Reduction ratio based on starting material diameter shall be a minimum of 4:1. The steel shall conform to the respective material specifications. Intentional addition of Boron is not allowed. All elements intentionally added to the heat shall be reported in the Test Certificate.

c. Furnace calibration shall be in accordance with API 6A *21st Ed 2018* Annex M; SAE AMS 2750 *Rev.F*; or SAE AMS H6875 *Rev.C*. For induction or direct resistant heat treatment, calibration shall be in accordance with manufacturer's written procedure. For forging furnaces, calibration shall be in accordance with manufacturer's written procedure

d. *Heat lot:*
- *Batch furnace: bolting or raw material of a single heat and diameter, heat treated together as a single austenitizing, quenching, tempering, and stress-relieving charge.*
- *Continuous furnace: bolting or raw material of a single heat and diameter heat treated without interruption in a continuous charge*

iii. Nuts shall be hot/cold forged or manufactured from hot rolled/cold drawn bars. If made from

hexagonal bars, 100% MT is to be done on bars as per ASTM E709-*15* to ensure freedom from surface/sub-surface defects.

iv. Hot rolled & cold drawn bars, if used (for studs/bolts or nuts), shall be machined at least 2 mm (minimum) in radius (i.e. 4 mm in diameter) to remove the seams completely. After machining, at least 10% of the bars shall be tested by MPI as per ASTM E709-*15* to ensure freedom from surface/sub-surface defects.

v. Heat treatment of finished studs/bolts shall be carried as per the material specification requirements for corresponding grades. For heat treatment of finished components, salt bath or controlled atmosphere furnace shall be used. After heat treatment, the threads shall be thoroughly cleaned to remove all deposits. If acid pickling is done for cleaning, it shall be as per Cl. 6 (v) of this TDC.

vi. Cadmium Plating (Cl 6 (i) of this TDC), Electroplating (Cl 6 (ii) of this TDC) and/or Xylan Coating (Cl 6 (iii) of this TDC) shall be done on the fasteners if specified in Drawing/PO. For all other cases, rust preventive coating (Cl 6 (iv) of this TDC) shall be done.

3.0 CHEMICAL, MECHANICAL PROPERTIES & NDE:

i. Mill certificate from steel manufacturer for conformance to chemistry heat-wise shall be submitted. Additionally, product analysis shall be done on one sample/heat by the stud/bolt/nut manufacturer. Methods and practices for chemical analysis shall be in accordance with ASTM A 751-*20*.

ii. The microstructure and macrostructure shall conform to the requirements of the respective material specifications.

iii. **Tensile Testing for Studs/Bolts:** One tensile test/heat/size/ HT batch shall be carried out in the finished heat treated condition as per SA / A 193 and shall meet the material specification requirements for corresponding grades.

iv. Hardness Testing for Studs/Bolts:

Hardness testing, including specimen preparation, shall be performed in accordance with ASTM A 370-*20* including Annex A3, except that testing shall also be in conformance with ASTM E10-*18* or ASTM E18-*20*.

a) **For ASME SA 193-*19* / ASTM A 193-*20* Gr B7 & B16:** Hardness check shall be carried out on finished stud/ bolt as per ASME SA 193-*19* / ASTM A 193-*20*, at least on 10% of the finished studs/bolts.
Gr B7: Hardness: 25 to 34 HRC or 253 to 319 HBW.
Gr B16: Hardness: 25 to 35 HRC or 253 to 321 HBW.

b) **For ASME SA 193-*19* / ASTM A 193-*20* Gr B7M:**
Hardness check on 100% of studs/bolts as per SA193.
Gr B7M: Hardness: 94 to 99 HRB or 201 to 235 HBW.

v. Mechanical Testing for Nuts:

a) **For ASME SA 194-*19* / ASTM A 194-*20A* Gr 2H, Gr 4, & Gr 7:**
Hardness check on finished nuts shall be as per ASME SA 194-*19* / ASTM A 194-*20A* (including quantum of testing).
Gr 4: Hardness: 24 to 35 HRC or 248 to 327 HBW.
Gr 2H & Gr 7: Hardness: 24 to 34 HRC or 248 to 319 HBW.

b) **For ASME SA 194-*19* / ASTM A 194-*20A* Gr 2HM:**
Hardness check on 100% of finished nuts shall be carried out as per ASME SA 194-*19* /

ASTM A 194-*20A*.
Gr 2HM: Hardness: 159 to 235 HBW.

c) **Proof load test shall be done as per ASME SA 194-*19* / ASTM A 194-*20A* for all grades of nuts** and shall meet the requirements of corresponding grades of the material specification.

d) After final heat treatment, sample nuts shall be heat treated as per Table 1 and meet the corresponding hardness requirements.

