

 BHARAT HEAVY ELECTRICAL LIMITED BHOPAL	PI No/ Enquiry No. : 120902028
	Due Date :
	Spec No. : BPL/SCR/SWE/OLT/OLTC/PQR/006 Rev 00
	Supplier Qtn. No.:
	Date :

SPECIFICATION CUM COMPLIANCE CERTIFICATE OF HARD SILVER STRIP

1	NOTE:-				
a	The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Bidder and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.				
b	The offer and all documents enclosed with offer should be in English language only.				
c	Bidder must not be under category banned/ debarred/ hold from dealing by BHEL on tender due date.				
d	BHEL reserves the right to verify the information and documents furnished by bidder. In case the information is found to be false/ incorrect, the offer shall be rejected.				
e	The vendor meeting pre qualifying criteria as per clause 4 of this specification will be evaluated further.				
2.a	NAME & ADDRESS OF THE SUPPLIER :				
2.b	TELEPHONE NOS.:/ Mobile No.				
2.c	E-MAIL ADDRESS :				
3	SCOPE:				
	<u>SUPPLY OF HARD SILVER STRIP</u>				
SNO	Description of requirement	Bidder to specify/ confirm/ furnish	Offered Parameters	Deviations	Remarks
4	Part -A : Pre Qualifying Criteria				
a	Bidder should have supplied Silver Strips during last 7 years ending 31st March 2020 for industrial applications.	1. Bidder to provide Three(3) PO copies of value not less than Rs. twenty eight lakh each OR Two(2) PO copies of value not less than Rs. thirty five lakh each OR One(1) PO of value not less than Rs.Fifty Five lakh. Vendor has to furnish supporting documents to establish that the ordered material and qty has been supplied successfully.			PO date must be between 01/04/2013 and tender Due Date.
b	Bidder's average annual financial turnover during the last 3 years ending 31st March of 2019-2020 should be greater than Rs. Twenty lakh.	Bidder to provide ITCC Annual report for last 3 financial yrs. OR Balance sheet and profit and loss statement for last 3 financial yrs.			2017-18, 2018-19 and 2019-20 will be considered as last 3 years.
c	Qualified Man Power having minimum ITI degree required for incoming material inspection, assembly and testing.	Bidder to provide organisation chart having Name, Designation Technical qualification, Experience and Responsibility.			

Prepared By : *[Signature]*
16.06.2020

Approved By :

[Signature]
16/6/20

S K Prasad
DGM/SWE

[Signature]
16/6

S Bhattacharya
DGM/SWM

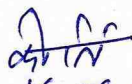
[Signature]
16/6/2020

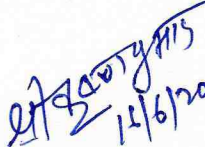
D. Katiyar
Sr. DGM / MWX

[Signature]
16/6/2020

P K Upadhyay
AGM-HOD/ SWE

SNO	Description of requirement	Bidder to specify/ confirm/ furnish	Offered Parameters	Deviations	Remarks
5	Part B: General Specification				
a	Bidder should have necessary testing facility to test parameters at point 3 & 4 of specification SG10027 Rev 02. In case of absence of test facility, bidder has to specify third party testing agency (NABL) for testing as per above clause.	Bidder to confirm / Specify			
b	Confirmation for BHEL visit to bidder's works and sub-vendor's works before accepting their offer to verify capability of bidder. Bidders' declaration/ information can be verified.	Bidder to confirm			
6	SPECIFICATION OF HARD SILVER STRIP				
a	Hard Silver Strip must be manufactured strictly as per drawing 5399921 Rev 05, 5399951 Rev 03 & 5399954 Rev 03 and specification SG10027 Rev 02	Bidder to confirm			
7	ACCEPTANCE CRITERIA OF HARD SILVER STRIP				
a	Bidder shall submit quality plans to BHEL for approval before delivery of bulk lot. However, it is sole responsibility of supplier to supply material as per our purchase order, specification and drawing within time agreed.	Bidder to confirm			
b	Dimensions & Material strictly as per drawing and specification.	Bidder to confirm			
c	Test report shall be submitted as per point 5 of specification SG 10027 Rev 02.	Bidder to confirm			
8	INSPECTION				
a	Testing at BHEL Lab as per clause 3 and 4 of SG10027 on 3 nos samples randomly selected from supplied lots. The test results of BHEL will be final and supercede any other test results being done by party at its works/ 3rd party.	Bidder to confirm			
b	Dimension verification at BHEL.	Bidder to confirm			

Prepared By: 
16.06.2020


16/6/20

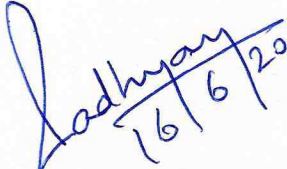
S K Prasad
DGM/SWE


16/6

S Bhattacharya
DGM/SWM


16/6/2020

D. Katiyar
Sr. DGM / MWX


16/6/20

P K Upadhyay
AGM-HOD/ SWE

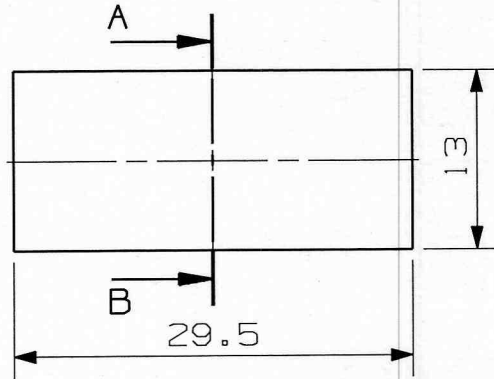
18

FIRST ANGLE PROJECTION

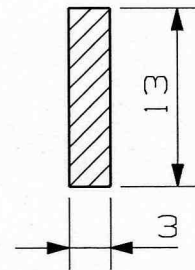
(ALL DIMENSIONS ARE IN MM.)

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETERMENTAL TO THE INTEREST OF THE COMPANY

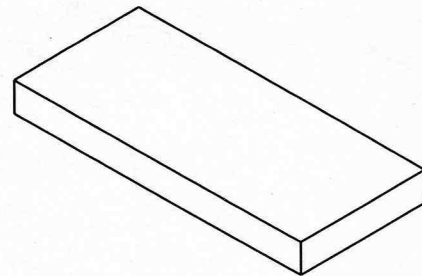
REV.	DATE	ALTERED	REV.	DATE	ALTERED	DAuto	ADDITIONAL INFORMATION
		CHECKED	05	23.06.11	CHECKED	K.S	
		APPROVED			APPROVED	S.K.P	
			DRAWING REDRAWN IN UG			STATUS OF DRAWING	
						DISTRIBUTION OF PRINTS	SWE SWM TCX
						1	3 1



FRONT VIEW



SECTION A-B



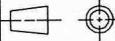
ISO VIEW

MAX PERMISSIBLE WEIGHT OF SILVER FOR PVC CALCULATION
AS PER TOLERANCES GIVEN IN IS2102 = 0.01194kg



SIGN. AND DATE 5399921-R04-S01 INVENTORY NO. REF.DRG.NO.

REMARKS	ITEM NO.	DESCRIPTION	STD.	MATERIAL CODE	MATERIAL SPECN.	UNIT	UNIT WT.
	001	3TK.X13X29.5 LG HARD SILVER STRIP		SG.10027		KG	0.012
							001

बी एच ई एल  BHARAT HEAVY ELECTRICALS LTD. BHOPAL		DRN. CKD. APPD		NAME	SIGN.	DATE	NO. OF VAR	
				S.D.W	Sd/-	04.03.80		
				B.S.R	Sd/-	04.03.80		
				N.N.S	Sd/-	05.03.80		
DPT. SWE	UNTOL. DMS.GR.		SCALE	WEIGHT (K.G.)	REF. TO ASSY.DRG.		ITEM NO.	NO. OF ITEM
CODE 409	M AA0230208		2:1		5015683		-	
TITLE HARD SILVER STRIP (ON LOAD TAP CHANGER)					DRAWING NO.			REV.
					5399921			
					SHT NO.	NO. OF SHT		01



BHARAT HEAVY ELECTRICALS LTD.
BHOPAL

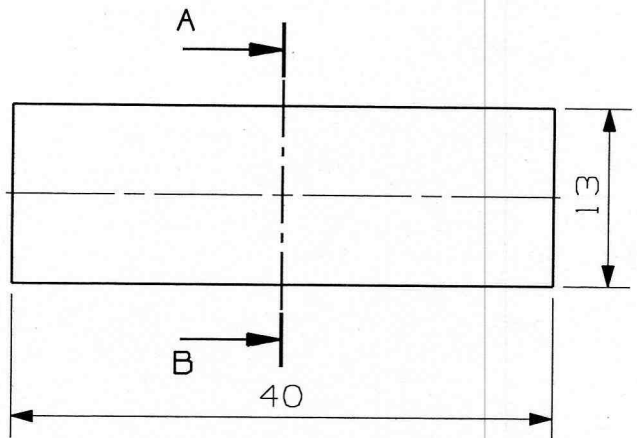
14

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETERMENTAL TO THE INTEREST OF THE COMPANY

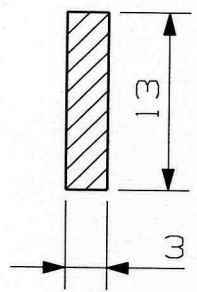
SIGN. AND DATE INVENTORY NO. 5399951-R02-S01 REF.DRG.NO.