Table 1.

Grade	Temperature (°C)	Soaking Time (Hr)	Cooling	Minimum Hardness (HBW) at room temperature
2H	540	24	Slow Cool	179
2HM	540	24	Slow Cool	159
4, 7	590	24	Slow Cool	201

e) **Cone Stripping Test:** This test shall be performed as per ASME SA 194-*19* / ASTM A 194-*20A* in case of visible surface discontinuities. On such cases Proof load shall be as per ASME SA 194-*19* / ASTM A 194-*20A*.

vi. **NDE:**
Magnetic particle inspection shall be carried out as per ASTM E709-*15* in at least 10% of the finished studs/bolts of all grades. Cracks, linear indications (length ≥ 3 times its width) are unacceptable.

4.0 SAMPLING INSPECTION:

All inspection shall be in accordance with relevant drawing or BPS (Boiler Plant Standard), PO, this TDC and ASME SA 193-*19* / ASTM A 193-*20* for studs/bolts and ASME SA 194-*20* / ASTM A 194-*20A* for nuts. The threads shall be checked with calibrated ring gauges for studs/bolts & plug gauges for nuts in the final heat treated condition for black variety and *prior to* final plated/coated condition for the cadmium plated/electroplated/ xylan coated items.

Visual, dimensional checks and their acceptance shall be as per applicable drawing and ASME SA 193-*19* / ASTM A 193-*20* for studs/bolts & ASME SA 194-*20* / ASTM A 194-*20A* for nuts.

4.1 *Gauging Requirements for Xylan along with Zinc Coated Fasteners*

i. Studs
- *a. No under sizing is allowed*
- *b. Prior to Xylan and Zinc Coating, Class 2A Gauge to be used for inspection*
- *c. After coating, No Gauge inspection is required*

ii. Nut
- *a. Under sizing is allowed to maximum of 0.2mm in the internal diameter of threads*
- *b. Prior to under sizing, Class 2B Gauge to be used for inspection*
- *c. After under sizing, a gauge having an allowance as per Class 2B along with 0.2mm under sizing allowance to be made and inspected thereof*

iii. Assembly of Stud and Nut
- *a. Free run of nut over stud to be ensured*
- *b. No play is allowed*
- *c. After free run of nut over stud, Xylan coating should not get peeled off.*

5.0 MARKING & PACKING:

i. Punch/emboss each finished component with applicable material grade (B7/ B7M/ B16 for studs/bolts; 2H/2HM/4/7 for nuts) and supplier's emblem. Studs/bolts of grade B7M and nuts of Gr 2HM shall have a line under the grade symbol.

ii. Punch/emboss serial number also in B7M studs/bolts and Gr 2HM nuts in addition to the above, to correlate with hardness. Protect the threaded ends with plastic end caps. Pack in wooden

box/ gunny bag of convenient size for easy handling and transportation. Mark quantity in each box/gunny bag.

iii. In addition to the above, studs / Bolts / Nuts for OFE applications shall marked with unique heat lot identification and followed by "20E1". Each piece 1 in. nominal diameter and larger shall be marked. For studs / Bolts / Nuts less than 1 in. nominal diameter, the studs / Bolts / Nuts shall be securely containerized to maintain heat lot identification and traceability. Multiple heat lots shall not be mixed in a single container. Containers used in the processing, storing, and shipping of studs / Bolts / Nuts not individually marked shall be clearly labeled with all marking information required by the relevant material specifications and API 20E *Ed 2017 Addendum 2.*

6.0 SPECIAL REQUIREMENTS:

i. CADMIUM PLATING:

a) Clean the fasteners to make them free from rust, grease, oil, scale, etc., before plating. When pickling is considered essential, it shall be done as per Cl 6 (v) of this TDC.
b) Apply Cadmium Plating to the specified thickness on specified areas. Thickness shall be measured on 5% of the PO quantity of fasteners.
c) After plating, bake the parts at 175^{0}C to 205^{0}C for a minimum period of 3 hours. The elapsed time between plating and baking shall not exceed 8 hours.
d) Apply a Chromate Conversion coating after plating and baking.

ii. ELECTROPLATING OF ZINC CHROMATE:

a) Clean the fasteners to make them free from rust, grease, oil, scale, etc., by suitable organic solvents/ hand tool methods before electroplating. Then, pickling shall be done as per Cl 6 (v) of this TDC.
b) The fasteners shall then be electroplated as per the method and to the minimum coating thickness specified in the applicable drawing. Thickness shall be measured on 5% of the PO quantity of fasteners.
c) All electroplated parts (regardless of strength level) shall be baked within 2 hours after plating at 375 °F–425 °F (191 °C–218 °C) for 8 hours minimum at temperature

iii. XYLAN COATING:

a) Clean the fasteners by blast cleaning to Sa2.5 to make them free from rust, grease, oil, scales, etc., before xylan coating.
b) The fasteners shall then be xylan coated as per the requirements and to the minimum coating thickness specified in the applicable drawing.
c) **Tests for Xylan Coating:**
The following test shall be carried out on Xylan coated fasteners and results to be reported in the Test certificate (in addition to the Test Certificate for the fastener material and other inspections requirements):

i) **Thickness measurement:**
Dry film thickness of Xylan coating to be measured using a magnetic induction or Eddy current type electronic gauge and the reading shall meet the drawing/PO requirement for thickness of coating of Xylan 1070. The thickness measurements shall be made in accordance with ASTM D7091-*20*. Thickness shall be measured on 5% of the PO quantity of fasteners.

ii) **Cure Test:**
This test method is for ensuring the completeness of cure of Xylan 1070 coating by evaluating the resistance of the cured coating to a solvent known to attack uncured film. The testing method shall be as per Whitford test method 115B (as recommended by the Xylan coating supplier).
Acceptance criteria: No white precipitate or stain shall be available after the test.

iii) **Adhesion Test using Cross-hatch and Cello Tape:**

Test as per ASTM D3359-*17* Method B for measuring Adhesion by Tape Test.
Acceptance Criteria: No loss of adhesion (5B Classification).

iv) **Salt Spray Test:**
Xylan coated fasteners should pass a minimum requirement of 500 hours of salt spray test as per ASTM B117-*19*. Certificate of compliance for meeting the salt spray test requirements shall be provided.

iv. RUST PREVENTIVE FLUIDS/COATING REQUIREMENTS:

a) Clean the fasteners to make them free from rust, grease, oil, scale, etc., by hand tool/ manual cleaning method.

b) Apply one coat of rust preventive fluid, of any of the following brands of the suppliers (Table 2), to obtain dry film thickness of 20 microns minimum:

Table 2. Rust Preventive Fluid/Coatings Brands

Sl No	Brand/Chemical	Supplier Name and Address
1	BONITA-RPF	M/s Bonita Chemicals, 64, Industrial Estate, Nunhai, Agra-282 006
2	CHAMPION-RPF	M/s Guardian Chemicals, 8, Rajaji IInd st, West Lake Area, Nungambakkam, Madras-600 034
3	ECONOL RPF (non-drying type)	M/s Process Aids, Bangalore
4	TECTYL 506	M/s Plastipeel Chemicals and Plastics (P) Ltd, Thane-400 604
5	TRPF	M/s Sundaram Paints Pvt. Ltd., Thanjavur-613 004
6	TRPF	M/s Solar Paints, Pudukkotai.
7	WICOR-P	M/s Western India Paint and Color Co P. Ltd, Madras-600 017

Use of any other brand/chemical shall be done with the prior approval of BHEL.

v. ACID PICKLING:

a) Wherever pickling done, it shall be done using Hydrochloric acid of 5-10% concentration for a period of 5 to 10 minutes at room temperature with suitable inhibitor.
b) After pickling thorough rinsing shall be carried out with water to remove acid residues & further DM water rinsing. After thorough rinsing with DM water, the rinsing shall not show any red color (free acidity) when tested with methyl orange indicator.