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM.)

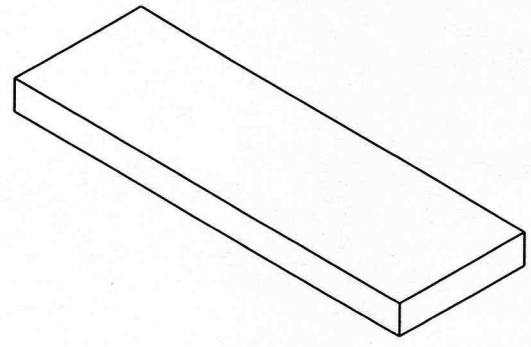
REV.	DATE	ALTERED	REV.	DATE	ALTERED	D Auto	ADDITIONAL INFORMATION
		CHECKED			CHECKED		
		APPROVED			APPROVED		
			03	07.06.11		K.S	
						S.K.P	
			DRAWING REDRAWN IN UG			STATUS OF DRAWING	
						DISTRIBUTION OF PRINTS	SWE 1
							SWM 3
							TCX 1



FRONT VIEW



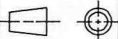
SECTION A-B



ISO VIEW

MAX PERMISSIBLE WEIGHT OF SILVER FOR PVC CALCULATION AS PER TOLERANCES GIVEN IN IS2102 = 0.01618kg



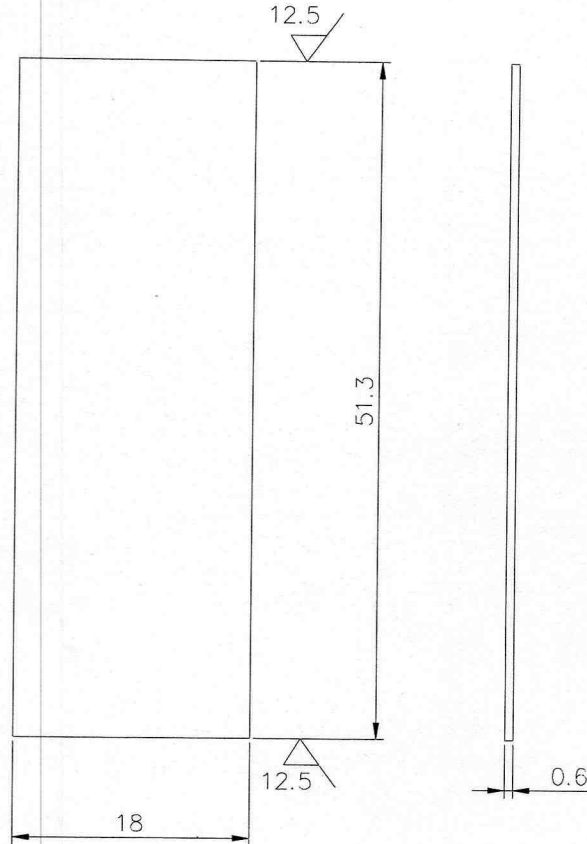
		001	3TK.X13X40 LG HARD SILVER STRIP			SG.10027			KG	0.0162 001	
REMARKS	ITEM NO.		DESCRIPTION	STD.	MATL CODE		A/C	UNIT	UNIT WT.		
					MATL.SPECN.				QTY.		
	BHARAT HEAVY ELECTRICALS LTD. BHOPAL			DRN.	NAME	SIGN.	DATE	NO.OF VAR --			
					S.D.W	Sd/-	15.07.80				
				CKD.	B.S.R	Sd/-	16.07.80				
				APPD	R.K.S	Sd/-	16.07.80				
DPT. SWE	UNTOL. DMS.GR.		SCALE	WEIGHT (K.G.)	REF.TO ASSY.DRG.		ITEM NO.	NO.OF ITEM 001			
CODE 409	M AA0230208		2:1		5015667,5015686		-				
TITLE HARD SILVER STRIP (ON LOAD TAP CHANGER)					DRAWING NO. 5399951				REV. 03		
					SHT NO.		NO. OF SHT 01				

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

REV. 03	DATE 03.12.07	ALTERED AKU CHECKED SKP APPROVED SK	REV. 02	DATE 03.12.07	ALTERED AKU CHECKED SKP APPROVED SK	ADDITIONAL INFORMATION
Weight of Silver Added (DCA 27110)			DRAWING REDRAWN MAT. SPECN. TABLE DELETED & SG.10027 ADDED. (DCA 23030)			STATUS OF DRAWING
						DISTRIBUTION OF PRINTS
						SWE 1
						SWM 3
						TCX 1