7.0 CERTIFICATION:

The manufacturer shall provide Test Certificates (TC) duly countersigned by the Authorized Inspecting Authority nominated by BHEL in P.O. (if specified) along with raw material TC from Steel Maker. *The applicable versions of the referred Codes, Standards and Specifications shall be reported in the Test Certificates and NDE reports.* Manufacturer's TC shall contain the following details as per the sample format attached as Annexure-1 to this TDC:

i. BHEL PO No & PO Date
ii. Technical Delivery Condition (TDC) No & its Revision No, Drawing & its revision no
iii. Melt/Heat No, Serial No (if applicable)
iv. Raw Material TC Number and Date
v. Chemical and Mechanical properties for Studs/Bolts and Nuts *including the location and orientation of test specimens*
vi. Heat treatment details (temperature, time, cooling medium, etc.)
vii. *NDE reports with NDE Personnel qualification records, all relevant NDE operating parameters and* NDE Results with reference and acceptance criteria
viii. Type of Surface coating & its coating thickness – Cadmium Plating, Chromate conversion coating, Electroplating, Xylan Coating, Rust preventive coating, etc.
ix. Test methods and results on Xylan Coating
x. Baking details for cadmium plating, electroplating & Xylan coating
xi. Manufacturers' identification mark
xii. Certify soundness & confirmation to PO requirements.

19/02/2021	19/2/21	19/2/21	19/2/21	19/02/2021
N Nagamuthu Pandian	P Arun kumar	S Lakshmi	A Wilfred Joseph	J V V Aruna Kumar
Manager/QA	DM / Valves Engg	DGM/QA	AGM / Valves/MM	SDGM / QA
Prepared By	**Reviewed By**			**Approved By**

Annexure-1. Test certificate for Studs/Bolts & Nuts– Sample format

TC No: Date:

Customer : PO No./ Amd :
TDC No./Rev.: DC No. :
Product : Drg. No./Rev :
Description : (Spec, dia, pitch, length) Thread Spec. :
Quantity :

Requirement : Records/ Observation
Size of bar - Before machining :
- After machining :
Type of furnace used for hardening :

TDC Clause no.										
	Raw Material mill TC No: TC Date: Melt/Heat Number: *Reduction Ratio:*									
2.0 & 3.0	**a) Heat Treatment Details:** Hardening Temperature: °C; Soaking time: Cooling Medium: Tempering Temperature: °C; Soaking time: Cooling Medium: **b) Additional Tempering for Nuts (after final tempering):** Temperature: °C; Soaking time: Cooling Medium:									
3.0	**a) Product analysis for chemistry**								**Report No & Date:**	
	Spec	C	Mn	P	S	Si	Cr	Mo	V	Ni	Others
	Min.										
	Max.										
	Actual										
	b) Tensile test after H & T and final drying (Finished heat treated condition) – **For Studs/Bolts**									
		UTS (MPa)			**YS (MPa)**			**%Elongation**		**%Red in Area**
	Reqd/Spec Value									
	Test result									
					Spec Value			**Test result**		**Remarks**
	c) Hardness Test Result (for Studs/Bolts, Nuts):									
	d) Hardness Test Result (for Nuts after 24 hrs of tempering):									
	e) Proof load (kN) for nuts & result									
	f) Result of Cone Stripping test for nuts									
	g) NDE Result for Studs/Bolts:									
4.0	Visual and dimensional checking as per applicable drawing for studs/bolts & nuts:									
5.0	Punching details (identification): End cap for threaded portion:									
6.0	**a) Type of coating:** Cadmium Plating /Chromate Conversion / Electroplating/ Xylan /Rust preventive coating **(Tick applicable coating)** **Coating thickness/DFT:**									
	b) Tests for Xylan Coating							**Results**		
	c) Pickling Acid: **Concentration:** Drying after pickling. Temperature: °C; Soaking time:									
This is to certify that the above results are correct and the parts meet specification and PO requirements.										

Signature with date
Supplier: In-charge of Quality

Signature with date
BHEL / Authorized Inspection Agency

Note: Additional Sheets may be attached, if required.