Max permissible weight of Silver For PVC Calculation
as per tolerances given in IS2102 = 0.00611 kg

✓ 12.5 (✓)

REF. DRG. NO.	001	0.6TK.X18X51.3 LG. HARD SILVER STRIP	SG.10027	0.0058
	REMARKS	ITEM NO.	DESCRIPTION	UNIT WT.
			MATL. CODE	QTY.
			MATL. SPCN.	
SIGN. & DATE	28 → CARD TYPE-3	28 → CARD TYPE-1	28 → CARD TYPE-2	
			नाम NAME कसया DRN S.D.W जीचा CKD B.S.R अनुमोदित APPD N.N.S	हस्ता. SIGN Sd/- Sd/- Sd/-
	भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल BHARAT HEAVY ELECTRICALS LTD. BHOPAL		दिनांक DATE 04.03.80 04.03.80 05.03.80	वे. र. की संख्या NO. OF VAR. - -
	विभाग DEPT SVE कोड CODE 409	अन. टल. नाम की श्रेणी UNTO.DIMS. GR. M AA 0230208	अनुपात SCALE 2:1	भार कि.ग्रा. WEIGHT (K.G.) 5016780
INVENTORY NO.	शीर्षक/TITLE HARD SILVER STRIP (ON LOAD TAP CHANGER)		आरेख क्र./DRAWING NO. 5399954	
			पृष्ठ क्र./SHT. No. 01	

पृष्ठों की संख्या/NO. OF SHT. 01

12

			PRODUCT STANDARD SWITCHGEAR ENGINEERING DIVISION		SG 10027 Rev 02		
					PAGE 1 OF 2		
		<u>SPECIFICATION FOR HARD SILVER STRIP AgCu3</u> <u>PART NO : 5399921, 5399922, 5399951, 5399954</u>					
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited It must not be used directly or indirectly in any way detrimental to interest of Co.		1. <u>Introduction</u> : - Silver possesses the highest electrical and thermal conductivity, low contact resistance, very good deformability and is characterized by good brazability and weldability. Silver as contact material satisfies the requirements only in a narrow range of electrical applications. Alloying of silver with palladium improves the resistance against both the electric wear and corrosion. Alloying of silver with copper and nickel in low concentrations increases the mechanical hardness and the resistance against electrical wear, but without reducing the electrical conductivity and increasing contact resistance essentially. Finally, silver with alloying additives like manganese and nickel are the basis for dispersion hardened alloys. It has following properties : ○ Highest electrical and thermal conductivity ○ Oxidation residues ○ Sulfide formation ○ Tendency of material migration ○ Very good formability ○ Similar to Ag, however wear resistance higher ○ Low welding tendency for peak currents up to 100 A ○ Anti-welding properties on make worse than AgNi ○ Greater contact resistance for AgCu than for Fg-Ag; resistance rises as Cu content increases ○ Very good brazeability and weldability					
		2. <u>Application</u> : - This material is used as Contact Material in OLTCs.					
REV 02: 4.iii conductivity was 57 m/ohm mm ² (Min).		REV.	02	PRINTS TO :-		APPROVED – R.K.SHUKLA	
		ALTD.	SKP	SWE(D) QCX SWM	PREPARED	ISSUED	DATE
		APPD.	AKI		AKI	APS	11.04.02
		DATE.	10.1.2011				

11

			PRODUCT STANDARD SWITCHGEAR ENGINEERING DIVISION	SG 10027 Rev 02
		3. <u>CHEMICAL COMPOSITION :-</u> The material should have chemical composition as :- Ag - 97 % Min Cu - 3 % Max		
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited It must not be used directly or indirectly in any way detrimental to interest of Co.		4. <u>PHYSICAL PROPERTIES :-</u> (i) Density - 10.4 gm / cc $\pm$ 2 % (ii) Hardness - 85 HB $\pm$ 5 % (iii) Conductivity - 51 M/ohm mm ² (Min). 5. <u>ACCEPTANCE CRITERIA :-</u> <u>APPROVED SOURCE :-</u> (i) Chemical composition & hardness test on components at BHEL. (ii) Supplier's test certificate for chemical & physical properties as per para 3 & 4. <u>NEW SOURCE :-</u> (i) All the chemicals & physical properties mentioned in cl 3 & 4 to be tested at BHEL on 3 nos components. (ii) Supplier's test certificate for chemical & physical properties as per cl 3 & 4.		